Friends of the Florissant Fossil Beds

Volume 2004, Issue 2 June, 2004

Inside this issue:

The Geology of Crystal Peak

by Andy Weinzapfel, Geologist

Centered on the cover of the official park brochure of Florissant Fossil Beds National Monument is a prominent natural topographic feature shaped like a pyramid. Variously called by old-timers Cheop's Pyramid, Topaz Butte, and Crystal Beds at Florissant, today it is known formally as Crystal Peak. It is both a significant geological and historical point of interest.

A view of Crystal Peak, a significant geological and historical point of interest. Photo by author.

Exceptional mineral specimens from the Crystal Peak area can be found in many of the best national and international museums. Most notable are greenish or greenish-blue euhedral (smooth-faced) crystals of amazonite, a relatively rare and beautiful variant of a common mineral, microcline feldspar. Feldspar, along with quartz, is a major constituent of granite, the most prevalent igneous rock found in continental mountain ranges.

The geology of the Pikes Peak region is dominated by the 1.07-1.09 billion-year-old Pikes Peak batholith, a large body of once-molten rock that was likely derived from the earth's deep mantle and injected upward to a depth of 3 miles or less below the surface. Crystal Peak is part of this batholith. The Pikes Peak Granite, extending over an area of 1200 square miles, is exposed at the surface today only because the rocks that once covered it have gradually eroded away.

The Ute Indians were the first collectors of crystals from this area, used for spiritual purposes. In the 1870s, Dr. A. E. Foote of Philadelphia, systematically explored the area, employing 19 men, and shipped many specimens back east. Arthur Lakes, who accompanied Samuel Scudder of Harvard University on an early

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Vincent Matthews Appointed State Geologist

On March 9, Dr. Vincent Matthews was appointed Colorado's third State Geologist since the Colorado Geological Survey was reactivated in 1967. In his previous position as Senior Science Advisor, Matthews was responsible for CGS' geologic mapping, earthquake hazards research, and outreach programs. A native of east Tennessee, he received B.S. and M.S. degrees in Geology from the University of Georgia and the Ph.D. from the University of California, Santa Cruz.

Before joining the CGS in 2000, Vince spent over 20 years in the petroleum industry, working for four public companies. Additionally, he taught at the University of California, University of Northern Colorado, Arizona State University, the Frank Lloyd Wright School of Architecture, and the University of Texas of the Permian Basin.

Matthews has conducted research and published on the San Andreas Fault, global tectonics, subduction zone tectonics, igneous and metamorphic petrology, and Laramide deformation. He is the author of more than 40 technical articles and abstracts.

Matthews is a Fellow in the

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Florissant Lahars

By John M. Ghist

Lahar, such an exotic sounding word, brings to mind all sorts of images, such as a dinner toast, a French rabbit, or even some ancient battle cry. Lahars, however, are dirty, wet and often hot mudflows associated with volcanoes. The word is Indonesian in origin and based on this, you might expect these forms of mass wasting to be found only in far-away exotic areas of the world, far from Colorado. This is not the case. We have lahars too and they are closer than you might think.

What is a lahar and how we can recognize one? A lahar is a volcanic debris flow or a rapid flowing mixture of mostly volcanic rock and water originating on the slopes of a volcano. Although most vulcanologists would prefer that it be caused by a volcanic eruption, it is not always possible to be sure that it was or whether it was caused by remobilization of volcanic materials long after an eruption. For modern lahars, it is fairly easy to make the distinction; for ancient deposits, it is not.

Photo 1: General view of the road cut 6.5 miles south of the Florissant Fossil Beds Monument along Teller County 1. Photo date March 2004 by J. M. Ghist.

Lahars are not all that different from pyroclastic flows (or nuées ardentes). Both are associated with volcanoes and are composed primarily of volcanic material. The difference is in the delivery method. The material carried with pyroclastic flows is supported by air as opposed to lahars where it is carried by water. So how do you tell the difference? Photo 1 is that of a lahar about 6.5 miles south of the Florissant Fossil Beds Visitor Center. As you can see, it is made up of a variety of different size clasts, most volcanic, some not. Photo 2 (page 7) is a more detailed picture of the lahar. Although not definitive, pyroclastic flows tend to show stratification while lahars do not. Although you tend to envision pyroclastic flows as very violent and chaotic flows, they are, with the exception of the very bottom layer, very planar in their flow characteristics, oftentimes preserving stratigraphic relationships as they move hundreds or even thousands of meters. Lahars, however, are like avalanche deposits, unsorted, containing fragments from fine mud to boulders as large as houses. There is usually no trace of bedding except perhaps near the bottom of the flow and more rarely at the very top (Francis, 1998). As you can see in the above photos, the distribution of clasts is chaotic.

So, lahars are terrifying, destructive acts of Nature! Something to be feared, avoided, and that we should never want to happen. This is true. Modern lahars have destroyed whole towns and killed thousands of people. They have caused some of the most destructive modern catastrophes. However, we owe a great deal to the lahars around Florissant. Thanks to them we have the Florissant Fossil Beds.

About 35 million years ago, the area around Florissant was covered by a beautiful forest of gigantic sequoias, much like those seen today in California. These large trees grew to tremendous heights towering over everything around them and providing shelter for wide and varied forms of life.

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Dr. Ralph Root

On the verge of retirement from government service, Dr. Ralph Root, one of Florissant's ardent supporters and researchers, died from prostate cancer on January 15, 2004. Originally hailing from Erie, Pennsylvania, Ralph was trained in geology at Allegheny College in Meadville, Pennsylvania, earned his Master's at Indiana University, and his Ph.D. in remote sensing from Colorado State University at Fort Collins. Since locating in Colorado, he worked for thirty years for the National Park Service and the Geological Survey, receiving a citation for those many years of service just before he died.

