COLORADO DEPARTMENT OF NATURAL RESOURCES

ROCKTALK

COLORADO GEOLOGICAL SURVEY

Volume 9, Number 1
Spring 2006

Colorado's Magnificent POGIs

POGI—that's what we get as an acronym for one of our favorite phrases: ***Points of Geological Interest.***

In this special issue of *RockTalk,* we highlight POGIs where there are guided activities in the form of interpretive presentations, hikes, or tours; self-guiding hikes or drives; museum exhibits; roadside displays; or educational seminars where geology is a primary topic of interest.

Given this broad definition, there are dozens of guided, POGI-related activities for your enjoyment in Colorado. Most are available in the summer, coincident with the tourist season. However, once you've experienced a guided activity in these areas, it is easy to return to enjoy these areas during different seasons. A little bit of instruction can go a long way!

We've divided our POGIs into a number of categories including fossil and dinosaur activities (F); minerals, mine tours, and mining-related activities (M); more general and scenic geology activities in Colorado's federal lands, state parks, and county and municipal parks (G); cave tours (C); and formal and informal geology seminars.

At the center of this newsletter is a map of the state showing all of these locations, by category.

Our aim is to provide you with a basic description of cool geology-related activities at each area, along with contact phone numbers and web sites. We have not included the costs (some have fees while other events are free) or gear that is needed for these activities. For more information about any of these POGI areas, please contact the sponsors directly.

Of course, there are thousands of undeveloped Points of Geological Interest across Colorado where no guided activities exist. While we won't attempt to list these, there are some good general guidebooks for sale that cover many parts of the state. We've listed some of these for you. Happy exploring!

Jill Carlson and Dave Noe
POGI Compilers and Authors

Coming Soon— More POGIs on CGS Web Page

Colorado has more great POGIs than we could fit into this printed version of *RockTalk,* so look for an expanded version coming soon to the CGS web site, at <geosurvey.state.co.us>, under "Geoactivities." The web page will contain a map with links to the sites referenced in this *RockTalk,* plus several other POGIs that are not listed here, with expanded descriptions, GPS coordinates, and photos.

IN THIS ISSUE:

FOSSIL AND DINOSAUR ACTIVITIES

From the Plateaus in the west, to the flanks of the Rocky Mountains, to the wide expanses of the Great Plains, Colorado is dinosaur country. During the past two decades, the fossil and dinosaur-themed activity areas in the state have exploded, both in number and in the range of activities offered. The choices range from museums, to dinomation exhibits, to guided interpretive trails, to quarry visits and participation. These activities appeal to dinosaur lovers of all ages and abilities.

Trail Through Time—POGI #F1, Rabbit Valley, near Fruita. This 1.5-mile, self-guided trail includes the seasonally active Mygatt–Moore dinosaur quarry (type locality of both *Mymoorapelta*, the first Jurassic ankylosaur found in North America, and the palaeoniscoid fish *Morrolepis*), *in situ* *Camarasaurus* and *Diplodocus* vertebrae, and other geological highlights. During the summer, hikers may observe paleontologists at work in the quarry. Administered by the Bureau of Land Management and the Museum of Western Colorado. Located immediately north of the Rabbit Valley exit off of I-70, about 2 miles east of the Colorado state line. A brochure that explains the stops is available and may be downloaded from the BLM web site. Information: (970) 244-3000 or <co.blm.gov/mcnca/ttt.htm>

Museum of Western Colorado/ Dinosaur Journey—POGI #F2, Fruita. This museum provides an overview of the diverse paleontology of the Rabbit Valley–Fruita–Grand Junction area, with hands-on, interactive exhibits about dinosaur excavations, realistic and scientifically accurate robotic dinosaurs, and a working paleontology laboratory where fossils excavated from local quarries are prepared for study and display. Information: (970) 858-7282 or <dinosaurjourney.org>

Dinosaur Hill Interpretive Trail—POGI #F3, near Fruita. This one-mile, self-guided trail loops past 10 points of geological and paleontological interest, including an *Apatosaurus* site excavated in 1901 by Elmer Riggs. The *Apatosaurus* skeleton is on display at the Field Museum in Chicago in a new exhibit called "Evolving Planet." Located about 1.5 miles south of Fruita on Hwy 340. Information: same as for Dinosaur Journey (above)

CGS geologist Matt Sares points out Camarasaurus *vertebrae in an outcrop along the Trail Through Time. Photo by Vince Matthews, CGS.*

Fruita Paleo Area Trail—POGI #F4, near Fruita. A loop trail through the 360-acre Fruita Paleo Area features interpretive signs describing the landscape as it existed 150 million years ago and the dinosaurs and other Jurassic vertebrates that roamed there. This world-class fossil site contains a prolific record of Jurassic microvertebrates exposed in deeply dissected Morrison badlands. Administered by BLM and the Museum of Western Colorado. Information: (970) 244-3000

Riggs Hill Trail—POGI #F5, near Grand Junction. A ¾-mile long, self-guided trail in the Redlands area, featuring eight points of interest. The type specimen for *Brachiosaurus* was excavated here by Elmer Riggs in 1900 (a cast replica of this *Brachiosaurus altithorax* is on display at Chicago's O'Hare airport), and in 1937 Lee Edward Holt uncovered partial skeletons of *Stegosaurus*, *Allosaurus* and possibly another *Brachiosaurus*. Information: same as for Dinosaur Journey (above)

Dinosaur National Monument—POGI #F6, near Jensen, Utah and Dinosaur, Colorado—(see *Feature Box 1*)

Ryan Geology Museum—POGI #F7, Alamosa. The Adams State College geology department maintains an exceptional collection of over 2,000 mineral and 3,000 fossil specimens from all over the world at its Ryan Geology Museum. Information: (719) 587-7921 or <faculty.adams.edu/~rgbenson/>

Dinosaur Depot Museum—POGI #F8, Cañon City. This is a great place to begin exploring the rich fossil heritage of the Cañon City area. On display is a full-size replica of one of the three *Stegosaurus* skeletons found at the Garden Park Fossil Area. Information: (719) 269-7150 or <www.dinosaurdepot.com>

Garden Park Fossil Area—POGI #F9, near Cañon City. The Garden Park Fossil Area has been an important site for late Jurassic vertebrate paleontology since the 1870s. At least six new dinosaur genera have been discovered here, along with the only skull of *Brachiosaurus* from the Morrison Formation, three *Stegosaurus stenops* skeletons, and a clutch of dinosaur eggs. Self-guided tour brochures are available at the Dinosaur Depot Museum. Information: see Dinosaur Depot Museum (above)

POGI Internet Link Information: The web page listings are presented in a shorthand form that should work when typed into any Internet browser's address box. We've included "www." prefixes and capital letters only where they are necessary for calling up the page.

FEATURE BOX 1: Dinosaur National Monument

Dinosaur National Monument contains a wild landscape of mesas, hogbacks, and river gorges astride the Colorado and Utah border. The Colorado section of the Monument preserves scenic canyons carved by the Green and Yampa Rivers, and huge, well-displayed folds (monoclines). Beautiful exposures of thick, ancient sand dune deposits can be seen at Echo Park.

The world-famous Douglas Quarry Visitor Center, which sits on the Utah side of DNM, preserves 1,400 dinosaur bones left in place as they were deposited 145 million years ago. More than half of all the different kinds of dinosaurs that lived in North America in the late Jurassic Period are found in this quarry. Besides the huge plant-eating sauropods, *Apatosaurus*, *Camarasaurus*, *Barosaurus* and *Diplodocus*, which compose three-quarters of all of the fossils in the exposed quarry wall, the dinosaurs of the quarry include other plant eaters ranging from large to small, and a few meat eaters as well.

Photo of the famous quarry wall at Dinosaur NM. Yes, it's located just over the Utah border, but that's close enough for us! National Park Service photo.

This centerpiece visitor center also houses exhibits about the bones and their burial and preservation, a preparation laboratory, research facilities, and a bookstore operated by the Intermountain Natural History Association (open during the summer) that specializes in dinosaur and natural history books. A second visitor center near Dinosaur, Colorado, features an orientation movie and a bookstore.

Activities include guided ranger-led walks, evening talks, self-guiding nature trails, and two guided auto tours—"Tour of the Tilted Rocks" and "Journey Through Time." Information: (970) 374-3000 or <nps.gov/dino>

There's more to Dinosaur NM than the quarry! Steamboat Rock dominates the geology at Echo Park. National Park Service photo.

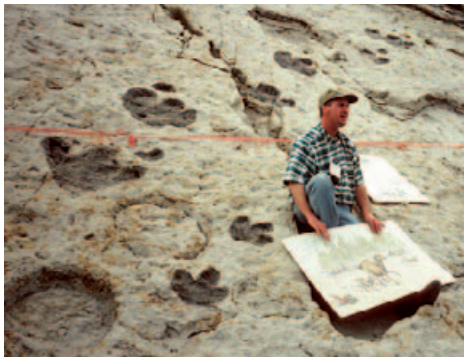
Skyline Drive Trackway Site—POGI #F10, near Cañon City. At the Skyline Drive Trackway Site, you can see a series of Cretaceous *Ankylosaur* tracks made by a group of dinosaurs walking side-by-side through mud. The tracks were discovered in 1999. Interpretive signs are posted, and a self-guided tour brochure is available at the Dinosaur Depot. Skyline Drive is a one-way road that is narrow and has precipitous drop-offs and tremendous views—this is not a POGI for the faint of heart! Information: see Dinosaur Depot Museum (above)

Florissant Fossil Beds National Monument—POGI #F11, near Woodland Park. A wonderful surprise in Colorado, FFBNM contains in-place, petrified, giant sequoia stumps, petrified logs, and a host of fossilized, delicate impressions of plants, fish, birds, mammals, mollusks, and insects that have been quarried from volcanic and lake sediments that once filled the valley. Up to 1,700 different species have been described. The visitor center houses an extensive collection of the fossils and describes the geologic events that led to their preservation. The giant trees are accessed by the 1.4-mile-long, Petrified Forest self-guided nature trail. Ranger-led walks, seminars, and discovery programs are offered. The FFBNM web site contains an online virtual museum that presents a wealth of visual information about the area's geology and fossils. Information: (719) 748-3253 or <nps.gov/flfo>

