

May 2022, Issue 5, Volume 84

## WHAT'S INSIDE

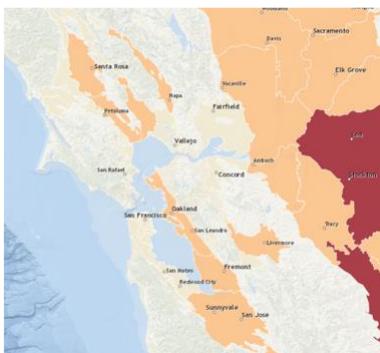
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Cover photo credits:

1. Top Left: Trudy Lionel – Alex Madonik
2. Middle Left: Aquifers in Bayer Area May - <https://gis.water.ca.gov/app/bp-dashboard/final/>
3. Bottom Right: Petrified Wood – Donald MacLean

Newsletter Editor Donald MacLean

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# Cal ACS Section Spring Science Festival Participation Plans

Please contact [Alex Madonik](#) if you'd like to help out at this event.

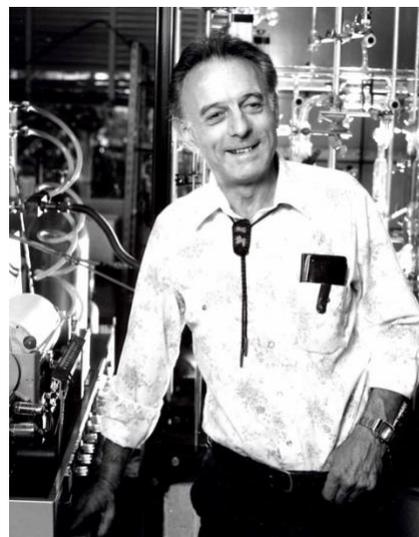


**Sunday, May 15, 2022 | 10:00 a.m. to 4:00 p.m. | Sonoma County Fairgrounds**  
*A science festival to spark children's wonder and curiosity for science, technology, engineering, and mathematics!*

## George Pimentel Centenary Celebration – May 15<sup>th</sup>, 2022 – 1 PM

It is 33 years since George Pimentel's untimely death, but his influence continues, so I would like you to join me in celebrating his centenary this month: George was born May 2, 1922! George was not as active with the local chapter as many of you, partly because he was often working with the national organization, but he fervently believed in the principles and the invaluable efforts of CALACS, and I myself have enjoyed participating in various chapter activities in the last decades.

May 2022 is also the 20th anniversary of the George C. Pimentel Award for Undergraduate Research that is presented annually at the UC Berkeley College of Chemistry Commencement. Coincidentally, it is the 150th anniversary of the founding of the College. So it's certainly time for a celebration!



I am inviting you to join me, the Pimentel award winners, and other special friends, in a private event on May 15<sup>th</sup>. There will be a small live gathering for lunch at The Faculty Club on the UC Berkeley campus, but the program that follows at 1 pm will also be on Zoom, so people can join from anywhere. We will hear from some of the award winners, and their research directors, and from all of you who care to share your stories - about your own relevant experiences and, of course, reminiscences about George.

Space is limited, so in-person attendance may be limited to those who actually knew George, but everyone is welcome on Zoom. If you would like to attend, either way, please email me. Even if you are not available, I would love to hear any comments and memories you may like to share.

Jeanne Pimentel (Mrs. George C. Pimentel) cell: 510-684-5256

California Section  
American Chemical  
Society



All are welcome  
Saturday, May 21, 2022

Title  
**How to Thrive (Not Just Survive) as a Woman in Today's World**

Time  
10:30 – 11:00 am  
Chatting  
11:00 am  
Talk and Discussion

Reservation  
Please visit the CalACS website [www.calacs.org](http://www.calacs.org) to register for this meeting or use [Brown Paper Tickets](#). Link for registration:  
Link will be placed here!  
Please register before Thursday, May 19, 2022, 12 noon. Your email address is needed to send the ZOOM link, which will be shared with attendees on or before the day of the event via Brown Paper Tickets.

Cost  
Free

### About the Speaker



Keda Edwards Pierre is a **renaissance woman** who lives a successful, unconventional, and transformative life - which by all accounts and most societal rules, she should not have. She strives to inspire change through action as a **thought leader, inspirational speaker and Founder of True II Soul Network**

([true2soul.com](http://true2soul.com)), a collective of professional members and community members that are **challenging the status quo around trauma recovery, resiliency development and diversity & inclusion.**

A **27-year police veteran**, Keda walks the talk of powerful healing and living the life we desire – personally and professionally. Her healing journey, coupled with her diverse training and professional history, is the driving force behind her two-fold mission: to **revolutionise how we deal with trauma and create safe and inclusive spaces** for this healing work to be done.

### Abstract

So, you're surviving in this dog-eat-dog world - now what? How do we kick it up a notch? I know, firsthand, what this takes - as a **Black female police veteran** and an **adult survivor of physical, sexual and racial trauma**. A life full of challenges taught me a few important lessons - including that **trust, adaptability, and authenticity are essential for success**. Our achievements correlate with our willingness to be true to who we are, our capacity to trust ourselves and our readiness to release old versions of ourselves to transform our lives.

