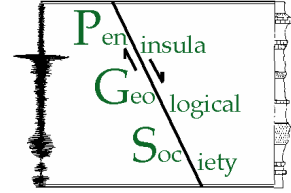


**Peninsula Geological Society Field Trip
Robert Sibley Volcanic Regional Preserve
in the Berkeley Hills
Leader: Steve Edwards
May 15, 2004**



Summary:

The volcanic rocks at Robert Sibley Volcanic Regional Preserve are all late Miocene (ca. 10.2- 9 ma.) Moraga Fm. Garniss Curtis has studied this formation and this site for decades and believes this is a piece of the Quien Sabe volcanics that has been transported north on the East Bay fault system. In terms of accessibility and exposure, Sibley is the showcase site for this volcanic complex, which is also represented by the Tolay Volcanics in Sonoma and probably Burdell Mountain in Marin County. We will be looking primarily at basaltic-andesitic rocks, but with considerable textural and structural variety. A basaltic volcano (Round Top) dominates the landscape. Kaiser quarrying and erosion have exposed its deep interior and underpinning like no other volcano in California. URL <http://www.ebparks.org/parks/sibley.htm>

About the Trip Leader:

Steve Edwards is the director of the Regional Parks Botanic Garden in Berkeley (California native plants). His field trips usually include a little botany to spice things up. Steve was one of Don Savage's students in the Dept. of Paleontology at Berkeley (fossil mammals), where he received my Ph.D. Steve mapped the geology of Sibley on my own in 1982 as an exercise in preparation for his orals. As a result of his findings the park district named the park a "geologic preserve". Steve is a botanist and paleontologist, not a volcanologist, but he has been scrutinizing Sibley for many years and he has a lot to share. Steve says that Garniss Curtis, by walking around with him, made sure his comments will be (pretty much) rectitudinous. Mel Erskine a volunteer at the botanical garden is Steve's current geological mentor.

Directions:

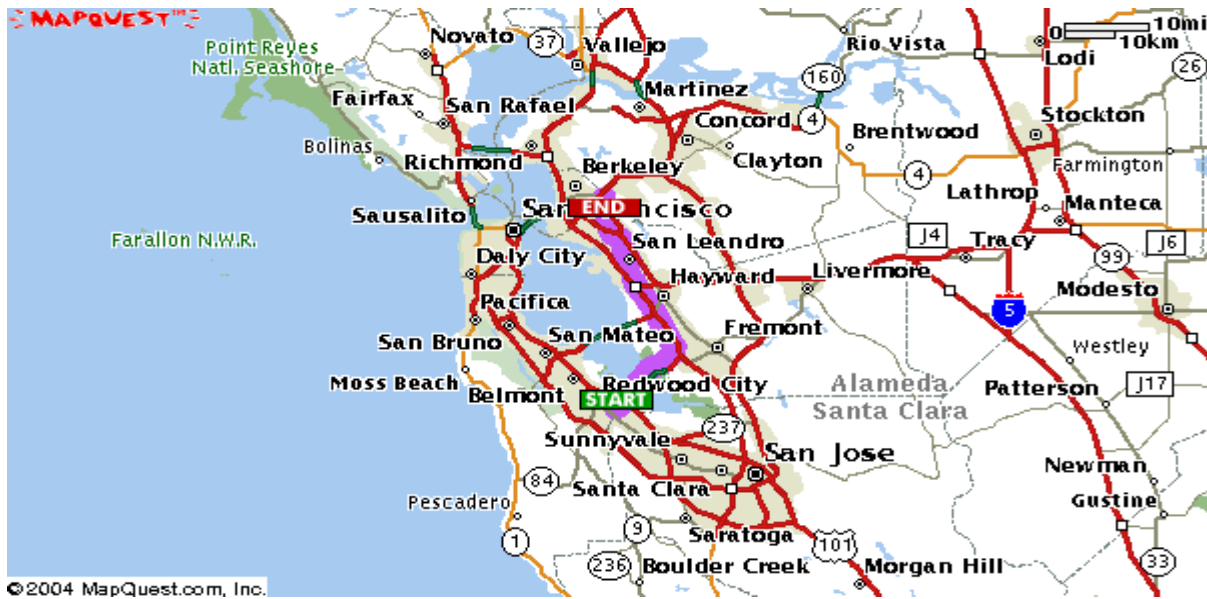
Meet at the parking lot for Sibley which is along Skyline Blvd. a block south of its junction with Grizzly Peak Blvd. **Meeting time 9:45 AM** so the tour can begin without delay at 10 AM.

