

DINOSAUR RIDGE



Meet the newest additions to
the Dinosaur Ridge Family

Ridge Report – Fall 2009

Friends of Dinosaur Ridge
16831 W Alameda Pkwy
Morrison, CO 80465
Phone: 303-697-3466
Web: www.dinoridge.org

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 geological, prehistoric, and natural features.

Major Contributors:

- * Rocky Mtn. Assoc. of Geologists
- * Denver Gem & Mineral Council
- * Jeffco Conservation Trust Funds
- * Scientific & Cultural Facilities District (SCFD)
- * Golden Civic Foundation
- * Dan & Mac Turner Estates
- * Colorado Geologic Survey
- * Xcel Energy Foundation



FRIENDS OF DINOSAUR RIDGE 2009

Officers:

President	Sam Bartlett	Bureau of Recl. (Ret.)
Vice-President	Kathleen McCoy	Lawyer
Secretary	Beth Simmons	MSCD Geo. Instructor
Treasurer	Keith Meakins	Accountant

Executive Committee Members:

Norb Cygan	Geologist
Kathleen McCoy	Lawyer
Pete Martin	U.S. Bureau of Reclamation
Betty Rall	Geologist

Board of Directors:

Marsha Barber	Science Coordinator Jeffco Schools (Ret.)
Tim Connors	National Park Service
Harald Drewes	Geologist
DuWayne Ebertowski	Federal Highway Admin (Ret.)
John Ghist	Earth Science Teacher
Bob Higgins	National Park Service (Ret.)
John Kelly	Geologist
Jan Jacobs	Technical Editor
Martin Lockley	University of Colorado, Denver
Marj MacLachlan	Geologist
Judy Peterson	Paleo-artist
Robert Reynolds	Denver Museum of Nature and Science
Kermit Shields	Geologist
Beth Simmons	Metro State College
Andrew Taylor	Metro State College
Lou Taylor	Consulting Geologist
Bruce Wyre	Management Consultant

Committee Chairs:

Sub Committee Chairs:

Beth Simmons

Martin Lockley
 Lou Taylor
 Clare Marshall
 Tom Moglestad

Kermit Shields

Erin Fair
 Tom Moglestad

Bruce Wyre

Pete Martin
 Joe Tempel
 Robert Reynolds
 Keith Meakins

Sam Bartlett

Tom Moglestad

Committees:

Sub Committees:

Education

Publications
 Curation
 Exhibits
 Events & Tours

Volunteers

Membership
 Community Outreach

Finance

Budget
 Fundraising
 Investments

Accounting

Preservation

Marketing

Staff - Friends of Dinosaur Ridge:

Executive Director	Joe Tempel
Programs & Operations Director	Tom Moglestad
Education Programs Assistant	Erin Fair
Visitor Center Manager	Roger Bennett
Visitor Center Assistant	Jack Davidson
Visitor Center Assistant	Barbara Davidson
VC Assistant and Computer Tech	Brian Davidson
Driver/Docent	Bobbi Kilgore
Driver/Docent	Clare Marshall
Driver	Ted Gildea
Driver	Sue Kaberline
Driver	Dan Fanelli

TABLE OF CONTENTS

4. **President's Message**
5. **Executive Director's Report**
5. **Gift Shop News**
6. **Program Director's Report**
8. **Preservation Committee Report**
9. **Volunteer Corner**
9. **Education Committee Report**
10. **"The Legacy of Arthur Lakes"**
11. **The Bernissart Iguanodons**
12. **"Rocks & Minerals" To Showcase Arthur Lakes**
12. **Dinosaur Ridge Calendar of Events**
13. **Tracking New Evidence of Vertebrate Life In Ancient Golden**

Cover Photo: Picture of two Red Tailed Hawk babies at the Hawk's Nest Site (see article on page 14)



MANAGEMENT REPORTS

PRESIDENT'S MESSAGE

I am proud and honored to be your new president. I hope that I can live up to the record that has been set by all of the past presidents of the Friends of Dinosaur Ridge and meet the expectations of the members of the Friends of Dinosaur Ridge.

Since becoming president, I have been reminded several times by both members and visitors and have observed first hand for myself that Dinosaur Ridge is a world class destination. Through the hard work of the members, the volunteers, the staff and the Board of Directors, we will continue to improve and keep that distinction during the coming years.

One of the burdens of achieving world class status is conducting our operations on a professional and business-like manner. Over the years, Dinosaur Ridge has been operated as essentially an all volunteer organization valuing individuality, friendliness, personal initiative and pride of ownership. The trick in coming years will be to further our business development while maintaining the individuality, friendliness, initiative and pride of ownership that have made Dinosaur Ridge such a great place to be a part of and to spend our spare time. Each time that I talk to a new acquaintance, I can feel the pride of being a member of the Friends of Dinosaur Ridge and express my enthusiasm for this unique place on earth.

To improve our status as a world class destination we will need to continually improve our business practices and operate in a professional and corporate manner. In our recent endeavors to raise funds for the track site cover, we have become especially aware that we must tweak our business practices and present ourselves professionally in order to gain the respect and funding from potential corporate donors.