Florissant Fossil Quarry—POGI #F12, near Woodland Park. Although specimen collecting is prohibited in Florissant Fossil Beds National Monument, there is a private quarry just to the north that does allow collecting for a fee. On-site collecting is offered for groups, schools, and individuals. The quarry has regular summer hours, or may be visited by appointment. Information: (719) 748-1002, or e-mail the owners at florissantfossils@earthlink.net

Morrison Natural History Museum—POGI #F13, near Morrison. The Morrison Natural History Museum tells the story of Jefferson County's paleontological heritage. Explore the museum's hands-on exhibits with a personal guide. On permanent exhibit are Morrison-area dinosaur discoveries from 1877 to the present day. New displays discuss Front Range dinosaur habitats and ecosystems. The museum is also conducting a study of the life and landscape of the Jurassic Morrison Formation. Recent excavations in nearby quarries have revealed several important fossil finds, yet to be announced. Inquire about opportunities to explore and study with researchers at dig sites, on field trips, or in classes. Information: (303) 697-1873 or <morrisonmuseum.org>

Dinosaur Ridge—POGI #F14, near Morrison. The Dinosaur Ridge area is one of the world's most famous dinosaur localities. Some of the best-known dinosaurs were first discovered here in 1877, including *Apatosaurus*; *Diplodocus*; *Allosaurus*; and *Stegosaurus*, the Colorado State Fossil. Dinosaur Ridge offers a visitor center as well as guided and self-guided tours of the tracks, fossils and geology. Dinosaur Discovery Days are held one day each month during summer, when the road over Dinosaur Ridge is closed to traffic and guides are available to answer questions and give demonstrations. An extensive set of educational programs is available. A Dinosaur Ridge brochure is available at CGS. Information: (303) 697-3466 or <dinoridge.org>



A guided tour being led at Dinosaur Ridge. The drawing is a depiction of the adult and juvenile duckbill dinosaurs that are thought to have made the tracks behind the tour guide. Photo by Vince Matthews, CGS.

Triceratops Trail at Parfet Prehistoric Preserve—POGI #F15, near Golden. This ½-mile hiking trail through a reclaimed clay pit leads you on a walk through 68 million years of Colorado's pre-history. Along the Triceratops Trail, you can see footprints, trace fossils and other impressions left in an ancient swamp by dinosaurs, birds, mammals, beetles and plants. After you hike the trail, you may want to visit the paleontological exhibit at the Fossil Trace Golf Club clubhouse. An informative brochure is available at the trailhead, at Dinosaur Ridge visitor center, and at CGS. Information: see Dinosaur Ridge (above)

University of Colorado Museum—POGI #F16, Boulder. The CU Museum's Dinosaur/Fossil Hall features triceratops, saber-toothed cats, and a wide variety of dinosaur, reptile and mammal fossils. Some of these specimens are part of an exceptional collection of Tertiary vertebrate fossils from the Laramide basins of the Rocky Mountains. Information: (303) 492-6892 or <cumuseum.colorado.edu>

Broomfield Walk Through Time—POGI #F17, Broomfield. Students and teachers at Broomfield Heights Middle School, with assistance from the Geological Society of America, have created a marvelous self-guided walk in an open field to the west of the school. A scale model of geologic time, this 600-foot long, loop path represents the most recent 600 million years of earth's history using rock samples, drawings and interpretive signs. The walk features a series of stations, each of which includes a student-illustrated exhibit sign that describes the geologic scene, creatures that inhabited the area, and the geology of a large, adjacent boulder of a representative local rock formation for that period of geologic history. At certain times of the year, student-led tours may be available. Information: (303) 466-2387 or <schools.bvsd.org/broomfield heights/wtt/dev/>

An exhibit station along Broomfield Heights Middle School's excellent "Walk Through Time." Photo by Dave Noe, CGS.

Dinosaur Tracks Museum—POGI #F18, Denver. Located on the University of Colorado at Denver campus, this gem of a museum is home to the world's largest collection of fossil footprints and traces. Specimens from a wide range of geologic time periods and geographic locations are displayed here, but the emphasis is on dinosaur tracks from the American southwest. Museum hours are limited, so call

before you go. Special tours may be arranged. Information: (303) 556-5261 or <www.dinosaurtracking.org>

Colorado Convention Center—POGI #F19, Denver. The newly renovated Center contains an exhibit, "Ancient Colorados," in its grand hallway. Commissioned by the City of Denver in partnership with the Denver Museum of Nature and Science, there are ten large murals that depict scenes from Colorado's prehistoric past during different geological ages. Each painting has a companion display that shows photographs of the outcrops today, plus fossil evidence that was used to create the scene. A brochure is available at the Center's information kiosk. Information: (303) 892-1505 or <denver.org>

Denver Museum of Nature and Science—POGI #F20, Denver—(see *Feature Box 2*)

Comanche National Grassland—POGI #F21, near La Junta. The largest documented dinosaur tracksite in North America, this remote ¼-mile stretch along the banks of the Purgatoire River in southeastern Colorado contains over 1,300 visible tracks in 100 separate trackways. Access to the Purgatoire Valley Dinosaur Tracksite Area is extremely limited. The Forest Service offers guided auto tours into the Picketwire Canyonlands. Reservations for the guided auto tours must be made months in advance due to the tour's popularity. Information: (719) 384-2181 or <www.fs.fed.us/r2/psicc/coma/palo/auto_tour_general_info>

A few of the 1,300 dinosaur tracks in the Picketwire Canyonlands at Comanche National Grasslands. Photo by John Keller, CGS.

FEATURE BOX 2: Denver Museum of Nature and Science

The Denver Museum of Nature and Science has several permanent exhibitions and ongoing projects of great interest to both amateur and professional geologists. The museum hosts traveling exhibitions, as well; please consult the DMNS web page for current and upcoming special events.

State Geologist Vince Matthews and his granddaughter tour the Coors Mineral Hall at the Denver Museum of Nature and Science. Photo by Glenn Graham.

- **Prehistoric Journey**, on Level 3, takes visitors through 3.5 billion years of geologic time, from ancient seas where life began, past the fascinating life forms that evolved during the "Cambrian explosion," directly into a raging battle between *Allosaurus* and *Stegosaurus* with an 80-foot long *Diplodocus* towering overhead, and continuing with the rise of mammals and the dawn of humans.
- **Gems & Minerals**, in the Coors Mineral Hall on Level 1, illustrates the mining history that Colorado was founded on, and contains beautiful rhodochrosite specimens from the Sweet Home Mine, an eight-pound nugget of crystallized gold found in Breckenridge, and samples of Colorado's other important gems, minerals and metals.
- **Ancient Denvers**, on Level 3, is an exhibit of the original, large-scale landscape paintings and images from the book, *Ancient Denvers*, illustrating how subsurface rock layers and outcrops provide evidence of Denver's geologically and climatologically diverse past.
- **Space Odyssey**, on Level 1, reminds us that interesting geology isn't found only on Earth. Explore canyons, craters, dunes and channels on Mars, create a star, compare it to images of real stars, and watch it cycle from birth to death, and learn about the tools and experiments that allow planetary scientists and cosmologists to study their remote field sites.

Information: (303) 322-7009 or <dmns.org>

Digging Deeper

Want to get your hands dirty on a real dinosaur dig? There are several museums and companies that allow individuals to participate in fossil digs in Colorado. Here are three:

- **Dinosaur Journey/Museum of Western Colorado** offers one-day dinosaur digs at the Mygatt–Moore Quarry and five-day geology–paleontology–rafting expeditions in western Colorado. Information: (970) 242-0971 or <dinodigs.org>
- The private company **Jurassic Tours** offers guided tours and dinosaur digs at the Split Rock Dinosaur Area and Cactus Park Hups/Lowell Quarry. Information: (970) 872-3959 or <jurassictours.com>
- The **Morrison Natural History Museum** offers opportunities to explore and study with researchers at dig sites, on field trips, or in classes. Information: (303) 697-1873 or <morrisonmuseum.org>

Other useful online resources for learning about Colorado dinosaur localities include the following:

Dinosaur Diamond National Scenic Parkway, in Colorado and Utah: <dinosaurdiamond.org>

Dino Russ' Lair, a personal web site: <dinoruss.com> ●

MINERALS, MINE TOURS, AND MINING-RELATED ACTIVITIES

Colorado has a rich history of gold, silver, industrial metals, gemstone and coal mining. Most of the state's mines have been closed and are not safe to explore, but a few have been reincarnated as tourist mines. The Colorado Division of Minerals and Geology (DMG) inspects the tourist mines listed here for safety. Many of these mines are located in the "Colorado Mineral Belt" that extends from the foothills of Boulder County southwest across the state to the San Juan and La Plata Mountains. Occasional tours are offered at a few of Colorado's working mines. The working mines are inspected for safety by DMG, as well, but only supervised visits should be made to these mines. Numerous museums throughout the state preserve mining equipment, tools and everyday artifacts from the gold and silver mining glory years of 1859 through the early 1900s. Others host interesting collections of local minerals. These POGIs may entice you to journey back in time and experience what it was like to work in an underground mine and live during Colorado's mining boom!

The San Juan Mountains in southwestern Colorado are mining country. Painting by Larry Scott.