As women, how do we lead in today's world? A better question is: How well do you trust your capacity to lead? Success is built on trust, and trust is built on honesty - with yourself and with others. Combine these with authenticity and adaptability for true empowerment - from home to boardroom. I don't have a magic pill or formula for you. What I offer are unique perspectives, life experiences, hard-won lessons and effective methods. My methods are how I was able to build a **successful 27-year policing career** - and this is how I was able to leave it (despite many clucking tongues and well-intentioned warnings). I'm now the renaissance woman I always envisioned - as an **actor, coach and inspirational speaker**. I'm living a life that I should not have by all accounts and most societal rules. What life do you envision for yourself?

I'll share a **5-Point Self-Check List, also known as my True II Soul ABCs: Alignment, Boots on the Ground, Communication, Care and Creativity**. My "tried, tested and true" checklist brings clarity and guidance in pursuit of excellence. Want to kick it up a notch? This is what I live and breathe. Come learn how!

### Questions?

Please contact Elaine Yamaguchi at [eyamaguchi08@gmail.com](mailto:eyamaguchi08@gmail.com)

## Cal ACS Honors its 2022 50-Year Members

Compiled by Al Verstuyft

The following 50-year members were listed in [CEN Volume 100, Issue 11, March 28, 2022 p. 30-37](#), "ACS honors its 50-year members in 2022" by [Manny I. Fox Morone](#)

<b>Name</b>	<b>Location</b>
Janice Imada Byington	Oakland, CA
Edward L. Cho	Antioch, CA
Clement K. Choy	Alamo, CA
Nelson H.C. Cooke	Haywood, CA
John Frederick Cooper	Oakland, CA
Vito John D'Aurora Jr.	Redding, CA
Stanley Alan Hutchings	San Anselmo, CA
William Anthony Kleschick	San Rafael, CA
Benny Edward Knuckles	Fairfield, CA
Jiann-Tsyh Lin	Danville, CA
James Francis Litton	Fremont, CA
Paul L. Patterson	Walnut Creek, CA
Philip Warren Payne	Turlock, CA
Joseph M. Pecoraro	Danville, CA
David Robert Pegg	Chico, CA
Carl Edward Rechsteiner Jr.	Petaluma, CA
Clayton John Radke	Berkeley, CA
William G. Reinfenrath	Novato, CA
John William Remoy	Pittsburg, CA
Richard Norman Reynolds	Richmond, CA
Lou Rigali	Oakland, CA
Stephen Harold Roby	Benicia, CA
Samuel Paul Sawan	San Rafael, CA
Patricia Abigail Shaw	El Cerrito, CA
Leverett Ralph Smith	El Cerrito, CA
Richard J. Uriarte	Danville, CA
K. Peter C. Vollhardt	Oakland, CA
A. Stephen Zavell	Oakland, CA

“This year, ACS has 759 50-year members worldwide; 15 chose not to have their names listed. To commemorate reaching this milestone, ACS gives each member a 50-year certificate, a special lapel pin, and a permanent member card entitling the person to free registration at all national and regional ACS meetings.” The section has 28 (according to the list) of the 759 50-year members.

The section usually holds an Awards Luncheon. Covid 19 has placed a hold on the last 2 year’s milestone members luncheons. A survey for 50 / 60 year members on format will be done.

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## Section Gives Award in the 2022 Golden Gate STEM Fair

By Paul Vartanian

This past March the California section participated in the completely virtual Golden Gate STEM Fair in San Francisco by judging STEM entries. The Section awarded a certificate and \$200 to Connie Huang. The award is made for an excellent entry that involves some principle of the chemical sciences. The award was sent to the winning student.

We congratulate all the Fair participants and especially the student who received the Section’s award:

Student / Teacher	Entry Title	School
<b>Connie Huang / Curtis Chin</b>	<b>Testing the Effectiveness of Epigallocatechin Gallate Against Escherichia Coli HB101 Growth</b>	<b>Galileo Academy of Science and Technology – San Francisco</b>

For background go to <https://wp.ggstemfair.org/>.

## Educational Activities Review

By Eileen Nottoli

### Olympiad

Julie Mason, Cal. Section Office Manager deserves High Honors for her exceptional work in herding teachers and students and helping Eileen Nottoli with everything needed to make the local and national exam possible including delivering our lunch order.

Sixteen students from the immediate Bay Area [in the California Section; San Mateo and Santa Clara (and Santa Cruz by closeness) counties are in the Silicon Valley Section] qualified to participate in the National Olympiad which was held this last Saturday [April 30<sup>th</sup>] at Las Positas College in Livermore thanks to Charlie Gluchowski. This year, students took the 60-question multiple choice test on their laptops. Part 2, an eight-question word problem, and Part 3, the lab practical, were done in booklets as in the past. However, the surprise was that ACS wanted us to photocopy each page, scan by question for each student – 160 files [16 students x 10 questions (8 questions Part 2 + 2 question Part 1)]. It's been a very laborious chore.

At the end of the day, each student was given an envelope packed by Julie containing my letter, a certificate prepared by Paul Vartanian, an envelope containing \$500 to match what the Silicon Valley Section host Natalie McClure was giving to each of their students, and a National Olympiad pin and Californium element pin.

Julie also mailed my letters to all teachers that participated in the Olympiad with copies to their principals along with a small gift.