One of the current business practices that Joe is working on to raise us to the next level is a Safety Policy and Procedures initiative. With the closing of Dinosaur Ridge to unauthorized vehicles last year we have significantly changed our business operations by purchasing a new electric bus and hiring drivers/guides to operate the gas Vanosaurus and the electric

“Cartosaurus.” Thus, we need a safety policy and plan to keep the visitors and van drivers aware and safe on the Ridge.

Having been a construction inspector in a former life, I had the opportunity of being the safety officer for many projects as well as being responsible for the safety of the employees working under my supervision. Having seen the results of unsafe practices and attitudes and the results of ignoring safety procedures, I have taken my safety responsibilities very seriously and feel the same way towards the safety of the visitors, volunteers and staff at Dinosaur Ridge. I hope that we can all realize the importance of doing our tasks safely and work in an enjoyable and accident-free environment.

If you have any observations or suggestions for making Dinosaur Ridge a safer place to visit, volunteer or work, please contact Joe Tempel or me. Remember that safety is everyone's responsibility and that we are all in this together.

-SAM BARTLETT



“Cartosaurus” as seen on channel 4 news

MANAGEMENT REPORTS

EXECUTIVE DIRECTOR'S REPORT

Fundraising

We have received funds from the following sources since the last *Ridge Report*:

- Rocky Mountain Association of Geologists Foundation -- \$2,000 for Interpretive Signs
- MDU Foundation -- \$10,000 for final design of the Track Structure
- Leonard Rice Engineering -- \$200 (unrestricted)

We are awaiting bids from three consultants to help us raise \$2 million for the Track Structure. These bids should be received by August 1, 2009, and we will select a consultant by the middle of the month. We will apply for funds from the Harvey Family Foundation to pay for the consultant.

The total cost for purchasing, shipping and installing the two life-size dinosaur replicas will be approximately \$20,500. We anticipate delivery of these dinosaurs in October. We will seek \$4,500 from the MDU Foundation to help us purchase the replicas. Board member Marj MacLachan has pledged \$10,000 to the project. We have also requested \$3,000 from the Western Interior Paleontological Society (WIPS), and should be receiving \$3,000 from the Scientific and Cultural Facilities District (SCFD) in October.

GIFT SHOP NEWS

Summertime in the Gift Shop was busy. We had record sales in the month of July! (What economic slowdown?) With Roger out of town for most of the month, the whole staff pitched in to help keep things rolling. Thanks especially to Tom and Erin for taking time out of their schedules to stock, order and do many of those "Roger" duties. Among the new items in the shop are the new biography of Arthur Lakes by Beth Simmons and Kathleen Honda, additional Carnegie collection dinosaurs, and many new mineral specimens. Come in for a visit!

-BOBBI KILGORE

Future Projects on Dinosaur Ridge

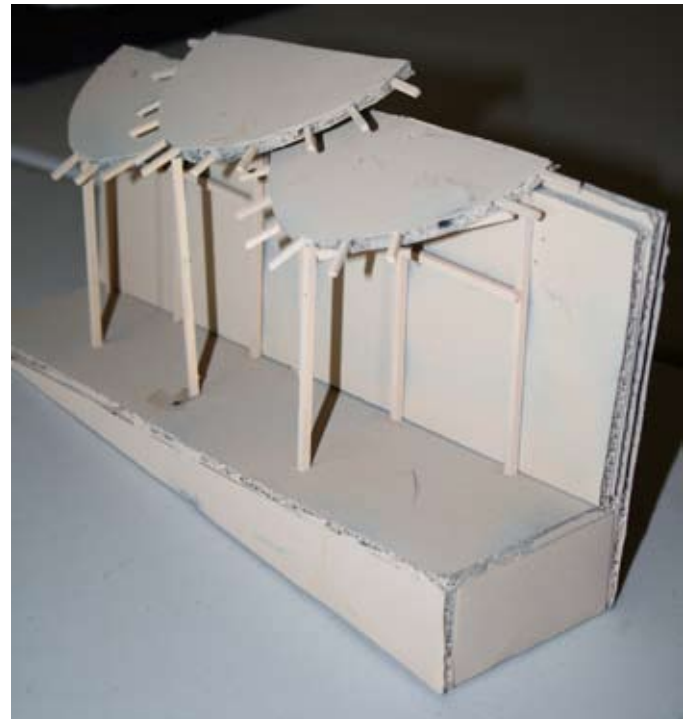
We are still awaiting approval from Jefferson County to improve Dinosaur Ridge by constructing:

- Structure over Dinosaur Track Site on the east side of the Ridge
- Parking lots on both sides of the Ridge
- Interpretive kiosks on both sides of the Ridge
- Picnic structure at the top of the curve
- Port-a-Potty enclosure on the east side of the Ridge

Future Project along Triceratops Trail

We will construct a roof over the sandstone wall containing the palm frond impressions and bird tracks in November. This 45'-long structure should minimize the adverse affects of rain and snow on the wall. We have received a commitment of \$30,000 from the Jefferson County Conservation Trust Fund for this project and will be requesting additional funds from the Golden Civic Foundation.