Ralph's first job with the National Park Service was the mapping of the geology of the Fossil Beds. Using remote sensing techniques across the monument, he plotted the potential location of about 60 additional buried stumps. Through his work, plans for the new visitor's center were drawn and the administration building now being constructed depended on Ralph's study.

"Root's Gulley" is a deep entrenched stream just east of Teller County One south of Lower Twin Rocks Road was named for Ralph. There he studied the stratigraphy of that little known section of shale and ash layers, lending insight to the origins of the lake.

Ralph Root's role in the initial geologic mapping of Florissant fossil beds is akin to Harry Macginitie's work on the fossil plants and Samuel Scudder's work on the fossil insects. The Monument owes a great deal to Ralph Root's love of and work at the Florissant Fossil Beds.

Colorado's First Fossil Insects Were Fifth Ever Found in US

By Beth Simmons

By 1871, how much was known about the fossil insects of Colorado? What paleontological work had been accomplished? How were the results disseminated to those interested in the fossil wealth of the vast Rocky Mountain region?

A number of scientists, well versed in geology, were among the early arrivals in Colorado Territory. Among them were E.L. Berthoud, a great engineer and Robert Old, a mining engineer who worked together to publish the first topographic maps and geological sections of the strata along the Front Range. Each described fossils they found. Old used Berthoud's work to sell Colorado mines to the British. Old even took some fossils to England to show potential investors. Joel Parker Whitney used Berthoud's work in his description of Colorado in his 'pamphlet' for the Paris Exposition of 1867. At the same time, James Ovando Hollister, published his renowned volume, "The Mines of Colorado" in which Professor William Denton of Boston described the general geology of the region. In his description, Denton published the first list of fossil insects from the fifth known occurrence of fossil insects in the country. Samuel Scudder identified the fossils.

F.W. Hayden came along in 1867 and in the summer and fall of 1869. In 1871, prior to the government's publication of the F.W. Hayden report in 1872, a local printer obtained a preliminary copy of Hayden's general geologic field report and published it, almost in its entirety, in a "Colorado Gazetteer" or "Rocky Mountain Business Directory" with a complete list of mines across the state. This "Gazetteer" repeated Denton's insect report from 1867.

Denton found his insect specimens not far from the junction of the White River and Green Rivers in Colorado, from "Fossil Kanyon" and "Chagrin Valley," about sixty miles apart. We know this now to be the famous Green River formation of middle Eocene age. In a brown sandstone that laid over the insect bearing layers, Denton found fossil wood of deciduous trees, large bone fragments and perfect fossil turtles, some two feet in length. Under the sandstone the beds of petroleum shale, a thousand feet in thickness, were filled with innumerable leaves of deciduous trees.

"Throughout the remains of insects abound." About fifty specimens found their way to Samuel Scudder at Harvard, but some were so fragmentary or imperfectly preserved that they were impossible to identify. The most abundant forms were Diptera (flies), either in larval or perfect state, minute Coleoptera (beetles), several Homoptera (Cicadas), an ant, a night-flying moth, and a larvae of slug-caterpillar or Limacode. The flies were mostly small species of Mycetophilidae, a family whose larvae live mostly in "fungoid vegetation" and Tipulidae (Crane Flies) whose larvae live in "stagnant water." There were some Muscidae, (House-flies). The Homoptera were genera that Scudder called *Issus, Gypetna, Delphax,* and members of the Tettigonidae.

Denton used the insects to compare the strata and proposed that the units were the same formation, but perhaps separated by a period of time. He did not try to determine the 'environment of deposition' or suggest that these were fresh water lake deposits.

Denton's collection and others afterward opened the world of western fossil insects to great entomologist Samuel Scudder. Based on the many collections that he studied, Scudder then came out to collect fossil and modern insects for the Hayden Survey. When he arrived in Florissant in August of 1877 to retrieve the crates of fossils that Mrs. Hill had collected for him, Scudder was well versed in fossil insects of the West.

Sources:

Hollister, James Ovando, 1867, The Mines of Colorado, reprint, 1974, Promontory Press, New York, p. 380-383

Wallihan and Company, 1871, Rocky Mountain Directory and Colorado Gazetteer, Denver, S.S. Wallihan and Company, Compilers and Publishers, p. 98- 99

Princeton Scientific Expedition of 1877

The Pikes Peak Historical Society will present:

The Princeton Scientific Expedition of 1877, from College to Colorado by Steven Veatch. The program will be at the new Florissant Library June 13 at 2 p.m.

This student organized trip left Princeton in 1877 to search for fossils, collect minerals, measure mountains, and make general field observations in the American West. Steven Veatch will present this remarkable story through highlights from the handwritten journals kept by these students and the photographs they took. These journals and rare photos document their paleontological work in the Colorado Springs and Florissant area and early placer mining near Fairplay. Ryan Reynolds will read excerpts from these fascinating journals. This research was funded, in part, by a grant from the Western Interior Paleontological Society and was presented at the Rocky Mountain Section Meeting of the Geological Society of America last year at Western State College. Steven Veatch is on the faculty of the Earth Science Department at Emporia State University. Ryan is a pre-med student at the University of Colorado at Colorado Springs. The program will be in the conference room at the Florissant Library. The library is located in the Florissant Community Park.

