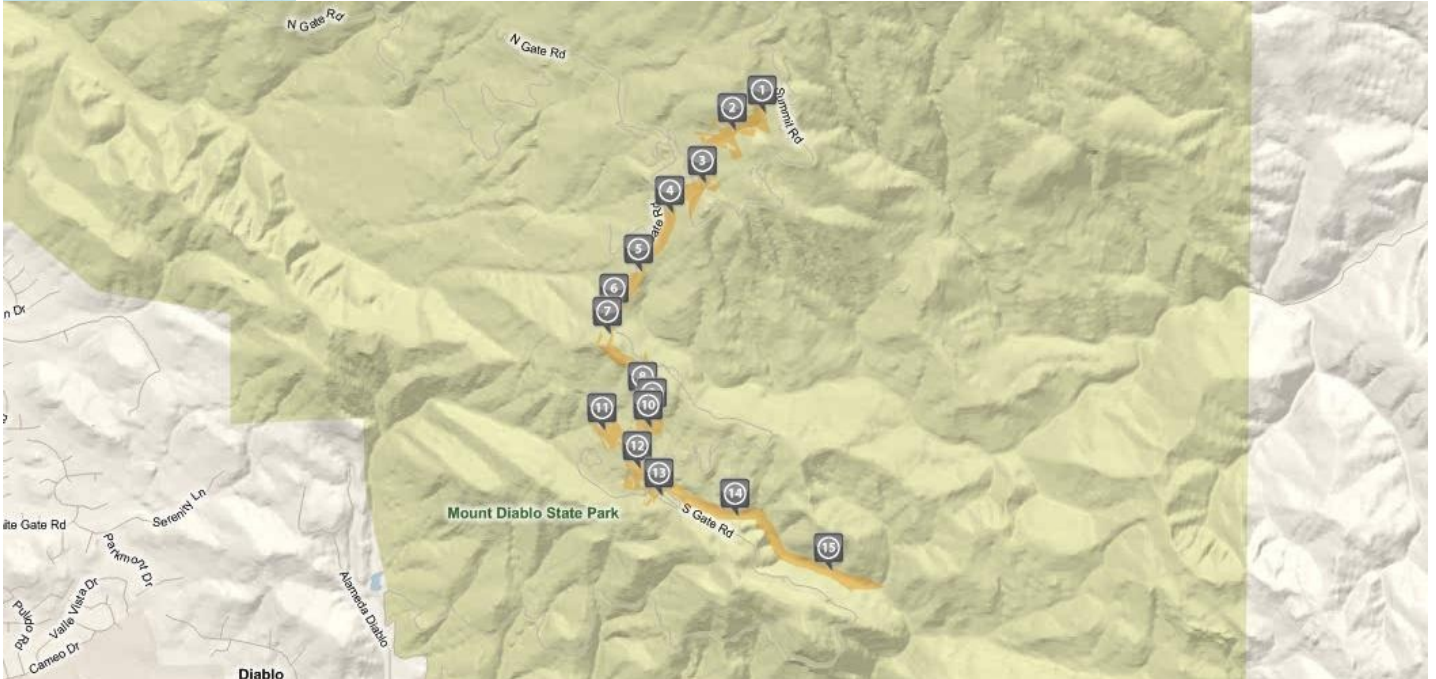




MT. DIABLO STATE PARK EXPLORATION

<http://www.kqed.org/quest/exploration/mt-diablo-state-park-exploration>

Difficulty: Difficult, Accessible: No, Duration: 3.0 hrs



Mount Diablo State Park



This Exploration created in collaboration with the



Many visitors to Mount Diablo head straight for the summit to enjoy the famous view. Summer days are sometimes hazy, and the best viewing is often on the day after a winter storm. Then, you can look to the west, beyond the Golden Gate Bridge, to the Farallon Islands; southeast to the James Lick Observatory on Mount Hamilton at 4,213 feet elevation; south to Mount Loma Prieta in the Santa Cruz Mountains at 3,791 feet elevation, north to Mount Saint Helena in the Coast Range at 4,344 feet elevation, and

still farther north to Mount Lassen in the Cascades at 10,466 feet. North and east of Mount Diablo the San Joaquin and Sacramento Rivers converge to form the twisting waterways of the Delta. To the east beyond California's great central valley, the crest of the Sierra Nevada seems to float in space.