-JOE TEMPEL



MANAGEMENT REPORTS

PROGRAM DIRECTOR'S REPORT 2009, 1st Half Visitation, Attendance and Sales

Program	2008 1st Half	2009 1st Half	Change
Visitors to Visitor Center	20,076	23,697	+18%
Tours (Total Attend.)*	4,555	11,563	+154%
Trek Through Time	-----	8,984	~
Chats, Hikes, Field Trips	129	176	+36%
Traveling Exhibit Visitors	8,000	1,000	-88%
Dino Discovery Days (3)	3,150	2,650	-16%
Triceratops Trail Day	0	100	~
Sales (\$)***	61,432	92,813	+51%

* includes guided school tours, shuttle bus tours and school outreach

** includes receipts from Gift Shop, Shuttle Bus, and Trek Through Time

Visitations, attendance and sales continued to increase significantly in the second quarter. June visitations set a new record for that month. June visitations set a new record for that month. April school tour attendance was an all-time high with 1761 students, followed closely by 1737 for May, even though May has many schools letting out well before month's end.

First Three Dinosaur Discovery Days Successful

DDD-BSA (Boy Scout Day), sponsored by the Rocky Mountain Association of Geologists and the Boy Scouts of America on May 2, was successful despite temperatures in the 40s and the slight on and off drizzle. Nonetheless, about 1500 scouts and family members attended. Thanks go to participating organizations, including Pioneer Natural Resources, Solsource, National Speleological Society, Colorado Groundwater, Rocky Mountain Bird Observatory, Colorado School of Mines Geology Museum, and the Lookout Mountain Nature Center. Thanks to all the volunteers for making such an educational experience possible. Photos from this event were featured in the previous Ridge Report.

DDD-GED (Geocache and Earthcache Day) on June 13 under a heavy cloud cover, but the rain held off until after the event. A crowd of 650 set a record for June. Thanks to Dave McCullough for organizing an Earthcache tutorial. Several earthcachers posted very appreciative and complimentary comments on www.geocaching.com. Thanks to event sponsor, Andrews and Anderson Architects, PC, and to the Morrison Natural History Museum for participating. Thanks to

Holly Tempel and the Stegosaurus Snack Shack for feeding the volunteers and many thanks to the volunteers.

DDD-BYF (Bring Your own Fossil) on July 11 had a warm day with an outstanding turnout of our volunteers. About 500 visitors attended; 400 of them took the Ridge Trail. Thanks to the event sponsors, Bandimere Speedway and the Fort Restaurant. Sieving for fossils and recovering them with tweezers was a big hit with the kids. Thanks to Erika Sueker with the Golden Independent School for facilitating the dig area and for hosting several dinosaur story times for younger visitors. Morrison Natural History Museum helped at the Bone Quarry, the Deep Time Players gave puppet shows at the visitor center, and the Lookout Mountain Nature Center facilitated the ecology site. Thanks to all who helped!

Visitors Evaluate Trek Through Time

Chaired by board member Marsha Barber, the Evaluations Committee, a subcommittee of the Exhibits Committee, released preliminary results from questionnaires given to about a dozen visitors in the Exhibit Hall. All visitors when asked, "What did you learn at the hands-on exhibit?" responded positively. One reviewer commented, "Excellent information: time spent with the staff was especially helpful." When asked if anything was confusing about the exhibits [on the touchcars] all respondents said, "No." One person went on to write, "All [touch cart exhibits] were especially well presented for easy understanding."

MANAGEMENT REPORTS

When asked for any additional comments, one visitor wrote, “This exhibit has done a great job of making the information accessible to a wide range of abilities. The hands-on is the best!” Respondents ranged in age from five to 72 years old. Based on one comment, the committee will look to improve on the selection of rock specimens at the microscope table and possibly try to improve the substrate at the track making experiments. Thanks to education assistant Erin Fair for doing an excellent job designing and building the touch cart exhibits on short notice in time for the busy summer season.

Two Shuttle Buses Better Than One

After the new electric golf cart/shuttle bus was delivered, field tested, deemed street legal and finally officially inspected for compliance with PUC regulations, it went into service, joining the Vanosaurus on Friday, June 5. Together they hauled 115 passengers that day. On June 16 we started a seven-day-a-week schedule that will probably last until either late August or Labor Day weekend. After that the two-bus schedule probably will continue on weekends into the fall. On weekends this summer both buses have been running at capacity. In June the buses carried 2994 visitors up Dinosaur Ridge as part of short guided tours currently being offered.

The Friends of Dinosaur Ridge is doing its part to fight the national recession by creating jobs. One full-time and four part-time driver/guides rotate shifts on the buses covering a total of about 100 hours a week.

New Web Site is on its Way.

There have been so many changes at Dinosaur Ridge in the last year that it was decided to create an entirely new web site. Consultant Brian LaCount has designed an excellent layout, and staff and volunteers are busy writing text for him to use. Brian is concentrating on making the new web site attractive and user friendly. Brian is also responsible for the new look of the *Ridge Report*, available by snail mail or email.