Mine Tours

Old Hundred Gold Mine—POGI #M1, near Silverton. Mined sporadically and unprofitably from 1907 until 1972, this mine can be explored on a tour that takes visitors ⅓ mile into Galena Mountain on a mine tram and includes demonstrations of mining methods using authentic mining equipment. Information: (970) 387-5444 or <minetour.com>

Bachelor–Syracuse Mine—POGI #M2, near Ouray. This gold and silver mine was worked from 1884 until the silver crash of the early 1980s. The mine tour takes you 3,350 feet into the side of Gold Hill on a "trammer" to see ore veins, mining equipment, and mine workings such as stopes, declines, crosscuts, run-a-rounds and drifts. Information: (970) 325-0220 or <bachelorsyracuse.com>

Hard Tack Mine—POGI #M3, Lake City. This 100-year-old mine tunnel was supposed to be an underground transport tunnel for nearby Hidden Treasure Mine, but the tunnel was never completed. Part of the Hinsdale County Galena Mining District, the Hidden Treasure Mine and the Treasureville mining camp were active in the production of silver ore from the 1890s until 1930. Information: (970) 944-2506 or <hardtackmine.com>

Colorado Yule Marble Quarry—POGI #M4, Marble. The Colorado Yule Marble Quarry produces one of the finest white marbles in the world. It operated from 1905 to 1941, and is the source of the stone used for the exterior of the Lincoln Memorial and the Tomb of the Unknowns in Washington, D.C. Yule Marble was declared the Colorado State Rock in 2004. The quarry re-opened in 1990, but tours into the quarry are not currently offered. A short trail from the parking lot at the base of the quarry (four miles south of town along a very poor, dangerous road) takes you past lots of beautiful white marble blocks that have been cast out of the quarry, and offers a view into the quarry itself. The Marble Historical Society has prepared a self-guided walking tour of the Town of Marble that includes the site of the marble-finishing mill, once the largest in the world. The CGS has a slide show

about Yule Marble on our web page (geosurvey.state.co.us/general_info/YuleMarble_files/frame.htm). Information: <marblecolorado.org> or the Marble Historical Society Museum, 412 Main Street, open 2–4 PM, summer weekends only

Compromise Mine/Smuggler Mine—POGI #M5, Aspen. The Compromise Mine is located on the front side of Aspen Mountain; a 4WD vehicle takes visitors up to the mine. On the tour, visitors ride 2,000 feet underground in tour cars behind an electric mine locomotive, through some of the largest open underground chambers in the world. The Smuggler Mine, listed on the National Historic Register, is a walking tour that takes visitors 1,200 feet into Smuggler Mountain and visits two levels of the mine workings. The world's largest silver nugget was found at the Smuggler Mine in 1894. Information: (970) 925-2049

Lost Mine—POGI #M6, near Salida. The Lost Mine operated during World War I and produced only about 80 tons of manganese and tungsten ore before the war ended and prices plummeted for these steel alloy components. The mine consists of the original discovery cut and about 150 feet of underground mine workings. The Lost Mine Tour takes visitors on a rugged backcountry road past geologic faults and folds, an old travertine quarry, and an abandoned lime kiln operation on the way to the Lost Mine. Information: (719) 539-7786 or <salida.com/lostmine/>

Climax Mine—POGI #M7, near Leadville. Although currently idle, the Climax Mine is the world's largest molybdenum mine; it is slated to be reopened in 2009 when the Henderson Mine ore body is exhausted. The underground workings are not visible from the road, but travelers can see the extensive tailings ponds where waste rock is deposited, and glimpse some of the open pit mine workings. The disturbed land is in the process of being reclaimed using bio-solid waste from nearby communities. Travelers along State Highway 91, south of I-70 between Copper Mountain and Leadville, can tune their car radios to a special AM-band station hear a narrative about the mine, and interpretive signs near the parking lot describe the geology of the huge molybdenum ore body. Information: AM radio 700, local transmitter

That's not snow. Large, white blocks of cast-off marble greet visitors near the Yule quarry site above the town of Marble. Photo by Jill Carlson, CGS.

Carbonate Mine—POGI #M8, near Breckenridge. The Carbonate Mine was first opened in the summer of 1896 and remained in production until the late 1950s. The principal ores were limonite, a gold-bearing, mustard-colored ore; and galena, a purplish ore containing gold and silver. Some of the passageways are encrusted with astounding ice crystals. With a constant temperature of 28°F, warm, water-resistant clothing is a must! Summer tours are offered by appointment. If that's not enough, wintertime visitors may arrange to stay overnight in the rustic mill building, at 12,000 feet elevation, a unique opportunity to live like the miners of old. The mine itself is buried by snow and is not accessible during the off-season months. Information: (720) 226-0702 or <carbonatemine.com>

Country Boy Mine—POGI #M9, near Breckenridge. Founded in 1887, the Country Boy Mine first produced gold and silver, then high-grade lead and zinc for use in World Wars I and II. The tour takes visitors 1,000 feet into the mine workings. Information: (970) 453-4405 or <www.countryboymine.com>

Washington Mine/Lomax Placer Gulch—POGI #M10, near Breckenridge. The Washington Mine was opened in the 1880s as a hardrock gold and silver mine. On the Washington Mine tour, the Summit Historical Society takes visitors through several typical mine "headworks" buildings including the original shafthouse, a typical prospector's cabin, the hoist- and steam-generation equipment, and the tramway to the tipple where ore was sorted and loaded into wagons. On the Lomax Placer Gulch tour, visitors can pan for gold, learn how mining-town chemists assayed the ore content, and watch a slide show to learn how hydraulic mining changed the landscape. Information: (970) 453-9022 or <summithistorical.org/Tours.html>

Henderson Mine—POGI #M11, near Empire. In operation since 1976, the Henderson Mine has produced more than 160 million tons of ore and 770 million pounds of molybdenum. The ore is mined underground using a method known as "panel

POGI Hint: "Baby, It's Cold in the Mine!" Many of Colorado's underground mines can be cool and/or wet. Enhance your own comfort by bringing appropriate footwear and a jacket. Contact the mine before you go; they will be able to tell you how to dress for their particular tour.

caving," and is transported to the Henderson Mill via the world's longest conveyor, a fifteen-mile elevated belt that passes underneath the Continental Divide through an old train tunnel. Most of the mined areas have been covered with shotcrete, so geologic exposures are limited. Regular tours are not offered, but tours are sometimes offered during special events such as Clear Creek County Mining Days. Information: (303) 567-4660 or <clear creekcounty.org>

Lebanon Silver Mine/Georgetown Loop Historic Mining and Railroad Park—POGI #M12, near Georgetown. The Georgetown Loop Historic Mining & Railroad Park comprises two mines from the 1860s, four reconstructed mine buildings, an 1871 mill building, and several narrow gauge railroad structures. The Lebanon Silver Mine can be accessed only from a stop on the Georgetown Loop Railroad. The mine was developed in 1871 and operated until the 1880s. A walking tour of the mine, led by Colorado Historical Society guides, takes visitors through the mine, the mine manager's office, the miners' change room, the blacksmith shop and the tool shed. Information: (888) 456-6777 or <georgetownlooprr.com>

Argo Gold Mine, Mill, and Museum—POGI #M13, Idaho Springs. The Argo Tunnel dewatered and transported ore from numerous mines in Seaton Mountain, part of the major Central City–Idaho Springs District, to the Argo Mill. In 1894, when it was built, it was the longest tunnel in the world. The mill operated from 1913 until 1943, and is now a museum. Tours of the mine and mill are available year round. Information: (303) 567-2421 or <historicargotours.com>

Edgar Experimental Mine—POGI #M14, Idaho Springs. In the 1870s, the Edgar Mine produced high-grade silver, gold, lead and copper. Today, the Edgar Experimental Mine is operated by the Mining Engineering Department of the Colorado School of Mines, and is used as an underground laboratory and classroom for topics such as underground mine surveying, geologic mapping, rock fragmentation and blasting, mine ventilation field studies, rock mechanics and instrumentation, and mine safety. The mine tour takes visitors through more than one-half mile of underground workings, representing over 100 years of mining. Students and staff conduct guided one-hour mine tours for the general public throughout the year. The tour features lighted displays of drilling, blasting, and mucking equipment, and topics of discussion include mining practice, mining economics, and the role of the mining industry in modern society. Special tours may be arranged. Information: (303) 567-2911 or <mines.edu/academic/mining/edgar.html>

Phoenix Mine—POGI #M15, near Idaho Springs. This is a working gold mine in Clear Creek County's Trail Creek Mining District. The Phoenix Vein was discovered in 1871, and miners are currently working the Resurrection Vein. Tons of ore are still pushed along underground narrow-gauge rails in small ore cars, and the mine has its own mill. Information: (303) 567-0422 or <www.phoenixmine.com>

Hidee Gold Mine—POGI #M16, near Central City. The Hidee Mine is located in the rich Virginia Canyon–Glory Hole mining area, and has been worked intermittently from 1896 until the present time. Gold, silver and copper are found here. The mine tour takes visitors into an adit driven 600 feet into the mountainside, and visitors are allowed to try hard rock mining using a hammer and chisel to carve out a gold specimen from the main ore vein. Information: (303) 989-2861 or <cccmma.com/hidee/hidee.htm>

Mollie Kathleen Gold Mine—POGI #M17, near Cripple Creek. Mollie Kathleen Gortner discovered an outcrop of quartz containing wire gold in 1891, filed a gold claim in her own name and, with her husband and son, hand steeled the mine's initial 250-foot deep mine shaft. The mine operated almost continuously until 1961, when it closed as a result of the closure of the Carlton Mill. This is the only mine tour that takes visitors down a 1,000-foot vertical mine shaft, via a man-skip elevator. Once underground, visitors travel in a miners' train car pulled by an air-powered Tram-Air locomotive. Information: (719) 689-2466 or <goldmine tours.com>

These miners had to "rough it" to see Colorado in 1875. Today, it's easy to tour any of the state's many tourist mines in relative comfort. Photo by W. H. Jackson, U.S. Geological Survey collection.