A Florissant Fossil for the White City

By Steven Wade Veatch

The "Big Stump" at Florissant Fossil Beds National Monument is one of the largest petrified stumps exposed in the Monument: it measures 3.6 meters tall and is 3.7 meters in diameter at breast height (Meyer, 2003). This solitary petrified stump (one of the largest in diameter on record) is all that remains of a tree that was more than 60 meters tall when a volcanic mudflow (lahar) buried its base during the late Eocene.

Figure 1. *This postcard, ca. 1894, shows a wooden framework built around Big Stump. From the E. Simmons collection.*

Big Stump is similar to the modern *Sequoia* (redwood) and is the type specimen described by Andrews in 1936 for *Sequoioxylon pearsallii*. An often confusing aspect of paleobotany is that different organs (e.g., wood and leaves) that belonged to the same living species are preserved isolated and unattached in the fossil record. Therefore, it can be difficult to prove that they belonged to the same living species, and for that reason they are sometimes given different names as fossils. At Florissant, *Sequoioxylon pearsallii* is the name assigned to the fossil wood and *Sequoia affinis* is the name for cones and foliage. It is very likely that they belonged to the same species of tree when they were living, but this can not be proved unless these organs can be found attached in the same fossil. Philosophies differ, however, and in 1953 MacGinitie placed *Sequoioxylon pearsallii* into synonomy with *Sequoia affinis*.

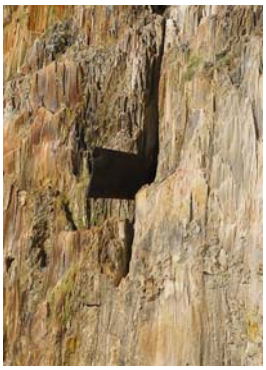

Figure 2. *A broken saw blade remains wedged in Big Stump from an attempt to cut it into sections and ship it to Chicago for the World's Fair. Image date 11/2003, © by S. Veatch.*

The Big Stump has been depicted in early photographs and postcards that date back to the late 1890s. Arthur Lakes, on an early expedition to the area with Samuel Scudder, marked the location of a "petrified forest" on his original water color map in 1878—the same general area where Big Stump is situated.

There was once a local effort to send this incredible fossilized tree stump to the World's Columbian Exposition (The Chicago World's Fair) of 1893. A plan was made in 1890 to remove the stump, transport it to Chicago by rail, and then rebuild it at the fair. Fortunately, the attempt to remove Colorado's prized fossil was unsuccessful. As it happened, the workmen's saw blades became permanently wedged in the fossil wood. The plans to send Florissant's famous stump to the Columbian Exposition were then quickly abandoned.

Figure 3. *This ticket admitted the bearer into the World's Columbian Exposition in Chicago, a landmark event in American history and culture. From the Michele Veatch Collection.*

The World's Columbian Exposition, one of the greatest cultural events in the nineteenth century, was named in honor of Christopher Columbus and the 400th anniversary of his discovery of the New World.

Thousands were employed in the development of 633 acres of fairgrounds and the construction of 200 buildings at Chicago's Jackson Park. Many of the fair buildings were located along constructed waterways fed by Lake Michigan. The Court of Honor buildings (14 main buildings) were covered in white stucco. Visitors, after seeing these white buildings, began to call this the White City. After three years of planning and building, and at a cost of twenty eight million dollars, President Cleveland opened the fair on May 1, 1893. Ticket prices were 50 cents for adults and 25 cents for children.

Visitors to the Columbian Exposition enjoyed more than 65,000 exhibits and attractions. The fair contained many marvels and introduced Americans and the world to picture postcards, carbonated soda, hamburgers, and a gigantic wheel (built by George W. Farris) that visitors could ride. The fair also introduced the nation to the Pledge of Allegiance, and brought a new holiday—Columbus Day.

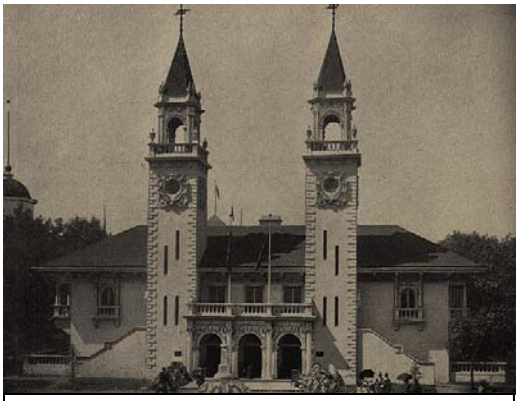

Figure 4. *View of the Colorado building at the World's Columbian Exposition. From the Michele Veatch Collection.*

Most of the states and territories had exhibits at the fair, including Colorado. The Colorado building had a wide variety of displays from the Centennial State. If Big Stump had been cut and quarried into sections, the Colorado building would have been a likely destination. Colorado day was celebrated September 12 at the fair without Big Stump—Colorado's famous fossil remained at the Florissant Fossil Beds, intact. Although Big Stump did not make

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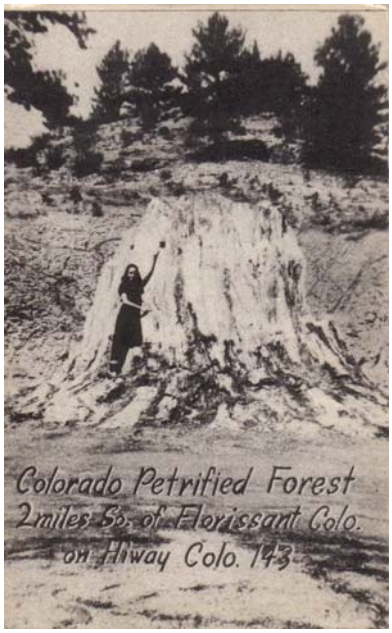
Annual Meeting



Don't forget the Annual Meeting of the Friends of the Florissant Fossil Beds. It is a potluck (bring something good to eat) at the A-Frame starting at noon September 25, 2004. See you there!