Remember to contact Erin by snail mail or at tours@dinoridge.org in order to either request snail mail delivery or email service for the *Ridge Report*. She will need either your most recent physical address or latest email address.

Bear Essentials

Bus driver/Guide Ted Gildea arrived at the Visitor Center on Sunday morning July 25 to find four of five trash cans overturned and the bird feeder ripped from its moorings. Further investigation turned up a hole in the perimeter fence and a calling card—bear scat in the parking lot. Ted thinks we were visited by a fairly large bear because of the size of the wire it broke on the bird feeder. For the time being, staff is emptying the trash cans into the dumpster at closing in order to discourage further visitation



Mountain Lion Essentials

On the evening of Sunday, August 2nd, a 200 lb. doe was taken down by a mountain lion and its carcass was left along Alameda near the Western Interior Seaway sign on the east side of the Ridge. It looked like the lion had only had one meal of “prime rib” because there was a big hole in the side of the deer. Joe Tempel dragged the carcass down the side of the hill and checked a couple days later. There was further evidence the mountain lion had come back for another meal. On the Sunday evening news, August 9th, there was a piece about a mountain lion that was tranquilized at Colfax and the north end of Dinosaur Ridge. It was probably the same animal. Hopefully, it has been relocated and living a long distance away from the Ridge.

-TOM MOKLESTAD

COMMITTEE REPORTS

PPRESERVATION COMMITTEE REPORT

In spite of all the snow and rain that we have had this spring, Mother Nature has been much kinder to us on the Ridge this year, compared with last year. The last large snowmelt in April caused continued down-slope movement of large rocks and boulders. Apparently the rate at which the snow melted resulted in large amounts of water flowing down the slopes, creating new water courses, enlarging existing ones and causing numerous rock falls. The features on Dinosaur Ridge did not suffer serious damage. However some new block falls have been noted under the bulge overhangs, in spite of the work the Yenter Companies, Inc. completed last year. It remains uncertain that the snow melt caused the rock blocks to fall, but one of the major water courses lies directly over the fallen rock blocks and some seepage down the under face of the rock probably occurred.

The Lakewood road crews quickly moved the rocks and boulders from the roadways and things returned to normal. Also, as a result of the heavy rain storms, sand and gravel periodically covered the bottom of the hill roadways on both sides of the Ridge. Again, the Lakewood road crews showed up promptly and swept this material to the side, making the surface safe for pedestrians and bicyclists. There is at least one culvert, drop-box on the east side of the Ridge that has become clogged with debris and needs to be cleaned out to ease the problem of excessive loose

sand and gravel on the roadways.

After each heavy rain, the bulges and bone site sidewalks became mud holes. The City of Lakewood cleaned off the sidewalks between the two sites and Ted Gildea and Bobbie Kilgore worked diligently to keep the walkways clean at the bulges and bone sites. Thanks Bobbi and Ted for a job well done.

Due to the potentially unstable rock slopes between the two fault planes and the continually falling loose rock on the north rock face at the top of the hill, we are planning to install a split-rail fence around the curve of the road to keep visitors away from these areas and off the rock slopes.

The Track Site cover has been the primary focus of the Preservation Committee this year. A fundraising committee of Joe Tempel, Marsha Barber and Bruce Wyre, along with our fundraising expert Al Geyer has been formed to raise the monies necessary to construct the Track Site cover and maintain it over its lifetime. We have come up with a list of potential donors and a plan to approach these potential donors for pledges.

The design for the tracksite cover has been completed and a construction cost estimate has been completed with input from the general contractor and all of the specialty contractors. One of the holdups of the final design has been the exterior roofing material. Architect Dan O'Brien, after exhaustive searching, has found a durable heavy-duty, translucent material that should meet

our requirements of durability, water proofing and at the same time diffuse the sunlight for even illumination of the tracks, since there will be no electricity in the building at the start.

Tim Connors and Kermit Shields with additional help from Morgan Grey and Dan Fanelli, continue to highlight the tracks with charcoal prior to Dinosaur Discovery Days. Thanks to them for keeping the tracks visible for our visitors to enjoy.

The Adopt-a-Track program is still running strongly and 103 tracks have been adopted so far. There are still a few tracks up for adoption, so please consider adopting an orphan track to help us in the preservation efforts on the Ridge.

In addition to causing havoc on the Ridge, the great snow storm in April also wreaked havoc at Triceratops Trail. The Hadrosaur pit flooded with a messy mixture of mud and water. John Ghist's quick action in cleaning up the mess prevented any hardships or wet feet for our visitors. Thanks John!

We are waiting on a design by Yenter Companies, Inc. for a cover at the palm frond site. Hopefully, the design will be completed by fall, and construction accomplished by winter. This cover should protect the palm frond wall from the devastating effects that continue to degrade the fossils at an accelerated rate.