- Bring hat, sunglasses, sunscreen, water, snacks, and a wind breaker in case of blowing fog.
- About 2 miles of gentle hiking.
- Will try to return back to the cars by 12:30.
- Flush toilets at parking area.

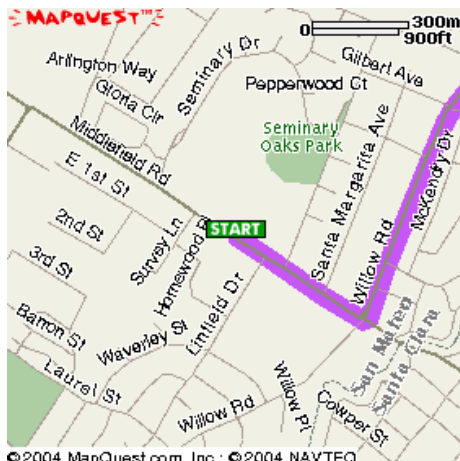
See the PGS Web page for a 5-page PDF that includes four maps, a summary of the Preserve, and a nine-point tour sheet. Read it at http://diggles.50megs.com/pgs/PGS04-05a_Sibley.pdf

Directions to Robert Sibley Volcanic Regional Preserve from the USGS

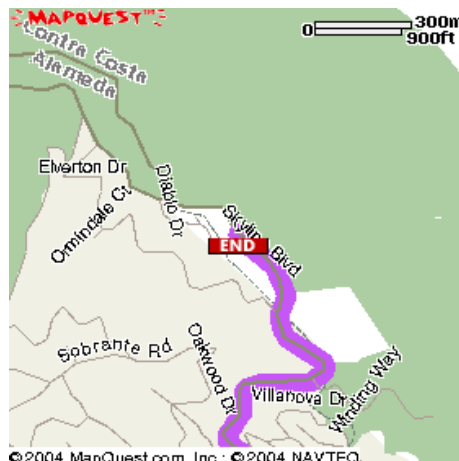
1. Start out going Southeast on MIDDLEFIELD RD toward LINFIELD DR. 0.2 miles
2. Turn LEFT onto WILLOW RD. 2.0 miles
3. Turn RIGHT onto CA-84 E. 8.2 miles
4. Stay straight to go onto DECOTO RD. 0.2 miles
5. Merge onto I-880 N toward OAKLAND. 9.8 miles
6. Merge onto HESPERIAN BLVD. 1.6 miles
7. Turn SLIGHT RIGHT onto 150TH AVE. 0.4 miles
8. Merge onto I-580 W via the ramp- on the left- toward OAKLAND. 6.1 miles
9. Merge onto CA-13 N toward BERKELEY. 3.1 miles
10. Take the exit toward PARK BLVD. 0.1 miles
11. Turn LEFT onto MOUNTAIN BLVD. 0.3 miles
12. Turn RIGHT onto SNAKE RD. 0.1 miles
13. Turn SHARP LEFT to stay on SNAKE RD. 1.6 miles
14. SNAKE RD becomes SKYLINE BLVD. <0.1 miles
15. Turn LEFT to stay on SKYLINE BLVD. 0.6 miles



Start



End at 6800 Skyline Blvd, Oakland, CA



ROBERT SIBLEY VOLCANIC REGIONAL PRESERVE

Robert Sibley Volcanic Regional Preserve is named to honor Robert Sibley, a Director and President of the East Bay Regional Park District from 1948 until his death in 1958. A Regional Park founder and enthusiast, Sibley enjoyed hiking in this park, at that time named Round Top. His active career spanned the realms of education, business, writing and editing. Friends called him “a visionary who made his visions come true.” That was his genius, and it lives on in the vast acres of the East Bay Regional Parks.

The Preserve was dedicated with Tilden Regional Park and Temescal Regional Recreation Area in October 1936, just two years after the East Bay Regional Park District was formed. These lands comprised the first three Regional Parks – and the beginning steps to realize the ambitious plan outlined in the Park District’s first Master Plan: *Proposed Park Reservation for East Bay Cities* (1930).

This document describes the recreational potential of the East Bay hill lands, stating that “almost every form of healthful, pleasurable, and educational inland interest can be developed for the people. The report also contained panoramic photos taken from Round Top, looking south, west and north to show Oakland and San Francisco, and looking northeast, east and southeast toward Walnut Creek, Mount Diablo and Moraga.

