



Volunteer Times

Published for the volunteers of the UCI Arboretum

August 2009

A Thumbnail Geology of the Sierra Nevada

By Laura Lyons, Nursery Manager, UCI Arboretum
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California has been a geologic hot spot for hundreds of millions of years. Plates colliding, subducting (one plate going under another), rocks jammed onto the North American continent willy-nilly, volcanic activity on a massive scale—the Golden State is a geologic laboratory of the first order.

However, let's focus on the Sierra Nevada. Ted Konigsmark's excellent book, *Geologic Trips: Sierra Nevada*¹, lays out the history of the range in very readable detail. If you want to really sink your teeth into the geologic story of our state, I highly recommend it. Here's my Cliffs-Notes² version of the geologic history of the Sierra Nevada.

My version begins some 80-

150 million years ago. Then, a massive chain of volcanoes covered the site of the present Sierras. The Pacific Plate

pushed the Farallon Plate under (subduction) the North American Plate and in the process created the chain volcanoes, called subduction-zone volcanoes.

(Interestingly, the modern Cascade Range is a geologic equivalent, and even comes from one of the three remnants of the Farallon Plate, the Juan de Fuca Plate³.)

However, the roots of the Sierras are not in the lava⁴ discharges, rather from the huge chambers⁵ of magma that fed the surface eruptions.

The life-span of a volcano may be measured in millions of years, but eventually every volcano dies. The magma chambers slowly cool and

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Three different granites are visible in this boulder near Zumwalt Meadow, Kings Canyon National Park, illustrating the variability in Sierra granites.

Photo by Laura Lyons



Middle fork Kings River

Monarch divide

South fork Kings River

View from California State Highway 180 with Kings Canyon on the left (Middle Fork of the Kings River)

Photo by Laura Lyon

New Volunteers Join Arboretum Workforce

By Laura Lyons, Nursery Manager, UCI Arboretum

Spring brings a bumper crop of flowers; summer a bumper crop of fruits and vegetables from our gardens. This summer at the UCI Arboretum, we have a bumper crop of new volunteers!

A perfect storm of free publicity brought over 20(!) new volunteers to our Information Session on

June 27; certainly a record for the 18 years I've managed our volunteer core. Most are community volunteers, with a leavening of high school students looking to fill community service requirements. These new volunteers plunged right into the California Garden Group, our very successful July 11 plant sale, and into our summer preoccupation—bulb repotting.

Perennial Garden Group Resumes

By Laura Lyons, Nursery Manager, UCI Arboretum

With all these wonderful new volunteers, we have re-activated our Perennial Garden Group. It meets Thursday mornings from 9 a.m. to noon. Better yet, some of our Master Gardeners have stepped up and are providing most of the supervision. I'm working closely with them right now but once the group gets going I'll step back and just provide general guidance, like I do with the California Garden and South African Bulb groups.

No experience is needed for the Perennial Garden Group. In fact, this is a great way to learn skills you can use in your own garden! The Master Gardeners are eager to show you all the techniques you need

to know. Right now we are working to tame many too eager plants, giving many of them a much needed cutting back while removing the occasional overachiever. Weeds are not a problem right now—and we are working to keep it that way!

Once we tame some of the plants gone wild, there are some short lived perennials that need replacing and other planting we can do. The fall blooming season is not that far away, either!

I know a number of volunteers have been interested in the Perennial Garden Group in the past, so I hope you can join us on Thursday mornings. Bring water, and, if you have them, garden gloves and pruning shears. The Arboretum supplies the rest.

Summer Bulb Repotting

By Laura Lyons, Nursery Manager, UCI Arboretum

We've already made a great deal of progress this summer with our incomparable South African bulbs. These rare and unique items draw people from all over Southern California to our sales. Over the last three years we have been working energetically to grow new varieties from divisions and seed. New varieties are approaching release, and we've built up stock in some customer favorites to provide more selection to our customers.

Pacific Life *Good Guys* brought over 20 volunteers and to give us a great start, and the Nursery Group and Friday Club have been doing more than their share. The Friday Club in particular is working on bulbs most of August. I also have added another Saturday bulb workday, on Saturday, August 15, 9 a.m. - noon.

Watering help

By Laura Lyons, Nursery Manager, UCI Arboretum

The hottest part of the summer is still coming—a frightening thought after 10 days of 85°F plus temperatures! Tuesdays and Saturdays are our big watering days. If you are available either day on a regular basis to water around the Nursery, please let me know!



That's pretty much it for this month. A very warm welcome to all our new volunteers, and a big thank you to all the veteran volunteers that have stepped up to show them the ropes and make them welcome. In these tough budget times, our volunteers are our ace in the hole. Our prosperity as a garden comes from your hard work, and our future as a garden depends on it.

Natives Need Love, Too!

By Laura Lyons, Nursery Manager, UCI Arboretum

California native group is busy, too, keeping down the weeds and performing other maintenance around the California gardens. This is another group that is ALWAYS looking for more volunteers. It meets Thursdays from 10 a.m. to 1 p.m.