-SAM BARTLETT

COMMITTEE REPORTS

VOLUNTEER CORNER

The Friends of Dinosaur Ridge could not operate without the large number of volunteers that help with everything from guided tours to Dinosaur Discovery Days to working in the exhibit hall to making casts to cleaning up around the Ridge. Thanks to all of you who make this place work!

The volunteer Committee wants to provide all of the help necessary to make your volunteer jobs successful and rewarding. Please note that our dino-library on the second floor of the Visitor Center has lots of good paleontology and geology literature that you will find interesting and helpful. One-page articles in the series “Mesozoic Moments” (MeMo) can be found in the notebook in the volunteer office. These articles provide information about many aspects of the Ridge. If you have not spent time in the Exhibit Hall or taken a tour on the Shuttle Bus, we encourage you to do this.

FODR volunteers have a great variety of knowledge and backgrounds. Please continue to give us ideas about how we can provide a better learning environment for our guests. Also, suggestions about better ways to preserve the tracks, bones and environment at Dinosaur Ridge (and Triceratops Trail) are always welcome. Remember, the objectives of the Friends of Dinosaur Ridge are to 1) protect and preserve this unique environment and 2) use Dinosaur Ridge as an educational opportunity to teach about paleontology, geology and other sciences, while at the same time getting today’s kids away from their computers and cable TV in order to experience the outdoors.

We continue to hear great comments about the volunteers (and staff, too!) who help and teach our guests. Dinosaur Ridge is a great place to start with, and you all make it much, much greater. Thanks!

-KERMIT SHIELDS

EDUCATION COMMITTEE REPORT

The following schedule of fall educational events sponsored by FODR is tentative (except for Rock Out for the Ridge). Check the FODR web site and future Ridge Reports for changes.

The theme for 2009-2010 is “A Jurassic Journey.”

Come on a Jurassic hike this year!!! Hear the experts talk about the Jurassic Morrison formation.

October 3, 2009 – “Jurassic Jaunt” -- Dr. Karen Houck, UCD Trackers Group. Walk from the Stegosaurus parking lot along the Morrison formation exposed in the south I-70 Road cut. Read Karen’s article in the Mountain Geologist (2001, vol. 38, no. 3) and Drs. L. W. LeRoy and Robert Weimer’s guide to the I-70 Road Cut (1971) and visit www.geocities.com/jghist/Roadcuts/roadcut_4.htm. Bring them along as field guidebooks. Time to be announced.

October 28, 2009 -- Fireside Chat -- “The Old/New Dinosaur of Garden of the Gods” -- Kathy Brill, DMNS Volunteer researcher, WIPS member, and author. Chevron Classroom, 7:00 p.m.

November 6, 2009 - Rock Out for the Ridge --. Annual FODR Fund Raising banquet and silent auction. Keynote Speaker, Dr. John Foster, Museum of Western Colorado and author of Jurassic West: The Dinosaurs of the Morrison Formation and Their World, will present “Jurassic Journey - a Hike from the Sundance Seaway to Pikes Peak!” Red Rocks Visitor Center, 6-10 p.m.

Jan. 27, 2010 -- Fireside Chat -- “The Environment of the Morrison Formation” --Dr. Christine Turner, USGS. Chevron Classroom, 7:00 p. m.

-BETH SIMMONS

ARTICLES

“THE LEGACY OF ARTHUR LAKES”

Newest FODR Book Introduced

The Friends of Dinosaur Ridge premiered their newest (and largest) publication to date on Thursday evening, May 28th. Over 60 persons attended the grand signing celebration for Katherine Honda and Beth Simmons' "The Legacy of Arthur Lakes." Following a brief presentation about the book and its creation, John Ghist demonstrated the use of the CD-ROM that accompanies each book, and contains most of Lakes' works organized by topic, publication date, or location. The majority of the contributing authors, those FODR experts in Lakes' fields who edited chapters in the book, were available to sign books. These notables included Dr. Robert Weimer, Sally White, Dr. Martin Lockley, Dr. Vince Matthews, Dr. Robert Reynolds, Judy Peterson, Dr. Peter Modreski, Dr. Jack Murphy, and Kermit Shields. Dr. Louis Taylor, Dr. Bruce Geller, and Dr. Kenneth Carpenter provided "testimonials" for the back cover. Gary Raham, graphics designer, made the book into a beautiful publication, which Mike Bjarko, Ink & Scribe Printing in LaPorte, Colorado, put to the press. Bill Schneider of Vestige Press in Wellington, Colorado, duplicated the CD-ROMs, which Doris Meakins and Beth Simmons taped into the books. All of these people, plus many more, played a role in creating a publication that should become the standard reference about Arthur



ARTICLES

THE BERNISSART IGUANODONS

While Arthur Lakes and his crew were digging in their quarries in Morrison, what was happening in the rest of the world? This article, written seventeen years after Iguanodons were found in Belgium, tells what types of plants and animals were resurrected from the Jurassic Wealdon Shales in 1878.