### High School Teacher Award

Ethan Schnell of Dougherty Valley was thrilled with being named our 2022 Lloyd Ryland Outstanding Chemistry Teacher Award. Julie will be mailing him my letter with a \$500 check for him and a \$500 check for the chemistry department. Dougherty Valley remains one of our top Olympiad schools and we hope that one of his students will be selected for study camp this year.

### Exceptional High School Student

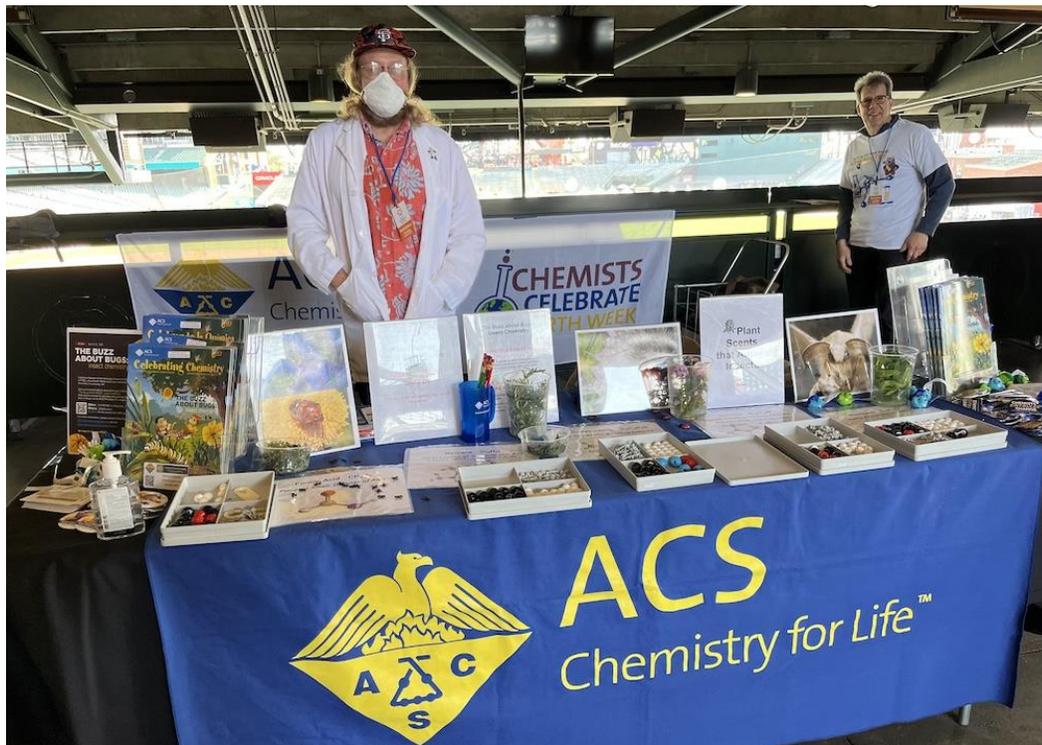
We received a nomination for AleSahand Adibnia of Dublin High. Julie will be mailing him my letter and a check for \$100. He is a 3-year National Olympiad competitor with an impressive 4.0+ GPA and earned a score of "5" on the AP Chemistry exam administered in May 2020. He is a 2-year President of the Dublin High School Chemistry Club, does lunchtime Chemistry demonstrations for interested students, and is a long-time Science Fair participant.



The Bay Area Science Festival is back, better than ever with a spring time schedule (to avoid wildfire smoke and worse disruptions), and Cal ACS was there at Oracle Park in San Francisco on Sunday, April 24<sup>th</sup> for Science Discovery Day. Dan Calef and Alex rode in together on BART and picked up coffee on a beautiful morning in the City. Charlie Gluchowski caught up with us as we crossed King Street, where BASF volunteers were ready to check us in.



We were also greeted by bomb-sniffing dogs who, fortunately, were not troubled by the herbs and flowers from my garden that formed a key part of our hands-on activity, Plant Scents that Attract or Repel Insects. We headed up to the Promenade Level and toured the outer rim of the stadium – our chance to enjoy the view of the Bay and McCovey Cove – before locating our spot at the far end of the right field stands, where a stiff breeze greeted us from the Fourth Street entrance to the Park . . . so we taped everything down securely and got ready for visitors (photos by Alex Madonik):



The gates opened at 10:30 AM, and we didn't have to wait long:



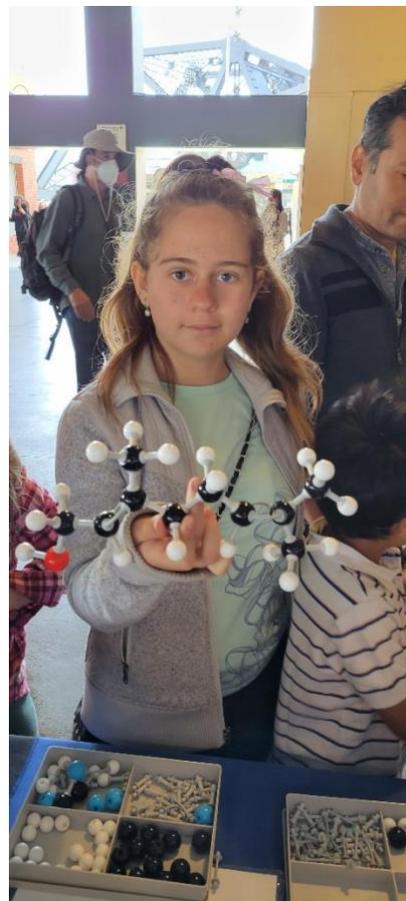


The challenge for our visitors, after sniffing geraniums and rosemary, was to build molecular models of key scent compounds such as geraniol and myrcene, guided by the illustrations prepared by [Margareta Séquin](#) for this activity. Many started with simple molecules such as formic acid, an annoying component of insect bites and stings! Others were ready for terpenes or even more complex molecules such as the stinky defensive pyrazine compound produced ladybugs (photos by Charlie Gluchowski):