Due to customer demand we added a
Saturday Plant Sale
September 26 9 a.m. to noon
more details to follow next issue

Sierra Nevada Geology

Growing Mountains, From Page 1

solidify underground forming a very special rock known as granite.

Granite is a highly variable rock, formed chiefly of four different crystalline minerals—mostly quartz, feldspar, and small amounts of biotite and hornblende. Its color depends on the proportion of its different minerals and can be highly variable; however, Sierra granites are usually shades of gray.

The variability in composition and cooling rates affects the form of the granite's joints (a crack or fracture without dislocation) and how it behaves when it is exposed by erosion. Some granites are almost unjointed and are extremely resistant to erosion; other granites form concentric shells as they erode, leading to formations like the domes in Yosemite (e.g., Half Dome) and Kings Canyon (e.g., North Dome) national parks.

Even though the Sierras of today are a crazy quilt of granites from these old magma chambers, most are distinct enough for geologists to identify and date them. In Yosemite Valley, geologists have identified six distinct granite masses (known as plutons).

The second part of the story begins merely five million years ago—a breath ago, in geologic time. Then, the site of the modern Sierras was only a zone of rolling hills; the eroded remnants of the ancient volcanoes. The Farallon Plate had all but disappeared, subducted beneath the North American Plate. Instead the San Andreas, a transform boundary, formed as the North American and Pacific plates slid alongside one another. Like the phoenix rising from the ashes, a new period of mountain building began—what we now know as the Sierra Frontal Zone—along a massive fault zone parallel to the San Andreas east of the present chain. The modern Sierras began to rise quite rapidly, as mountain building goes. Over the next five million years the bulk of the overlying rocks eroded away, baring the ultra-hard-granite cores of those old volcanoes. The surface continued to rise, and the modern Sierras were born.

Not all of the overlying rock was stripped away and you can still find so-called roof pendants of older rock on top of the Sierra's granite, especially in the southern Sierra. In the twin national parks of Sequoia/Kings Canyon, for example, there are some extensive beds of limestone and marble⁶. (*If you want proof of how much the geologic locale has changed over time, consider that the limestone was formed on an ocean floor!*) These beds, in turn, give rise to some interest-

ing caves throughout the park; though only one significant cave, Crystal Cave, is open to the public. Throughout the parks are more roof pendants some formed of other, more exotic rocks.

The next part of the Sierra's story was written not with heat and stone, but with ice—glacier ice. Glaciers carved the river valleys of the Sierras into some of the natural wonders of the world—valleys with names like Hetch Hetchy, Kings Canyon, and Yosemite.

Kings Canyon is particularly interesting to a geologist for a multiplicity of reasons. What I found most fascinating is that the upper canyon was glaciated and thus has a U-shaped profile typical of a glacial canyon, but the lower half was untouched; therefore retained a V-shaped, river-cut canyon. Two for one, as it were.

Kings Canyon also passes through some interesting roof pendants, has some lovely waterfalls, meadows, and hiking trails. Try visiting before the Memorial Day weekend to enjoy the wildflowers without the crowds. Spend a few days exploring Kings Canyon, Crystal Cave and the Sequoia groves, Sierra mountain lakes, and windswept granite ridges. The twin parks have so much to offer, and are just a short drive away.

Notes:

1. Ted Kongismark, **Geologic Trips: Sierra Nevada**, GeoPress, 1983.
2. Apologies to **CliffNotes** and John Wiley & Sons, Inc, who holds the trademark.
3. The other two remnants of the Farallon Plate are the Cocos and Rivera Plates, both are located south of Baja California
4. Molten rock is called magma when underground and lava once it breaks the surface.
5. Volcanoes typically have both a shallow chamber and deeper magma chambers, which may be over 40 miles below the surface; therefore there can be many zones of molten rock underneath the volcanic chain.
6. Marble is limestone that has been changed by heat and pressure.

Coming next issue: *The Life and Times of a Giant Sequoia*

IMPORTANT DATES

<u>DATE</u>	<u>EVENT</u>
August 15	Bulb Work Day
September 7	Arboretum Closed for Labor Day
September 19	Bulb Work Day
September 26	Saturday Plant Sale

LOOKING AHEAD

<u>DATE</u>	<u>EVENT</u>
October 17	<i>Art of Flowers</i> Fall Art and Flowers Festival

CURRENT VOLUNTEER SCHEDULE

<u>PROJECT</u>	<u>DAY AND TIME</u>
Nursery Group	Wednesday 9 a.m. – noon
Orchid Care Group	Wednesday 9 a.m. – noon
SA Bulb Garden	Wednesday 9 a.m. – noon
Perennial Garden	Thursday 9 a.m. – noon
California Garden	Thursday 10 a.m. – 2 p.m.
Herbarium Group	Thursday 1 p.m. – 4 p.m.
Friday Club	Friday 9 a.m. – noon
Special Events	See Cover

For information on any of these or for general information on volunteering, call Laura Lyons at: (949) 824-5833 or e-mail: ldlyons@uci.edu