Herb Meyer Awarded Funding

Herb Meyer, the paleontologist at Florissant Fossil Beds National Monument and Deborah Woodcock of Clark University have been awarded the funding on their proposal to the National Science Foundation to go forward with their project in Peru. The project is "The Peruvian Fossil Forest Piedra Chamana: A Record of Continental Conditions during the middle Eocene." Their proposal includes research (wood identification and paleoclimate), on-site conservation, implementing an inventory and monitoring project, developing a museum for the community, and providing educational materials for the local school.

State Geologist (Continued)

Geological Society of America, a Trustee Associate for the American Association of Petroleum Geologists, has been an officer in the Rocky Mountain Association of Geologists, and is President-Elect of the Colorado Scientific Society. He has been on the Board of Directors of many industry organizations. On March 25th he presented the second community program at Colorado College sponsored by the Friends of the Florissant Fossil Beds with over 100 people attending. Dr. Matthews was pleased to announce that evening that the Colorado Geological Survey is a corporate sponsor of the Friends of the Florissant Fossil Beds, At the conclusion of his presentation, he signed the new Colorado Geological Survey's book that he edited "Messages in Stone." Dr. Matthews will also present a summer seminar at the Monument on July 31, 2004.

Note about the Colorado Geological Survey:

The Colorado Geological Survey (CGS) provides a variety of services to federal, state, and local government agencies, Colorado's mineral and energy industries, and private citizens. Services include: geologic mapping, including digitized data for identifying geological hazards and mineral resources; technical assistance on topics like swelling soils, and school site and land use reviews; and research and economic development information on Colorado's mineral and energy industries. The CGS is also the home of the Colorado Avalanche Information Center, which provides avalanche hazard monitoring and research. The CGS publishes and distributes its geology-related research in the form of maps and technical reports, as well as non-technical publications such as Colorado's Dinosaurs.

Fossil for the White City (Continued)

it to the Columbian Exposition, it is probable that other Colorado fossils made it to the fair, perhaps even fossils from Florissant.

By its closing date on October 30, 1893, more than 27 million people had visited the White City. If Big Stump had been removed and displayed at the fair, this oddity of nature would have been lost. This magnificent fossil is now protected by the National Park Service, and visitors to the Florissant Fossil Beds National Monument can view Big Stump in its geologic setting.

***Figure 5**. Fortunately, Big Stump did not make it to the White City, but remains for visitors to the Monument to enjoy.*
Image date 11/2003, © by S. Veatch.

References cited:

Andrews, H.N., 1936. A new *Sequoioxylon* from Florissant, Colorado. Annals of the Missouri Botanical Garden 23 (3): 439-446.

MacGinitie, H.D. 1953. Fossil Plants of the Florissant Beds, Colorado. Carnegie Institution of Washing Publication 599:1-198.

Meyer, H.W., 2003. The Fossils of Florissant, Smithsonian Books, Washington, D.C., 258 p.

Crystal Peak (Continued)

paleontological investigation of the area, sketched the first regional geologic map of the Florissant valley while sitting on Crystal Peak. In 1908, A. B. Whitmore established the Gem Mines north of Crystal Peak, a popular collecting site. Successful collecting in the area continues today, as witnessed best by the discovery of several gigantic smoky quartz crystals on the Godsend Claim in 2002.

Crystal Peak appears to lie along an old, northwest-southeast trending fault system that has previously not been recognized. This major fault is likely responsible for forming the paleo-valley in which the fossiliferous Florissant Formation was deposited 34 million years ago. The topaz-rich Redskin Granite of the Tarryall region and Cripple Creek gold district are also on this trend.

Note: A mini-seminar on the geology of Crystal Peak will be presented at the Monument at 2 PM, June 20, 2004.

Lahars (Continued)

Suddenly, to the west, the Guffey volcano erupted ejecting lava and ash onto the surface and more significantly for the Florissant area, initiated a very large lahar that flowed down Four Mile Creek to Evergreen Station then north up Twin Creek burying everything in its path (Simmons, 2001). The sequoias being so much higher than the mudflows only had their lower parts buried, but it was enough to eventually kill them off. The unprotected portions eventually rotted away, but the lower 15 feet or so of the trees buried by the lahar were preserved.

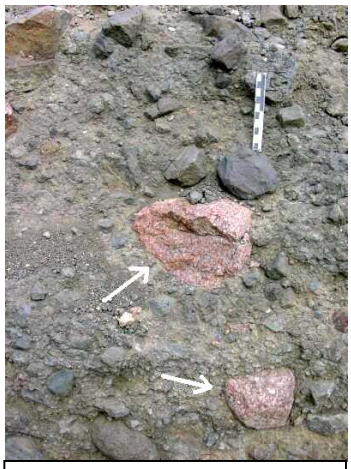


Photo 2. *Close-up view of the lahar deposit. Light-colored rocks indicated with arrows are Pikes Peak Granite. Darker colored rocks are volcanic. Scale is in centimeters. Photo date March 2004 by J. M. Ghist.*

Perhaps fairly soon after, perhaps longer, another eruption occurred or perhaps heavy rains caused earlier deposited volcanic materials to again flow. This lahar (see photo above) blocked off the stream flowing through this valley and a lake was formed. For a time, the valley returned to a fairly normal state. It was populated by insects, birds, fish, and all manner of plants and animals. Occasionally the volcanoes to the west erupted, dumping small amounts of ash on the area. Plants and animals were caught up in this and buried on the bottom of the lake. But this wasn't the last of the lahars. At least once more, the valley would be buried by one of these mudflows covering over the lake deposits. It would seal off the more fragile fossil-bearing shales helping to preserve them for 35 million years so that we could eventually find them and marvel at the fossils preserved therein .

