Welcome to Henry Coe State Park. As you walk along the Burra Burra Trail, this guide will point out features that we have found of interest and it is our hope that you will be able to enjoy them as much as we have. As you hike along the trail, you'll see rocks that formed millions of years ago when California was very different than it is today. The numbered figures match locations shown on the map on the front of this guide.

Starting near the southern end of the trail, you will find a rock that is gray or brown and has noticeable speckles (**Fig. 1**). This is andesite, an igneous rock made when molten rock (lava) cooled. The speckles are small crystals of the minerals quartz (round and clear) and feldspar (rectangular and white). This andesite is thought to be a detached remnant of


Figure 1


Figure 2

the Quien Sabe Volcanic field, which is located near Hollister. Just think: about 10 million years ago, Henry Coe State Park had its own volcano!

As you continue your hike, check out the hillside on your right for landslides (**Fig. 2)**. Look for uneven topography that looks kind of like melted ice cream.

Continuing, you will come to an outcrop of rock, on your left within some trees. Go over and take a look **(Fig. 3)**. This rock, called schist, is formed under high pressures and temperatures. Schist is a type of metamorphic rock that has undergone changes from an original sedimentary or igneous rock to become the rock that you see today. You will notice some layering in the rock, which is known as foliation. The dark, shiny, flaky mineral is mica.

As you continue your walk, you'll come to Burra Burra Peak, the namesake of this trail. If you leave the trail and walk up the side of the peak, you'll see pieces of a rock known as serpentinite. In addition to a state bird, a state flower, and even a state fossil (sabertooth tiger, if you were curious), California


Figure 3

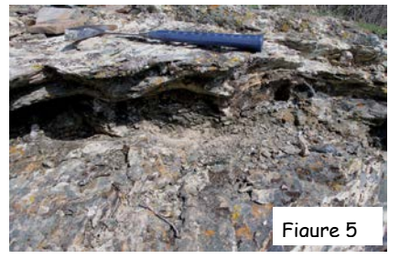
has a state rock, and this is it. It is usually green or black. You'll also see another, lighter-colored metamorphic rock which can be scratched with your fingernail and is called talc schist. A third metamorphic rock found on Burra Burra Peak is blueschist, a bluish-gray rock which is formed only under high-pressure, low-temperature conditions where one tectonic plate dives beneath another. Geologists come from all over the world to see the blueschist found in the California Coast Ranges.

As you head back down to the trail and walk around the foot of Burra Burra Peak, take a good look at the hillside **(Fig. 4**). There are three noticeable landslides that have left their mark. Look for scars where the soil appears to have pulled away from the slope. The landslides are not difficult to see and if you think you are seeing them here, you probably are.


Figure 4

Good examples of blueschist and serpentinite can be found as blocks near the scar farthest to the right as you are facing the hill.

Notice how these rocks have been folded. Look at the foliation and follow it along the rock. It is not a straight line but rather takes some twists and turns (**Fig. 5)**. This happened when the rock was compressed within the Earth. If you look carefully you might be able to see the contact, the place where the serpentinite and blueschist meet. You will also see white veins formed from very hot water working its way into the rock and precipitating the mineral quartz.


Fiaure 5

Just across the trail from these landslides you will see another large rock **(Fig. 6)**. This is a sedimentary rock and is formed from pieces of older rock that have been recycled by weathering and erosion to become part of this rock. This particular rock is a conglomerate. If you look beneath the lichen on the rock, you will notice pebbles of several different rock types within this conglomerate. Notice how they are arranged. This alignment


Figure 6

occurred when the sediments were deposited in flowing water.

Continuing down the trail, as you turn around a sharp bend, look up at the hillside and notice the large outcrop of blueschist **(Fig. 7)**. You will also notice that the soil in this area is very red. This happens because iron in the soils and rocks reacts with the oxygen in the environment. This is called oxidation and can sometimes make it difficult for a geologist to identify rocks in the field.


Figure 7

Just at the top of the next ridge, on the right side, there is another rock outcrop **(Fig. 8)**. Due to the lichens and the way the rock has weathered, we are currently unable to identify it. Sometimes a rock has been so altered by interaction with air and water that, without further testing in the laboratory, we cannot easily identify it.

As you continue and head down a steep slope, notice the rock with small holes in it on the trail. This is basalt, a volcanic rock that sometimes forms deep under the ocean. The holes are formed as gas escapes the rock while it is still soft. The source of this basalt is currently unknown. There is a good chance that the park staff has brought it in to support the trail. No other basalts have been found in the Burra Burra Peak area, but basalts are common in California. This is yet another difficult task that the field geologist must face, determining what rocks have been brought in by people.


Figure 8

Unfortunately, along the rest of the trail, we come back to the problem of rocks that are too weathered to identify without more work in the lab.

As you continue the loop around Burra Burra Peak, you will take the Hersman Pond Trail to the right and will see more of the andesite that you saw earlier in your trip. There is one rock here that you have not yet come across. Look for the red rock along the trail as you get down into the low-lying areas in the trees. This is another sedimentary rock named chert, which forms deep in the ocean when silica (very fine-grained quartz) precipitates from seawater. This chert probably contains fossils of small animals called radiolarians, but they are so small that you can't see them without a microscope.

As you keep going to the end of the trail, you will find more of the andesite, including a nice outcrop of it along the main road. Now head back to the Visitor's Center or better yet, go find another trail and test your newfound geologic knowledge. See what more you can identify along another trail.

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To Learn More

An excellent summary of the rocks and geology of the Bay Area can be found in U.S. Geological Survey Bulletin 2195 by Phil Stoffer, which is available online at: http://geopubs.wr.usgs.gov/bulletin/b2195

Geology Guide to the Burra Burra Trail

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