Friends of the Florissant

Fossil Beds Newsletter

Volume 2006, Issue 3

September, 2006

A VISIT TO "THE BASEMENT" – THE OLDEST ROCKS OF THE SOUTHERN FRONT RANGE

By Reinhard A. (Bud) Wobus, Professor of Geosciences, Williams College, Massachusetts

The rocks exposed in and around the Florissant Fossil Beds National Monument are either "very old" (a billion years and more) or "very young" (a few tens of millions of years), geologically speaking. The oldest, ranging in age from about 1800 m.y. (m.y. = million years) to 1000 m.y., constitute the crystalline "basement" rocks of the southern Front Range; rocks older than 1800 m.y. are not found within the range and are absent from most of Colorado. What are these basement rocks,

how and where did they form, how can we distinguish them from one another, and how have they affected the development of today's landscape?

As shown by the patterned rock units in the simplified geologic map in Figure 1, the oldest rocks are a mosaic of Proterozoic (Precambrian) metamorphic rocks, along with granitic pluton of three generations. The unpatterned rock units in the map are the Florissant lake beds and associated volcanic rocks of mid-Tertiary age (mostly 36-34 million years old); they form a relatively thin veneer $% \left({{{\left({{{{{\bf{r}}_{{\rm{c}}}}} \right)}}} \right)$, often filling ancient stream valleys

incised into the basement rocks.

The "oldest of the old" in the Florissant area is a thick sequence of former sedimentary rocks (mostly marine mudstones) with minor interlayered volcanics, all regionally metamorphosed by heat and pressure deep within the earth's crust between 1800 and 1700 m.y. These oldest rocks - now metamorphic schists and gneisses – are more resistant to erosion than most of the younger granites that intrude them; they hold up the NNW-

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Figure 1 - Geologic sketch map of the Florissant 15-minute quadrangle (adapted from Wobus and Epis, 1978).



Tertiary volcanics and lake beds PROTEROZOIC ROCKS PIKES PEAK PLUTONS (ca. 1.08 Ga.) Lake George alkaline center Pikes Peak Granite BERTHOUD/SILVER PLUME PLUTONS (ca. 1.4 Ga.) Cripple Creek Granite Silver Plume (?) Granite Granite of Elevenmile Canvon ROUTT/BOULDER CREEK PLUTONS (ca. 1.7 Ga.)

CENOZOIC ROCKS

METASEDIMENTARY ROCKS (ca. 1.8 Ga.)

Biotite and sillimanite gneisses

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Cockerell's Contributions Celebrated

By Melissa Barton

Naturalist Theodore Dru Alison Cockerell was one of the greatest researchers to collect at Florissant. He described hundreds of species, many of which still stand today. T.D.A. Cockerell's interested were broad: he studied plants, insects, and mollusks at Florissant, although his particular interest was in the fossil insects.

This summer marked the centennial of Cockerell's first collecting expedition to Florissant in the summer of 1906. The expeditions of 1906-1908 collected many of the most spectacular and scientifically interesting fossils to come from the lake shales of Florissant. Today these specimens are scattered through the collections of museums across the country and in Europe, although many remain at the University of Colorado Museum.

Florissant Fossil Beds National Monument, in conjunction with the University of Colorado Museum and the Friends of the Florissant



This Fagopsis branch with a male fruit was found by Wilmatte Cockerell. Credit: Yale Peabody Museum of Natural History. Fossil Beds, celebrated the centennial with a wreath-laying ceremony at Columbia Cemetery and reception at the museum on Friday, June 9, followed by speakers, a luncheon, and a field trip to several of Cockerell's collection sites on Saturday, June 10.

"When I was doing the inventory of all the Florissant collections, I thought this was something we could do when 2006 rolled around," said Dr. Herb Meyer, the Monument paleontologist. "Why not celebrate the people who made the important contributions long ago?"