Without these lahars, there would not have been any fossilized trees, no lake for sediments to be deposited and fossil insects, leaves, and so much more to be preserved. Who says lahars are all bad.

References Cited

Francis, Peter, 1998, *Volcanoes: A Planetary Perspective*: Claredon Press, 443 p.

Simmons, Beth, 2001, Volcanoes Trip, Part I. Road log from Morrison to Florissant, 48 p.

35th Anniversary Celebration of the Park

COME HELP THE FLORISSANT FOSSIL BEDS CELEBRATE ITS 35TH ANNIVERSARY: AUGUST 27-29,2004

Friday, **August 27, 2004**

Anniversary Dinner at Pine Crest Lodge and Resort, Florissant, CO. Dinner starts at 6 pm. (Dinner choices: roast beef or vegetarian) Jeff Mow, Superintendent, will be the master of ceremonies. Ann Zwinger will be the main speaker. Other speakers are being scheduled as the newsletter is going to press.

Saturday, **August 28, 2004**

10:00 am to 4:00 pm

Friends of the Florissant Fossil Beds will provide refreshments at the Visitor Center.

Rocky Mountain Nature Center will have a book signing. A two-day seminar starts at the Monument on the 200th anniversary of Lewis and Clark.

Children's activities.

Showing of 25th and 30th anniversary videos.

A picture exhibit Hike with a ranger.

Special Homestead activities.

A very special presentation on Charlotte Hill, Mistress of Fossils by David Atkins.

Sunday, August 29, 2004

10:00 am to 4:00 pm

Friends of the Florissant Fossil Beds will provide refreshments at the Visitor Center.

Day two of the Lewis and Clark seminar.

Stories of western settlement and the Homestead.

Chautauqua at the Florissant Library, co-sponsored by the Friends of the Florissant Fossil Beds and Pikes Peak Historical Society at 1 p.m. with Doug Mischler "presenting" William Clark (of Lewis and Clark).

A special program on the Princeton Scientific Expedition of 1877 to Florissant by Steven Veatch and Ryan Reynolds.

Children's activities

Showing of 25th and 30th Anniversary videos.

Picture exhibit

Hike with a Ranger and more….

Join us for an exciting weekend!

10TH ANNIVERSARY SEMINAR SERIES – 2004
Florissant Fossil Beds National Monument

(See http://www.nps.gov/flfo/Seminars%202004.htm)

You are invited…to fun-filled learning adventures in an engaging outdoor environment, and to celebrate 10 years of achievement. Sign up for any or all of these specially selected 2004 seminars!

This year, 2004, marks the 10th anniversary of the Friends seminars as well as the 35th anniversary of the monument itself. In 1994, as Florissant Fossil Beds National Monument celebrated its 25th anniversary, the supporting association, Friends of Florissant Fossil beds, sponsored its first field seminars. These featured such outstanding instructors as Richard and Linda Beidleman, and Beatrice Willard, the latter one of three women who were, in a large part, responsible for spearheading the effort to establish the fossil beds as a national monument. The seminars have grown in scope, offering a stimulating and diverse selection of earth sciences, natural history, and humanities themes.

The Friends group is not a Field Institute such as those found in many of the larger parks in the National Park system. It is a non-profit organization comprised of people just like yourself who are strongly dedicated to the mission of supporting the monument through a number of dynamic, innovative, and creative programs. All proceeds assist the National Park Service at Florissant Fossil Beds in protecting the world-class fossils and educating the public about their significance. A vital aspect of the partnership between the monument and the Friends organization is that of promoting, through excellence in education and interpretation, a desire to learn about, preserve and protect the beauty and uniqueness of the natural world. Field-based, experiential seminars in the natural outdoor university that the area offers have brought outstanding instructors who are recognized experts in their fields, together with those who find challenge, inspiration, and an enthusiastic sense of commitment in the lifelong process or learning and discovery.

DISCOVERING THE SECRETS OF SOUTHERN COLORADO WILDFLOWERS (Southern Rocky Mountain Wildflowers) (1/2 credit)

June 12th, 9 am to 5 pm, Leigh Robertson, BS — Join Leigh Robertson, author of Southern Rocky Mountain Wildflowers, and explore the wildflower possibilities of mid-June. Secret places yield unexpected surprises, and flowers vary from year to year. Be prepared to meet familiar friends of the plant world and to encounter some you haven't yet been introduced to. Whether a beginner or a bit more advanced in botany, participants will learn valuable facts about flowers, discover edible and medicinal plants and their uses, and hear the stories behind many wildflower names. Learn how to use various wildflower books and keys. If you've always wanted to know the names and stories of wildflowers, this is the seminar for you. Be prepared for a day of enchantment and discovery!