Myrcene



Geraniol

In the afternoon we were assisted by one of our favorite high school students, Hansen Yang, who has prepared diligently for the Chemistry Olympiad exam by meeting with Peter Olds and me on Zoom. This was our first face-to-face meeting, and we were introduced to his family as well. With everyone's help, we distributed an entire case of Celebrating Chemistry, featuring more hands-on chemistry around this year's CCEW theme, "The Buzz about Bugs: Insect Chemistry." The Spanish edition, "El Zumbido," was popular as well. We also gave away 200 pocket Periodic Tables and just about every other CCEW souvenir that we brought. Thanks again to Charlie and Dan – I couldn't have done it without you!

For the rest of our Cal ACS community, there's still a chance to join us on May 15<sup>th</sup> at the Sonoma County Fairgrounds in Santa Rosa for North Bay Science Discovery Day. Please let me know if you can be there!

Alex Madonik – alexmadonik@sonic.net

## Editor's Note (Donald MacLean)

### Trudy Lionel

I have been informed that Trudy Lionel has passed away. Because this is close to the May publishing Deadline, I have no reflections to print. Her obituary is located in SF Chronicle (4/29/22) on page C5 along with a lovely picture. It mentions her many efforts and volunteering. Hopefully, like always, we will create a reflection of her time with the section.

I meet Trudy though ACS, before she came to work with me at Bayer in Berkeley. She came from Saskatchewan (a Prairie Province in Canada) then moved to lower BC (British Columbia), coincidentally the same place where my family came from and moved to. I remember the day she retired. She told me she was dedicating her time at the Academy of Science in San Francisco.



Photo provided by Alex Madonik.

# The Irony of Iron

## Part 5

by  
Bill Motzer



In Part 4 (April Vortex), I discussed the relatively large iron-rich cores of the Solar System's inner rocky (terrestrial) planets: Mercury, Venus, Earth, and Mars. Only Earth and Mars have mantles and crusts that seem to be enriched in soluble or ferrous iron [Fe(II)]. How this came about is an interesting question and many answers are still hypothetical and theoretical.

**Mercury:** data returned from NASA's Messenger Space probe survey (2011-2015) determined, via X-ray fluorescence spectroscopy, that Mercury's surface (i.e., crust) is thin but quite dense with a high ratio of magnesium (Mg) to silicon (Si) (Mg/Si) and low ratios of aluminum (Al) and calcium (Ca) to Si (Al/Si, Ca/Si). The crust also contains sulfur (S) at concentrations more than 20 times that of Earth

but very low amounts of titanium (Ti) and Fe. Mercury does not have a significantly thick mantle (500-700 km thick); however, its huge liquid Fe core forms 85% of the planet's mean radius (2,440 km) and 75% of its mass. It's also believed that Mercury's original crust and perhaps parts of its original mantle were removed by a large ancient asteroid impact. Therefore, its current crust may represent resurfacing derived from its present mantle.

