CHAPTER 11

Natural History and Environment

Overview

El Dorado Hills sits on the western slope of the Sierra Nevada at an elevation of 600 to 1,200 feet. The El Dorado Hills Post Office is at a latitude of 38 degrees 39 minutes north and a longitude of 121 degrees 4 minutes west.

Geologic history of the western Sierra

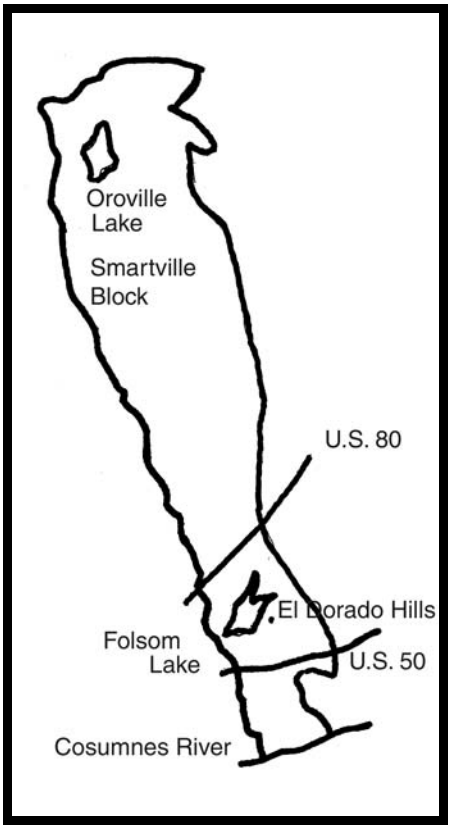
Over many millions of years, the land around El Dorado Hills has been uplifted, bent, folded, and eroded to create the landscape we see today.

Our part of the Sierra foothills was originally formed as part of a volcanic island chain in the sea, similar to the Hawaiian or Aleutian islands of today. The island chain was part of a *tectonic plate* geologists call the *Faralon plate.*

About 175 million years ago, the Faralon plate (moving west to east) collided with another tectonic plate that underlay the main part of what is now North America. The area where the collision took place is a north-south line stretching from the Oroville Dam through El Dorado Hills to Sutter Creek.

Geologists refer to our part of the western Sierra as the *Smartville block* or *Smartville complex*. Rocks in this area are characteristic of those that have had a volcanic origin and have since undergone physical and chemical changes.

The collision that took place in our area was not the only one significant to the formation of California. Subsequent collisions between plates influenced the formation of the Central Valley and Coast ranges of mountains.



Smartville block

Table 22 shows more detail about these and other geological events that have strongly influenced the landscape of the western Sierra.

Table 22. Important geological events

Date	Event
About 175 million years ago	The Faralon Plate (containing a chain of volcanic islands) crashed into North American plate and set in motion many geologic changes to the area that is now El Dorado Hills.
150-100 million years ago	A large inland sea covered what is now the Central Valley, the Coast Range, and the Sierra Nevada. The Sierra was formed by the folding and buckling of the *sedimentary* rocks in the inland sea being pushed upward. The heat and pressure changed some of the sedimentary rocks into *metamorphic* rocks. Quartz sandstone became quartzite. Shale hardened into slate. Limestone recrystallized into marble. Molten rocks cooling underground formed the granites found throughout the Sierra foothills. Other rocks metamorphosed into common local rocks like *serpentine* and *greenstone*. Pressures from the *magma* pushing upward and shrinkage caused by the cooling granitic rocks resulted in cracks and fissures filled by solutions of quartz mixed with small amounts of gold, copper, lead, and other minerals.
50-15 million years ago	The inland sea retreated. Volcanos erupted and ash buried the Sierra. New streams formed at right angles to the old streams containing the gold and other minerals deposited earlier.
15-2 million years ago	The Sierra tilted toward the west. Glaciers began to form in the mountains.
About 1 million years ago	As the glaciers melted they left *moraines* in the High Sierra. Runoff dislodged minerals and washed them downstream to gravel or sand bars. The Sacramento Delta and San Francisco Bay were formed.
1848+	Gold seekers discovered valuable minerals on the surface or just below the surface of the creekbeds. At first miners recovered gold nuggets and flakes by simply picking them up or panning for them. Over time, mining became more destructive and the miners caused significant environmental changes in the Sierra region. Examples include cutting of the forests and dredging of creekbeds that caused erosion and left *cobbles* and other debris in huge piles along the banks of rivers.