An old quarry site north of Round Top was added in 1977, bringing the Preserve’s size to 381 acres. Another 272 acres northwest of the park, containing another quarry area, was acquired in 1991, and brought the Preserve even closer to its current 660 acres. (The newest acquisition is being held as a land bank, and is currently closed to the public.) With the addition of these quarry sites, the Park District inherited a cross-section look at relics of the volcanic activity that occurred in the Berkeley Hills. A self-guiding technical tour of the park may be found on the other side of this brochure.

At the southern park boundary is 235-acre Huckleberry Botanic Regional Preserve. The East Bay Skyline National Recreation Trail, which connects Richmond-El Sobrante to Castro Valley, traverses both of these parks.

TO REACH THE PARK From Highway 24 take the Fish Ranch Road exit just east of the Caldecott Tunnel. Continue .8 miles to Grizzly Peak Blvd. Turn left and go 2.4 miles on Grizzly Peak to Skyline Blvd. Turn left on Skyline and proceed to the park entrance, on the left. **PUBLIC TRANSIT:** From 19th St. BART or Lake Merritt BART take AC Transit bus 59. This bus line goes to the Montclair Transit Center (Moraga Ave. and Medau Pl). From there, transfer to AC Transit bus 305 (Tue. & Thurs. only, four times daily) and exit at Colton Blvd. and Ridgewood Dr. Walk the short distance from Colton to Skyline Blvd, turn left and proceed to the park. It is a mostly level .9-mile walk. **Call AC Transit** at 817-1717 to confirm.

PARK HOURS: 5 a.m. to 10 p.m. Parking lot subject to closure at 6 p.m. November through March.

POLICE, FIRE, MEDICAL EMERGENCY9-1-1
PARK HEADQUARTERS.....(510) 644-0436
EBRPD HEADQUARTERS(510) 562-PARK
GROUP PICNIC RESERVATIONS.....(510) 636-1684

PARKLAND RULES

Welcome to your regional parklands. Help protect park resources and ensure an enjoyable visit for everyone by complying with these rules and any posted regulations. The Park District’s Ordinance 38, which is summarized below, lists specific rules for use and protection of regional parklands. Violators will be subject to citation or arrest. For further information, ask a Park Ranger, Police Officer, Volunteer Trail Patrol member, or telephone (510) 881-1833.

PARK GATES ARE OPEN to the public during hours posted at the park entrance. Unless otherwise posted, **CURFEW** is between the hours of 10 p.m. and 5 a.m., except for persons possessing a permit to remain on parklands.

MOTOR VEHICLES are restricted to designated parking areas and paved public roads.

BICYCLES may be ridden on designated bicycle trails, and on fire or service roads, unless otherwise posted. Bicycles are not permitted, either ridden, walked or carried, in areas posted “No Bicycles,” or on narrow hiking or narrow equestrian trails. State law requires that all bicyclists under age 18 wear an approved helmet while riding on trails and roadways. Riders should call out or sound a warning when overtaking other trail users.

DOGS must be leashed (six-foot maximum) and under control at any posted area, parking lot, picnic site, lawn or developed area. No dogs or other animals are permitted at any swimming pool, beach, wetland, or marsh. Owners must always carry a leash (six-foot maximum). Dogs may be off-leash in open space and undeveloped areas of parklands, provided they are under control at all times. Dangerous animals are not allowed in the parks. Please dispose of your dog’s waste by placing it in a garbage can. Persons who walk more than three dogs at a time on Regional Parks trails must obtain a permit; commercial dog walkers are required to obtain a permit regardless of how many dogs they walk at one time (limit of six). Please call (510) 544-3009 for information.

SWIMMING, WADING and other water contact activities are permitted only in designated areas. **DIVING** is permitted only from designated diving boards and swim platforms. **SCUBA** diving is prohibited in any District lake or inland waters.

PLANTS, ANIMALS, GEOLOGIC, ARCHAEOLOGIC OR HISTORIC OBJECTS are protected by law. Please do not disturb or remove any of these features.

HELP PROTECT OUR PARK WILDLIFE by not releasing or feeding ducks, cats or other animals. Do not feed wild park animals; enjoy them from a distance.

FIRES are permitted in barbecue pits or personal cooking equipment in designated picnic areas or irrigated turf areas only, placed at least 30 feet from flammable materials. Please do not place hot coals on the ground or in a garbage can. Dispose of hot coals or other burned fuel in barbecue pits or in designated hot coal disposal receptacles.

FIREWORKS are not permitted in any regional park.