Mining Museums and Mills

Telluride Historical Museum—POGI #M18, Telluride. Telluride was originally a rowdy mining camp called Columbia, and incorporated as the Town of Telluride in 1878. It was a prosperous gold and silver mining town from the arrival of the railroad in 1890 until the crash of the silver market in 1893 and World War I. The newly restored Telluride Historical Museum has permanent exhibits illustrating Telluride's colorful mining history, and the town's evolution from "Mining Camp to Community." Information: (970) 728-3344 or <telluridemuseum.com>

Silverton Mining Heritage Museum—POGI #M19, Silverton. The San Juan County Colorado Historical Society has amassed an extensive collection of early mining and surveying equipment, local mineral specimens, and other mining-era artifacts. Information: summer (970) 387-5838, winter (970) 387-5609, or <silver tonhistoricalsociety.org>

Mayflower Gold Mill—POGI #M20, near Silverton. Former miners demonstrate the Mayflower Mill's original equipment, which remains unchanged since operations ceased in 1991 after processing almost a billion tons of rock and producing nearly 2 million ounces of gold and 30 million ounces of silver. Information: (970) 387-0294 or <silvertonhistorical society.org>

Ouray County Historical Society Museum—POGI #M21, Ouray. The Ouray County Historical Society Museum is located in the historic St. Joseph's Miners' Hospital, and contains mining and mineral exhibits, as well as artifacts from Ouray's ranching and railroading history. The museum also houses the W. Ross Moore Mining History Library of the American West. Information: (970) 325-4576 or <ouraycountyhistoricalsociety.org>

Creede Underground Mining Museum—POGI #M22, Creede. This museum is located completely underground. Displays of mine features and mining techniques, including an exploration drift, a winze, a hoist, and shrink stope mining, along with real mining equipment, illustrate the history of the silver boom in Creede from 1889 to 1985 and demonstrate how silver mines operated. Information: (719) 658-0811 or <museum trail.org/CreedeUndergroundMiningMuseum.asp>

High cliffs form a backdrop for an old mining operation near Creede. Photo by John Keller, CGS.

Ryan Geology Museum—(see description under "Fossils and Dinosaur Activities")

National Mining Hall of Fame and Museum—POGI #M23, Leadville. Located in a 70,000-square-foot school built during the 19th century silver boom, this museum offers twelve exhibit rooms portraying the history of mining from the Bronze Age through the present. There is also a replicated underground hardrock mine to explore, complete with drills, ore cars, mine-gauge track, and chutes. Information: (719) 486-1229 or <mininghallof fame.org>

Matchless Mine and Museum—POGI #M24, near Leadville. Once a very productive silver mine, the Matchless is more famous for its role in the checkered lives of Horace and Baby Doe Tabor. The mine and museum now consist of the cabin where Baby Doe lived and died in poverty, and surface structures such as the gallows and shaft house. Information: (719) 486-4918 or <matchlessmine.com>

Nederland Historical Society and Museum—POGI #M25, Nederland. The Old Stone Garage in Nederland houses an old mine and mill replica, and illustrates, through mining artifacts, equipment and memorabilia, the story of the mining industry in Nederland and Boulder and Gilpin counties from 1859 to the present. Information: (303) 258-0567 or <neder landmuseums.org>

Gilpin County Historical Society Museum—POGI #M26, Central City. Mining-related exhibits at the Gilpin History Museum include a model of the Iron City Mill near Black Hawk and a mineral collection. Also part of the Gilpin Historical Society is the Coeur d'Alene Mine Shaft House, which visitors can explore on a self-guided interpretive tour. Information: (303) 582-5283 or <coloradomuseums.org/gilpin>

Historical Society of Idaho Springs Underhill Museum—POGI #M27, Idaho Springs. This is a living museum featuring a collection of mining artifacts in authentic living accommodations of the gold mining era. Information: (303) 567-4709 or <historicidahosprings.com/facilities.html>

Idaho Springs Heritage Museum and Visitor Center—POGI #M28, Idaho Springs. Exhibits include artifacts that celebrate the 1859 discoveries of placer gold in Clear Creek, and lode gold at Blackhawk and many other Colorado localities that would later become major mining districts. Other exhibits include mining tools, an ore wagon, historic photos and an array of mineral specimens. Information: (303) 567-4382 or <historicidahosprings.com/facilities.html>

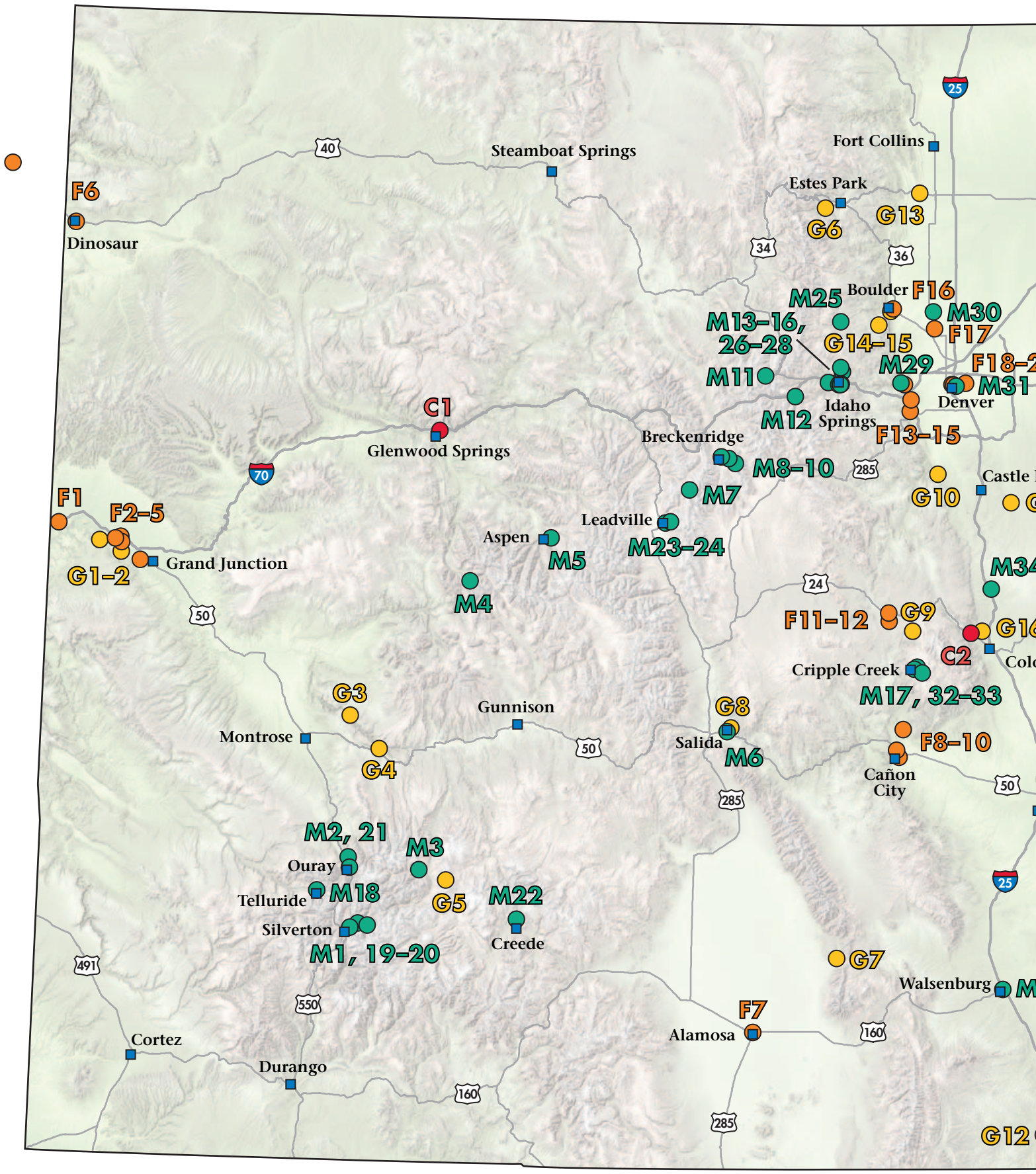
Colorado School of Mines Geology Museum—POGI #M29, Golden. The Geology Museum at the Colorado School of Mines started as a 'mineral cabinet' put together by Arthur Lakes, the first curator of collections, in 1874. Today the museum has approximately 50,000 minerals, fossils, gemstones, and artifacts. Exhibits include minerals from Colorado, Colorado's mining heritage and mining artifacts, a gold and silver display, rough and cut gemstones, mineral properties, earth history, special radioactive exhibits, and world minerals and fossils. School group tours may be arranged in advance. The museum moved into its sparkling new building and spacious exhibit area in 2004. Information: (303) 273-3823 or <mines.edu/academic/geology/museum>

Lafayette Miners Museum—POGI #M30, Lafayette. The Lafayette Miners Museum is located in a building once occupied by coal miners, and now contains a wealth of information on Lafayette's history and its coal mining heritage, along with a collection of mining tools and equipment. Information: (303) 665-7030 or <cityoflafayette.com/page.asp?navid=802>

Colorado History Museum—POGI #M31, Denver. A large, comprehensive mining exhibit provides an overview of Colorado's mining history through intricate dioramas and includes many pieces of equipment used in exploration, vein, placer and coal mining, assaying, mine blasting, ventilation and dewatering, mucking and loading, including an operable rotary dumper. There is a large exhibit depicting the life of H.A.W. Tabor, "Colorado's first and greatest Silver King." The museum has a library of books, maps, newspaper clippings, manuscripts, journals and photographs that document the historical evolution of mining activities in Colorado. School group tours may be scheduled in advance, and adult workshops and family days are offered. Information: (303) 866-3682 or <colorado history.org/hist_sites/CHM/Colorado_History_Museum.htm>