Location-Directions

The park may be accessed by vehicle from either the Danville area (Mount Diablo Scenic Boulevard) or the Walnut Creek area (North Gate Road). Highway 680 to Danville; take Diablo Road exit, then 3 miles east to Mount Diablo Scenic Blvd.

Seasons/Climate/Recommended clothing

Summers are generally hot and dry. The rainy season is generally from November through mid-March. Visitors in the winter occasionally experience a snowfall on the mountain peak.

Telephone

925-837-2525

General park information

925-838-9225

For information on mountain weather conditions

Operating Hours

Gates open 8:00am and close at sunset. Visitors should plan to be in their vehicles by sunset and headed out to avoid being locked in.

The Visitor Center will be open 7 days a week from 10 am to 4 pm.

Summit Museum is open:

Open 7 days a week 10 am to 4 pm.

Mitchell Canyon Interpretive Center is open Weekends only and some holidays.

Summer Hours

8:00am to 4:00pm

Winter Hours


10:00am to 2:00pm

Mailing Address

Mount Diablo State Park
96 Mitchell Canyon Road
Clayton CA 94517

Additional thanks go to Ken Lavin of [The Mount Diablo Interpretive Association](#), Dr. Carol Tang and Dr. Peter Roopnarine of the [California Academy of Sciences](#), and Judy Scotchmoor of the [UC Berkeley Natural History Museums](#) for their contributions to this piece.



 **Marker 1** latitude 37.8682 longitude -121.9263

1a. Radiolarian chert folds, or "chevrons"



Mt. Diablo is famous both for its rich geological history and the many fossil species discovered there. Here you see beds of chert, which itself is made of fossils, the recrystallized silica skeletons of microscopic sea creatures called radiolarians. When the radiolarians die, their skeletons slowly settle to the sea floor, where they form an ooze that eventually turns to this ribbon-like rock.

1b. Radiolarian chert layers



Chert forms when radiolarian skeletons, silt, and ash settle to the ocean floor together and lithify (turn to rock). The ooze must be several meters thick before this change, called diagenesis, occurs. The skeletons build up very slowly; only about 1 millimeter collects every 1,000 years.

1c. Radiolarian chert, druzey quartz



These examples of chert are among the oldest rocks in the park, 190-90 million years old. You can sometimes see the tiny radiolarian skeletons if you lick the rock to wet it and then peer through a hand lens. The skeletons look like opaque pinheads. The sparkling surfaces are bits of druse quartz.



Marker 2 latitude 37.86728 longitude -121.92818

2a. Nice example of blueschist




This blueschist is an unusual type of metamorphic rock that forms in high-pressure, low-temperature environments, such as plate subduction zones, where one of the earth's tectonic plates slides under another.

2b. Blueschist - metamorphic rock



Blueschist is usually derived from basalt or graywacke sandstone that has been dragged down 20-30 miles, squeezed, and then faulted back up to the surface before it's had time to heat up. This process happens very slowly, over many millions of years. To geologists, blue schist is a "red flag" indicator of an earthquake fault or subduction zone.



 **Marker 3** latitude 37.86467 longitude -121.93011

3a. Rest your head here? Pillow basalt




These pillow basalts formed where two plates of the earth's crust were under water and moving away from each other. Their blobby shape is characteristic of an underwater volcanic eruption, in which the outside of the flow cools and solidifies while the inside is still molten. The presence of volcanic rock on Mount Diablo can be confusing, since the mountain is not a volcano. Though volcanic action created the rock, it didn't create the mountain itself. This rock was forced up by the movement of crustal plates below and around it.

3b. Pillow basalt close-up



Paleomagnetic and radiometric studies tell us that these pillow basalts formed some 190 million years ago, 3,000 miles out in the Pacific Ocean, below the equator! Pillow basalt is sometimes called greenstone, because the mineral chlorite turns the rock green. However, the iron in basalt gives the rock a rusty tinge as it oxidizes over time. Pillow lavas can also be seen at Point Bonita, Nicasio Reservoir, and the Waldo tunnel in Sausalito.



 **Marker 4** latitude 37.86317 longitude -121.93216

4a. Mount Diablo Manzanita
(*Arctostaphylos auriculata*)



Botanically, Mount Diablo is an "island mountain" isolated on a relatively flat plain. The mountain is home to many endemic plant and animal species, including the Mount Diablo manzanita (*Arctostaphylos auriculata*), found nowhere else in the world. Some botanists think the peeling red bark of the manzanita is the tree's way of shedding harmful molds and fungi. The plant flowers early to take advantage of winter rains in our Mediterranean climate.