Seismic activity

At various times in the far distant past, the western Sierra has been the site of intense geologic disturbances. Some features of the El Dorado Hills landscape show remnants of this activity. For example, the West Bear Mountain earthquake fault, which is now inactive, runs in a north-south direction roughly along present-day El Dorado Hills Boulevard.

Other faults near El Dorado Hills are Bear Mountain and Melones (both also running north-south and located some miles to the east).

Most geologists believe these fault zones represent the boundary where the Smartville block collided with the western edge of the continent, as described in "Geologic history of the western Sierra" on page 190.

Currently there is little seismic activity in the western Sierra. To the west, however, in the San Francisco Bay Area, there are almost constant minor and moderate earthquakes, and in recent years there have also been a few quakes to the east.

For example, Truckee had a 3.8 temblor in 1998 and a one measuring 4.8 in 2000.

Oroville, which lies in the same fault zones as El Dorado Hills, had a magnitude 5.7[40] earthquake on August 1, 1975. Some geologists think this earthquake was caused by the filling of the reservoir behind Oroville Dam. The event called into question the plan to build a similar dam near Auburn. Construction has been on hold ever since, but there is constant pressure from various interest groups in the area to go ahead with the project.

Rocks and minerals

Rocks found in the western Sierra are usually metamorphic or igneous. Rocks found further down in the Valley are usually sedimentary.

One of the more common rocks in El Dorado Hills is *serpentine*, a gray-green rock made up of hydrated silica and magnesium with small amounts of iron or nickel. Soil resulting from the breakdown of this rock is relatively low in

40. Some sources say the magnitude was 6.1.

plant nutrients, which is one reason the vegetation on many hills in our community is rather sparse. (Other reasons are damage by grazing animals and local patterns of rainfall and drainage.).

Serpentine rock in a typical El Dorado Hills landscape

Asbestos in El Dorado Hills. Naturally occurring *asbestos*, in the form of a mineral called *chrysotile*, is sometimes found in serpentine rock, especially near fault zones.

For more information about asbestos in the El Dorado Hills area, see "Asbestos" on page 265.

Serpentine rock with lichens growing on it

Other rocks and minerals in El Dorado County. Other interesting rocks and minerals found in El Dorado County include:

- Chromite, which is used to make chrome and which was mined at one time in El Dorado Hills along Carson Creek
- Copper, which is collected as crystals and, when used for industrial purposes, is usually alloyed with other metals
- Eldoradoite, a blue variety of quartz
- Galena, the most common ore of lead
- Garnet, which occurs in many colors, including red, purple, orange, green, white, and brown, and is popular in jewelry
- Loadstone (magnetite), which is magnetic in nature and rich in iron
- Tourmaline, which occurs as hexagonal crystals most commonly colored black, green, or red

Soils and land use

Soils in this area (sometimes known as *Auburn/Argonaut soils*) are brownish in color, hard, and slightly acid. Depth to bedrock is 12 to 26 inches. Tombstone-like rock outcrops are common.

During the Spanish and Mexican periods of history and after the Gold Rush up until about 1920, the land around El Dorado Hills was used mostly for the production of hay and forage for livestock. Since then, urban uses (that is, buildings constructed for residential and commercial use) have been expanding, except on the steeper slopes, which are typically left as open space.

Water

Creeks, watershed

Harvard Way is the boundary of the El Dorado Hills watershed. North of Harvard Way, the creeks drain to the American River and Folsom Lake. Two of these include New York Creek and Deer Creek. South of Harvard Way, creeks drain to the Cosumnes River. These include Carson Creek and Dusty Creek.

Carson Creek

Water supply

Paolo Sioli, one of the early historians of El Dorado County, describes[41] the location of three canals that supplied much of the fresh water needs of western El Dorado county in the late 19th century:

- A canal running along an east-west ridge from the junction of the North and South forks of the American River
- A canal running west from the mouth of Weber Creek

41. Sioli (1883).

- A canal running west through the plains between the South Fork of the American River and the Cosumnes River

Ranchers living along the western slope also dug wells to supply their own needs and the needs of their animals, gardens, and crops.