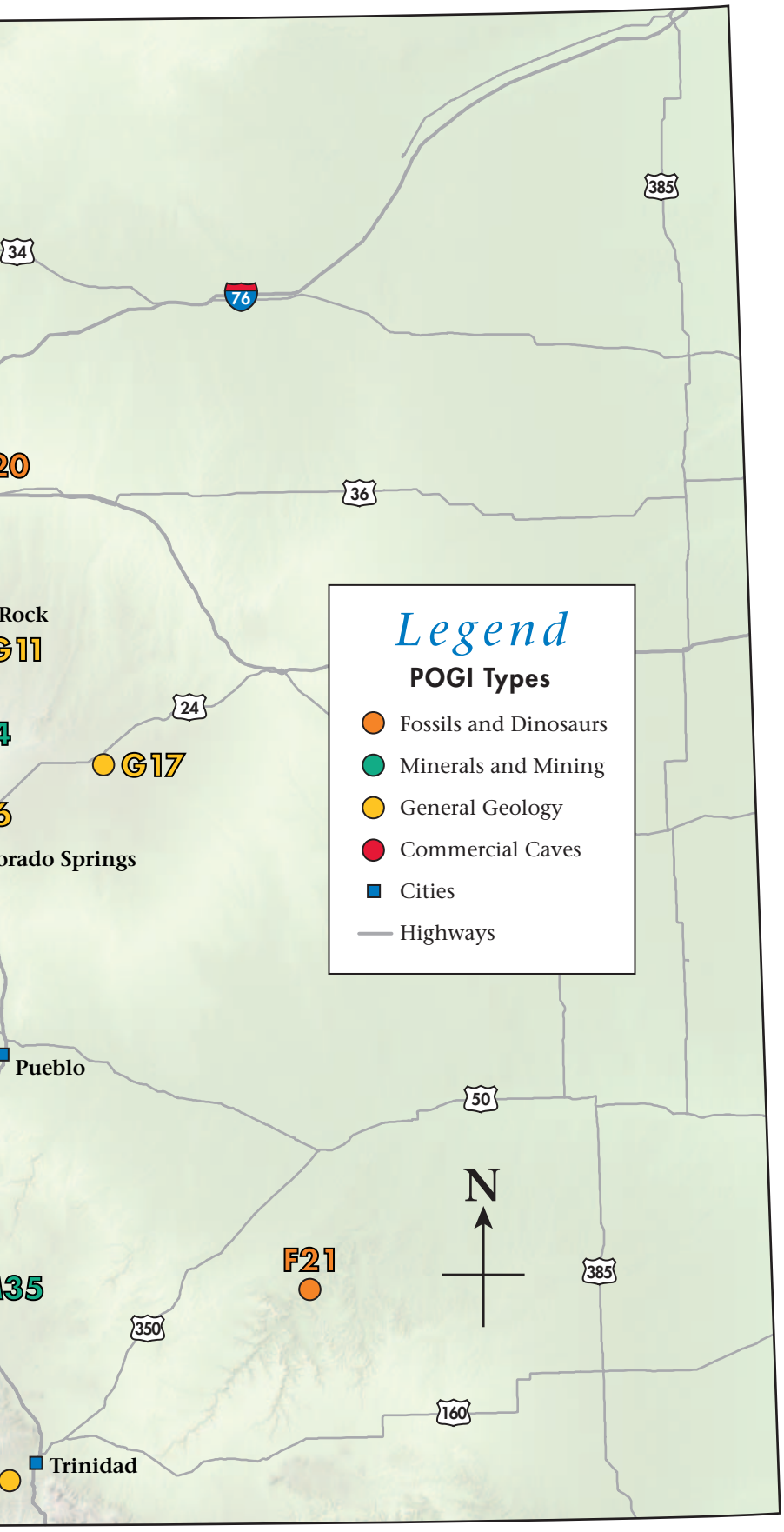
continues on page 12

Points of Geological

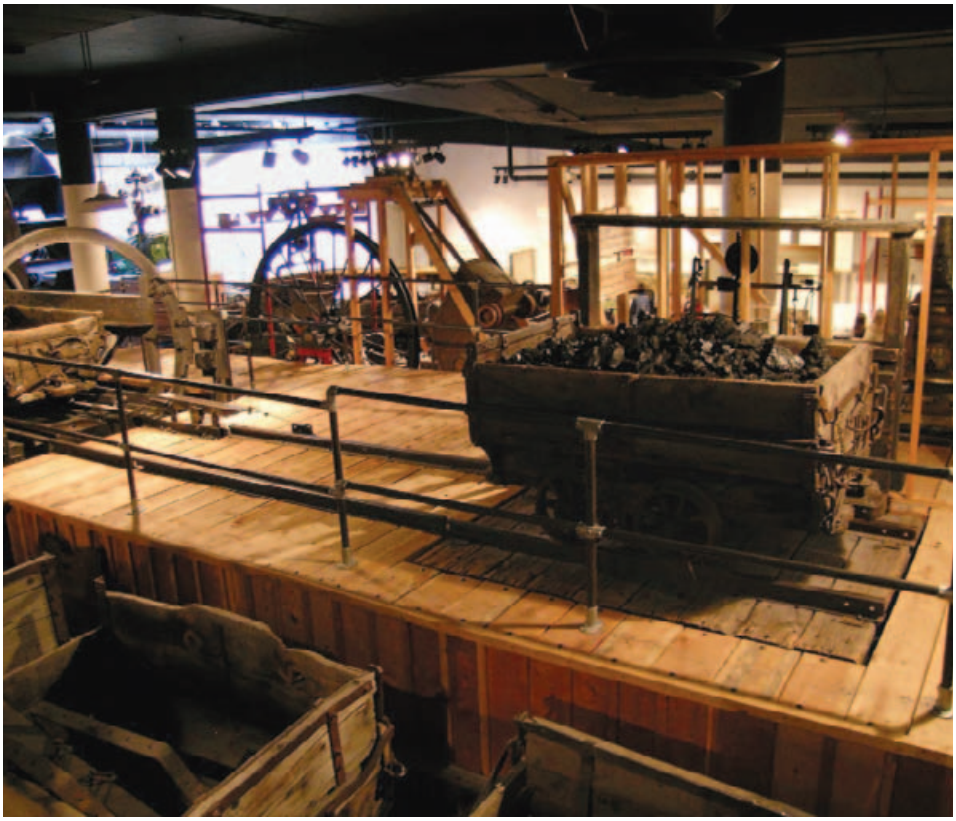


The CGS would like to acknowledge Lauren Heerschap and Matt Morgan for help in making this map.

Interest in Colorado



	POGI FEATURE & PAGE NUMBER
F1	Trail Through Time/Rabbit Valley, 2
F2	Museum of Western Colorado/Dinosaur Journey, 2
F3	Dinosaur Hill Interpretive Trail, 2
F4	Fruita Paleo Area Trail, 2
F5	Riggs Hill Trail, 2
F6	Dinosaur National Monument, 2, 3
F7	Ryan Geology Museum/Adams State College, 2
F8	Dinosaur Depot Museum, 2
F9	Garden Park Fossil Area, 2
F10	Skyline Drive Trackway Site, 4
F11	Florissant Fossil Beds National Monument, 4
F12	Florissant Fossil Quarry, 4
F13	Morrison Natural History Museum, 4
F14	Dinosaur Ridge, 4
F15	Triceratops Trail/Parfet Prehistoric Preserve, 4
F16	University of Colorado Museum, 4
F17	Broomfield Walk Through Time, 4
F18	Dinosaur Tracks Museum/CU-Denver, 4
F19	Ancient Colorados/Colorado Convention Center, 5
F20	Denver Museum of Nature and Science, 5
F21	Purgatoire Tracksite/Comanche National Grasslands, 5
M1	Old Hundred Gold Mine, 6
M2	Bachelor–Syracuse Mine, 6
M3	Hard Tack Mine, 6
M4	Colorado Yule Marble Quarry, 6
M5	Compromise Mine/Smuggler Mine, 7
M6	Lost Mine, 7
M7	Climax Mine, 7
M8	Carbonate Mine, 7
M9	Country Boy Mine, 7
M10	Washington Mine/Lomax Placer Gulch, 7
M11	Henderson Mine, 7
M12	Lebanon Silver Mine, 8
M13	Argo Gold Mine, Mill, and Museum, 8
M14	Edgar Experimental Mine, 8
M15	Phoenix Mine, 8
M16	Hidee Gold Mine, 8
M17	Mollie Kathleen Gold Mine, 8
M18	Telluride Historical Museum, 8
M19	Silverton Mining Heritage Museum, 8
M20	Mayflower Gold Mill, 9
M21	Ouray County Historical Society Museum, 9
M22	Creede Underground Mining Museum, 9
M23	National Mining Hall of Fame and Museum, 9
M24	Matchless Mine and Museum, 9
M25	Nederland Historical Society and Museum, 9
M26	Gilpin County Historical Society Museum, 9
M27	Historical Society of Idaho Springs Underhill Museum, 9
M28	Idaho Springs Heritage Museum and Visitor Center, 9
M29	Colorado School of Mines Geology Museum, 9
M30	Lafayette Miners Museum, 9
M31	Colorado History Museum, 9
M32	Cripple Creek District Museum, 12
M33	American Eagles Mine Overlook, 12
M34	Western Museum of Mining and Industry, 12
M35	Walsenburg Mining Museum, 12
G1	McInnis Canyons/Parade of Arches Trail, 13
G2	Colorado National Monument, 13
G3	Black Canyon of the Gunnison National Park, 13
G4	Curecanti National Recreation Area, 13
G5	Gunnison National Forest/Slumgullion Earthflow, 14
G6	Rocky Mountain National Park, 14, 15
G7	Great Sand Dunes National Park and Preserve, 14
G8	Arkansas Headwaters Recreation Area, 15
G9	Mueller State Park, 15
G10	Roxborough State Park, 16
G11	Castlewood Canyon State Park, 16
G12	Trinidad Lake State Park, 16
G13	Larimer County Parks and Open Lands, 16
G14	Boulder County Parks and Open Space, 16
G15	City of Boulder Open Space and Mountain Parks, 16
G16	Garden of the Gods Park, 17
G17	Paint Mines Interpretive Park, 17
C1	Glenwood Caverns Adventure Park, 18
C2	Cave of the Winds, 18



The Colorado History Museum has a huge exhibit of historic mining equipment, such as this coal cart on rails, headed to a rotary dumper where it might be emptied onto a conveyor or into a railroad hopper car. Photo by Jill Carlson, CGS.

continued from page 9

Denver Museum of Nature and Science—(see *Feature Box 2*)

Cripple Creek District Museum—POGI #M32, Cripple Creek. This museum displays mining machinery and memorabilia such as maps, ore samples, glass models of deep gold mines, and household items dating back to the 1890s, when the Cripple Creek Mining District was "The World's Greatest Gold Camp." Information: (719) 689-2634 or <cripple-creek.org>