CAMPING is not permitted within District parklands without a permit. **FISHING** is not permitted at Sibley Volcanic Regional Preserve. At parklands that do allow fishing, a state fishing license is required and a District fishing permit is required when posted.

ALCOHOLIC BEVERAGES are not permitted at pools, swim beaches or within 50 feet of paved roads, parking lots or posted areas. Otherwise, beer and wine are permitted at picnic areas and elsewhere on parklands.

GAMES AND ACTIVITIES, including model rockets, model airplanes, hang gliding, golf and other activities with potential risk to property or park visitors are permitted only in designated areas.

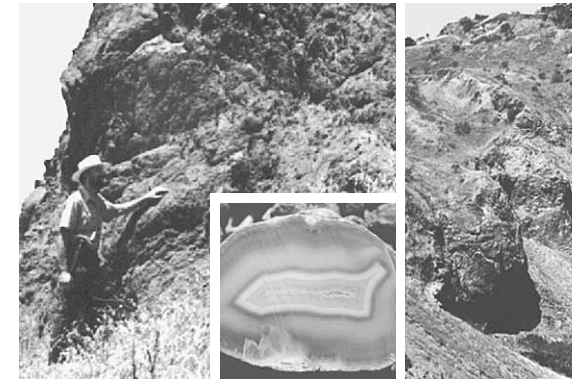
ASSEMBLIES, PERFORMANCES, SPECIAL EVENTS or similar gatherings require a permit.

Please be considerate of other park visitors if you use a **RADIO**. A permit is required for **AMPLIFICATION** of voice, music or other sounds.

FIREARMS OR BOWS AND ARROWS are not permitted on regional parklands except at established ranges. Crossbows, spears, slingshots, air pistols or rifles, and other dangerous weapons are prohibited anywhere on regional parklands.

PARK VISITORS are responsible for knowing and following park rules.

SIBLEY VOLCANIC REGIONAL PRESERVE



EAST BAY REGIONAL PARK DISTRICT

A SELF-GUIDED TOUR OF ROUND TOP VOLCANOES

By Stephen W. Edwards
Director, Regional Parks Botanic Garden

Robert Sibley Volcanic Regional Preserve features a complex volcanic center that was the source, 10 million years ago, of most of the lavas that underlie the ridges from Inspiration Point in Tilden Regional Park to Moraga. Round Top, one of the highest peaks in the Berkeley Hills, consists of lavas, breccias (unsorted mixtures of fine and coarse volcanic debris) and tuffs (lithified volcanic ash—ash that has become stone) that once filled a volcano.

Though Round Top was once the infilling of a great cauldron, it stands out today because it was originally surrounded by “incompetent” (easily eroded) sedimentary rocks of the Orinda Formation, which have eroded away. During the past 10 million years the Berkeley Hills were uplifted on a gigantic scale because of strains on the Hayward and Moraga fault systems. This uplift folded the rock formations, and the Round Top vent complex was tilted on its side. Hence, folding and erosion have exposed a cross section of a great volcano, right down to its roots, providing an unsurpassed outdoor laboratory for the study of volcanism in the Central Coast ranges.

The blocks of stone scattered everywhere around the flanks of Round Top are basalt lava (a hard, dense, dark volcanic rock). Lava within the vent has been dated at UC Berkeley, by the potassium-argon radioisotope dating method, at 9.5 million years before present.

A great diversity of volcanic phenomena is preserved for study at Sibley. Basaltic dikes (feeders of the vents), tuff-breccias (ash containing a scattered jumble of blocks and chunks of lava), lava flows, red-baked cinder piles, air-fall tuffs and the major vent itself can all be seen first-hand in the course of an easy hike. Numbered posts, which correspond to the numbered descriptions below, have been placed at some of the most interesting outcrops.

1 To visit this site, walk up the paved road to the EBMUD water tank. A dark basalt dike, an important feeder of lava to the caldera, cuts through a sequence of tuff-breccias (brown) and pebbly mudstones (gray), all inside and near the bottom of the caldera. The mudstones indicate ponding of water; the tuff-breccias are the remains of landslides and blockfalls into the pit from the surrounding walls.

2 Note Orinda Formation river sands and gravels on the left against basalt lava on the right. This is part of the wall of the caldera. As you walked along the road to this point, you passed the steep cliffs below the summit installation. These cliffs expose mostly colluvium (recently accumulated slope debris), but there are also numerous outcrops of cataclastic basalt flows that look much like the colluvium. Cataclastic means the flows were shattered into coarse blocks by violent motions within the caldera — perhaps by collapsing into voids created by eruptions of later lavas.