NATURAL HISTORY OF THE FLORISSANT VALLEY (1/2 credit)

June 19th, 9 am to 5 pm, Richard Beidleman, PhD and Linda Beidleman, MA — The Beidlemans are legendary, premier naturalists. We are honored to welcome them back once again to guide you on this all-day field trip afoot as they reveal the richness of the montane ecosystem in the Florissant Valley. They will discuss the area's geology and climate, past and present ecosystems, local flora and fauna, and human history. Stories of early naturalists who discovered and named plants and animals of the frontier west will be related. But that begs the humor and delight of the natural raconteur, which is always present when Dick Beidleman is leading a walk. The Beidlemans presented one of the first seminars here ten years ago, and will be on hand as we celebrate the anniversary series. Not to be missed! But sign up early, registration is limited. Suggested equipment list: bird field guide of your choice, binoculars, 10X-hand lens, field notebook, pencil/pen.

NATIVE PEOPLES OF THE FLORISSANT VALLEY, PAST AND PRESENT (1/2 credit)

June 26th, 9 am to 5 pm, Kurt Fair and Loya Cesspooch Arrum — he morning instructor will be Curtis (Curt) Fair, Pike Zone archaeologist of the Pike and San Isabel National Forests, Comanche and Cimarron National Grassland. He will present "Who Passed This Way", using a public archaeology power point presentation, which is structured for audience participation and includes a hands-on material segment. "Who Passed This Way" looks at the migration patterns of Native Americans in the Front Range of Colorado. Curt will mix commentary and a visual timeline to discuss the different occupation periods (Paleo Indian, Archaic, Ceramic, and Ethnographic). Discussions will take place at each of these developmental periods. The portion will focus on the Ute people and their placement on Reservations. As time permits, Curt will conclude with a flint knapping demonstration replicating stone tools of the periods discussed. Instructing the afternoon session will be Loya Cesspooch Arrum, a registered member of the Uintah-Ouray Ute Reservation in Ft. Duchesne, Utah. Loya will begin by moving into the circle of participants in full Ute regalia, explaining her culture through the various elements of her ceremonial dress. Cesspooch will share some of the ancient Ute legends with the class, first in the lilting Ute language, then in English. Leading participants on a walk through the forests and grasses of the monument, Loya will explain the sacredness of a number of flora and fauna; the cultural significance and connectedness of trees, birds, animals, plants, to the People of the Ute. The class will see, hear, and understand through the eyes of a different culture. Learn about this age-old way of being directly from one whose heritage it is. And what we know of the ancient ones who roamed this part of the country, surviving and living in an amazingly efficient Stone Age technology.

GEOLOGIC HISTORY OF THE GOLD BELT BYWAY (1 full credit)

July 10th and 11th, 8:00 am to 5:30 pm, Herb Meyer, PhD, and Woody Henry, PhD, (Site specialists: Dan Grenard and David Vardiman or Tim Brown) — The Gold Belt National Scenic Byway extends from Florissant at its northern end to Canon City on the south. The area encompasses world famous fossil sites, the remnants of extinct volcanoes, a gold mining district, crystalline

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basement rocks, layered sedimentary rocks, uplifted mountains and ridges, and deeply eroded canyons. This field-oriented course will examine 1.7 billion years of Earth history in this region, including the Eocene plants and insects at Florissant fossil beds, volcanic rocks from the Thirty-nine Mile Volcanic Field, ore mineralization and mining in the Cripple Creek volcanic complex, incision of the Royal Gorge, sedimentary rock formation of the Canon City embayment, and the paleontology of the Jurassic dinosaurs of Garden Park. Basic concepts of geology pertaining to this region will be discussed, including the formation of rock types, volcanic processes, sedimentation and stratigraphy, tectonics, types of fossilization, major groups of fossil organisms from these sites, and the use of these fossils in reconstructing paleoenvironments. A two-day field trip examines fossils and geologic landscapes as a means for demonstrating these concepts. **This is a 2-day seminar, and participants are required to register for and attend both days. Each day's schedule will be 8:00 am to 5:30 pm, the first day beginning and ending at Florissant, and the second day in Canon City. The course is most suitable for science teachers or people with an interest in geology. A previous background in principles of geology is strongly recommended. The instructors and site specialists for this course are co-authors of the guidebook *Geology of the Gold Belt Byway, Colorado*, which is due for publication this year. Students are encouraged to purchase this guidebook for the field trip. Participants will need to include an additional $3.00 with their registration in order to cover special admission costs during the field trips.**

THE WONDERS OF SOUTH PARK, Part 2: ANOTHER FIELD TRIP WITH AUTHOR DON McGOOKEY (1/2 credit)

July 17th, 9 am to 5 pm, Donald P. McGookey, PhD — Last year, McGookey's book *Geologic Wonders of South Park, Colorado, With Road Logs*, had just been released, and he agreed to conduct a field trip to a portion of the vast intermountain basin that is South Park. This year, McGookey will lead another seminar to different areas and sites within the park. "A geologist is basically a historian, reading the history of the earth by studying information available in rocks and geologic structures. South Park is ideal in that the entire geologic column (2 billion years of history) is tilted to the east, eroded and now lies exposed for easy study." This one-day field trip will begin and end at Wilkerson Pass Visitor's Center on US 24, will proceed to the Hartsel area and continue to the gold mining district in Mosquito Gulch northwest of Fairplay. After a brief stop in Fairplay, several ridges of differing origin will be visited along US 285, followed by traversing the leading edge of the Elkhorn Thrust. Some of the roads are unpaved, but all are easily traversed by automobile. The group will carpool if possible to minimize the number of vehicles. You needn't be a geologist, and a glossary of terms will be provided. Come prepared for an adventure and to view *time* as it's preserved in the rocks of the legendary South Park.