Dr. Dena Smith, the Curator of Invertebrate Paleontology at the CU Museum, organized Friday's events. Both T.D.A. Cockerell and his second wife, Wilmatte Porter Cockerell, are buried at the Columbia Cemetery in Boulder. Meyer and other park employees arranged the wreath, which was donated by the Friends. The wreath contained plants

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The Western Black Widow Spider

By J.J. Huie

Growing up in Colorado Springs and doing my fair share of searching for baseballs in the dark recesses under decks, I always wondered what kind of poisonous spiders could be waiting for me. The most common species in Colorado with venom harmful to humans is the western black widow spider (*Latrodectus hesperus*). Only the females are poisonous. These have a shiny black carapace (the case or shield covering the back) and a reddish hourglass shape on the underside of the spherical abdomen. The females are about 1.5 inches long, while the adult male is about half the female's size but with longer legs and usually yelow and red bands and spots over the carapace.

Widow spiders are not aggressive, but problems arise due to their often close proximity to people. They are shy and sedentary, avoiding light and retreating when disturbed. However, they can get into clothing or shoes or live among the logs in a woodpile, for example. If a widow spider is backed up against the skin, it will bite. The venom of the black widow spider is 15 times as toxic as that of the prairie rattlesnake, although the black widow spider injects only a small amount. The males and juveniles are harmless. Before antitoxin was developed, death occurred in less than 4% of cases. The antitoxin available at hospitals and poison control centers is highly effective.

The following are possible symptoms of a black widow spider

bite: extreme pain at the site of the bite (which can occur within minutes), nausea, vomiting, alternating salivation and drymouth, faintness, dizziness, and difficulty breathing. Tightness of the stomach muscles, facial contortions, and sweating can also result. Children under five years old, as well as those over 60

or adults experiencing severe symptoms, should be taken to a medical facility. So my best advice: avoid the irregularly-shaped, tangled webs (called scaffold webs, or cobwebs) of the black widow spider, and leave the baseball under the deck



The Indian Paintbrush

By Harv Burman, Park Ranger

Park Rangers get "paid" in a variety of ways, the least important of which is in dollars. At Florissant Fossil Beds, we get paid in being able to spend time in a beautiful, tranquil valley. We get paid in meeting and talking with people who love the Parks and WANT to be here (with the exception of some teenagers who didn't really want to join their families on vacation, since that meant leaving behind their computer games, friends, and television).

While leading visitors on nature walks, a fun part of my job is to point to the plant called Indian Paintbrush and ask, "What color is that flower?" They tell me the flower is orange, coral, or red. However, the flowers of the Indian Paintbrush are mostly green. "Flower" technically refers to the reproductive structures. In the case of Indian Paintbrush, the flower is the small, green spiky part within the bracts, or upper leaves. The bracts, which are generally not considered reproductive structures, have the orange, coral, or red color. Visitors enjoy learning this, even though I'm having fun at their expense.

The green chlorophyll in the flower of the Indian Paintbrush provides photosynthetic capability, which is using carbon dioxide (from the air) and sunlight to produce food. The Indian Paintbrush doesn't photosynthesize enough by itself, so it has developed the ability to attach to roots of nearby green plants, which provide a portion of its nutrients. It is, therefore, parasitic.



A late summer field of Indian Paintbrush. Photo by S. Veatch



Close-up of Indian Paintbrush. Photo by S. Veatch

So watch out for us Park Rangers and our questions. After all, there's no reason we can't have fun with visitors while sharing with them the wonders of nature.

Friend's Board Re-organizing

Needed—A few good members

The Friends' Board is in the process of re-organizing. We hope to be able to encourage more people to become member of the Friends. We are also looking for those who are members to consider serving on the Board. By reducing the number of Board meetings a year to 4, we hope that some of you will be willing to help.

We look forward to establishing several key committees that will work throughout the year. We do need a treasurer ASAP!!!

Please call Steven Veatch (748-5010) or Sally (687-9204) if you feel that you have some time to donate to the Friends.

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Seminar Teaches about Forest Birds, Ecosystem Health

By Melissa Barton, FFBNM Museum Aide

The pygmy nuthatch hangs quietly in the nearly-invisible mist net, as if suspended in midair. Unharmed, its alert black eyes follow the students as we gather around to watch Colorado College ecology professor Brian D. Link hart free it from the net.

Biologists use lightweight nylon mist nets like this one for catch-and-release trapping of small birds like this pygmy nuthatch. The nets are usually set up at the border or transition between two ecosystems, such as this one between pine and aspen forests. Unfortunately, our seminar class, Ecology and Conservation of Forest Birds in the Pikes Peak Region, had a late start this morning at 7:00 a.m.—the best time to set up a mist net is around 5:30 a.m.

