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Wally Yokoyama, recipient of the 2014 Petersen Award

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EDITOR:

Louis A. Rigali
255 4th St. Ste #101 Oakland 94607

510-268-9933

ADVERTISING MANAGER:

Vince Gale, MBO Services
Box 1150 Marshfield MA 02050-1150

781-837-0424

OFFICE ADMINISTRATIVE MANAGER

Julie Mason
2950 Merced St. # 225 San Leandro CA 94577

510-351-9922

PRINTER:

Quantity Postcards
255 4th Street #101 Oakland CA 94607
Printed in USA on recycled paper

510-268-9933

CONTRIBUTING EDITORS:

Evaldo Kothny
William Motzer

EDITORIAL STAFF:

Evaldo Kothny
Alex Madonik
Mark Frishberg
Margareta Sequin
Linda Wraxall

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Chair's Message

Mark Frishberg

As promised in my March message, here is the second installment of my recommendations on how to get the most out of attending an ACS National Meeting. The

ACS had a very successful Spring National Meeting in Dallas in March, and now the focus switches to the next National meeting taking place in San Francisco in mid-August. First, here is a quick local update. The California Local Section will be co-hosting this meeting with our neighboring Santa Clara Valley Local Section, and we are working together on several projects related to the meeting. There will be a joint hospitality booth staffed by our sections, a public outreach event is being planned in conjunction with the ACS Committee on Community Activities for Saturday, August 9th, immediately preceding the start of the National meeting, and a series of posters commemorating eminent scientists in the Bay area is being developed for display. We have collected the names of numerous people willing to help with these activities, and it is not too late to volunteer.

By the time you read this message, the deadlines will have passed for submitting papers and posters for the National meeting, so if making a presentation is a requirement of

your attendance, I hope that you have taken care of that detail. The next step is to make sure that you keep alert for the May issue of C&EN that will provide many of the initial logistical information regarding registration and housing. If you get email messages from ACS, make sure that you pick up on the one announcing the opening of housing reservations and submit your request as soon as possible. As I mentioned in my first message, when the ACS comes to San Francisco it is always the highest attended meeting and the most economical and convenient hotels rooms go quickly.

If you have not been to a National meeting lately, you may not have gotten attuned to the standard schedule of special events that now accompany each meeting. The start of the technical sessions is on Sunday, a day where an extensive undergraduate program will be scheduled, as well as the opening of the Career Fair, with its resume reviews, mock interviews, and career-oriented workshop opportunities. Mid Sunday afternoon is the first plenary session on the overall meeting theme: Chemistry and Global Stewardship. Sunday evening will bring the opening of the exhibition as well as the first poster sessions in many of the Divisions. For those who may be interested in the governance of the Society, the ACS Board of Directors is likely to have an open discussion session with lunch at noon on Sunday, and most Society

(continued on page 10)

California Section
American Chemical Society
May 10 2014 Awards Luncheon

Honoring 50, 60 and 70 Year Members of the American Chemical Society,
Walter B. Petersen Award Presentation and
Community College Faculty Awards

There will also be a lecture at the end of the ceremonies given by guest speaker:
Rebecca Sutton from the San Francisco Estuary Institute.

Topic: Smother and Spark: The Impact of Flame Retardant Policy on Pollution

Date: Saturday, May 10, 2014

Time: 12:00 noon, social; 12:30 pm, lunch; 1:30 pm, award presentations; followed by the lecture, starting around 2:30 pm.

Place: Pyramid Alehouse, 1410 Locust Street in Walnut Creek, Parking on street (meter in effect until 6:00 pm) or various (pay) lots in area

Lunch: Cost \$32, Buffet Style luncheon will be served which includes, several entrees, Mixed Green Salad, Sautéed Seasonal Vegetables, Roasted Red Mashed Potatoes & Gravy

Reservations: RSVP by Friday, May 2, 2014 to the Section office by e-mail to office@calacs.org or call (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 2, 2014

Abstract:

Flame retardant use is widespread in large part due to California's unusually strict flammability standards. Polybrominated diphenyl ethers (PBDEs) are a group of flame retardants added to thermoplastics, polyurethane foam, and textiles. A decade ago, California Environmental Protection Agency studies of PBDEs in people and wildlife in the San Francisco Bay Area revealed extremely high levels, indicating the region is a global PBDE contamination "hot spot." Meanwhile, a growing body of literature suggests PBDEs have toxic properties.