ANCIENT LIFE AND LANDSCAPES OF FLORISSANT (1/2 credit)

July 18th, 8:30 am to 5:00 pm, Herb Meyer, PhD — This course investigates the geologic events that shaped the formation of the fossil-rich Florissant Formation. Basic concepts of geology relating to Florissant are discussed, including rock types, volcanoes, dating and stratigraphy. The geologic processes responsible for the formation of the fossil beds are examined in detail, including an overview of regional geologic history through the past 1.4 billion years, types of fossilization, the relation of the fossil beds to the Guffey volcanic center, and sedimentation patterns in the ancient lake. The paleontology of the fossil beds is discussed, including the types of plants and insects that were present, the use of fossils in reconstructing climate and elevation, and the preservation of fossils. A 2-hour field trip examines geologic features as a means for reinforcing these concepts. Handouts will be provided, and numerous slides will be shown. Both basic and advanced topics will be discussed, and it is recommended that students have a previous background in geology. The course is most suitable for science teachers or people with an interest in geology.

MESSAGES IN STONE: Colorado's Geology as Revealed in the Rocks (1/2 credit)

July 31st, 9 am to 5 pm, Vince Mathews, PhD, State Geologist of Colorado — Have you wondered how the great, jutting rocks in Garden or the Gods were formed? Driven Ute Pass and marveled at the startling red rocks and how they change so abruptly, what dramatic events created their forms and colors? Vince Matthews, recently appointed the Colorado State Geologist, will explain the processes that resulted in these and other landforms. The morning portion of this seminar will be spent covering the geology and just such principles, and in seeing some of Colorado's spectacular scenery via stunning slides that will provide participants with birds-eye views that clearly illustrate the events discussed. Topics include the rocks and structures of Colorado, a brief review of Colorado's geologic history, Colorado's mineral wealth, and Colorado's geologic hazards. An afternoon field trip will visit volcanic, plutonic, metamorphic, and sedimentary rocks between Florissant and Garden of the Gods. The trip will end with a summary of the day's experience in Garden of the Gods.

PARKS AS CLASSROOMS: USING FLORISSANT FOSSIL BEDS TO TEACH EARTH SCIENCE (1/2 credit)

August 7th, 9 am to 5 pm, Bill Dexter, PhD, Laine Weber, MS, Jeff Wolin, MS — Do you teach Earth science at the K-12 level? Are you interested in and want to know more about the geologic story at Florissant? Are you looking for new curriculum that is based on a real world example and correlates to the standards? This seminar might be for you! This seminar is a teacher workshop geared towards the K-12 teacher. It is designed to provide teachers with both the background and curriculum to teach Earth science based on the geologic story of Florissant Fossil Beds. Most of the morning will be dedicated to learning about the unique geological story of Florissant Fossil Beds and how it relates to general Earth science. Topics will include volcanism, plate tectonics, geologic processes, geologic time, erosion, fossilization, and much more. This will involve both lecture presentations as well as some hiking and hands-on activities. During the afternoon, participants will explore a range of K-12 curriculum that has been developed by Colorado teachers and National

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Park Service staff. Participants will be exposed to a variety of activities and will participate in many of them. Ideally, participants will gain a more in-depth look at the geology and Earth science of Florissant. In addition, they will leave with specific activities and know how to access activities that bring the Earth science of Florissant to the classroom. Lastly, it is hoped that this seminar will provide enough knowledge that teachers could lead, with confidence, their own field trip to Florissant.

WATER FROM THE EARTH: FRONT RANGE WATER – LIMITED RESOURCE, FUTURE CHALLENGE (1/2 credit)

August 14th, 9 am to 5 pm, Bob Raynolds, PhD — Raynolds' recent study revealed that the underground water sources for the Front Range are a non-renewable resource, are far less than previously thought and, will be more difficult to extract than thought. Yet human demand for what remains is increasing at an unprecedented rate. This non-technical class will first review the geologic framework of the Front Range area including South Park and the Denver Basin, drawing on recent multidisciplinary research results from the Denver Museum of Nature & Science. We will next consider the character and distribution of water resources in this region with an emphasis on the Front Range area. The seminar will review alluvial aquifers and surface water distribution patterns, then will focus more comprehensively on the bedrock aquifers of the El Paso and Douglas county areas. We will examine and evaluate the geological control on these aquifers and discuss the significance of the heterogeneous rock that makes them up – and the implications this carries for groundwater distribution patterns. While the class will present detailed geological models, no prior geological background is necessary. We will use maps, well data, paleontological information, and modern analogs to illustrate and illuminate the water stories beneath our feet. If you live and work in the Front Range and environs, you won't want to miss the implications of this seminar.

FIRE ECOLOGY IN THE FRONT RANGE: Ecology and disturbance History of Front Range Forests and Fuels Treatment Options for the Urban Interface (1/2 credit)

August 21st, 9 am to 5 pm, Wayne D. Shepperd, PhD, and Merrill R. Kaufmann, PhD. — This seminar is an opportunity to learn more about the role of fire ecology and fire behavior from two highly recognized and respected experts in the fields of forestry and fire ecology. Participants will learn about the ecology of the ponderosa pine and other tree species of the Front Range and how current forest landscape conditions differ from those in the past. The morning will be spent in a series of illustrated lectures. In the afternoon, visiting areas of the Florissant Fossil Beds to observe, first-hand, forest conditions, learn about fire risk, and see what measures can be taken to restore forest structures that are ecologically sustainable and at less risk to disastrous crown fire. Opportunities to ask lots of questions and learn everything you've always wanted to know about fire in ecosystems. Fire as friend, fire as foe, this seminar on fire ecology is a way of understanding how both are correct.

