

# THE VORTEX

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CALIFORNIA SECTION  
May 2013



Allen "Al" Verstuyft, recipient of the 2013 Petersen Award

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*Western Regional Meeting (WRM)*

*October 3-6 2013*

Keep the dates open to attend this meeting in Silicon Vallery co-sponsored by the Santa Clara Valley and California Sections. Abstracts for papers are now being accepted. Registration forms, Vendor applications, will open May 13 Please check these and other details on the website. [www.WRM2013.org](http://www.WRM2013.org)

# THE VORTEX

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## Chair's Message

Wally Yokoyama

Most of us think that life is too short. On May 18 we will recognize members of the section who have been ACS members for over 50 or 60 years at the Metro Restaurant, Lafayette, CA. Fifty years at anything is an amazing feat. Perhaps their interest in a highly technical, ever changing area of science, for such a long period of time, kept them young. Their life long careers and interest in ACS seem to contradict the feeling that life is short.

I think most of us feel fortunate to be chemists because chemistry is useful in everyday life and we understand many of the natural phenomena of the world because of our education. But we are really a privileged few and our percentages are becoming lower and lower. For whatever reason interest in chemistry and other basic sciences is waning in the U.S. A recent article in the Wall Street Journal reported that 28,000 8<sup>th</sup> graders in New York City apply for positions in three elite N.Y. public high schools. In one school, Stuyvesant, 75% of the 830 new freshmen were Asian-Americans. This is about the same percentage of high school students we see at the Chem Olympiad exam for high school students in our region. The article

points out that "The Stuyvesant story speaks to a larger matter: the national disparity in educational advancement according to race and ethnicity. Reading and vocabulary skills are cumulative, meaning that verbal skills are not based on what an eighth-grader can cram into his head in a few weeks before a test. They come from everything read and heard since infancy." This is why Science Fairs and programs like National Chemistry Week are so important. They bring science to K-8 kids in order to engage them in science and math so that they can make the choice in high school that may forever decide their career paths in life. The California section has active programs to bring chemistry to kids by organizing middle school science fairs, science programs for girls, science in libraries, science at street fairs, recognizing chemistry teachers, providing small grants to chemistry programs, and others. Small amounts of money and large amounts of volunteer time and effort are required for these activities. But the small amounts of money multiplied by many activities became significant. Most of these funds come from local section membership dues. For those of you who voluntarily contribute we thank you and want you to know that your contributions are going to help to reduce the educational disparities in the Bay Area.



*May Awards Luncheon Honoring 50, 60, and 70 Year Members of  
the American Chemical Society,  
Walter B. Petersen Award Presentation,  
And the Lloyd Ryland Teacher Award*

**Date:** Saturday, May 18<sup>th</sup> no-host social hour at 12 noon, lunch at 1pm and award presentations at 2pm.

**Place:** Metro Lafayette Restaurant. 3524 Mt. Diablo Blvd. Lafayette, CA 94549  
www.metrolafayette.com 925/284-4422

**Cost:** \$35/person.

**RSVP:** Reservations need to be confirmed by May 10 by email to [office@calacs.org](mailto:office@calacs.org) or 510-351-9922. To pre-pay: Please mail checks made out to "California Section ACS" to the Cal Section office, 2950 Merced St. #225, San Leandro CA 94577, postmarked no later than Friday, May 10, 2013. The actual food option can be selected at the restaurant.

**Directions:** Directions to the restaurant can be found on the website

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The Lloyd Ryland Award is presented by the California Section to honor outstanding high school chemistry teachers within the California Section of ACS. The award is named after Mr. Lloyd Ryland, a member of the California Section of the American Chemical Society for 65 years and a strong believer in chemistry education. He was born in San Francisco in 1912 and lived his entire life in the Bay Area. Mr. Ryland made a generous contribution to the Section and we are pleased to honor him by naming this award after him.