Mesozoic Reptiles

Colliery Engineer and Metal Miner,
September 1895, p. 38

The following is taken from the Black Diamond: "One of the most remarkable finds made in our time was the discovery in 1878, of a herd of twenty-five gigantic land reptiles, called "Iguanodon" which had been accidentally drowned in an ancient river gorge, cut by a stream through several hundred feet of coal measure strata, forming in Jurassic times, one of the lesser valleys of Belgium, which was at that remote time a land surface, as it is to-day, but covered then with cycads and tree-ferns and other semi-tropical plants of the Wealden period.

The river was well stocked with fish having boy enameled scales, like the American bony-pike, whilst the banks of the river formed the home of lizards, crocodiles, water tortoises and huge iguanodons.

Thick vegetation of ferns and other plants clothed the marshy margins of the stream, and in times of floods, which were not infrequent, the giant Iguanodons with the plants they fed on, together with many reptiles and fishes of the stream, were all entombed in a common grave and covered up with deposits of fine mud left by the river. In process of time the valley was quite filled up with sediment, and in modern days, when coal pits had been sunk at Bernissart, between Mons

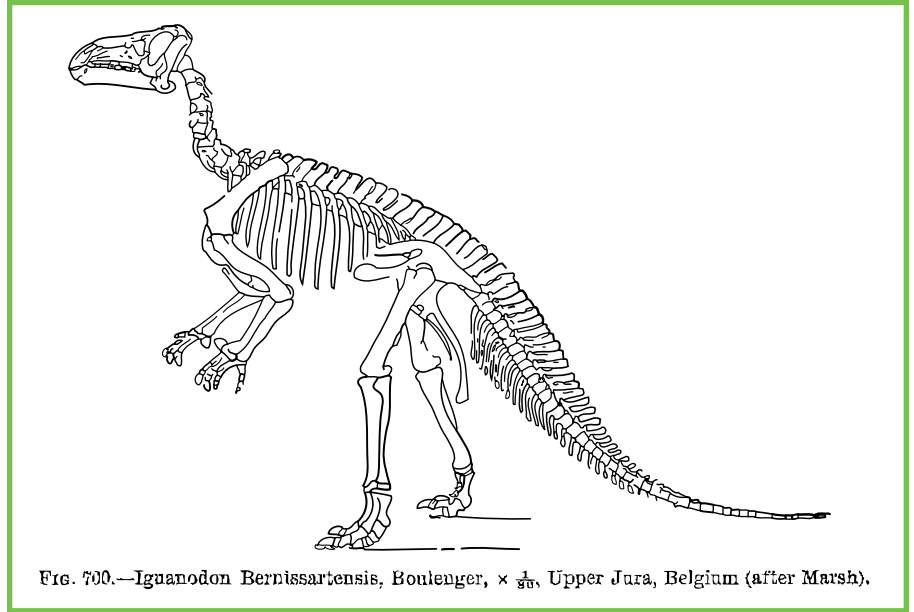


FIG. 700.—Iguanodon Bernissartensis, Boulenger, $\times \frac{1}{16}$, Upper Jura, Belgium (after Marsh).

and Tournay, near the French frontier, the old Wealden or Jurassic valley, was re-discovered at more than 1000 feet beneath the present surface of the ground.

At one spot instead of workable coal, the mine galleries traversed for 400 feet only barren ground, composed of chalk and green sand; here in the black Wealden shales the miners met with the remarkable series of skeletons of the Iguanodons which were with great difficulty extracted in many places and brought to bank by M. Depauw and the engineers of the mine. They have since, with infinite labor, been put together by M. Depauw, and five of them have been set up in the Royal Museum of Natural History in Brussels. Through the kindness of M. E. Dupont, and the director of the Brussels Museum, a cast of the entire skeleton has been acquired for the British Museum, and it has been set up in the reptile gallery of the geological department where it forms one of the most striking objects ever presented to the gaze of the British public. The beast stands 15 feet high, and measure 30 feet along the vertebral column and covers about 156 square feet of gallery."

-BETH SIMMONS

ARTICLES

“ROCKS AND MINERALS” TO SHOWCASE ARTHUR LAKES

When you go to the Denver Gem and Mineral Show September 18-20, be sure to pick up a copy of the September/October 2009 issue of “Rocks and Minerals” magazine. This issue will have two articles about local geological hero Arthur Lakes. One article is about Lakes’ art by award-winning mining artist historian Susan Robinson, and the other is by FODR’s own Beth Simmons and Katherine Honda, authors of his recent biography, “The Legacy of Arthur Lakes.” The book, complete with a CD-ROM containing all of Lakes’ works, is available at the Dinosaur Ridge gift shop for \$45. Supplies are limited, so get your copy while they are still available!

-- BETH SIMMONS

DINOSAUR RIDGE - CALENDAR OF EVENTS – 2009

08/08/09 Dinosaur Discovery Day: Rocks, Minerals, Fossils (10am - 2pm)

Event sponsor, Denver Area Gem and Mineral Council will give out free mineral specimens. Guides stationed along the Dinosaur Ridge Trail. Trek Through Time Exhibit Hall free all day.