4b. Mount Diablo Manzanita blossom



The Mount Diablo manzanita (*Arctostaphylos auriculata*) grows only around Mount Diablo. Its blossoms are pinker than those of other manzanita species.

4c. Chamise (*Adenostoma fasciculatum*)



Chamise, with its brown seeds, is a characteristic shrub of the hard chapparal community that grows below 5000 feet. The word chamise comes from the Spanish "chamisa," meaning brush or firewood. It catches fire easily, and this tendency to burn has earned it the colloquial name "greasewood."

4d. Close up of Chamise seed pods




Chamise (*Adenostoma fasciculatum*) seed pods.

4e. California sagebrush (*Artemisia californica*)



Artemisia, or California sagebrush (*Artemisia californica*), has a pleasant scent. Its fragrance deters herbivores, though, and washes into the soil, and discouraging competing plants. This method of defense is called alleopathy.

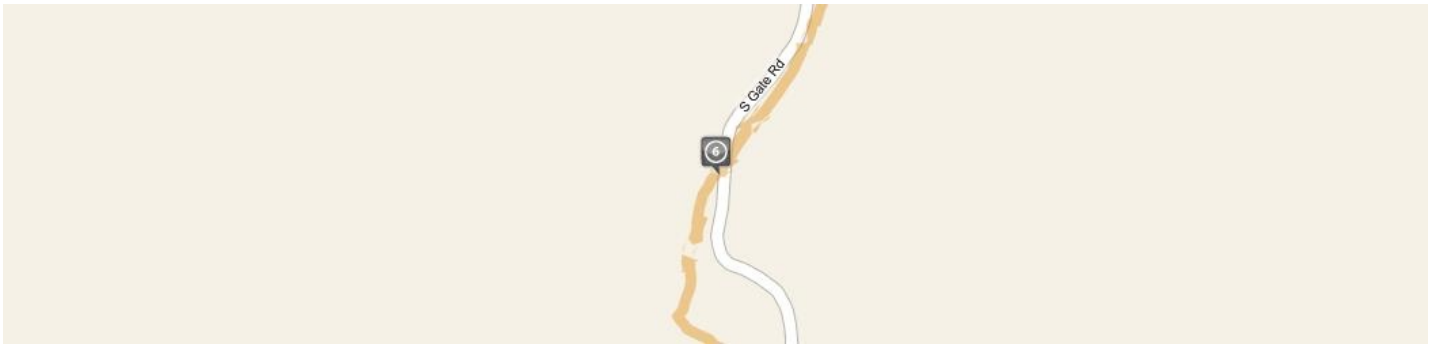



 **Marker 5** latitude 37.86023 longitude -121.93409

5a. Mt. Diablo thrust fault



To a trained eye, this hump in the trail reveals tectonic secrets. Although not thought to be active, this fault known as the "Mt. Diablo thrust fault," is characterized by a break in slope, a change in rock type when going from one side to the other, and ground-up rock nearby. The fault is hard to see because it's been reshaped; the mountain is constantly rising while at the same time material from it is constantly eroded. This same action will eventually sweep the dirt here into San Francisco Bay.