*Menu*

Maine Peekytoe Crab Salad Sandwich with mixed greens in Dijon vinaigrette  
OR

Roasted Chicken Salad with organic greens, cherry tomatoes,  
haricots vert & sherry vinaigrette  
OR

Roasted Steak Salad with organic spinach, grilled onions and mushrooms  
& buttermilk blue cheese  
OR

Shrimp Salad with romaine lettuce, watercress, avocado & green goddess dressing  
OR

Gnocchi Parisienne with creamy basil pesto & roasted organic cherry tomatoes  
OR

Croque Monsieur with dry-cured ham, gruyere mornay & mixed greens  
OR

Confit of Tombo Tuna Nicoise with haricots verts, fingerling potatoes, hard-boiled egg  
& tapenade  
\*

Madagascar Vanilla Crème Brulee with shortbread cookies or  
Warm Chocolate Cake with crème anglaise or Profiteroles with vanilla gelato &  
chocolate sauce or Ricotta Cheesecake with blood orange caramel  
\*

Numi Organic Tea or Illy Coffee

## Walter B. Petersen Award

This award honors the memory of Walter B. Petersen by recognizing a person who has made significant contributions over a period of years to the well-being of the California Section.

Walter B. Petersen was noted for his many years of outstanding service to the Section. He held numerous section offices and was Chair of the California Section in 1969. He authored a popular column in the *VORTEX* entitled "Personals by Petersen"

Thus, it is in his honor, with recollection of his high standards of service, that we recognize others who have given significantly to the advancement of the California Section. This award was established in 1982 and is supported by the California Section.

This year's recipient is Dr. Allen "Al" Verstuyft. Al was Global Laboratory Coordinator/Senior Consulting Scientist for Chevron's Energy Technology Co. He provided petroleum and environmental analysis and chemistry consulting to Chevron and its licensee's laboratories worldwide. Al started his professional career at the National Institute for Occupational Safety and Health (NIOSH) as a Research Analytical Chemist. After 32 years with Chevron Dr. Verstuyft formed Al Verstuyft Consulting, LLC in 2011.

Al's American Chemical Society (ACS) activities started with a student affiliate chapter at Santa Clara University, then as member of the Younger Chemists

Committee from 1976-1982, briefly chair of the California Section 1981, a Safety & Health Division councilor, and he was recently appointed to the Committee on Analytical Reagents. Al believes that the best ACS activity he has participated in is the Chemistry Olympiad where he has been a proctor and coordinator since 1994.

He is currently a member of the American Petroleum Industry's Test Methods Task Force, and Environmental Monitoring Task Force; the Western State Petroleum Association Test Methods Task Force for Petroleum Fuels; the American Society for Testing and Materials committees on Petroleum D-2, Water D-19; and Waste D-34.

He was appointed to many boards and committees including EPA Environmental Laboratory Advisory Board, EPA/NELAC On-Site Assessment committee, CAL-DOHS Environmental Laboratory Technical Advisory Board, CAL-EPA Laboratory Waste Regulatory Taskforce and the California Water Resources Board, Laboratory Accreditation Panel. Al was a U.S. DOE Visiting Scientist at Sandia National Laboratories, Burner Engineering Research Lab.

Dr. Verstuyft received a B.S. Chemistry from Santa Clara University, a Ph.D. in Inorganic/Organometallic Chemistry from University of Nevada at Reno, and was a Postdoctoral Associate in Physical Organic Chemistry at University of Utah. He is the author of 19 peer reviewed papers and 26 presentations.



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## *Volcanic Violence* Bill Motzer



We all have an extraordinary ability to remember in detail significant events (e.g. 9/11, the Loma Prieta earthquake, etc.). Sunday,

May 18<sup>th</sup> will mark the 33<sup>rd</sup> anniversary of such an event – the eruption of Mount Saint Helens – the only volcanic eruptive episode that I have experienced on a scientific and personal level. On that day I was completing an instructorship at the University of Idaho in Moscow, Idaho, diligently grading final examinations for two geology courses that I had taught that semester. Mt. St. Helens had become active several weeks before and most geology students and faculty were closely following news bulletins particularly those issued by the U.S. Geological Survey's volcanic observatory on Mt. St. Helens.