In response to federal pressure, the major manufacturer of PentaBDE and OctaBDE, two of three commercial PBDE mixtures, ceased production in 2004, preceding a California ban effective in 2006. Also in 2006, the United States Environmental Protection Agency (USEPA) issued a significant new use rule ensuring any proposed uses of these chemicals would be reviewed for safety. Production of the last

commercial PBDE mixture, DecaBDE, was phased out in 2013.

The Regional Monitoring Program for Water Quality in San Francisco Bay (RMP) has monitored PBDEs for over ten years as part of a strategic focus on contaminants of emerging concern. PBDEs are widely detected in Bay water and sediment, as well as in Bay bivalves, fish, and bird eggs. Declining contamination of Bay sediment and biota over the last decade is likely linked to the state ban and federal phase-outs. Declines are expected to continue and should diminish potential impacts of PBDEs on the Bay.

As PBDEs are removed from the market, manufacturers are increasing use of alternative flame retardants. The RMP has detected a number of these chemicals in Bay matrices and is conducting additional monitoring in 2014. Revisions to state flammability standards eliminate the need to incorporate these substances into upholstered furniture and many items for infants and young children.

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Volcanic Violence (Part 2)

Bill Motzer

May 18th marks the 34th anniversary of the eruption of Mount Saint Helens – the only volcanic eruptive episode

that I experienced on a scientific and personal level (see May 2013 Vortex Volcanic Violence, Part 1.)

At any given time, approximately 1,500 of the world's volcanoes may have been active during the past 10,000 years with 600 having known eruptions during recorded history. About 50 to 70 volcanoes are currently active or erupting each year with 75% occurring in the Pacific Rim of Fire. An estimated 500 to 600 million people live near these volcanoes.

Volcanic eruptions can be devastating, particularly from their explosive power – which makes them significant “physical engines.” They are also “heat engines” and depending on their type and location, they transfer heat in the form of magma from the lower crust and mantle to the earth's surface. All magmas contain dissolved gases released before, during, and between eruptive episodes, making volcanoes significant environmental “chemical engines,” particularly with respect to emitted gases (see figure below). The most common gases associated with active volcanoes (in general decreasing abundance) are water vapor or steam, constituting approximately 70% to 95% of all eruption gases, carbon dioxide sulfur dioxide, hydrogen sulfide, hydrogen, helium, carbon monoxide and hydrochloric and nitric acid. Lesser amounts of argon, fluorine, hydrofluoric acid, nitrogen carbonyl sulfide, carbon disulfide, hydrogen bromide, ammonia and native elements (e.g., sulfur, boron, and gold, and volatile metals: mercury and selenium) may be emitted. Generally, H and CO rapidly oxidize to H₂O and CO₂, respectively and H₂S oxidizes to sulfurous (H₂SO₃) and/or sulfuric (H₂SO₄) acids, but volatile sulfur may also result in direct condensates, sublimates, or encrustations as native sulfur deposits. Chlorine monoxide (ClO) may also form when HCl is oxidized and HF can condense in rain or on ash particles.

Gaseous compositions for different volcanoes are quite variable: e.g., Kilauea in Hawaii is a hot spot basaltic shield volcano with a magmatic temperature of ~1,170 °C. Kilauea's H₂O, CO₂, and SO₂ gaseous emissions are 37.1%, 48.9%, and 11.8%, respectively. Momotombo in Nicaragua is an explosive strata volcano with a magmatic temperature of ~820 °C; located at a convergent plate boundary, its H₂O, CO₂, and SO₂ concentrations are 97.1%, 1.44%, and 0.50%, respectively.

Generally, because of rapid atmospheric oxidation and solubilization in water vapor, most volcanic gases rarely reach or impact populated areas in lethal concentrations. One study showed that lethal effects are quite low ~10 km downwind from a volcano. Usually, such hazards are restricted to surrounding volcanic vents, fumaroles, and to low spots on the volcanoes' flanks. In such areas, volcanic gases (e.g., CO₂, HF, and SO₂) may cause harm to humans, animals, plants and crops, and property (e.g., utility lines, farm equipment, vehicles, and metal objects, which corrode when exposed to gases or acid rain). Exposure to acid gases (e.g., H₂SO₄, HCl, and HF) can damage eyes, mucous membranes, respiratory systems, and, under extreme conditions, may cause death. The different volcanic gases affect the earth, people and animals in different ways and health hazards can range from minor to life-threatening, particularly for people with chronic respiratory and/or heart disease.