09/12/09 Dinosaur Discovery Day: Reading Really Rocks (10am - 2pm)

Featuring the Jefferson County Public Library’s Knott’s Kids Day with giveaways, dinosaur book displays, and dinosaur story times. FODR authors will sign books. FODR will have a used geology book sale. Guides stationed on the Dinosaur Ridge Trail. Geology exhibits at the Visitor Center. Trek Through Time Exhibit Hall free all day.

10/10/09 Dinosaur Discovery Day: Earth Science Week (10am - 2pm)

In celebration of Earth Science Week the Association for Women Geoscientists and other professionals will facilitate stations on the Ridge and exhibits at the Visitor Center so that Girl Scouts can earn badges. Scouts must register. The public is welcome.

11/06/09 Rock Out for the Ridge (6pm – 9 pm)

Fundraiser dinner and silent auction at Red Rocks Park Visitor Center. Featured speaker, John Foster, will present “Jurassic Journey – A Hike from the Sundance Sea to Pikes Pike.”

11/14/09 Dinosaur Detectives: Backyard Bones (10am - 11:30am)

Free outdoor presentation of dinosaur bones for kindergarten through 2nd grade. Other ages and parents are welcome. Trek Through Time Exhibit Hall free for attendees.

ARTICLES

TRACKING NEW EVIDENCE OF VERTEBRATE LIFE IN ANCIENT GOLDEN

BY MARTIN LOCKLEY — DINOSAUR TRACKS MUSEUM, UNIVERSITY OF COLORADO AT DENVER, DENVER

Summary: 2009 has been an important year for the study of vertebrate footprints in the Dakota Group in the “Morrison-Golden Fossil Area.” A definitive study of *Ignotornis* – the first bird track ever named from the Mesozoic – was published and two significant new sites with dinosaur and crocodile tracks have been discovered along the northern outcrop of Dinosaur Ridge (the hogback between I -70 and West Colfax). These discoveries and research results are summarized below in the order that they came to light. The information presented here shows how much we still have to learn about the Dinosaur Ridge area, also known as the “Morrison-Golden Fossil Area.” The finds also promise to keep us busy preparing a number of significant publications in the near future.

Introduction.

Thanks to the initiative of the Friends of Dinosaur Ridge (FODR), we proposed to the National Park Service that three important paleontological sites be designated as National Natural landmarks. These tracts, are Triceratops Trail, Stop 2 on the Colorado School of Mines Geological Trail and the *Ignotornis* ‘early bird’ tracksite in north Golden. If the proposal is accepted these would be added to the two tracts (Quarry 10 near Morrison, and the main Dinosaur Ridge property along Alameda) already designated as the Morrison Fossil Area National Natural Landmark” (MFANNL) to create the new “Morrison-Golden Fossil Area National Natural Landmark” (M-GFANNL). As the proposed new designation indicates, the five sites include the most important outcrops between the city limits of Morrison and Golden, four of which have produced bone and track species new to science that were named between 1877 and 2001. We hope to publish a map of this network of five sites at such time as the proposal is accepted.

As this previous 124-year-history of discovery indicates, the process of scientific discovery and documentation is ongoing. Now in year 132 “after 1877,” the ongoing discovery process is well-illustrated by new dinosaur and crocodile track finds reported, on May 9th and July 12th, respectively. These finds, made between I-70 and Lena Gulch (West Colfax), fill important geographic and ‘paleobiological’ gaps in the track record of the Dakota Group in this area.

Tracking the early bird

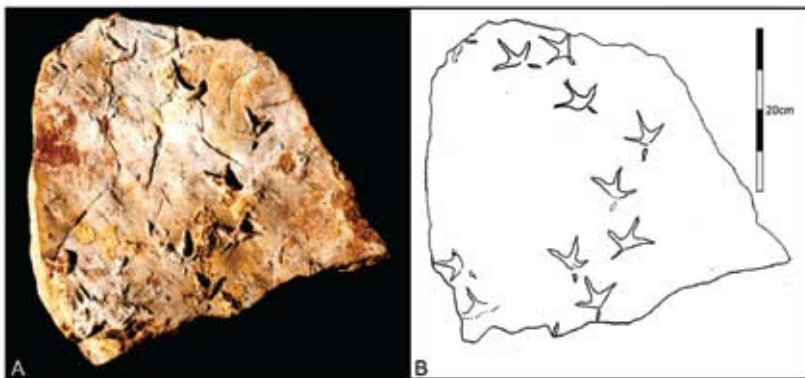


Figure 1. A photo and tracing of bird tracks (*Ignotornis*) found by Jordan Sawdo near Golden in the 1980s (after Lockley et al., 2009)

In 1930 the first bird tracks ever reported from the Mesozoic were discovered by a Mr. N. H. McConnell in the Dakota Group just north of Golden (actually within the present city limits). They were described and named as *Ignotornis mcconnelli* by Maurice Mehl (1931) from the University of Missouri, and four specimens, exhibiting a total of 70 footprints, were repositied at the University of Colorado Museum (UCB) Boulder. These were also the first fossil bird footprints ever named, from any geological unit of any age. In 1988 and 1989, the CU Denver dinosaur trackers found and described 70 additional bird tracks from a locality on a different property only about 80 meters north of what we now think was the original 1930 discovery site (Lockley et al.,