One of my fellow graduate students, Jim Fitzgerald, was completing his dissertation in volcanic geology; he had been to Mt. St. Helens several times and on the Thursday before the eruption, he knocked on my office door asking if I would like to accompany him on a field trip to the mountain. I had just given final exams for both of the courses that I had taught that semester; grades were due to administration by 5 PM on the following Monday. Jim was hoping to get a good view and photograph any new eruptions and knew which back roads to take to get close to Mt. St. Helens. I apologized to him indicating that I had to complete grading exams and compile final grades for about 50 students by the following Monday. The process would take the remainder of the week and most of the weekend. Jim left and I didn't think any more about his invitation and field trip until that fateful Sunday. At about 3 PM the sky had completely blackened and ash began falling with a distinctive sulfur dioxide (SO<sub>2</sub>) odor: Mt. St. Helens had erupted at 8:32 AM PDT and it took until the early afternoon for the ash cloud to pass over the University of Idaho. We did not realize the magnitude or impact of the eruption for several days. Several centimeters of volcanic ash subsequently settled over the area

because Moscow had been in the plume's direct downwind path. Nothing moved in the town for three days for fear of breathing in and clogging vehicle engines with the fine volcanic dust. Finally, impatience overtook the populace and the town and people began washing the volcanic ash from the streets.

On the third day, the skies cleared enough so that TV station helicopters began surveying the devastation. One close-up view, seven ridges away from the mountain, showed a purple Datsun hatch back with the back opened; it contained a body. This was Jim's vehicle. After recovering his body, an autopsy revealed that he had been without oxygen for ~15 to 20 minutes because the spent pyroclastic flow gases contained mostly carbon dioxide (CO<sub>2</sub>) and SO<sub>2</sub>. Several friends and colleagues hired a helicopter subsequently retrieving his dissertation maps; these were published and at the following year's graduation, his mother received his posthumous doctorate.

Further studies showed that the May 18<sup>th</sup> eruption was the largest known debris avalanche in recorded history. When exposed, Mt. St. Helens' magma was released as a large-scale horizontal pyroclastic flow flattening vegetation and buildings over 600 km<sup>2</sup> and emitting more than 1.5 million metric tons of SO<sub>2</sub>. On the Volcanic Explosivity Index (VEI) scale, the eruption rated a 5.0 – a Plinian-type eruption [named for Pliny the Younger, a Roman scholar who described Mt. Vesuvius' eruption (see below)]. For comparison, Hawaiian volcanoes, e.g., Kilauea with its continuous rather nonexplosive lava flows, has a VEI = 0. The volcano Toba, which erupted 74,000 years ago with a volume of 1,000 km<sup>3</sup> and a vertical plume >25 km, has been given a VEI = 8 and is designated as Ultra Plinian.

Mt. St. Helens' northern flank's collapse resulted in volcanic ash and rock mixing with glacial ice, snow, and water creating volcanic mudflows (lahars) that ultimately flowed down the Toutle and Cowlitz River valleys, destroying roads, bridges, homes, and lumber camps. Mudflows transported about 3.0 million m<sup>3</sup> of material 27 km south to the Columbia River. The ash plume continued rising for nine hours, reaching