3 These tuff-breccias originated when fluid mixtures of ash, lapilli (small pieces of lava, and pebbles derived from the Orinda gravels) and blocks of lava, perhaps saturated by rain, slurred and rumbled down the inside slopes of the volcano. In this outcrop there are two grades of breccia, the one at the bottom and the one to the right, bearing a much higher proportion of broken-up chunks of lava.

4 This quarry pit was made by quarry operations in which huge amounts of massive basalt lava were removed. The result is a tremendous boon to geology, for the pit exposes the interior of the Round Top volcano. You are standing on bedded tuff-breccias, which filled much of the caldera, settling at times into a small lake. To the left (north end of the pit) the layers of tuff-breccia curve around the pit, giving a hint of the inner parts of the volcano walls that originally stood above the surrounding terrain as a Miocene hill or peak. This unit also curves eastward through the bay-laurel grove in the gully to the right. The steep wall across the pit consists of lava that formed the basalt dome. Eventually the Round Top vent completely buried itself in basalt flows. From this point, note the view of Mt. Diablo, which, though it contains some submarine volcanic rocks, is not, and never was, a volcano.

5 This roadcut exposes Orinda Formation river gravels, sands and mudstones. A cross-cutting basalt dike at the left end feeds into the overlying volcanics. The red streaks and layers in these river beds were caused by oxidation of iron in the sediments. Such varicolored “redbeds” are explored worldwide for the fossils of plants and animals they contain. Elsewhere in the Preserve, bands of more intense red are found at the tops and bottoms of lava flows. In such cases iron was oxidized and reddened by baking; these bands are called “bake zones.” A related process occurs when a brushfire reddens rocks and soil. To see Post 6, walk down the road about 100 feet past Post 5, then bear to the right.

6 Before you is a wall with basalt on the left and Orinda mudstones on the right. The bedding in the mudstones is disrupted, giving the appearance of drag-folding resulting from relative uplift of the lava occurring during the past 10 million years. Alternatively, the disruption of the mudstones may have occurred earlier, at the time of volcanic activity. This site was close to, or was in, the wall of the caldera, and would have been subject to all kinds of slumping, sliding and plowing. The “exotic” large sandstone blocks lying about were torn from very ancient Cretaceous (Age of Dinosaurs) rocks by the ascending lavas. The quarrymen took the lava, but left the sandstone here. To see Post 7, proceed northwest along the main road, then take the first right.

7 Massive basalt was removed from this major quarry pit. The north wall shows a set of thick lava flows. They are tilted on edge, nearly vertical, with a bake zone at the base of the sequence (far left). The well-defined layers near the top of the face are jointing-units resulting from cooling. Another interesting outcrop is situated on the remnant of an old road along the southeast flank of this peak. There you can see a thick accumulation of cemented red-baked volcanic cinders. These kinds of deposits always indicate proximity of a vent. Loose deposits of comparable material are quarried at volcanic vents in Lake County, and the products end up as red-cinder mulch on gardens in the Bay Area.

8 This is a red-baked sequence of air-fall tuffs. At the base is a lava flow. Within the section are buff-colored thin bands that look like lava. They are really air-fall tuffs that were, for some reason, more strongly lithified than the other tuffs in the section. Volcanic ash, which is called tuff when lithified, generally consists of rock fragments, crystals and bits of glass ejected from a volcano. Most of the tuffs at Sibley have very little glass and would thus be called “lithic-crystal” tuffs. The thin, hard, buff-colored bands in this section are “vitric-lithic-crystal” because they contain glass shards.

9 This is a beautiful basalt lava flow. It is smooth and massive in its upper part, to the left. The lower part is vesicular and “jumbled.” The lower parts of lava flows are often jumbled by turbulence and drag. The vesicles in this flow were caused by escaping gas. The zeolites, chalcedony, opal and calcite filling many of the vesicles were precipitated during and after cooling of the lava. Alternatively, the outcrop can be interpreted as two separate lava flows.

HOW MANY VOLCANOES? Round Top was the big one. There are smaller ones outside the Preserve on private property to the north and southeast. Another, of rhyolitic composition like the ash from Mount St. Helens, underlies the Lawrence Berkeley Laboratory and Little Grizzly Peak in Tilden Regional Park. About 9 million years ago it was erupting beside Round Top. Subsequently it was shifted about three and one-half miles northwest by movement along Wildcat Fault. That makes a total of four volcanoes.