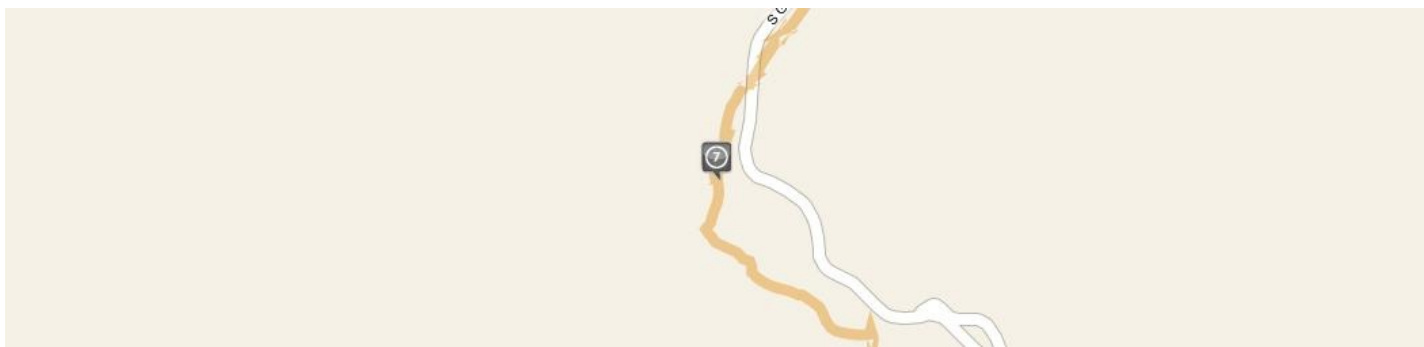


 **Marker 6** latitude 37.8583 longitude -121.93568

6a. Leap through time



Look both ways before you cross this street...you're about to step 25 million years ahead. You're standing on rock once dominated by dinosaurs (during the Cretaceous, 75 million years ago), and are about to cross to rocks that formed when mammals and flowering plants took over (the early Cenozoic, 50 million years ago), Geologists call a gap like this 25-million-year jump in the geological record an unconformity.



Marker 7 latitude 37.85715 longitude -121.9361

7a. Variegated Meadowhawk



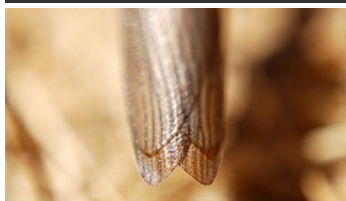
Mount Diablo abounds with insect and arachnid life. One stunning example is the dragonfly *Sympetrum corruptum*, or the variegated meadowhawk. Dragonflies are ancient creatures. They existed even before the oldest rocks on Mount Diablo formed.

7b. European Mantis (*Mantis religiosa*)



An open-eyed hiker can spot lots of well-camouflaged insects, like this European mantis (*Mantis religiosa*). Although they blend in extremely well, these mantids aren't natives. They hitched a ride from Europe to North America in 1899 on a shipment of nursery plants. Mantids have extremely good eyesight, which helps them detect movement of prey. They have a fully articulated head which they can pivot and swivel 180 degrees. They use their antennae for smell. These defenses help the mantis avoid predators like the tarantula, which would consider it a tasty morsel.

7c. Wings of European Mantis (*Mantis religiosa*)



Mantids don't develop wings until their final molt, and some mantids never grow wings at all, or may have small flightless wings. The only time mantids fly is when the adult female begins to emit pheromones to attract males for mating. Contrary to popular belief, not all males become meals for females. Male mantids fly at night, as they seem to be attracted to artificial lights.

7d. Funnel web spider



These silky globs are a common sight on summer trails, the homes of funnel web spiders. These arachnids add to their webs all year. By late summer the webs are really something to behold. If you peer into a funnel, you might find a timid (and completely harmless) spider hiding at the bottom.

7e. Black Widow spider web



The black widow (*Latrodectus hesperus*) is the only spider on Mount Diablo that is poisonous to humans. Its famously messy web is made of the strongest known spider silk. During World War II the Americans used the threads of these webs in their telescopic gun sights. The black widow bite is not fatal to healthy people, but medical attention should be sought. Black widows are not aggressive and will only bite if touched. The widow's larger cousin, the tarantula, is comparatively tame when it comes to people.



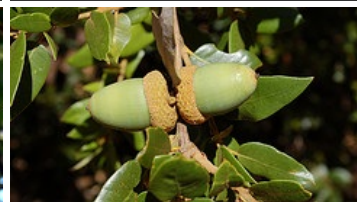
Marker 8 latitude 37.8539 longitude -121.93382

8a. Blue Oak (*Quercus douglasii*)



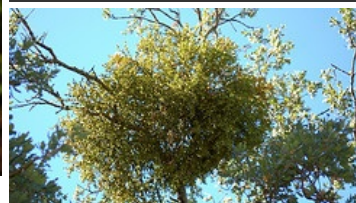
The deciduous blue oak (*Quercus douglasii*) is found only in California. It was first identified as a species by the famous explorer and botanist David Douglas. We know that Douglas visited Mount Diablo in the 1830s because he identified the Mount Diablo fairy lantern, a beautiful flower that grows nowhere else in the world.

8b. Canyon Live Oak




Canyon live oaks (*Quercus chrysolepis*) are evergreen and are common on Mount Diablo. Their large acorns are particularly good for making acorn flour, and mature in 8-10 months (as opposed to 18 months or more for some oak species).