*(Continued on page 7)*

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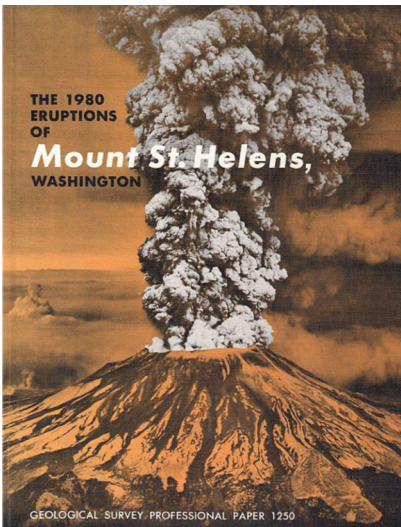
an altitude of 20 to 27 km above sea level, then moving eastward at ~100 km/h with ash falling in Idaho by noon and reaching as far north as Edmonton, Canada. The eruption released 24 megatons of thermal energy (equivalent to TNT), ejecting more than 2.79 km<sup>3</sup> of material, reducing the volcano's height by ~400 m, and leaving a 1.6 to 3.2 km wide and 800 m deep crater. It killed 57 people, ~7,000 deer, elk, and bear, and ~12 million fish from a hatchery. It destroyed or damaged >200 homes, 298 km of roads and highways, and 24 km of railways.

The most famous of Plinian eruptions occurred in late August 79 CE at Mt. Vesuvius in Italy which suddenly erupted with a vertical ash column at the rate of 1.5 million tons per second. The ash cloud reached 15 to 30 km, ultimately releasing an estimated 16,000 megatons of thermal energy. Subsequent eruptive clouds (over 2-3 days) collapsed as gases (largely CO<sub>2</sub> and SO<sub>2</sub>) expanded, losing the capability of supporting ash (tephra) fragments. The resulting pyroclastic surges reached the towns of Herculaneum and eventually Pompeii, burying them under several meters of tephra. These pyroclastic flows had internal temperatures reaching 500 °C. Magnetic studies of excavated roof tiles and

plaster fragments collected around Pompeii suggest that on the first day's eruption, white pumice containing ~3.0 cm diameter clastic fragments fell for several hours heating tiles to ~140 °C. On the second day, pyroclastic surges resulted in depositional temperatures ranging to 300 °C. Any remaining persons in buildings could not have escaped because the city was enveloped by gases at incinerating temperatures. The lowest temperatures occurred in rooms under collapsed roofs of ~100 °C. About 16,000 people perished in these eruptions.

These historical volcanic eruptions are rather "tame" considering what is contained in the geological record. Scientists are just now beginning to understand in more detail how present and past eruptions have affected the Earth and I will discuss these new findings in future articles.

Finally, Jim and I had a friendly wager on who would complete their graduate degrees first. The payment was a case of beer, winner's choice. He won and each May 18<sup>th</sup> I recall his devotion to science and geology. I still need to pay off the debt.



Mt. St Helens memorial plaque at the visitor's center, Mt. St. Helens National Volcanic Monument, Washington State.

Jim Fitzgerald's name is in the left column, second from the top.



## *Family Science Night at Bancroft Middle School on March 12th, 2013*

On Tuesday, March 12th, 2013, Bancroft Middle School in San Leandro took Family Science Night to a whole new level as the school staff, the PTA, the California Section of the American Chemical Society, and the Scientific Jam Band welcomed students and their families to an evening chock-full of entertainment, contests, and hands-on activities. The setting sun illuminated the courtyard as students lined up to check in and collect their nametags and folders with programs and extra credit activity sheets. They were delighted to discover that the bilingual (English and Spanish) programs, printed on thermochromic paper, changed color whenever they touched them.

Soon the cafeteria was packed, and the Scientific Jam turned the microphone over to Bryan Balazs of Lawrence Livermore National Laboratory, who kept the audience guessing as he demonstrated disappearing water, Elephant's Toothpaste, flames in a bottle, and the spectacular acrylic-

everyone to wear their safety glasses (donated by Chevron Energy Technology Company) while exploring the dozen or so hands-on experiments waiting for them in the science classrooms.

Room S-1 was especially lively as visitors assembled bracelets with UV-color-changing beads, learned how to match DNA and RNA bases into double-helix chains, and explored the various forms of carbon, the most versatile element that is the basis of all organic molecules. They found that graphite, an ancient form of carbon still used in pencils, can conduct electricity, and went on to assemble paper models of C<sub>60</sub> (buckminsterfullerene), the newest form, first seen in a laboratory in 1985.