However, although the wells supplied enough water for some of the residents' needs, they often fell short when it came to emergencies. Madeleine Petersen Moseley, a 20th century El Dorado Hills area pioneer, has described[42] how lack of water for fire fighting caused an exodus from the western slope. Moseley's family home burned to the ground when a spark started a blaze that couldn't be extinguished by available local water, and the response time for the nearest firefighters, located near Camino, was about 4 hours.

Today, water for El Dorado Hills is supplied by the El Dorado Irrigation District (EID), a public agency serving central and western El Dorado County. For more information about the EID and water issues in El Dorado Hills, see "Water" on page 243.

Native plants

The natural vegetation types throughout the El Dorado Hills area are mostly *grass-oak woodland* and *chaparral*.

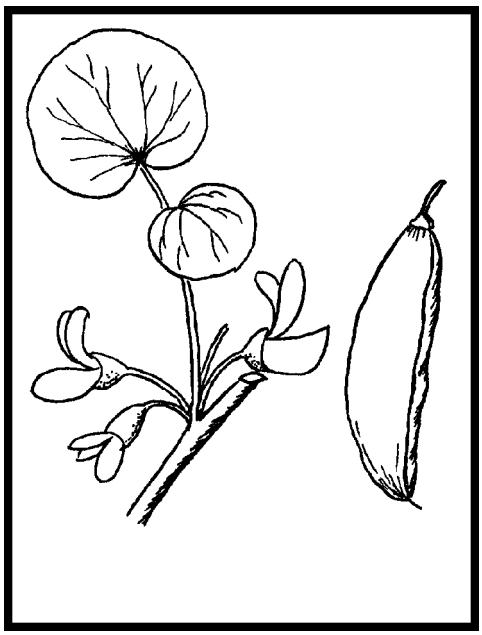
Native trees common in the area are:

- Gray Pine (sometimes called Digger Pine) (*Pinus sabiniana*)
- Blue Oak (*Quercus douglasii*)
- Interior Live Oak (*Q. wislizenii*)
- Valley Oak (*Q. lobata)*

All of these trees can withstand severe drought. In fact, too much water in the naturally dry season can kill them, and householders need to be careful that runoff from a lawn or flower bed doesn't reach their roots.

42. See "Clarksville: Once bustling Gold Rush town died for water" in the May 29, 2002 edition of *Village Life.*

Other common plants native to the Sierra foothills are California Western Redbud (a large, attractive bush with heart-shaped leaves, whose bright magenta flowers grace the April landscape), many grasses, California Poppy, and various kinds of lupines and vetch.

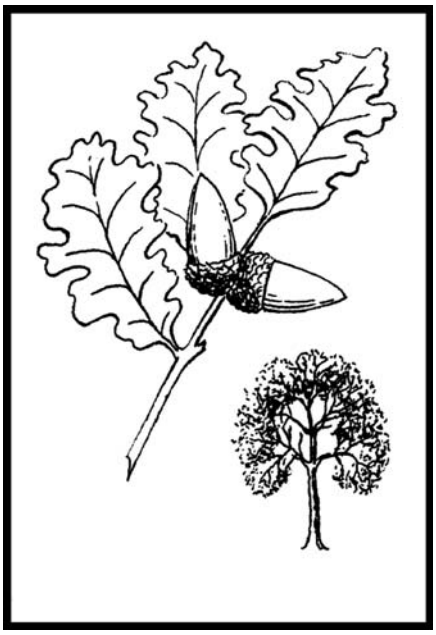


California Western Redbud
(from *The Outdoor World of the Sacramento Region*)

Along the creeks are *riparian* woodlands, which are among the most threatened and important plant communities. Common plants in riparian woodlands are:

- Rushes
- Sedges
- Willows
- Blackberry (*Rubus vitifolius*)
- Blue Oak (*Quercus douglasii*)
- Buckeye (*Aesculus californica*)
- Buttonbush (*Cephalanthus occidentalis*)
- California Grape (*Vitis californicus*)