LEWIS & CLARK AND THE CORPS OF DISCOVERY (1 full credit)
August 28th and 29th, 9 am to 5 pm both days. Dan McCrimmon, MS, John Stansfield, MA, Carol Stansfield, MA, Robert (Bob) Callan, MS, Marilyn Callan — The bicentennial (1804-1806) of the Long Journey of Lewis & Clark and the Corps of Discovery is under way all over America. This lively 2-day seminar will revisit many of the actual sites written of in the journals through slides and personal accounts. It will view replicas of items that would have been carried on the expedition and discuss some of the archetypal individuals who were a part of it. On Saturday, historian, teacher, storyteller, songwriter and performer Dan McCrimmon will provide an introduction and an overview of the journey. He will relate what day to day living on the trail might have been like. McCrimmon will demonstrate primitive skills, show authentically made clothing of the period, display and demonstrate his Model 1803 Harper's Ferry rifled musket. He will tell stories, sing his own original songs written about the expedition and some of its members, capturing a spirit of time, place, and people. On Sunday, Carol and John Stansfield will recount their 2001 canoe trip on the Missouri River. They experienced some of the grand scenes the explorers saw and, by studying the Lewis and Clark journals, gained a sense of what days on the river were like in 1805. The Stansfields will discuss their trip preparations, display maps, show slides of the river voyage, and share pertinent readings from the journals. Bob and Marilyn Callan will relate why they decided in 1997 to re-trace some of the wildest portions of the route, and what they hoped to find in the present day. Bob will present a slide overview of the expedition. Marilyn will relate some of their experiences in tracing the trail over a five month period, showing slides of actual camping sites and locations mentioned in the journals, many of them all but inaccessible and little known in the present, meeting Native Americans, and seeing plains covered with bison. The capstone of the Callans trip was meeting historian/author Stephen Ambrose and receiving his permission to videotape his presentation, part of which will be shown to the class. Weapons, a grizzly bear pelt (that will demonstrate just how formidable "these gentlemen" were), clothing, replicas and authentic trade items such as would have been part of the accoutrements of the company will be displayed. There will be handouts, a look at differing perspectives on the journey, insights into individual members of the party, and other participants with whom to share this interest in our first expedition to explore and map the country that had recently doubled in size. The last hour will feature a living history visit from a "leading member of the party" in an unforgettable climax to a 2-day evocation of an inspiring piece of our history

Our association with Adams State College, Division of Extended Studies, in Alamosa, Colorado, is entering its fourth year. Through this excellent program we offer graduate credit for teachers attending the seminar series. Tuition is of course in addition to regular seminar fees.

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REGISTRATION, COSTS and TUITION

FRIENDS SEMINAR FEES:

$35.00 fee for each 1 day seminar
$50.00 fee for each 2-day seminar (Must attend both full days, no split fees or credit)
$25.00 discounted fee for current member of Friends, 1 day
$40.00 discounted fee for current member of Friends, 2 days

ADAMS STATE COLLEGE:

$22.50 tuition for ½ credit per 1 day, 7.5 hour class*
$45.00 tuition for 1 full credit per 2 day, 15.0 hour total class*

Pre-registration by phone is acceptable, but we will hold only for 10 days for payment. Receipt of payment confirms your space in the seminar. **Please call the Florissant Fossil Beds National Monument for more details at 719-748-3253**

40th Annual Pikes Peak Gem & Mineral Show 2004

Sat. & Sun.
June 19th & 20th
10am—5pm

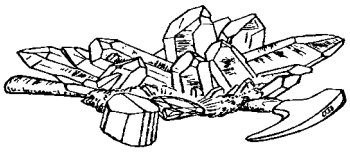
Admission:
Adults $4.00
Ages 12 to 18 $1.50
Under 12 free

Field Trip Mon. after the show

Rockhounding,
A Family Affair
Sponsored by the Colorado Springs Mineralogical Society
Plus the incredible Mr. Bones, life size dinosaur skeleton puppet

New location: Phil Long Expo Center
1515 Auto Mall Loop
Plenty of free parking

Take I-25 to North Academy Exit 150 and go South. Turn left on Highway 83, going North. Turn right at the light on Razorback Rd. and then left on Auto Mall Loop.



Featured Mineral - Feldspar

Larger expanded show at our new location.
Educational Kids area and hands on area for kids and parents.
Free Gold Panning provided by the Gold Prospectors of Colorado
Free Mineral Specimens
USGS Exhibits
Special Exhibits and Programs
Demonstrations of faceting and lapidary art
Special fossil exhibits

Theme: Pikes Peak, A Rockhound's Paradise
Featuring Colorado Gems, Minerals and Fossils
Dates: Fri. thru Sun. June 17th – 19th, 2005
Field Trips during the week following the show
In conjunction with: The Rocky Mountain Federation of Mineralogical Societies Show with exhibits from around the Rocky Mountain West
Hosting: The Rocky Mountain Micromineral Symposium – co-sponsored by The Friends of Mineralogy, The Denver Museum of Nature and Science and CSMS
Visit us in 2004 for a few days. In 2005 visit us for a few weeks.

**For more information:
(719) 632-9686
Email us at csmsshow@cs.com
Visit us at our website at csms.us
**Thanks to our sponsors: The Cripple Creek and Victor Gold Mining Company, The Gazette and The Embassy Suites

Email Addresses Wanted

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

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 fossilbeds@yahoo.com.

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 newspaper each spring
- Funding and coordination of annual Summer Educational Seminars Program

FRIENDS OF THE FLORISSANT FOSSIL BEDS
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