8c. Pacific Mistletoe (*Phoradendron villosum*)

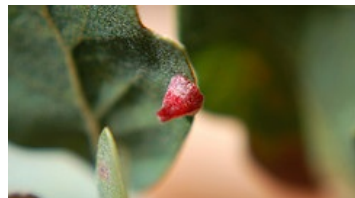


One of two common types of mistletoe found in the park, the Pacific mistletoe (*Phoradendron villosum*) favors oaks as a host for its parasitic ways. In some respects, it is not a "true" parasite because it can photosynthesize, but it does steal water and minerals from the host tree. The mistletoe is spread by birds that eat its sticky seeds and then wipe their beaks on the trunks of neighboring trees.



 **Marker 9** latitude 37.85306 longitude -121.9333

9a. Gall of Red Cone Gall Wasp



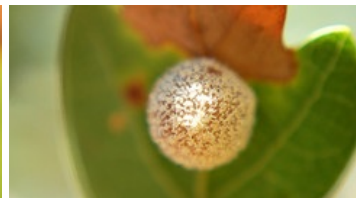
For the keen observer, a myriad of tiny jewel-colored formations can be found on almost every species of oak on Mount Diablo. These unlikely structures are called wasp galls, and serve as shelter and a food source for the larvae of a tiny wasp no bigger than a fruit fly. This example is from the red cone gall wasp (*Andricus kingi*). These are also called dunce cap galls because of their shape. They are found only on the leaves of blue oaks.

9b. Gall of Urchin Gall Wasp



The gall of the urchin gall wasp (*Antron quercusechinus*), another gall wasp that chooses blue oaks as its host. California oaks are host to over 150 different species of gall wasps. The study of galls is called cecidology.

9c. Gall of Clustered Gall Wasp?



Possibly the gall of *andricus brunneus*, or the clustered gall wasp. This was the third species of gall wasp we encountered on a single tree, a blue oak (*Quercus douglasii*).



Marker 10 latitude 37.85242 longitude -121.93352

10a. Fossil Turrítella Snail bed

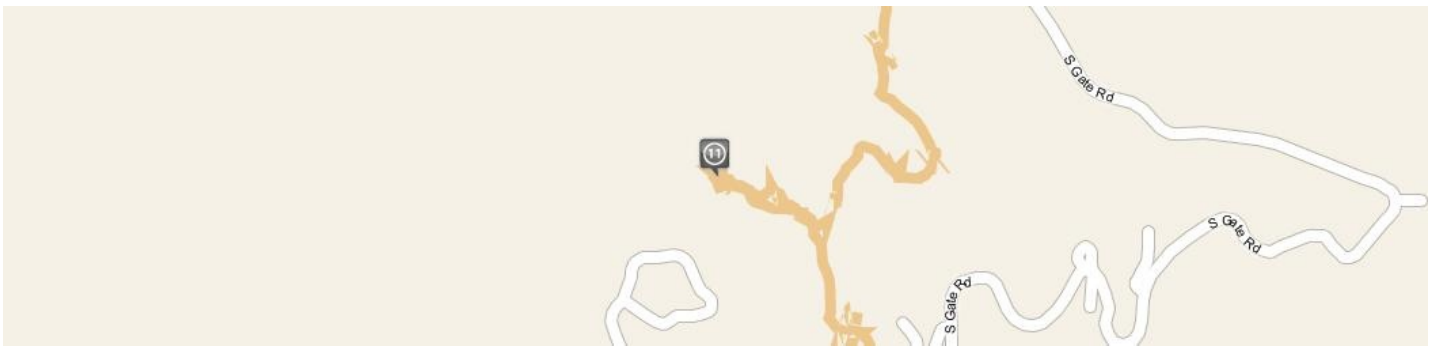


Here you can see a three-foot-thick sedimentary rock layer containing the fossil snail, *Turrítella aedificata*. During the Eocene period, 45 million years ago, these marine snails likely crawled along the ocean bottom and ate algae. This fossil deposit is an important marker for the geographic layers in Mount Diablo. Outcrops are seen a couple of miles to the east on the Knobcone Pine Trail, so that rock must be the same age as the rock at this site.

10b. Turrítella Snail bed, close up



These *Turrítella aedificata* snails are embedded in what once was the bottom of a shallow inland sea, and has, over millions of years, moved upward 1700 feet, to the side of this mountain. The rock layers (or beds) were originally formed in a horizontal position, but as Mt. Diablo was uplifted, the beds tilted 90 degrees. Here, you're looking at the edge of the beds.