- Fremont Cottonwood (*Populus fremontii*)
- Valley Oak (*Quercus lobata*))



Valley Oak
(from *The Outdoor World of the Sacramento Region*)

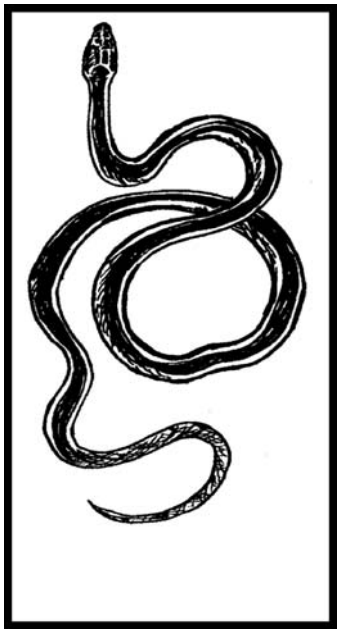
Cultivated plants

El Dorado Hills is close to the border of two of the *Sunset Western Garden Book* climate zones. We are actually in zone 9 (which we share with Folsom) but are close to the border of zone 7 (the zone for Cameron Park and Placerville). Heat-loving plants like oleander (*Apocynaceae*) and crape myrtle (*Lagerstroemia*) thrive here. We aren't living in a wintertime cold-air basin like the area

around Marysville and Yuba City, so citrus trees can usually be grown successfully. On the other hand, deciduous fruit trees that benefit from colder winters grow just east of us (for example, at Apple Hill), but not here.

Native animals

Wild animals and birds commonly seen in the El Dorado Hills area include deer, foxes, rabbits, voles, snakes, turtles, quail, hawks, and buzzards. Coyotes forage occasionally at the edge of the El Dorado Hills Golf Course. A flock of wild turkeys wanders the area north of Highway 50 near the El Dorado Hills community sign. Bobcats have been spotted along local nature trails, and river otters and beavers live in some of the Serrano ponds.



California Striped Whipsnake
(from *The Outdoor World of the Sacramento Region*)

Glossary

The following table lists key terms used in this chapter and their definitions.

asbestos	A group of minerals with a fibrous appearance. The asbestos form of serpentine, a rock common in El Dorado Hills, is called chrysotile.
Auburn/argonaut soils	Soil types in the El Dorado Hills area. These soils are slightly acid and brownish in color.
chaparral vegetation type	One of the vegetation types in the Sierra foothills. Features hard-leafed, drought-resistant plants.
chrysotile	See *asbestos*.
Faralon plate	The tectonic plate that collided with the North American plate about 150 million years ago in the area now known as El Dorado Hills.
fault	A fracture in the earth's crust along which the rocks on either side have shifted.
gabbro	A dark igneous rock or the resulting soil that forms as the rock breaks down. Rare gabbro soil occurs just east of El Dorado Hills in the Cameron Park area.
gold	A rare metal found in abundance during the Gold Rush period and still found occasionally in El Dorado County today.
granite	An igneous rock consisting mostly of feldspar and quartz.
grass-oak woodland vegetation type	One of the vegetation types in the western Sierra foothills. Characteristic plants are oaks, pines, and grasses.
greenstones	Metamorphosed igneous rocks.

igneous rocks	Sometimes called volcanic rocks. Rocks that come from magma found deep in the earth. When magma cools beneath the surface, intrusive rocks are formed. Examples include granite and gabbro. Magma that reaches the surface forms extrusive rocks. Examples include lava, obsidian, and basalt. Igneous rocks are often associated with metal ores.
marble	Recrystallized limestone.
metamorphic rocks	Rocks that have been changed by heat, pressure, or permeation by other substances. Examples include marble, quartzite, and schists.
moraine	A glacial deposit of sediment left at the margins of an ice sheet.
placer	Sedimentary deposits in which gold and other minerals are concentrated.
quartz	A common mineral, associated with gold, that occurs in a wide variety of colors and forms.
riparian	Any area within 50 feet from the center line of a seasonal creek or stream or any area within 100 feet from the shoreline of a pond, lake, or reservoir. These areas generally enjoy protected status.
sedimentary rocks	Rocks made of minerals that have been moved from their place of origin to another place of deposition. They are generally extremely varied, differing greatly in texture, color, and composition. Examples include sandstone, shale, and limestone.
serpentine	A gray-green rock made up of hydrated silica and magnesium with small amounts of iron or nickel. Serpentine rocks are common in the El Dorado Hills area.