CO₂ is denser than ambient air (~1.8 g/L at 25 °C and 1.0 atm), accumulating and concentrating in depressions in lethal concentrations causing suffocation. The OSHA maximum safe level is 30,000 ppm (3%) and 40,000 ppm is considered as immediately dangerous to life and health. A 30-minute exposure to 50,000 ppm produces intoxication, concentrations >70,000 to 100,000 ppm produce unconsciousness, and lethal concentrations (causing death in 30 minutes) are >100,000 ppm. In the past two decades, hundreds of people have died from CO₂ asphyxiation from nearby volcanoes, most of them

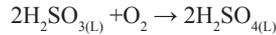
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in Cameroon, Africa, and Indonesia. Measured concentrations ranging to 100% CO₂ from Mount Vesuvius, in Italy, have claimed the lives of many people from pooling CO₂ in depressions. Locally, high CO₂ atmospheric concentrations, produced by disturbance of deep lake water saturated with volcanic-derived CO₂, may have caused 37 fatalities at Lake Monoun, Cameroon in 1984 and 1,700 casualties at Lake Nyos, Cameroon in 1986.

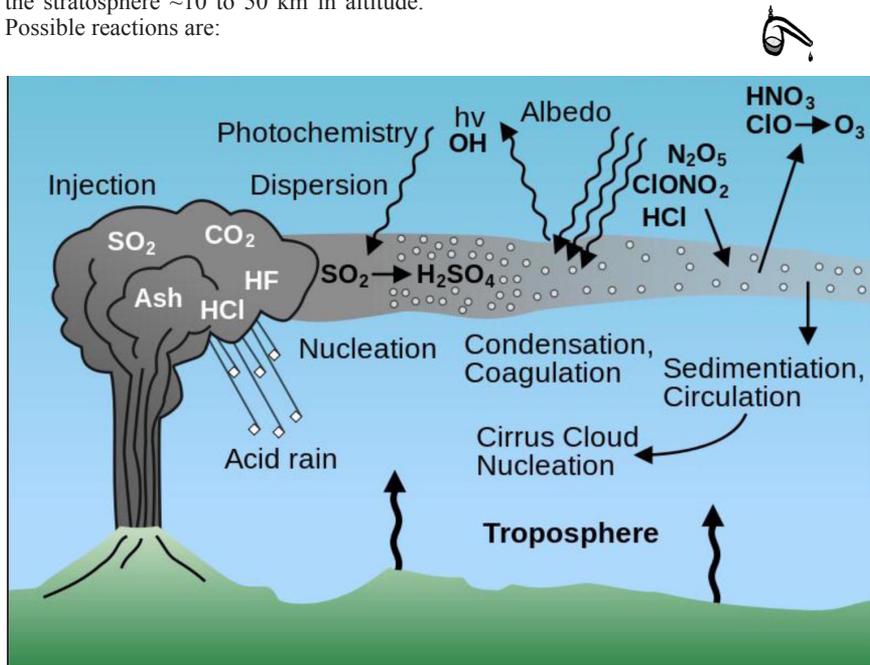
Fluorine gas and HF can condense in rain or on ash particles coating grass, polluting streams and lakes with excess dissolved fluoride (F⁻). Animals eating fluorine-tainted ash deposited on grass may be poisoned. Although small amounts of F⁻ can be beneficial, excess F⁻ causes fluorosis by destroying teeth and bones. This also impacts humans when F⁻ is leached into domestic water supplies.

SO₂ emissions may result in climate cooling when H₂SO₄ aerosols form in the upper atmosphere. This occurs when SO₂ as gases and in tephra from large eruptions impact the stratosphere ~10 to 50 km in altitude. Possible reactions are:



Liquid (L) H₂SO₄ aerosols (droplets) block sunlight, which may result in global cooling; but ordinarily such cooling is not long. For example, El Chichon in Mexico erupted in 1982 producing an ash plume reaching an altitude of ~26 km. The eruption produced 1.0 to 2.0 x 10¹⁰ kg of H₂SO₄ aerosols that caused northern hemisphere surface temperature decreases of 0.4 to 0.6 °C for about one to two years.

But these eruptions are “tame” when past (prehistoric) eruptions are considered. Although the May 18, 1980 Mount St. Helens eruption is considered a large eruption (~1.0 km³ of erupted material) it is miniscule when compared to the Yellowstone Supervolcanic eruption of 600,000 years ago at ~1,000 km³. And I’ll discuss that in a future article.