Linkhart carefully works the nuthatch free. It's thoroughly tangled in the nylon strands, so it takes about 10 minutes—mist netting is not

for the impatient. Finally he works it loose and cups it gently but



Colorado College ecology professor Linkhart frees a pygmy nuthatch from a mist net. Photo: Melissa Barton

firmly in his hands.

Nuthatches don't usually have obvious sex characteristics, but fledging season is just past, so Linkhart flips the bird over and blows lightly on its stomach feathers. The feathers spread to reveal a bright reddish-purple patch of bare skin on the belly, the brood patch. Female nuthatches, like many other birds, lose feathers from their belly area while incubating their eggs. Numerous tiny blood vessels close to the skin help keep their eggs warm.

We observe the nuthatch, examining the shape of her flight feathers, until she manages to wriggle free and fly to a nearby

tree, where she chatters loudly. Linkhart would normally band the birds he captures here at the Manitou Experimental Forest, a U.S. Forest Service (USFS) research station near Woodland Park, but there's no time today. The sunny morning is growing warmer,

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Annual Meeting of the Members

COME ONE - COME ALL - OCTOBER 15th Join members of the FRIENDS at the ANNUAL MEETING Where: Florissant Fossil Beds NM Fowler Education Center When: Sunday, October 15, 2006 - 12 Noon What to bring: A potluck dish for 8 Drinks and dessert will be provided Program for the meeting: Lunch at 12 Meeting to begin at 12:45 During the meeting, awards will be presented and the new Monument film will be shown After the meeting, there will be an opportunity to take a guided hike for all who wish to go.

PLEASE JOIN US ON THE 15th!!

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Visitor Center Changes Herald New Exhibits

By Melissa Barton, FFBNM Museum Aide

Recent visitors may have noticed that the Visitor Center at Florissant Fossil Beds National Monument is looking a little different of late. The large fossil display from Waynesburg College is gone, and the small display by thae front desk has a different selection of fossils.

Monument staff are sorting and packaging the old exhibits in preparation for the installation of new exhibits. Most of the fossils on exhibit were generously loaned by Waynesburg Col-



Flats of fossils awaiting packaging and return to Waynesburg College in Pennsylvania. Photo: NPS/Melissa Barton

lege, and the Monument will be returning most of those specimens.

The Monument requested funding for new exhibits in 2003 and received funding in 2005. The National Park Service granted \$25,000 for the new exhibits, the Cooperative Ecosystem Study Unit granted \$5,000, and an additional \$4,000 came from donation monies.

Lead Interpretive Ranger Jeff Wolin and Monument Paleontologist Herb Meyer have been working with Colorado State University in Fort Collins on the designs for the new exhibits, which will be installed this fall and next spring. Jennifer Fish Kashay,



Monument staff and volunteers dismantle the large fossil case (left to right: Ranger Jeff Wolin, Ranger Rick Wilson in back, and VIP Ron Haberkorn). Prior to disassembly, Jeff Wolin read "Ode to the Fossil Display," a humorous eulogy for the old display. Photo: NPS/Melissa Barton.

professor of history and museum studies, is leading the project with graduate student Kate Legg.

Five new exhibits will replace the old exhibits. There will be a new "What Is A Fossil?" display using specimens from Florissant, a view of the ancient valley in place of the map in the entryway, a "rock outcrop" display about paleontological methods, a "paleontology lab" with fossils to examine and a display of historical photographs from Florissant, and three smaller displays with drawers and upright panels of fossils.

These new exhibits will follow current principles of exhibit design, and will display excellent specimens from the Monument's collections, as well as photographs of famous and spectacular specimens held at other institutions. Wolin will also be updating the Junior Ranger booklet to refer to the new exhibits.

So be patient—the Visitor Center is a little bare now, but better displays lie ahead!