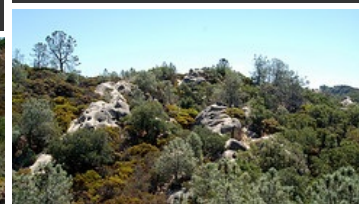
Marker 11 latitude 37.85233 longitude -121.9364

11a. Sentinel Rock, Mt. Diablo State Park



These tan-colored sandy rock formations were formed in the Eocene, and wrap around the south and west sides of the mountain. Their arrangement indicates that they were laid down here about 37-58 million years ago.

11b. Untouched landscape



The view from Sentinel Rock, Mt. Diablo State Park. Relatively undisturbed, this landscape has looked like this for thousands of years, perhaps since the last ice age, which ended about 10,000 years ago.

11c. Lichen on sandstone



This is a crustose lichen. Lichens are not one creature, but actually two, or sometimes three species living together: algae, fungus, and sometimes microscopic cyanobacterium. Many scientists believe that lichen secretes an acid, over time, which dissolves the rock it lives on into sediments. Such living things, as well as the weather, are an important part of the rock cycle.



Marker 12 latitude 37.8504 longitude -121.9342

12a. 'Water' caves, not wind caves



Mt. Diablo State Park is famous for its stunning sandstone formations, also known as 'tafoni.' Although commonly referred to as "wind caves," the element most responsible for creating these formations is water. Mt Diablo is probably only 2 million years old at the most, and the caves are only a few hundred or thousand years old. Geologically speaking, the porous sandstone in which these caves form can't stand up to our Mediterranean climate of wet winters and dry summers for long.

12b. Duracrust at Rock City



On tafoni structures, you can often see a dark mineral crust called a duracrust. This is what remains of the mineral cement that holds the sandstone together. Brought out by capillary action as rainwater evaporates, it's then deposited on the outside of the rock. When the duracrust falls off, the sandstone underneath erodes rapidly.



Marker 13 latitude 37.84906 longitude -121.93287

13a. Fossil scallop on the grill



An ancient fossil scallop shell peeks out from a surprising place, the barbecue pit at the Rock City campground. Fifteen million years ago, this area was on the eastern edge of a large inlet called the San Pablo Embayment. It was larger and deeper than San Francisco Bay, and was home to the ancestors of organisms we find in the bay today.

13b. A side of fossil oyster



This 15-million-year-old fossil oyster holds some clues to the complex geologic origins of the parent rock. The sand and pebbles surrounding the fossil indicate the direction of ancient streams; chert pebbles hint at the source from the south or west. bluish coating... some volcanic weathering product from the sierra foothills.



Marker 14 latitude 37.84803 longitude -121.92801

14a. Gray Pine cone up close



The cone of the Gray pine (*Pinus sabiniana*) is one of the heaviest of any conifer, up to several pounds for a single cone, which could pack a whallop falling from this tall tree. Needless to say, you won't find a picnic table under a Gray pine anywhere in the park.

14b. Cone of Gray Pine



A Coulter pine cone. The tree was first classified by Irish botanist Thomas Coulter, a contemporary of Scottish botanist David Douglas. The two were friendly rivals in North America.

14c. Crowns of the Gray Pine



The Gray Pine exhibits several characteristics of a drought-adapted tree. Open at the top (unlike most pines), these trees grow apart and not in tight-knit groves.

14d. Gray Pine bark




Prolonged drought can pose challenges for the Coulter pine. A lack of water means they can't make enough resin or pitch to ward off attack by beetles and other insects.

14e. Gray Pine Dwarf Mistletoe



An example of what looks to be gray pine dwarf mistletoe (*Arceuthobium occidentale*). Endemic to California, this species is mainly found on gray pine (formerly called Digger pine), but will often attack Coulter pine and knobcone pine (*Pinus attenuata*) residing near infected gray pines.



 **Marker 15** latitude 37.84532 longitude -121.92206

15a. 15 million years ago - storm evidence



These bands of pebbles in the massive, fine-grained Eocene sandstone at Rock City area of the park indicate that a major event, such as a large storm, created a stream moving fast enough to carry heavier stones.

15b. Tiny fossil



If you peer at Rock City's sandstone closely enough, you just might find tiny marine fossils.