American Eagles Overlook—POGI #M33, near Victor. A startling mix of old and new, this self-guiding, outdoor exhibit features restored mining equipment, shop buildings, and the headframe for the deepest shaft in the Cripple Creek district. One may also look down into the maw of the gigantic open pits of the active Cripple Creek and Victor gold mining operation. There are views to Pikes Peak and other mountain ranges from this high, windswept overlook. A brochure is available. Information: (719) 686-7955 or <co.teller.co.us/parks.htm> or <victorcolorado.com/eagles.htm>

Western Museum of Mining and Industry—POGI #M34, Colorado Springs. Exhibits and guided tours focus on the technology and technological history of metal mining and metallurgy, as well as the social history of the American mining west. Each June, the old stamp mill is started up along with many other working exhibits. Information: (719) 488-0880 or <wmmi.org>

Walsenburg Mining Museum—POGI #M35, Walsenburg. Housed in the 1896 county jail building, the Walsenburg Mining Museum has exhibits and oral histories describing the area's coal mining heritage. Information: (719) 738-1992 ●

Digging Deeper

Other useful resources for exploring and learning about Colorado's mining history and localities include the following:

Mining History Association: <mininghistoryassociation.org>

Cripple Creek history page: <cripplecreekhistory.com>

Colorado **ghost towns and mining camps** page: <coloradoghosttowns.com>

Colorado School of Mines special collections: <mines.edu/library/speccoll/special.html>

Scenic drives through Colorado's "**Gold Belt**" and "**Silver Thread**": <coloradobyways.org>

A visitor enjoys the view of the open pits of the CC&V Cresson Mine from the American Eagles Overlook. Photo by John Keller, CGS.

Federal Lands

Colorado has four National Parks and four National Monuments that contain soaring peaks, yawning canyons, vast seas of dune sand, and treasure troves of prehistoric cultures and beasts. Guided activities, roadside and visitor-center interpretive displays, self-guiding trails and auto tours, and special programs may be available. (See the expanded descriptions on our web site.) The summer months are perhaps the best time to attend guided walks and campfire talks.

Dinosaur National Monument—(see description under "Fossil and Dinosaur Activities")

McInnis Canyons National Conservation Area—POGI #G1, near Fruita. The Rattlesnake Canyon trail, also known as the "Parade of Arches," provides access to a canyon system containing the largest concentration of natural sandstone arches outside of Utah's Arches National Monument. The U.S. Bureau of Land Management maintains a rough dirt road to the trailhead. You can get a feel for the geologic story using the Rattlesnake Arches trail brochure and the MCNCA brochure. Information: (970) 244-3000 or <co.blm.gov/mcnca/recreationhp.htm>

Colorado National Monument—POGI #G2, near Grand Junction. The highlight of Colorado National Monument is 23-mile-long Rim Rock Drive, which offers panoramic views and overlooks of sheer slick-rock canyons and farther panoramas of the broad Grand Valley, more than 2,000 feet below. The mesa front is an outstanding example of a monoclinal fold, where the mesa-top beds are flat and the flanking beds are bent at highly inclined angles. Activities include a visitor center, an audiovisual program on the Park's geology, summer talks by local geologists, self-guiding tour books, roadside exhibits, and the Colorado National Monument Association (CNMA) Talks and Walks program. Information: (970) 858-3617 or <nps.gov/colm> or <coloradonma.org/walks.htm>

Black Canyon of the Gunnison National Park—POGI #G3, near Montrose. An eye-popping chasm carved into solid rock by the Gunnison River, the Black Canyon boasts the highest unbroken cliff walls (over 2,700 feet high) in Colorado. No other canyon in North America combines the narrow opening span, sheer marbled walls of Proterozoic crystalline rock, and startling depths offered by the Black Canyon of the Gunnison. Activities include summer walks and campfire talks, self-guiding trail and auto tours, and a visitor center with exhibits. Information: (970) 641-2337 or <nps.gov/blca>

One of the thirty-five natural arches in the Rattlesnake Canyon area, seen from the "Parade of Arches" trail. Photo by Wallace Hansen.

Curecanti National Recreation Area—POGI #G4, near Montrose. Curecanti NRA is an upstream extension of the Black Canyon of the Gunnison NP and is administered by the NPS. During the summer, the Morrow Point pontoon boat tour, a 1½ hour excursion along the upper Black Canyon, features a guided ranger narrative about the scenery and its geologic origins. Information: (970) 641-2337 or <nps.gov/cure>

The mysterious and intriguing Black Canyon of the Gunnison. Photo by Dave Noe and Jonathan White, CGS.

Colorado's world-class Slumgullion Earthflow, near Lake City. Photo courtesy of U.S. Geological Survey.

Gunnison National Forest—POGI #G5, near Lake City. The Slumgullion Earthflow is a world-class example of a gigantic earthflow landslide, which has dammed the Lake Fork of the Gunnison River and created Lake San Cristobal, Colorado's second-largest natural lake. Parts of the landslide are still active today. Interpretive signs for this Registered National Landmark have been placed at scenic pullouts along State Highway 149, which crosses the lower part of the slide. Information: (970) 874-6600 or <www.fs.fed.us/r2/gmug/>

Rocky Mountain National Park—POGI #G6, near Estes Park. Spectacular, 12–14,000-foot-high peaks and glacier-carved valleys are the primary features of interest in Rocky Mountain National Park. There is an extensive summer schedule of guided hikes and campfire programs, some of which focus on the Park's geology. Many of the scenic road pull-offs along Trail Ridge Road (closed in winter) have interpretive signs. Moraine Park Museum (see *Feature Box 3*) has an exciting geology exhibit. Several trails and roads have self-guiding interpretive pamphlets or booklets. Geology-related seminars take place in the Park each year (see description under "Geology Seminars" section of this newsletter). Information: (970) 586-1206 or <nps.gov/romo>

Great Sand Dunes National Park and Preserve—POGI #G7, near Alamosa. Colo-

Colorado's incomparable Great Sand Dunes and the Sangre de Cristo Range, as seen from the air. Photo copyright: Louis J. Mahar, Jr., used with permission.

FEATURE BOX 3: Moraine Park Museum, RMNP

"Why are there mountains here? How does a glacier move? What is a moraine? How do people affect the land? The answers are found in the landscape itself…"

So begins the self-guided tour, "The Making of a Landscape," at Rocky Mountain National Park's Moraine Park Visitor Center. The focus is on Moraine Park, a broad, beautiful, mountain valley that provides a textbook example of the after-effects of glaciation.

In telling the story of Moraine Park, the exhibit goes deep into geologic time. Colorful paintings and dioramas, working models, and hands-on specimens are used in a series of displays that discuss such topics as mountain building, rock types and the rock cycle, faults, folds, canyon carving, the erosion cycle, glacier movement, the ice ages, ice-age humans and animals, glaciers and climate, and precious metals.

Kids get a kick out of turning cranks to watch rock models break and bend (faults and folds), mountains rise, and glaciers move down valleys. Two large 3-D models depict what Moraine Park may have looked like before and during glaciation. To see the valley after glaciation, one only needs to walk a few steps to the glass-fronted porch, where bent-wood rocking chairs and a scenic view of the real thing await! The museum is open seasonally, typically from late April to early October. Information: (970) 586-1206 or <nps.gov/romo/pphtml/facilities.html>

Outdoor display depicting a former glacial valley at the Moraine Park Museum. Photo by Dave Noe, CGS.

A young, future geologist demonstrates how glaciers move and create moraines at the Moraine Park Museum. Photo by Dave Noe, CGS.

rado's newest National Park contains over 30 square miles of massive dunes that are North America's tallest, at over 750 feet high. The dunes, and the unique meteorological and topographic setting in which they formed, are primary topics that are featured in the Park's interpretive programs. Ranger-led walks, talks, and campfire programs are offered on most days from May through September, and on a limited or by-request basis during the rest of the year. Brochures are available at the visitor center for free or low cost, including "Exploring the Dunes," "Landscape in Motion," and "Mysterious Waters." Stay tuned for related articles in an upcoming issue of CGS *RockTalk*. Information: (719) 378-6399 or <nps.gov/grsa>

State Parks

Colorado's 41 State Parks are administered by the Colorado Department of Natural Resources, Division of Parks and Outdoor Recreation (DPOR). While most are based on recreational activities such as boating and fishing, several also contain points of geological interest. The State Parks listed below are ones that have geology-related exhibits or guided activities. Information is available at <parks.state.co.us>, or by calling each Park directly. Each Park's web page may be accessed from the main web page; browse the "Calendar" button for listings of upcoming, guided walks and talks. The "Environment" link for each park provides a description of the local geology.