Smartville block	Also known as the Smartville complex. The area of the western Sierra where the Faralon tectonic plate collided with the North American plate about 175 million years ago.
tectonic plate	A segment of the earth's outer rind, the lithosphere, which extends down to a depth of about 60 to 100 miles. A dozen or more plates of various sizes now move about on the earth's surface.

For more information

Sources of information listed in this section include references cited or used in researching this chapter, as well as sources that might be useful for readers to consult for more information.

Suggested field trips

Visiting locations described in the following sections helps to understand the unique geography, geology, and botany of the Sierra foothills.

Rare plants, rocks, and soil. Pine Hill Preserve, just to the east of El Dorado Hills, is a good place to learn about local botany and geology. The preserve is a collaborative effort among various federal, state, county, and private organizations to save the habitat of 8 plants that grow nowhere else on earth. The preserve consists of about 6 separate parcels of land both north and south of Green Valley Road a few miles east of El Dorado Hills.

The Cameron Park Unit is one of the parcels open to the public (some other parcels require special permission to enter). You can park and enter the preserve from one of these two locations:

- Behind the Bel Air market at the end of Gabbert Drive. After you park, walk up the dirt road.
- Next to a park on Veld Way (right off Meder Road). After you park, walk back out to Meder, turn left (west), go a short distance on Meder, and turn left onto another dirt road partially hidden by trees.

Both entrances lead you to an unused dirt road that goes to the top of a hill. Rare plants grow next to or even in the middle of the road.

Some of the species protected in the preserve are:

- Pine Hill Ceanothus (*Ceanothus roderickii*). This ceanothus (related to other, more common ceanothus plants common in the foothills) has small white flowers, which can have a pinkish or bluish tinge. Periodic fire has a positive effect on this plant.
- El Dorado Bedstraw (*Galium californicum ssp.sierrae*). This plant has small, pale yellow flowers. It is very difficult to spot.
- El Dorado Mule-ears (*Wyethia reticulata*). This plant is a perennial in the sunflower family. It has yellow flowers that appear in May or June. It grows in gabbro and serpentine soils.
- Stebbins' Morning-glory (*Calystegia stebbinsii*). This endangered species has white flowers (typical morning-glory flowers but smaller).
- Red Hills Soaproot (*Chlorogalum grandiflorum*). This plant is a member of the lily family. The leaves are dark-green and wavy. The flowers open in the evening.

Soaproot plant

Soaproot has many uses, including:

- The root can be used to make soap or shampoo, and the local Indians mashed it and threw it into pools of water to stupify the fish so they could catch them more easily
- The root can be baked (to remove the soapy taste) and eaten
- The fibers surrounding the root can be made into brushes

The preserve also provides a hands-on lesson in local geology. The plants are growing in rare *gabbro soil* derived from the underlying *gabbro rock*, originally formed deep in the earth's crust and dark red in color due to a high iron content. Crystals are commonly embedded in the rocks. The gabbro rock and soil share some characteristics and also some plant species with the serpentine soil found more commonly in El Dorado Hills just a few miles to the west.

The best time to visit the preserve is April through June when many of the plants are in bloom.

As you might expect, it is forbidden to pick the plants or remove any rocks or minerals from the preserve.

More information is available at www.co.el-dorado.ca.us/phpreserve/.

Rock and mineral collection sites. Popular rock and mineral observation and collection sites in El Dorado County include:

- Folsom (along the American River): granitic rocks and cobbles (dredger tailings)
- Georgetown (Stifle Claim / Traverse Creek area, 1.3 miles from Georgetown Road (Highway 193) just off Meadow Brook Road: serpentine, jade, garnet, and vesuvianite

  This area is managed by the United States Department of Forestry. William Stifle, for whom the area is named, was a gold miner, and he also submitted a claim in the early 1900s for vesuvianite crystals, which were thought at the time to be emeralds.