Ode to the Fossil Display

By Jeff Wolin, Lead Interpretive Ranger, FFBNM

For thirty years you have displayed and shown Florissant fossils known and unknown. You have served and informed, delighted and inspired But now it is time to honorably retire. The world has changed since you were born— New scientific ideas have come to form. Research has been done on what makes good interpretation: Themes and universal concepts are the standards throughout the nation. Accessibility, multiperspective, and learning styles are now required, Terms you didn't know when you were hired. So we thank you for your service and please understand We must jump on this opportunity to update While this chance is in our hand.

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Basement (Continued)

trending ridge that includes Blue Mountain about 3

miles west of the Monument. They also underlie significant parts of the Puma Hills, which form the eastern rim of South Park about 10 miles to the west. They are typically dark gray to black, thinly layered (and sometimes tightly folded), and may form "slabby" outcrops. Significant amounts of mica (both black biotite and silvery muscovite) impart a sheen to many exposed surfaces. Some layers contain the metamorphic mineral sillimanite, which can only form when ancient mudstones are subjected to temperatures and pressures reached when they are displaced to a depth beneath the surface of 12 miles or more!

While these former ocean sediments were being metamorphosed at such huge depths, they were intruded about 1700 m.y. ago by the first (and deepest) of three granitic magma series, known in Colorado as the Boulder Creek (or Routt) plutonic series. Because magma cooling rates were very slow at such depths, and because deformation of the rock was occurring simultaneously with cooling, the Boulder Creek granitic rocks (specifically "tonalite" and "granodiorite") are coarse grained and strongly foliated (banded). They contain appreciable amounts of biotite mica, which forms the black layers and streaks in the rock, and often large pink ovoid to rectangular grains of potash feldspar (microcline), as well as quartz and plagioclase feldspar. While not exposed immediately adjacent to the Monument, this rock underlies much of the Puma Hills near Wilkerson Pass and forms large plutons (batholiths) in Phantom Canyon, Helene Canyon, and in the Arkansas River Canyon to the south.

The middle generation of granite plutons was exposed about 1400 m.y. ago at a depth in the

earth of 6-10 miles. Granites of this generation are not as coarsegrained and are not foliated. They are typically reddish to pink and contain more muscovite (silvery) mica than biotite, and more potash feldspar than plagioclase. Known in Colorado as the Silver Plume (or Berthoud) plutonic series, these granites form blocky, angular outcrops that are broken by vertical jointing. The Beasley Hills, west of Teller County Highway I just south of the Monument, are underlain by the Cripple Creek granite, one member of this plutonic series (but having nothing to

do with the origin of the gold deposits of the Cripple Creek district). Much of the granite in Eleven mile Canyon south of Lake George is also part of this generation of granites, as are several small plutons (stocks) just east of the Puma Hills.

The youngest (and shallowest) of the Precambrian granites of the region – and the one with which Monument visitors rapidly become familiar – is the billion-year-old Pikes Peak granite.

Exposed over more than 1500 square miles of the Front Range, it is a batholith-sized pluton and the largest single body of granite in the Southern Rocky Mountains. It also has considerable vertical exposure, from the top of Pikes Peak to the base of the Front Range, and below the surface beneath the plains to the east. At the time its magma cooled, parts of the batholith were within a few miles of the surface, and circular ring-complexes like the one north of Lake George were probably the roots of ancient volcanic centers connected to it.

The Pikes Peak granite is typically coarse-grained and quite red, with the dominant feldspar and quartz grains separated by nonoriented black biotite mica or hornblende (another black silicate mineral). The dark minerals are the rock's weakest link because they expand by as much as 40% when they become more hydrated during weathering. This volume change causes the rock literally to "dis-integrate," falling apart into the coarse gravel that covers so much of the area. By a process called "casehardening," some outcrops develop a resistant rind that outlines the shape of huge exfoliation domes, like those in Mueller State Park to the southeast of the Monument (Figure 2). These rounded outcrops of Pikes Peak granite are in stark contrast to the blocky, angular outcrop pattern of the Cripple Creek granite. The route of Teller County Highway I south of the Monument runs parallel to or along the boundary between these two granite bodies almost all the way to Cripple Creek, and the difference in appearance is obvious between the bedrock exposures to the east (Pikes Peak granite) and west (Cripple Creek granite) of the highway as you travel south.