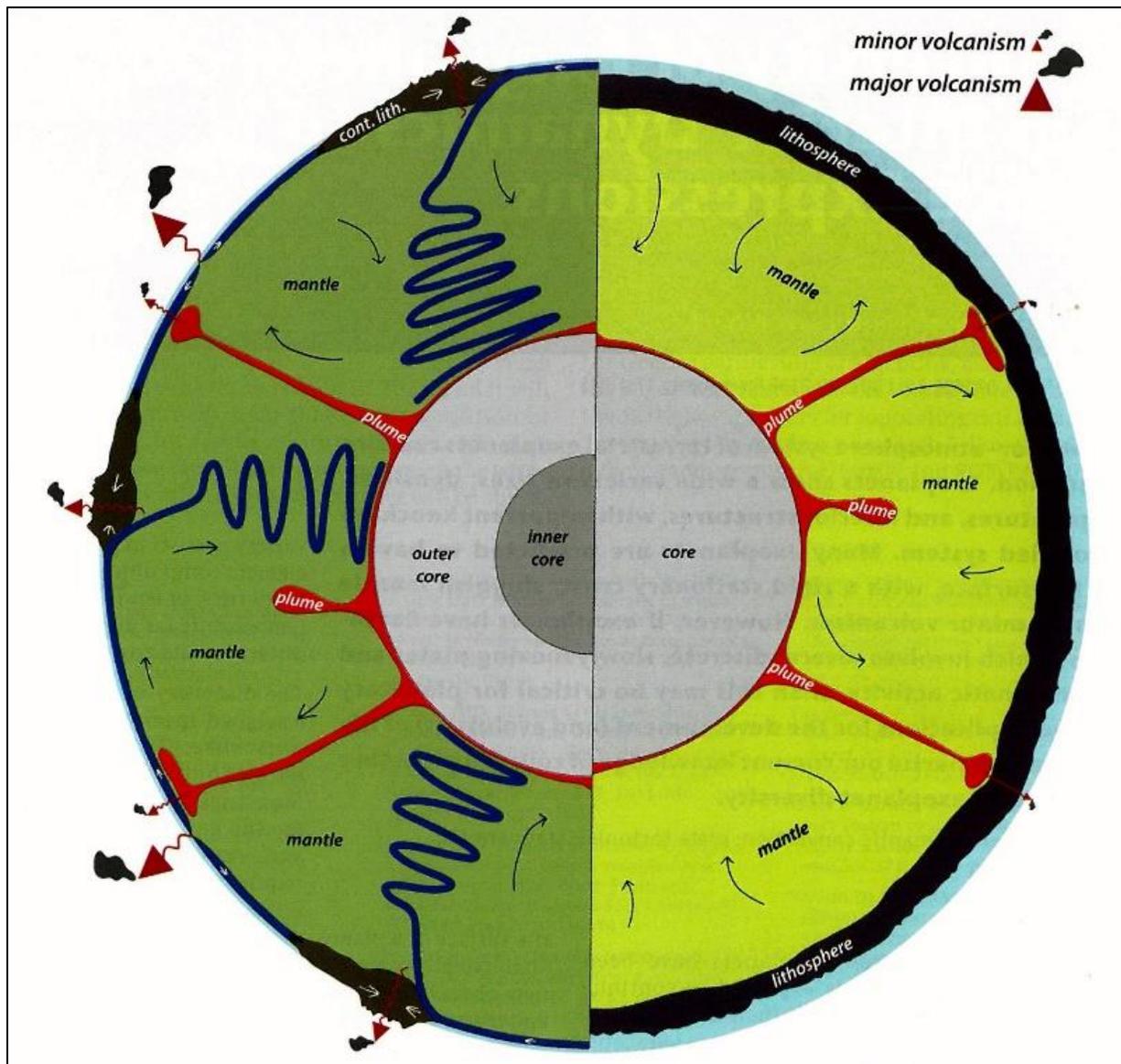
**Venus'** surface composition is somewhat known from the Soviet Union's Venera probes (1960s-1980s) and Vega missions (1975) which landed on Venus' surface. X-ray fluorescence and gamma-ray spectrometers on Veneras 8, 9, and 10 and Vega 1 (1985) and 2 (1987) measured elemental and radioactive crustal compositions. Venera 15 and 16 (1983) orbited the planet mapping Venus' northern quarter's surface with side-looking radar. The U.S. Mariner 2 (1962), 5 (1967), and 10 (1974) probes on the way to Mercury analyzed Venus' atmosphere. The Magellan spacecraft (1990-1994) in a near polar orbit produced surface radar images with 100 m resolutions, thereby mapping almost the entire planet.

Results of these and other subsequent space probes indicated that Venus surface consists of "young" impact craters on a volcanic terrain composed of basalt largely erupted as lava plains, domes, and shield volcanoes. Planetary scientists believe that its entire surface underwent resurfacing from about 750 to 350 million years ago (Ma) and perhaps as recently as 150 Ma. Gravity data suggests a fairly uniform crust ranging in thickness from 20 to 50 km. Below the crust is a semi-solid rocky mantle overlying a Fe-Ni-S rich core which may be 7,000 km in diameter. However, because Venus lacks a dynamo-magnetic field like Earth's, it's not known if it has a liquid or solid core. Therefore, it's also not known how elemental iron gets from the core to the mantle and crust. In such a reducing environment soluble Fe (II) oxides probably don't occur. However, iron in the basalts may exist as pyrite and/or marcasite (FeS<sub>2</sub>).

**Mars** is known as the "Red Planet" because of the iron-rich (oxide) minerals in its surface regolith, including goethite [FeO(OH)], hematite (Fe<sub>2</sub>O<sub>3</sub>), and jarosite [KFe<sub>3</sub>(SO<sub>4</sub>)<sub>2</sub>(OH)<sub>6</sub>]. Over

the past 50 plus years, NASA has launched various space probes to Mars, including Mariner 4 (1965), Mariner 6 and 7 (1967), Mariner 9 (1971), and Vikings 1 and 2 (1976-78 and 1976-1980, respectively), both landing in 1976. Surface robots such as Sojourner (1997-1998) – the first wheeled rover, which analyzed rocks over 95 Earth day period. In 2001, NASA launched the Odyssey orbiter which mapped water ice below the Martian surface. The Spirit (2004-2011), Opportunity (2004-2018), and Phoenix (2008) probes were robotic geologists analyzing atmosphere and soil. The Insight lander (2018) contains a seismometer, currently measuring Martian earthquakes. The recent on-going Perseverance (2021) rover's mission is to drill and return soil and rock cores and determine if life existed or currently exists on Mars.

Mars' surface is a heavily asteroid and meteor impact cratered, largely volcanic (basalt and andesite) terrain with sedimentary deposits (mudstones, sandstones, clays, and sands) derived from flowing water when Noachian Mars had shallow oceans, perhaps 4.1 to 3.7-3.5 billion years ago (Ga). Mars has a dense Fe-, Ni-, and S-rich solid core between 3,580 and 3,740 km diameter surrounded by less dense silicate-, Fe-, Mg-rich (rocky) mantle about 1,240 to 1,880 km thick. If Mars had a magnetic field it probably shut down about 500 million years after its formation. The mantle is overlain by a 10-50 km thick crust composed of Fe, Al, Ca, and K. Iron mobilized from the core to mantle to crust is illustrated in Figure 1. Note that for both cases abundant surface water occurs. It's in such oceans that life can begin and evolve and I'll discuss the possibilities in my next article.