  Individuals can collect on the site without a formal permit. However, jackhammer digging is not allowed and overcollecting is also prohibited.

  For more information about the site, contact the Georgetown Ranger Station on Wentworth in Georgetown.

- Placerville (north of town): jade
- Pollock Pines (west and southwest of town): quartz crystals
- Volcanoville (north of Chiquita lake): quartz crystals
- White Rock Road (south of the Aerojet property): cobbles (dredger tailings)

Straza Ranch wildlife preserve. The Straza Ranch wildlife preserve is 4-5 miles north of Coloma on Highway 49. The gate to the preserve (on the west side of the highway) is almost directly opposite the entrance to a winery. There is a small parking area next to the gate.

Jensen Botanical Gardens. These gardens, located on Fair Oaks Boulevard in Carmichael, contains exotic flora, including rare hybrids of camellias, dogwoods, azaleas, and rhododendrons. Phone: 944-2025.

Rusch Park Botanical Garden. This garden, located at Rosswood Drive and Antelope Road in Citrus Heights, represents 7 biomes of California. Phone: 725-7275.

Organizations

Table 23 lists organizations concerned with natural history issues.

Locations are in El Dorado Hills unless otherwise indicated. Phone numbers are in the 916 area code unless otherwise indicated.

Table 23. Organizations concerned with natural history issues

Organization	Location	Responsibility or interest	Contact, phone, URL, notes
American River Conservancy	Coloma: Highway 49	American River area	530-621-1224 www.arconservancy.org
California Department of Conservation	Sacramento: K Street	Conservation of natural resources	322-1080 www.consrv.ca.gov
California Department of Fish and Game	Sacramento: 9th Street	Fish and game	445-0411 www.dfg.ca.gov
California Department of Forestry and Fire Protection	Sacramento: 9th Street	Forestry and fire protection	653-5123 www.fire.ca.gov
California Native Plant Society (El Dorado Chapter)	State office in Sacramento: J Street	Plants native to El Dorado County	www.eldoradocnps.org You can purchase native plants from this organization.
El Dorado County Mineral and Gem Society	Placerville	Rocks and minerals in El Dorado County	530-676-2472 www.eldoradomineralandgem.org
U. S. Bureau of Land Management (Pine Hill Preserve)	Folsom: Natoma Street	Pine Hill Preserve	985-4474 www.ca.blm.gov/folsom/
U. S. Bureau of Reclamation	Sacramento: Cottage Way	Folsom Dam	978-5100 www.mp.usbr.gov
U. S. Fish and Wildlife Service	Sacramento: Cottage Way	Fish and wildlife	414-6464 http://offices.fws.gov

Books, pamphlets, reports, and CDs

_____, *Economic Feasibility Study for the El Dorado County Ecological Preserves*. (EPS #4025) February 1997. Prepared by Economic & Planning Systems, Inc., Sacramento, California.

_____, *Preservation Sites and Preservation Strategies for Rare Plant Species in Western El Dorado County.* November 1991. Prepared by EIP Associates.

_____. *The Outdoor World of the Sacramento Region*. [No date] Sacramento: Sacramento County Office of Education, Educational Services Division.

A revision of *The Natural History Guide of the Sacramento Area* published in 1963. The "creative spirit responsible for the [original] book" and "the inspiring force for its revision" was Effie Yeaw, a naturalist and teacher who is legendary in the Sacramento area.

Good addition to the library of all serious amateur naturalists. Includes a section titled "Suggestions for a Classroom Library."

Alt, David D. and Donald W. Hyndman. 2000. *Roadside Geology of Northern and Central California*. Missoula, Montana: Mountain Press Publishing Company. El Dorado County Library: 557.94.

Good addition to the library of all serious amateur geologists.

The El Dorado Hills area is described in the section titled "Highway 50: Sacramento to Carson City."

Bailey, Edgar H. (Editor). 1966. *Geology of Northern California: Bulletin 190.* Menlo Park: California Division of Mines and Geology. El Dorado County Library: 557.94.

Brenzel, Kathleen Norris (Editor). 2001. *Sunset Western Garden Book*. Menlo Park: Sunset Publishing Corporation. Web site: www.sunsetbooks.com.