Putting on safety glasses as they entered Room S-2, students tested the pH (acidity or basicity) of numerous household substances, and then carried out electrolysis of purple cabbage juice, itself an excellent pH indicator. Oxidation at the anode created bubbles of oxygen and turned the solution red as acidic, positive hydrogen ions formed in solution, while reduction at the cathode generated hydrogen gas and turned the solution green through the



oxygen rocket. Alex Madonik, ACS event coordinator, added his welcome on behalf of the California Section, encouraging

formation of negatively charged, basic, hydroxide ions.

*(Continued on page 9)*



*(Continued from page 8)*

The Chevron team took over Room S-4, where every visitor had the chance to create brightly colored slime by combining solutions of a synthetic polymer (polyvinyl alcohol) and a cross-linking agent, borax. Next door, in Room S-5, ACS volunteers helped students recreate an ancient recipe

raspberry ice cream to 500 people, it sure helps to freeze it in one minute flat with liquid nitrogen (provided by AirGas of San Leandro) at  $-196^{\circ}\text{C}$  ( $-321^{\circ}\text{F}$ ), and the cryogenic liquid creates spectacular clouds of water vapor. Satisfied parents and students enjoyed the music and a few more chemistry tricks by Bryan Balazs, and then listened eagerly as the Bancroft staff



for ink, combining tea from oak galls with white iron supplement tablets to make a black solution that they could use to sign their own “parchment” certificates. In the same classroom, modern plastics in their many forms presented puzzles to would-be recyclers, who learned that seemingly similar materials can differ dramatically in density and melting point because of their molecular structure.

In Room S-6, visitors came face-to-face with a desert tortoise and several snakes, introduced by evolutionary biologist David Seaborg. In Room S-7, plant chemistry was the theme, as Margareta Séquin of San Francisco State University challenged everyone to identify plant scents and then try to build plastic molecular models of the key scent components.

Back in the cafeteria, the Scientific Jam played a second set while ACS volunteers prepared ice cream. When serving

read out winning raffle numbers. Prizes included Periodic Table clocks donated by the ACS and signed by ACS Past-President Bassam Shkhashiri. No one was disappointed, as there were ACS souvenirs for everyone: Periodic Table wallet cards, fuzzy “Nanomoles,” and miniature chemiluminescent glow-sticks.

In addition to the volunteers and donors acknowledged above, the ACS thanks Concord science teacher Margaret Elliott, Celera scientist Birgit Drews, Abbott scientist Blanca Domingo (who also prepared and checked Spanish translations), retired chemists John and Anne Frazer, Chevron scientists Michael Cheng, Francisco Lopez-Linares, Toni Miao, Deanna Quon, Sheila Yeh, and Hong Yu, and their retired colleagues Larry Jossens

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and Elaine Yamaguchi, UC Berkeley graduate students Hoang Doan and Latisha Pau U, ACS California Section councilors Sheila Kanodia and Lee Latimer, ACS Board member Bonnie Charpentier, chemist Charles Gluchowski, Greg and Vreni Rau, and Jeanne Pimentel. Special thanks to California Section Office Manager Julie Mason and to the Bancroft Middle School staff, particularly science teacher Clinton Huey, who initially contacted the ACS last fall and offered to host this event.

Alex Madonik



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Dr. Margareta (Greti) Sequin, author, plant enthusiast and Lecturer Emerita at San Francisco State University, comes to the LLLC to share her vast knowledge of California native flora and their pleasing and poisonous properties.

Dr. Sequin will lead us on a virtual walk, illustrated by many pictures, around the vicinity of Lafayette Library and to surrounding nature areas to explore the smells and defensive substances of plants

that we may encounter. Plants are masters at defense, in the form of tough skins, thorns, or sharp spines, but also in the form of bitter saps, sticky resins, or poisons that can harm. On our virtual walk we will look at plants that contain defensive substances and examine their molecular structures... no previous chemistry knowledge required! We will also explore the connections with human uses of these plant substances, such as commercial fragrances or medicines.



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