**Figure 1:** Schematic cross sections (not to scale) of a plate tectonic planet (left): e.g., Earth versus a plume/static-lid planet (right): e.g., Mars. Solid inner core (dark gray) surrounded by a liquid outer core (light gray) overlain by a mantle (green). Lithospheres (crusts) are in dark brown; upwelling plumes in orange. On Earth,  $\text{Fe}^0$  is transported by plumes from the core-mantle boundary through the mantle to the crust.  $\text{Fe}^0$  is oxidized in a hydrous (oceanic) crust and via subduction enriches the mantle. On Mars, plumes from the core to the crust bring  $\text{Fe}^0$  through the mantle where it may undergo oxidation eventually forming soluble  $\text{Fe(II)}$  oxides. Mars's (or Mars') mantle is probably not enriched with Fe oxides because liquid water and subduction does not occur. White arrows show plate movement; oceans in light blue. Source: Ballmer, M.D. and Noack, L., 2021, *The Diversity of Exoplanets: From Interior Dynamics to Surface Expressions*: Elements magazine, pp. 245-250.

## Earth Day - Ground Water Management – Filings, Fees Coming

By: Donald MacLean

Water is something people take for granted, especially city folks. However, not everyone is on city water. Last year in our driest year since 1977 wells went dry. Up in Fort Bragg they were talking about using the Skunk Train line from Willits (Mendocino County) to haul water to the coast, but then the interior also had their own water storage issue, but they did have water. I have a neighbor who spends \$300 to have about 3000 gals delivered weekly, that is 10 cents / gal. In western Sonoma County the ground is not porous so people rely on surface runoff. No rain, no water. I am fortunate as I am on an aquifer. However, the water is so full of iron that the toilet tank looks like something is growing in it. With technology, we reduce the iron concentration through oxidation and filtration. Electricity to pump water and the bleach treatment costs about 0.2 cents / gal. That is cheap until you have to put in another well or do repairs. As a comparison EBMUD (East Bay Municipal Utility District) charges 1.4 cents / gal which includes sewer and they take care of the pipe breaks. As a general comparison a person will use 50 gallons of water per day (approx. 73,000 gal / year for 4 people or 0.25 acre feet).

During the 70's when it froze, smug pots and fans were used to protect crops during the spring freeze after trees began budding. In the 80's a new more environmentally friendly concept replaced the heat the world concept. This method used water sprayed onto the plants to form water layers around the ice. As long as the water did not completely freeze the temperature of the water did not go below 32 F (0 C) [the danger temperature is below 0 C and depends upon the stage of the bud and blossom]<sup>1</sup>. The colder it got the more water used. I loved the idea. Then the vineyards came and they sucked the water out of the ground. At the same time ranchettes (1 to 5 acre properties) popped up and so a competition between the vineyard and houses arose for ground water in late spring through summer. The water table dropped. There is no regulation on the amount of water you can withdraw as an individual.

Recently the fan and heating the air concept has come back as the more practical method. The only difference is the fans pushing propane heated air instead of smug pots. No more sprinklers to prevent grape buds from freezing. A second new item is the reporting and fees for using a well. This new item is the result of a 2014 state law, 2014 Sustainable Management Groundwater Act. The Sustainable Groundwater Management Act (SGMA) required that California groundwater basins identified as high or medium priority establish a Groundwater Sustainability Agency (GSA) by June 30, 2017, and develop a plan for sustainable management by January 31, 2022. If the local GSAs fail to follow the timeline, then the State Water Resources Control Board will step in and intervene in local groundwater management. The carrot and stick was a hefty fee applied to everyone who drew water. The counties then created a commission which promised only the big water users would pay a fee. Nonvoluntary surveys were sent out, and in some case an assumption was made about grandfathered wells. Now it appears a usage fee is coming for everyone with a well in those medium and high priority areas.

To see your area water basin go to your local county government website. If this affects you, you probably have been told by mail about the county's plans.