Parts of the Pikes Peak granite cooled more rapidly into a finegrained variety known as the Windy Point granite. This rock is

> much tougher, and doesn't fall apart into gravel like the coarse Pikes Peak granite. It forms prominent topographic features where it is exposed, as at the summit of Pikes Peak, at Crystal Peak (the pyramidlike hill about 3 miles north of Florissant), and many of the monadnocks (resistant hills) across the nearly flat surface of the Rampart range northeast of Woodland Park.

> This largely descriptive article about the oldest rocks of the region is only an introduction to the long and dramatic history these units record. A longer, more detailed version that also describes

the tectonic settings that unfolded during the Precambrian can be found in the following reference, on sale at the Monument Visitors' Center:

Wobus, R. A., 2001, Precambrian igneous and metamorphic rocks in the Florissant region, central Colorado: their topographic influence, past and present: Bulletin No. 5, Pikes Peak Research Station, Florissant, CO, 9 p.



Domes of the Peak

Cockerell (Continued)



This robberfly (Microstylum) is said to be the first Florissant fossil Cockerell found. Credit: University of Colorado Museum

Cockerell collected as fossils at Florissant—redwood, cattail, elderberry, oak, rose, hydrangea—and bees. Although Cockerell was a generalist who studied both ancient and modern plants and animals, bees were his particular research interest he collected over 900 species of modern bees in Colorado alone.

Jean Rodeck, former superintendent of the Monument, introduced the speakers on Saturday. Her father, Dr. Hugo Rodeck, was encouraged by Cockerell to study biology, and became director of the CU Museum.

"On Dr. Cockerell's gravestone it says 'Naturalist— Humanitarian—Teacher,' and I really feel that 'mentor' should be added to that," said Rodeck, who followed in her father's footsteps. "I would not be here if it were not for T.D.A. Cockerell." Keynote speaker Dr. William A. Weber, Professor Emeritus of Natural History at the CU Museum, only met Cockerell once, when Hugo Rodeck took him to the Cockerells' house for dinner. "I was not impressed," Weber said. "He didn't say one word." Today Weber is Cockerell's most enthusiastic admirer.

"It turns out that I have followed the kind of career Cockerell recommended," Weber said with a smile, "that scientists diverged from their main interested every 20 years or so." One of Weber's long-term interests turned out to be Cockerell. Over the past several years, Weber has collected and published three volumes of Cockerell's letters and essays, as well as a biobibliography.

But when CU dismantled Cockerell's office to save space, Weber rescued all of the papers and stored them in the library until the Archives were established. Weber and his assistants ulti-



This beautifully preserved caterpillar from the Cockerell expeditions is one of the finest fossils found at Florissant. Credit: University of Colorado Museum



View of Florissant Valley taken during one of the Cockerell expeditions to Florissant

mately spent years transcribing Cockerell's letters and hunting down papers for the biobibliography.

Cockerell "practically invented Darwin for America," according to Weber, who also noted that Cockerell was an early environmentalist, probably the first person to write about ships dumping oil at sea.

"I'm bubbling over today about this whole thing," Weber said of the events.

Meyer spoke about Cockerell's contributions to paleobotany at Florissant, emphasizing the process of science. Cockerell corrected identifications by earlier scientists, some of which have since been corrected and some of which are still standing. Cockerell himself believed that a good scientist corrected his own "likely to be numerous" errors.

Cockerell also thought beyond North America and Europe when making identifications, and was one of the first to think in terms of an ecological mosaic around the lake. Perhaps

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Cockerell (Continued)



Dr. Weber receives a certificate from the Monument and the Friends. Left to right: Weber, Jean Rodeck, and Herb Meyer



Cockerell's most productive collection site, "Station I 4" today is heavily weathered and covered with vegetation

most significantly, Cockerell began a longstanding relationship between the University of Colorado and the Florissant Fossil Beds.

Smith first learned about Florissant from Cockerell's papers, and ultimately conducted her doctoral research at the Monument. While largely forgotten in other fields, Cockerell is still widely known and respected among entomologists, largely for his development of identification "characters" for fossil insects.

"Cockerell had to deal with flattened fossils," Smith said, "so he couldn't use traditional entomology techniques."