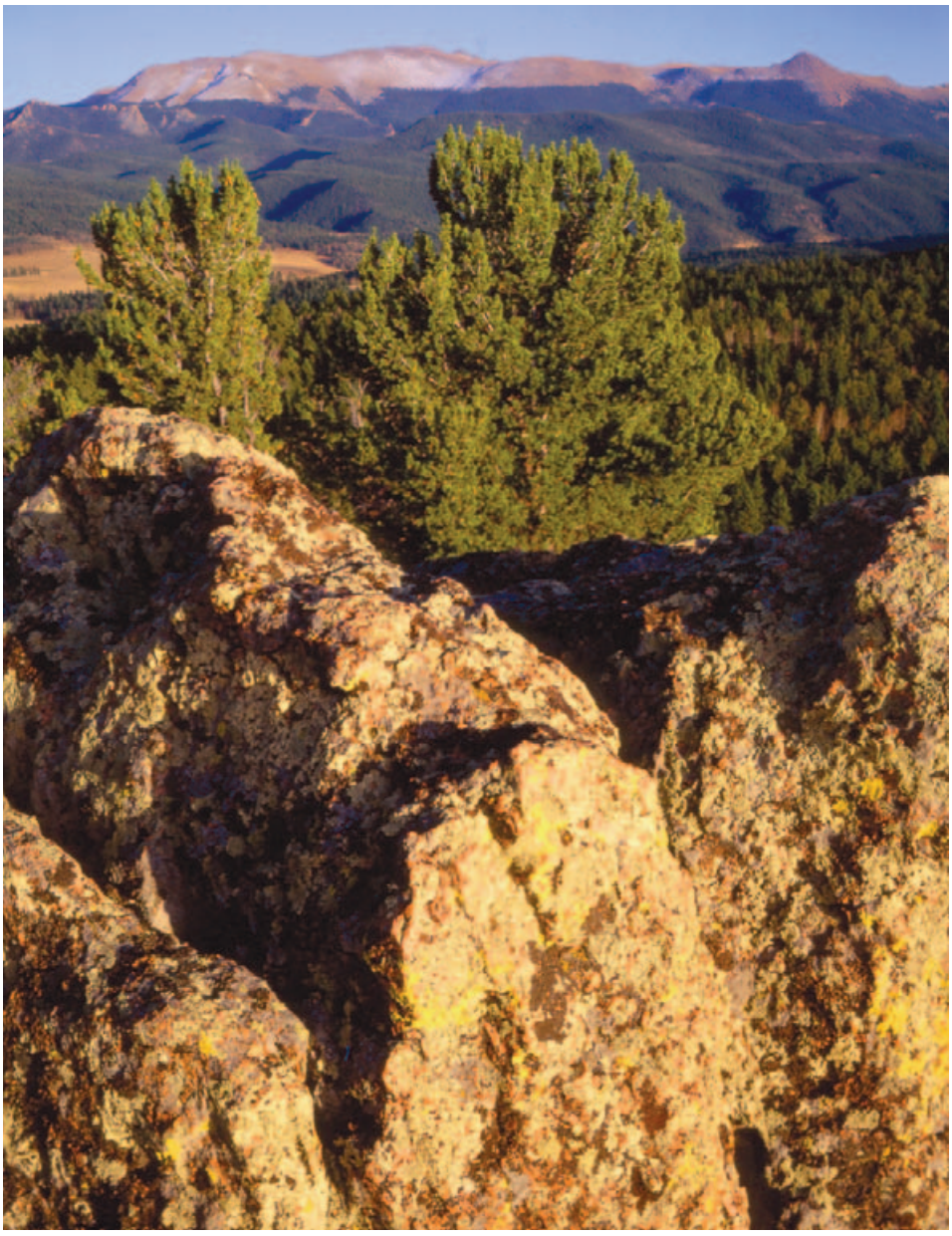
Arkansas Headwaters Recreation Area—POGI #G8, near Salida. The U.S. Bureau of Land Management and Colorado State Parks jointly administer this area, which consists of a 150-mile stretch of the Arkansas River between Leadville and Pueblo. A guided program and a Junior Ranger geology program are offered at Ruby Mountain campground. A rock-hounding handout list is available at the visitor center near downtown Salida. AHRA's naturalist staff trains many of the area's commercial boatmen about geology and natural history. Information: (719) 539-7289

Mueller State Park—POGI #G9, near Woodland Park. This state park is nestled on the backside of Pikes Peak and contains

wonderful exposures of weathered and rounded, Pikes Peak Granite. The Wapiti self-guided nature trail has a brochure and a geology stop, and the Outlook Ridge trail has three scenic overlooks perched on the top of granite knobs. The visitor center has interactive displays that describe the regional geology and minerals. Geology campfire talks are given on an occasional basis, and focus on geology of the region. Information: (719) 687-2366

Roxborough State Park—POGI #G10, near Littleton. The wild, red-rock country at Roxborough is a geologic wonderland. The Park sponsors a monthly geology walk, and the "Rocks Revealed" summer program covers some geology related topics. The visitor center features a geology display, "The Shape of Roxborough." The interactive exhibit includes paintings, hand specimens, and displays about the uplift and erosion that produced the landscape. Information: (303) 973-3959

Castlewood Canyon State Park—POGI #G11, near Castle Rock. Small but scenic, CCSP offers several geology-related walks and talks every year. School groups may schedule a special program called "Rock and Roll." The visitor center contains a display about the Castle Rock Conglomerate, and one about the Castlewood Canyon dam, which failed spectacularly in 1933. The park is developing a geology brochure. Information: (303) 688-5242



A view of Pikes Peak from the granite knobs of Mueller State Park. Photo copyright: John Fielder, used with permission.

Trinidad Lake State Park—POGI #G12, near Trinidad. TLSP contains one of the best exposures of the famed K/T Boundary, where Cretaceous and Tertiary aged rocks are separated by an iridium-rich layer that represents an asteroid impact and possibly the extinction of many of the Earth's dinosaur species. There is an interpretive display at the visitor center. The site may be visited by taking a short hike down into Long Canyon, and an interpretive sign and a self-guiding brochure are available. Summer ranger-led walks are available that occasionally focus on geology. Information: (719) 846-6951

County and Municipal Parks

Some local jurisdictions within Colorado have outstanding interpretive programs. Here are a few that have featured geology-related activities. For more information about these guided activities, contact these local agencies directly.

Larimer County Parks and Open Lands—POGI #G13, near Loveland and Fort Collins. Larimer County has several county parks in areas of geological interest, including Carter Lake, Eagle's Nest, and Devil's Backbone. Geology walks are led at these areas on occasion, and group or student tours may be arranged. The fascinating and spookily realistic Devils Backbone, a spine of vertically dipping Dakota Sandstone west of Loveland, may be toured using a self-guiding brochure that describes the local geology and the related cultural history. Information: (970) 679-4570 or <co.larimer.co.us/parks>

Boulder County Parks and Open Space—POGI #G14, near Boulder. Boulder County's parks have three retired geologists that lead occasional guided walks, with topics including "A Story in the Rocks" and "Geology and Landforms." A presentation on the County's geologic story is offered at the Boulder Public Library about twice a year. Programs for schools and groups may be requested, as well. Some interpretive signs regarding geology are in place at Walker Ranch Open Space. Information: (303) 678-6214 or <www.co.boulder.co.us/openspace/>

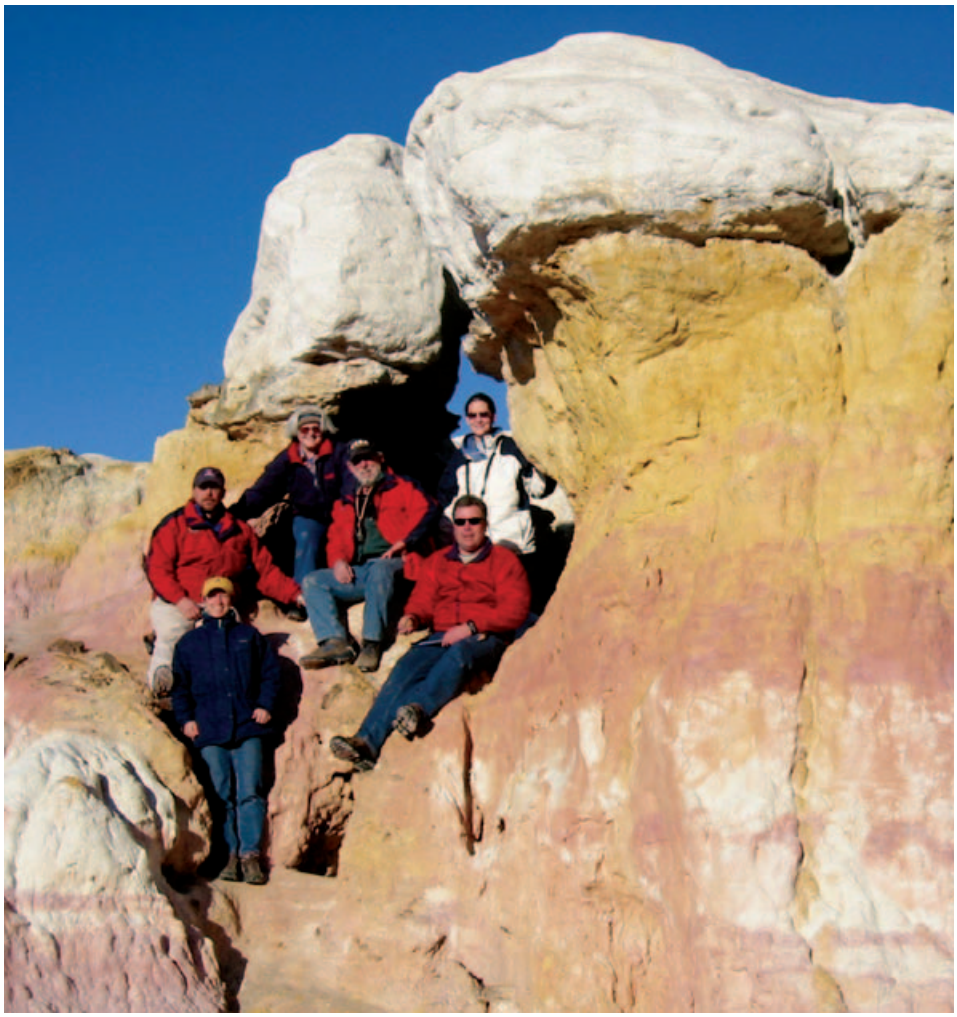
City of Boulder Open Space and Mountain Parks—POGI #G15, near Boulder. The spectacular range-front formations of the Flatirons form a backdrop for guided activities in Boulder's mountain parks. Guided public nature hikes,

Guided tour group approaching Devil's Backbone, in Larimer County. Photo by Rick Price.

including geology hikes are led by staff or volunteer naturalists. Group and educational programs may be scheduled, as well. Information: (303) 441-3440 or <www.ci.boulder.co.us/openspace/>

Garden of the Gods Park—POGI #G16, near Colorado Springs. This municipal park contains 480 acres of astounding, red sandstone fins and spires. The new visitor center affords great views of the Park and Pikes Peak, and has a multimedia presentation and hands-on geology exhibits. Fabulous, lifelike murals depict the region's ancient landscapes through the ages. During the summer, bus tours are available, as well as various walks and talks. Group tours, junior ranger and guided outdoor education programs, and self-guided "adventure hunts" are offered, as well. Information: (719) 634-6666 or <gardenofgods.com>

Paint Mines Interpretive Park—POGI #G17, near Colorado Springs. This new El Paso County park features brilliant, pastel-colored clay beds capped by hoodoos of white sandstone. Ancient cultures and early settlers mined the clays from a labyrinth of small canyons. The park is open dawn to dusk, seven days a week. A geology and natural history pamphlet is available, and several interpretive sites may be found along the park's trails. Guided tours by parks staff are led on occasion or may be arranged. Information: (719) 520-6387 or <www.elpasoco.com/parks>



The CGS Minerals and Mineral Fuels Section pays a visit to El Paso County's colorful Paint Mines Interpretive Park. Photo by Beth Widmann, CGS.