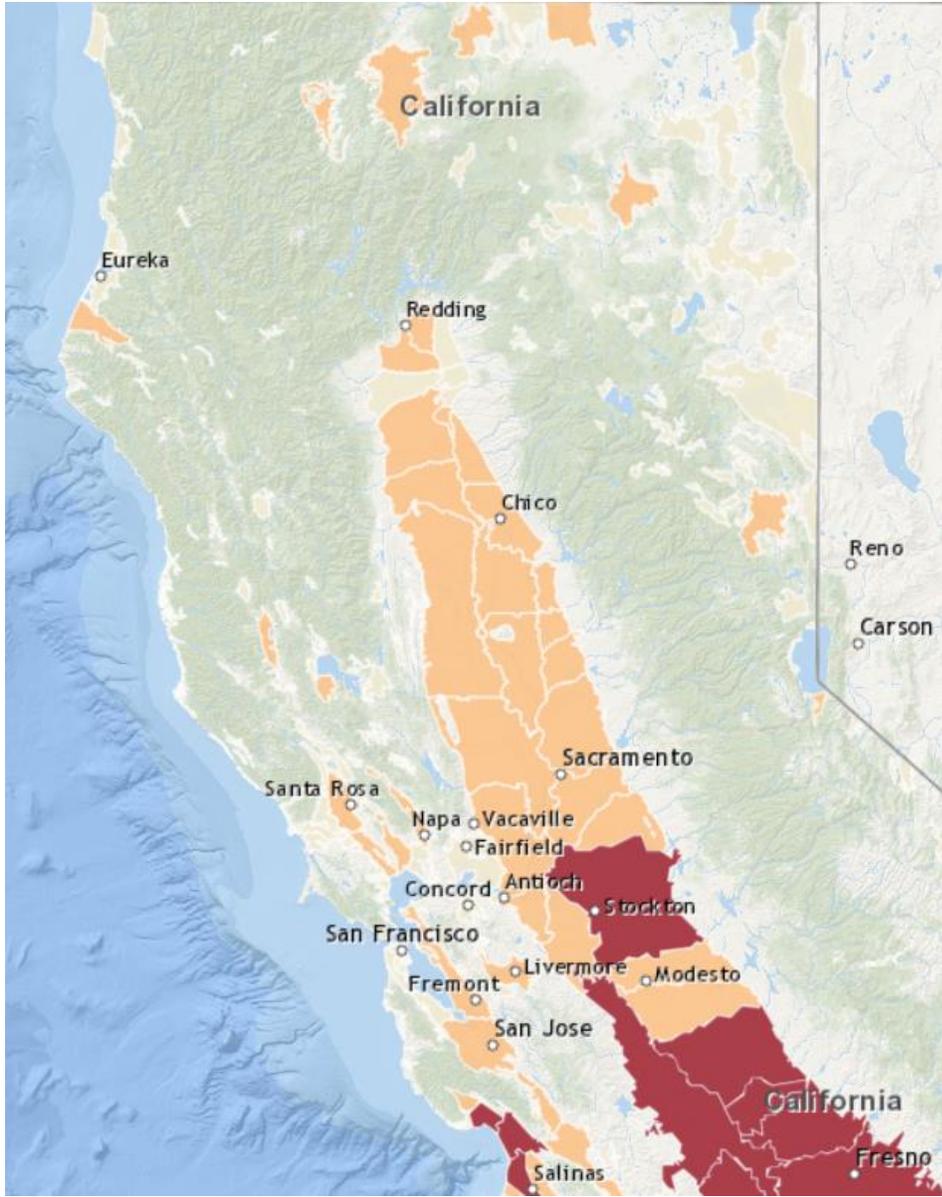


Figure 1. The state water basins of concerns. The red (around Salinas and the Central Valley) is the critical over drafted areas. The peachy color areas medium priority areas. The tan areas are aquafer of least concern. See reference #6 for interactive map.