Cockerell thought about the types of characters that would best be preserved as fossils, and in the process realized that many fossil insects actually belong to modern genera. Many of these characters are still used by paleoentomologists today to identify fossil insects. But Cockerell wasn't just a taxonomist. "He was interested in broader evolutionary patterns," Smith said. "That wasn't how things were done back then. He set the foundations for those of us who came later."

Florissant Fossil Beds National Monument and the Friends of the Florissant Fossil Beds honored Weber with a certificate in recognition of his work in preserving and sharing Cockerell's legacy. The Archives, University of Colorado Libraries, recently finished a catalogue for the papers which Weber saved from Cockerell's office.

Following the luncheon, Meyer led a field trip with Beth Simmons and Melissa Barton to some of Cockerell's collection sites in and around the Monument, including the productive and seldom-visited "Station 14" in the northwestern corner of the Monument and the railroad cut east of town where the "flower car" of the Colorado Midland Railway Co. used to stop to allow tourists to collect fossils and wildflowers.

After a stop at a fossil site near the Florissant cemetery, the trip ended with an excursion to the Big Stump, the most famous fossil redwood visible in the park. Four of Cockerell's collection sites were located nearby.

The celebrations were a great success, although Cockerell him-



Monument paleontologist Herb Meyer arranges the wreath at Columbia Cemetery

self would probably have been a bit embarrassed by all the acclaim. Now it's time to mark calendars for the Harry D. MacGinitie centennial in 2036!

(More Photos on Page 9)

Cockerell (Continued)



Dr. Smith shows visitors some of Cockerell's specimens



These beautiful (and tasty) "part and counterpart" cakes were provided by the Friends

Forest Birds (Continued)

and it's important to check mist nets frequently so birds won't injure themselves by struggling or overheating.

Unfortunately, our late start means that the nets remain empty. We examined other signs of bird activity in the aspens trees, including numerous woodpecker and flicker cavities. Both mountain bluebirds and flammulated owls nest in the abandoned nest cavities of other birds, but only flicker cavities are large enough for the owls.

Flammulated owls, one of the two smallest owl species in the United States, are Linkhart's speciality.

Every summer, Linkhart brings a few of his students from Colorado College to the experimental forest to collect owl data. They work from dusk until the wee hours of the morning, tracking the owl's movements, trapping the adults for blood samples, and weighing the owlets. During the day they describe habitat and perform other diurnal tasks.



A female pygmy nuthatch caught in a mist net. Photo: Melissa Barton

"Flams," as Linkhart calls flammulated owls, are nocturnal insecteaters which migrate in winter. Because flams are very sensitive to habitat changes, they are what biologists call an "indicator species." The health of their population provides information about the health of the whole ecosystem.

We had hoped to see owlets, but this year's unusually hot, dry spring and early summer followed by sudden heavy rains killed almost all of the owlets. Fortunately, flammulated owls are unusually long-lived for such a small raptor—the oldest Linkhart has caught was over 14 years old, and most are 6 to 8 years old. One year's nest loss will probably not be as devastating for them as it would be for a shorter-lived species.

Flammulated owls aren't the only forest animals that like flicker nest cavities—several trees showed deep scars from black bears that had climbed the trees in search of eggs or nestlings. When the bears do manage to reach the nests, it usually kills the softwooded aspens.



A female broad-tailed hummingbird resting in a spruce tree after release. Males can be recognized by their russet throat patches, which the females lack. Photo: Melissa Barton.

As we started taking the mist nets down, we caught another bird, an iridescent blue-green broad-tailed hummingbird. The tiny female lacks the russet throat patch of the males.

Because of their high metabolisms, just flying into a mist net is exhausting for hummingbirds. This one was so tired she barely moved, so we observed her for a few minutes and then set her in a spruce tree to recover.

The Manitou Experimental Forest is an exceptionally good site for observing and studying forest birds like pygmy nuthatches and broadtailed hummingbirds. A USFS research station for 70 years, it provides an excellent opportunity to study the elusive flammulated owl and other rare birds, as well as the effects of careful thinning on ponderosa pine forests and their inhabitants. The health of sensitive mountain ecosystems like this one is an increasingly important topic of study for today's environment.



Linkhart and students set up the first mist net. Photo: Melissa Barton

For those who missed this bird seminar, Linkhart will also be presenting one of the Friends' winter seminars at Colorado College.