CAVE TOURS

Colorado has more than 265 catalogued caves. Some contain evidence of early human habitation, while others have yielded significant and unusual animal remains. The largest caves are dissolved from limestone, usually Mississippian Leadville Limestone, which is thick, pure, and areally extensive. Of these, two have been developed for visitation and are open to the public.

Glenwood Caverns Adventure Park—POGI #C1, near Glenwood Springs. Cited by *USA Today* as being one of the top ten caves in the U.S., this commercial cavern offers guided tours, ranging from mild to wild, a gift shop, hilltop restaurant, and other attractions, and is reached via a spectacular, 3,400-foot-long gondola tramway from town. The "Education Center" part of the web page offers lessons on cave geology. Information: (800) 530-1635 or <glenwoodcaverns.com>

Cave of the Winds—POGI #C2, near Manitou Springs. Cave of the Winds has been hosting tours since the 1880s, and remains a popular tourist destination. The cave is notable for its stalactites and stalagmites and its internally blowing breeze. The visitor center at the cavern's mouth provides a spectacular view of dipping rock formations in Williams Canyon and the skyline of Colorado Springs below. Information: (719) 685-5444 or <caveofthewinds.com>

Delicate, gravity-defying helectite formations in the Silent Splendor section of Cave of the Winds. Photo courtesy of Cave of the Winds.

A family enjoys the subterranean features of Glenwood Caverns. Photo by Norm Thompson.

GEOLOGY SEMINARS

A great way to learn the geology of a place or region is to attend a seminar talk or enroll in a field seminar sponsored by a university, non-profit group, or professional organization. Because offerings may change from year to year, you should contact the sponsor directly or view their web pages.

Rocky Mountain Nature Association—RMNA sponsors over 50 field-based seminars each year, several of which are geology-related and led by professional geologists. Most are based in Rocky Mountain National Park, although an increasing number are being held in other National and State Parks. Information: (970) 586-3262, (800) 748-7002, or <rmna.org>

National Park Service Outreach Education Programs—Colorado's National Parks and Monuments sponsor education programs for preschoolers, K–12 and college students, and lifelong learners in cooperation with nearby communities and school districts. The programs have outdoor and indoor components, plus pre- and post-visit classroom activities. Information: look under "Education Programs" and "For Kids" on each Park's web page

College and University Seminars—Many of the geoscience departments at Colorado's colleges and universities have geology displays that may be viewed by the public. Some may have lectures, walking geology tours, museums, or field seminars. Our web page version contains an expanded write-up of these offerings.

Professional Organization Activities—Colorado is home to different professional geology organizations that represent a variety of disciplines, whose purposes range from broadly scientific to applied practice. Many organizations hold monthly meetings (except in summer—geology field season) that feature invited speakers and hour-long talks. In addition, several organizations sponsor annual or seasonal field trips. The **Four Corners Geological Society** (Durango) <canyonwinds.com/FCGS>, **Grand Junction Geological Society** <www.mesastate.edu/schools/snsm/geology/clubs.htm>, **Colorado Scientific Society** (Denver) <coloscisoc.org>, and **Rocky Mountain Association of Geologists** (Denver) <rmag.org> are regional organizations that sponsor events that may be of interest to the public. Calendars of events for certain Denver-based professional organizations are kept by Colorado Scientific Society on their web site, <coloscisoc.org/news>.

FEATURE BOX 4: Some Great Guidebooks

Of course, there are times when there's no one around to give you a personal geology tour, or no convenient interpretive sign along the side of the road. Fortunately, many parts of Colorado are covered by geologic guidebooks. These range from specialty field trips that are often technical in nature (typically issued by professional organizations, or by government agencies such as CGS or USGS) to more broadly focused travel guides for laypersons, such as the *Roadside Geology of Colorado* book.

The following are some of our favorites; those marked with an asterisk (*) are available through the CGS publications department: <dnr.state.co.us/geostore>

Statewide or Multiple Locations

*Roadside Geology of Colorado**, by H. Chronic and F. Williams. Covers many of the state's highways and is designed for those with little or no geologic training

*Hiking Colorado's Geology**, by R. and L. Hopkins

*Geologic Excursions to the Rocky Mountains and Beyond**, by Geological Society of America. CD-ROM containing field trip guidebooks from the 1996 GSA annual meeting. CDs of individual field trips are also available through CGS

GSA Field Guide 1—Colorado and Adjacent Areas, by Geological Society of America. Soft-cover book containing field trip guidebooks from the 1999 GSA annual meeting

GSA Field Guide 5—Field Trips in the Southern Rocky Mountains, USA, by Geological Society of America. Soft-cover book containing field trip guidebooks from the 2004 GSA annual meeting

*Colorado Caves**, by R. Rhinehart and D. Harris

*Colorado Gem Trails and Mineral Guide**, by R. Pearl

*Gem Trails of Colorado**, by J. Mitchell

*Colorado Rockhounding**, by S. Voynik

*Rockhounding Colorado**, by W. and C. Cappele

*Gems and Minerals of Colorado**, by L. and D. McKinney

*Gold Panning and Placering in Colorado: How and Where**, by B. Parker, Jr.

*Messages in Stone**, by V. Matthews and others. Plan your next geo-trip—you won't even need to leave your home to learn about Colorado's colorful geology using this richly illustrated book

Regional or Area Specific

Dinosaur's Restless Rivers and Craggy Canyon Walls—River Guide, by W. Hansen

*Scenic Trips into Colorado Geology—Uncompahgre Plateau**, by D. Collins

The Western San Juan Mountains—Their Geology, Ecology, and Human History, by R. Blair and others

*Mines, Mountain Roads, and Rocks—Guidebook No. 1**, by G. Moore. Covers the Ouray area

Black Canyon of the Gunnison in Depth, by W. Hansen

Aspen High Country—the Geology, by D. Laing and N. Lampiris

*Geologic Wonders of South Park, Colorado with Road Logs**, by D. McGookey

*Geologic Guidebook to the Gold Belt Byway**, by T. Henry and others. Covers the Pikes Peak–Cripple Creek region

Geology Along Trail Ridge Road—by O. Raup. In Rocky Mountain National Park

*The Geology of Boulder County with 25 Field Trips**, by R. Bridge

*Dinosaurs in Our Backyard**, by Friends of Dinosaur Ridge. Interactive CD-ROM and audio tour of Dinosaur Ridge–Fossil Trace–Red Rocks Park near Denver

*A Field Guide to Dinosaur Ridge**, by M. Lockley

*Ancient Denvers**, by K. Johnson and R. Raynolds. Contains paintings of what the Denver area looked like at different times during geologic history, and lists the best nearby spots for viewing formations from those ages

*Geology Tour of Denver's Buildings and Monuments**, by J. Murphy

*Geology Tour of Denver's Capitol Hill Stone Buildings**, by J. Murphy

Great landscapes and geology along the Uncompahgre Plateau scenic loop. A self-guiding map and tour guide is available from CGS. Photo by Vince Matthews, CGS.

UNDEVELOPED POGIS

There are numerous, undeveloped POGIs in Colorado where interpretive materials and guided activities are not readily available that may well be worth visiting. A good place to start is the **Colorado Natural Areas Program (CNAP)**, which has catalogued thirteen areas having outstanding geologic resources and six areas having outstanding paleontological resources. While few of these areas have interpretive materials (see Rabbit Valley and Fruita paleontological areas, Slumgullion Earthflow, and Roxborough State Park in this issue), you can also visit sites that are relatively undeveloped. Please contact CNAP to inquire about access to Colorado Natural Areas. Information: (303) 866-3437 or <parks.state.co.us/cnap/features.html>

Building a Better POGI Network—How You Can Help

At CGS, we fully support the notion that Colorado should have vibrant outdoor education resources to enhance your visitation of Points of Geological Interest. Many areas in Colorado have outstanding geology, but may not have fully developed interpretational resources, or any at all. While no single agency can make this happen, we can all contribute. Here are some things you can do to help!

- Visit the areas listed in this guide
- Attend the available programs
- View the available exhibits
- Ask for geology information
- Request geology activities
- Offer suggestions for improvement
- Volunteer your services

We hope that you will actively support those programs that already provide excellent geology-related activities and resources, and that you will encourage the growth of such activities and resources where they do not currently exist!

ROCKTALK
is published by the
Colorado Geological Survey
1313 Sherman Street, Room 715,
Denver, CO 80203

State of Colorado
Bill Owens, Governor

Department of Natural Resources
Russell George, Executive Director

Colorado Geological Survey
Vince Matthews, State Geologist and Division Director

Back issues and subscriptions
can be obtained FREE by contacting the CGS by mail, fax, phone, or e-mail or download them from our Web site.

Phone: (303) 866-4762
Fax: (303) 866-2461
E-mail: cgspubs@state.co.us
Web site: http://geosurvey.state.co.us

THIS ISSUE
Authors: J. Carlson, D. Noe
Editor: V. Matthews
Production: R. Ciminelli

Did We Miss Anything?

If we've left out any of your favorite, guided geology-related activities in Colorado, please let us know!

Colorado Geological Survey
1313 Sherman Street, Room 715
Denver, CO 80203

M#341100040