ARTICLES

1989). However, it was not until 2007 and 2008 that UCD and UCB teamed up to reinvestigate the area in detail. As a result we found many more bird tracks, at three levels, and increased the total sample size to about 360 tracks (Lockley et al., 2009). Iguanodon tracks resemble those of small herons and some trackways show foot-shuffling patterns similar to those used by modern birds to stir up food. One specimen that came to light was a slab found some 25 years ago, by Jordan Sawdo (WIPS) and donated to the UC Denver Dinosaur Tracks Museum (Fig. 1). During these investigations we also found and replicated a large bird track plaque and a crocodile trackway, both of which are now on display in the FODR “Trek Through Time” exhibit. They are illustrated in the new exhibit guidebook (Marshall, 2009). The crocodile trackway is the best single trackway ever found in the Dakota, exhibiting a clear sequence of left and right footprints that indicate walking progression. It will be described in a special volume on crocodile trackways that is scheduled for completion towards the end of 2009.

An Ornithopod Bigfoot at the Hawk’s Nest Site

On May 9th, George Daggett, a local resident, discovered a surface with several large dinosaur tracks at an old clay quarry on the hogback just north of I-70. Investigation of this site revealed at least four clear three-toed tracks of large (foot length ~50-60 cm) ornithopods, and many other partial tracks in a trampled zone. The tracks are preserved as natural casts: i.e., in negative relief, and some, as a result of sliding in the mud, appear more elongate than others. These have generated debate as to whether they may be of a different type – possibly theropod tracks –?? We hope to publish a map and detailed description of this site in the FODR 2009 Annual Report. In the meantime we have made a rubber mold of the ‘best’ tracks (Fig. 2), and a replica will be provided for Dinosaur Ridge as an example of a new local find. At the time of the discovery, a hawk, (i.e., an extant dinosaur), was nesting on the cliff above the track site. The site now dubbed the Hawk’s Nest site, it has already been visited by many geologists and students (age range 7-89).



Figure. 2. Mold of a large ornithopod track from the Hawk’s nest site. Molded track is immediately above bag.

Crocodile Gulch

On July 12th when scouting north of the Hawk’s Nest site, Dan Fanelli (a student and FODR employee), and I discovered more tracks in the area known as Lena Gulch. As often happens, the best find was made at the very end of the day. Dan, who had been specifically looking for crocodile tracks, spotted a great assemblage just as we were about to leave the outcrop. Unlike the single trackway from North Golden, the tracks from Lena Gulch represent swimming animals. More than 50 tracks have been identified on a single surface (Fig. 3); some are as much as 25-30 cm long, indicating they were made by very large crocodiles. All are oriented in the same direction (west) as if traveling along a channel or conduit that guided them in a preferred direction. Perhaps a current in this direction was a factor. We have made a latex mold of the main area and we have discovered at least six other levels with additional smaller swim tracks. (Some may represent turtles, because small crocodile and turtle swim tracks are hard to differentiate).

This site is highly significant for two reasons. First, with the possible exception of an assemblage discovered in Kansas in 1933 (McAllister, 1989), it is the largest assemblage of crocodile swim tracks ever discovered. Second, it is also the first site to reveal swim tracks of this type at multiple levels. This suggests that the environment was suitable crocodile habitat for an extended period of time. Previous interpretations of the paleoenvironment of the track-bearing beds at Lena Gulch suggest

ARTICLES

marsh, swamp and tidal flat environments (Weimer and Land, 1972). Again, this discovery is timely, and a detailed account with maps will be submitted for the aforementioned crocodile track volume planned for later this year, as well as for the FODR 2009 Annual Report.

Conclusions and acknowledgements

These recent discoveries indicate that there is much still to discover and learn about vertebrate life in ancient Golden, and we are reminded of the important role played by local residents and students. These finds also underscore the need for ongoing scientific research to support our interpretative exhibits and public education efforts. For example, the crocodile track discoveries will generate significant contributions to a timely scientific volume, and they underscore the importance of the reconstructions in our “Trek Through Time” exhibit.

Many people have helped with the track discoveries, research and documentation briefly described here. These include co-authors on the bird tracks paper: Karen Chin (UCB), Karen Houck (UCD), Masaki Matsukawa (Teikyo Gakugei University) and Reichi Kukihara (author of a UCD Master’s thesis on the Dakota Group: Kukihara 2006). Thanks also to Heather Germaine (National Parks Service). George Daggett and Dan Fanelli made two of the recent discoveries in May and July 2009. Beth Simmons, John Ghist, Bob Weimer and Steve Wallace have also been active in providing photographs and background information. The University of Colorado at Denver, Dinosaur Tracks Museum is holder of the state permit (2009-92) which authorizes the molding, tracing and collection of track specimens. The museum has also provided the materials so far used in these projects.

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Figure 3. Dan Fanelli and the crocodile track assemblage he discovered at Lena Gulch.

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