Geoscience Adventure Classes

Cripple Creek Parks and Recreation Department

The Fossil Record: An Introduction to

Paleontology

October 7, 2006 8:30 am to 5:30 pm

This outdoor-based class offers an unmatched opportunity to understand the basics of paleontology and the fascinating world of fossils. The Florissant Fossil Beds National Monument will be the center of our studies. The course fee includes two field trips, admission to the national monument and a commercial collecting quarry. **Course fee:** \$69.

Field Studies in Paleontology: Exploring the Shelf Road From Cripple Creek to Garden Park, Colorado

October 14 8:30 am to 5:30 pm

Starting in Cripple Creek, this field-oriented class offers an unsurpassed opportunity to explore the geological and paleontological wonders along the Shelf Road. The class will view the famous Garden Park dinosaur sites and examine dinosaur tracks. Transportation, course guide, admission to the Dinosaur Depot, and snacks are included. **Course fee:** \$69.

History and Geology of the Cripple Creek Mining District

October 21, 2006 8:30 am to 5:30 pm

The Cripple Creek Mining District is one of the most interesting geologic regions in the country. In this field-oriented program, you will learn about the local geology and tour current operations at the Cresson surface mine. Be prepared for lively discussions and lots of fun as you explore the mining operations that are currently underway and learn about the mining history of this area. Transportation, course guide, and snacks are included. **Course fee:** \$69.



To register call Cripple Creek Parks and Recreation today 719-689-3514

Participants may earn 0.5 graduate-level semester credit from the **Colorado School** of **Mines** for an extra fee for each class. This credit is optional. The credit is applicable for teacher license renewal in the State of Colorado and is <u>generally</u> <u>accepted elsewhere.</u> The additional fee for graduate credit from the Colorado School of Mines is \$30.00. This fee must be paid by check, payable to the Colorado School of Mines and given to the instructor.





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Advertising Rates

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1/4 Page	\$12.00
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You may submit advertisements to: Steven Veatch, P.O. Box 5938, Woodland Park, CO 80866 or via email: sgeoveatch@att.net

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Please send your current email address to sgeoveatch@att.net. This will allow us to send you reminders or events and important news items as they occur.

Friends of the Florissant Fossil Beds

Please provide us with feedback on the newsletter or any topic you are interested in. We would also like to know who is interested in serving on various committees or on the Board. You can reach us at the address to the left or by email at sgeoveatch@att.net.

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The Friends of the Florissant Fossil Beds newsletter is published quarterly by the Friends of the Florissant Fossil Beds and is governed by the by-laws of the Friends. Articles appearing in the newsletter do not necessarily reflect the views of the National Monument, officers, members, or sponsors of the Friends.

About Our Organization...

In 1987, the Friends of the Florissant Fossil Beds, Inc. was organized by a group of dedicated individuals interested in assisting the National Park Service in its mission to preserve and protect our national treasures. As a non-profit organization, the Friend's mission is to secure resources to help preserve the fossils and promote programs activities that enhance the Monument's educational, research, and scientific objectives.

Friends' groups help many of the National Park service areas in a variety of ways. Membership fees and donations to the Friends of Florissant Fossil Beds are used for:

- Environmental education programs
- Field seminars
- Year-round interpretive programs
- Jr. Ranger programs
- Paleontological and geological resources
- Natural history resources
- Publications

Past accomplishments and ongoing support by the Friends of Florissant Fossil Beds includes:

Major funding of the yurt shelters

- Travel and research funding for the Monument's paleontologist
- Assistance in the purchase of an all-terrain wheelchair for handicapped visitors
- Financial support for the University of Denver's (fossil data) Digitization Project
- Purchase of furniture for the seasonal rangers and intern housing
- Funding for other special Monument related celebrations and special events (such as the dedication of the new stump exhibit area May 11, 2002)
- Planning, funding, and coordinating the Monument's 30th Anniversary Celebration (1999) and 35th Anniversary Celebration (2004)
- Funding for the Monument's newspapers each spring
- Funding and coordination of annual Summer Educational Seminars Program

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We're on the Web! See us at: www.fossilbeds.org

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