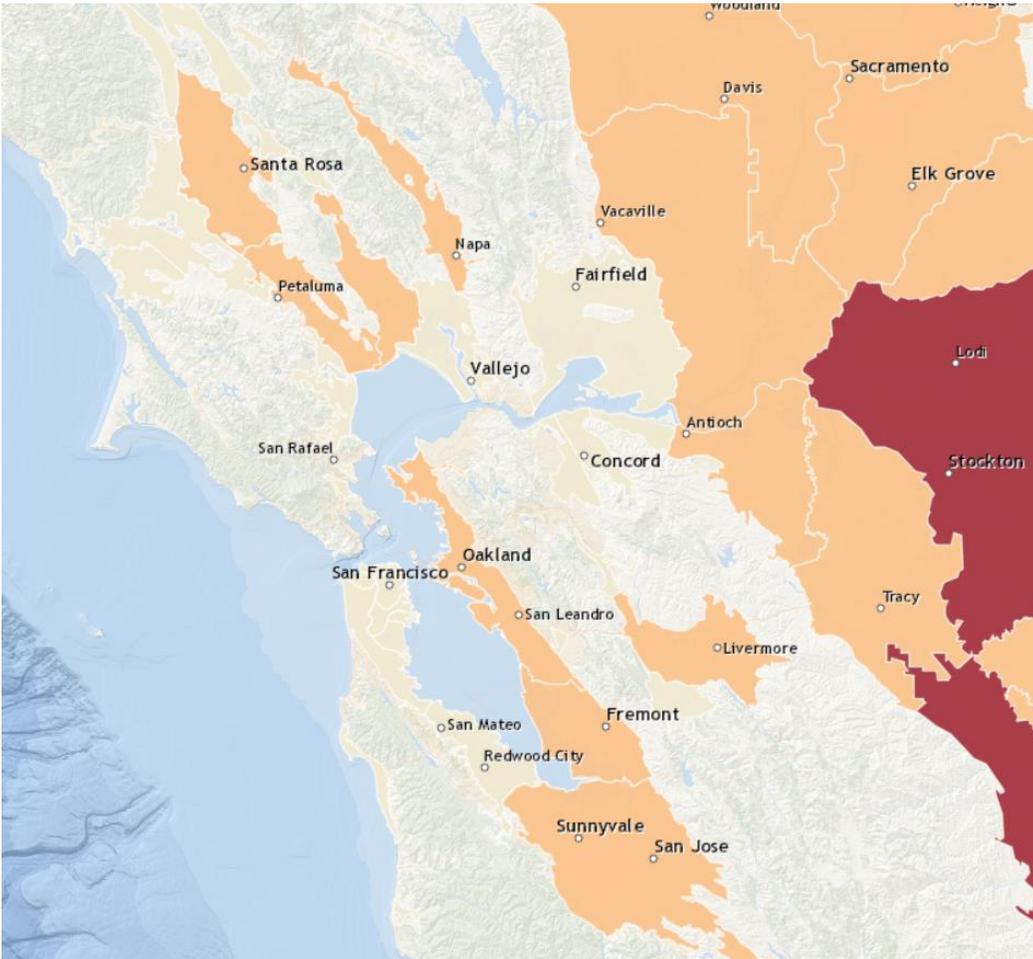


Figure 2. The Bay Area water basins of concerns. The red color (Central Valley) is the critical over drafted areas. The peachy color areas medium (along the East Bay shore to San Jose, Livermore, Santa Rosa Plain, and Napa Valley) priority areas. See reference #6 for interactive map.

About the author: The author currently works and lives in an urban environment but still has the rural connections that requires him to deal with surface and ground water in Sonoma County.

Reference:

1. Utah Pest Fact Sheet, Critical Temperatures for Frost Damage on Fruit Trees, Utah State University Cooperative Extension.
2. The Press Democrat, How is California’s landmark groundwater law impacting Sonoma County?, Glen Martin, June 24, 2021.
3. <https://www.SantaRosaPlainGroundwater.org>
4. <https://www.marincounty.org/depts/cd/divisions/environmental-health-services/groundwater-resources>
5. <https://www.countyofnapa.org/3084/Groundwater-Sustainability-Plan>
6. <https://gis.water.ca.gov/app/bp-dashboard/final/>

# Recommended Travel: Petrified Forest – Calistoga (Napa County)

By Donald MacLean



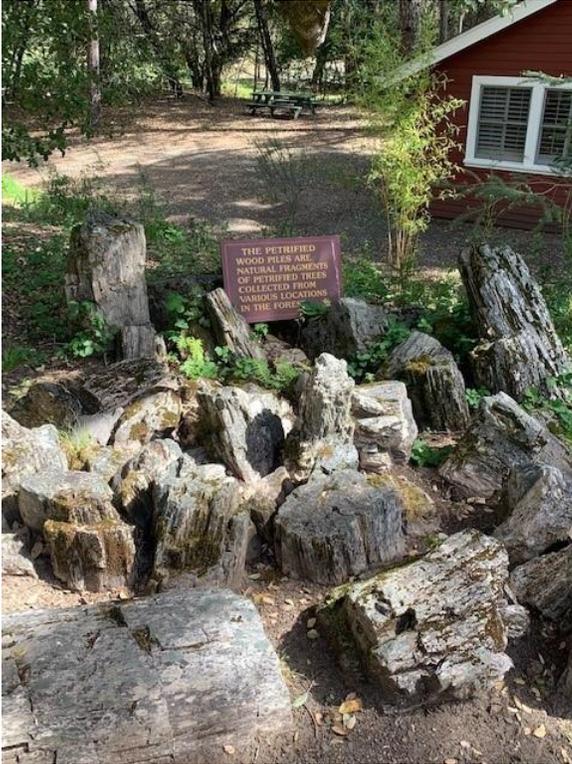
Just west of Calistoga is the Petrified Forest. It is a California landmark site. If you have not been there since November 2017, you will notice that there was a major fire ravaged the area. New fences and many downed blacken trees are evidence of this, however the petrified trees survived. As the old saying goes, stone houses do not burn. In this case the stone trees do not burn. The area esthetics are lost with the fire, but the purpose of going here is the petrified trees. All the trees face the same direction, tops pointed away from Mount St Helena. Some of the trees look like real wood, and the detail is



spectacular for being stone (Picture 2). In other cases the stone is covered in lichen and moss so they are not so noticeable if you were hiking and oblivious to the what happened there. The trees have been excavated to various extents.

3.4 million years ago Mount St Helena (not to be confused with Mount St Helens in Washington State) blew up burying prehistoric Redwood trees (*Sequoia langsdorfii*) trees in ash creating an anaerobic (oxygen deprived) environment which discouraged the presence of the bacteria (probably fungus should be stated here as well) that decompose organic material. The trees are aligned in SW NE orientation leading to the now dormant Mt St. Helena which you can see from the site. For thousands of years the formation of mineral-rich water percolated through the ashy deposits, saturating the pores of the organic tissues of the Redwoods with silica, filling the cellular spaces. During this process the saturated water evaporated, and the excess minerals were deposited in the cells and tissues, creating a three-

dimensional fossil through the process of permineralization, and perfectly preserving even the most minute detail of the wood. That detail can be seen in fine examples like that in Picture 2.



The stone trees have tree rings and look like wood. Knocking on the wood does not give the expected sound, rather more like the sound when patting a cement wall. Some of the trees have been excavated and remain on location. Others have been gathered up (Picture 3) and some in the past were sold off.

As you exit there is a shop with stones and stone art that can be purchased.

Address: 4100 Petrified Forest Rd, Calistoga, CA 94515

Parking – free and plenty

Fee \$12 adults