The definitive book about gardening in the western United States.

Desautels, Paul E. 1974. *Rocks & Minerals.* New York: Grosset & Dunlap. El Dorado County Library: Q 549.

Good general reference about rocks and minerals.

Dunn, Melanie, Rosemary Guerin-Place, Lyn Roefs, and Kathleen Twomey (Information compilers) (DMG CD 2000-001). 2000. *California Minerals and Mines*. California Department of Conservation, Division of Mines and Geology. CD-ROM.

Durrenberger, Robert W. 1965, 1968. *Patterns on the Land: Geographical, Historical and Political Maps of California.* Palo Alto, California: National Press Books. El Dorado County Library: 979.4.

Excellent source of information. Lots of maps.

Hanauer, Elsie. 1976. *Rocks and Minerals of the Western United States.* New York: A. S. Barnes and Company. El Dorado County Library: 549.075.

Good high-level treatment of the formation of rocks and minerals. Contains many maps showing collecting locations.

Harden, Deborah R. 1998. *California Geology.* Upper Saddle River, NJ: Prentice Hall, Inc.

College-level textbook.

Holden, William M. 1988, 1991, 1998. *Sacramento: Excursions into its history and natural world.* Fair Oaks, California: Two Rivers Publishing Co.

Contains a chapter about Effie Yeaw and the Effie Yeaw Nature Center in Ancil Hoffman Park in Carmichael.

Jennings, Charles W. 1994. *Fault Activity Map of California and Adjacent Areas.* Sacramento: Department of Conservation, Division of Mines and Geology. El Dorado County library: 551.87.

Large map and commentary about volcanic eruptions in California.

McPhee, John. 1993. *Assembling California.* New York: Farrar, Straus, and Giroux.

The McPhee books are written in a readable, journalistic style that appeals to amateurs. Describes the Smartville block and the area around the proposed Auburn dam.

McPhee, John. 1980. *Basin and Range*. New York: Farrar, Straus, and Giroux.

Covers Nevada and parts of the Sierra.

Niehaus, Theodore F. and Charles L. Ripper. 1976. *Pacific States Wildflowers: Washington, Oregon, California and adjacent areas)* (A Peterson Field Guide). Boston: Houghton Mifflin Company.

Both color and black / white pictures. Relatively easy for amateur botanists to use.

Other books in the Peterson series would also be of interest to local amateur naturalists.

Rogers, John H. 1968. *Soils of Western El Dorado County, California.* Placerville: El Dorado and Georgetown Divide Soil Conversation Districts cooperating

with United States Department of Agriculture Soil Conservation Service. El Dorado County Library: 631.4979441.

Schiffman, Peter and David L. Wagner (Editors). 1992. Field Guide to the Geology and Metamorphism of the Franciscan Complex and Western Metamorphic Belt of Northern California (Special Publication 114). California Department of Conservation, Division of Mines and Geology.

Wagner, D. L., C. W. Jennings, T. L. Bedrossian and E. J. Bortugno (Information Compilers). 1987 (Second Printing). *Geologic Map of the Sacramento Quadrangle*. California Department of Conservation, Division of Mines and Geology. Map.

Wagner, David L. and Stephan A. Graham. 1999. *Geologic Field Trips in Northern California*. Sacramento: California Department of Conservation, Division of Mines and Geology.

Highly scientific treatment—of interest primarily to professionals and serious amateurs.

One of the articles in this book, titled "Accretionary Tectonics of the Western Sierra Nevada Metamorphic Belt," written by Richard A. Schweickert, Richard E. Hanson, and Gary H. Girty, talks about geologic features in the El Dorado Hills area.

Williams, Jerry (Editor). 2000. *California Atlas: A Geographic Journey*. Quincy. California: California Geographic Associates.

Available at Sutter's Fort in Sacramento and from the Web site www.calatlas.com.

Wuerthner, George. 1993. *California's Sierra Nevada*. Helena, Montana: American Geographic Publishing. El Dorado County Library: 979.44.

Lots of pictures.

Note

This chapter was excerpted under the title "The natural history of the El Dorado Hills area" in the 40th anniversary edition (May 29, 2002) of the *Village Life* newspaper.