Volcanic injection of gases into the atmosphere. Schematic by S. E. Wilson, U.S. Geological Survey (2009)

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 recognition 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. Wallace (Wally) Yokoyama. Wally moved to the Bay Area and joined the section about 1993 moving from the Orange County section where he had been a member and officer

At about that time at the USDA lab in Albany, Wally became familiar through Glenn Fuller with Project SEED, one of the largest in the country. When Glenn retired from the lab, Wally stepped up to coordinate the program at USDA and ensure that it would continue successfully at the lab. Not only did Wally serve as Coordinator, he also was a mentor. Mentors work one-on-

(meeting continued from page 4)

Biography

Rebecca Sutton is a senior scientist at the San Francisco Estuary Institute (SFEI) and a member of the California Department of Toxic Substance Control's Green Ribbon Science Panel. She received her B.S. in Environmental Resource Science from the University of California, Davis and her Ph.D. in Environmental Chemistry from the University of California, Berkeley. Her dissertation explored molecular-scale interactions of ions and natural organic matter with clay mineral surfaces using molecular

one with students; while CALACS Section coordinators make sure both student and mentor enjoy a productive summer. Wally provided the lead to expand the program geographically south into the Central Valley to the farm town of Parlier, where another USDA site is located. We now provide an annual SEED satellite program there. Ours is one of the few ACS SEED programs that covers 3 Sections: California, Sacramento, and San Joaquin Valley.

Wally helped to establish a base of students at the USDA. Even today, the USDA Albany is remembered as the first institution that opened its doors to large numbers of SEED students. Wally helped to establish that base.

He has served as the California section's Chair-Elect in 2002 and 2012 and Chair in 2003 and 2013. He is a member of the Section's Project SEED committee and was able to recruit more schools from outside East Contra Costa. His services as a Mentor for students in Project SEED for many summers are an indication of his dedication and commitment to outreach programs. Wally continues to serve on the ACS National Project SEED committee and has been in a leadership position and chair for the ACS Agricultural and Food Chemistry division.



modeling techniques. Prior to joining SFEI in 2013, Dr. Sutton was a senior scientist with research and advocacy non-profit Environmental Working Group, where she conducted research on chemicals of concern in air, water, soil, consumer goods, and people. At SFEI, Dr. Sutton works on various projects for the Regional Monitoring Program for Water Quality in San Francisco Bay, with an emphasis on emerging contaminants. She also She also leads SFEI's green chemistry focus area.



Fox News Says
Published April 9, 2014

U.N.-commissioned panel says climate change is hurting the growth of crops, affecting the quality of water supplies and forcing wildlife to change the way it lives – but what if it's all just smoke and mirrors?

A new report from the Nongovernmental International Panel on Climate Change (NIPCC), written by an international collection of scientists and published by the conservative Heartland Institute, claims just that, declaring that humanity's impact on climate is not causing substantial harm to the Earth.



ACS Position on Climate Change Literacy and Education

To make informed decisions, people need a basic understanding of the causes, likelihood, and severity of the impacts of climate change, and the range, cost, and efficacy of different options to limit or adapt. Transparency, accountability, and fairness in the measurement, reporting, and verification of data on climate change risks and vulnerabilities, sources of GHG emissions, and climate policy are priorities. Climate educators and communicators at all levels of society should set a tone of respect for diverse perspectives and an open and honest consideration of the implications of various responses to climate change. When discussion moves from core scientific concepts to more complex issues involving societal values, students should learn how to engage in responsible, respectful discourse and debate, as well as critical thinking and analysis skills (NRC, 2010d).



Divestiture, now is the time

The Guardian, Thursday 10 April 2014 “We live in a world dominated by greed. We have allowed the interests of capital to outweigh the interests of human beings and our Earth” In an article by Damian Carrington, Desmond Tutu went on to call for an anti-apartheid-style boycott and disinvestment campaign against the fossil fuel industry for driving global warming. The complete interview can be read on line at <http://www.theguardian.com/environment/2014/apr/10/desmond-tutu-anti-apartheid-style-boycott-fossil-fuel-industry>

Also on April 10 about 100 members of the Harvard University faculty wrote an open letter to the President of the University arguing for divestiture of the fossil fuel industry. The complete text can be found at <http://www.harvardfacultydivest.com/> Among the reasons given was to expose corporate attitudes and change corporate behavior.

One might argue that a boycott or divestiture is an extreme action; certainly there must be other methods that could be employed. There have been some students and other individuals picketing the fossil fuel industry. We can also purchase expensive electric cars, take public transportation, and turn the thermostat lower or higher to conserve power. But perhaps you and I could appeal directly to some of these fossil fuel companies and demand they be better world citizens or else.

Or you and I could appeal to our government to enact laws that would change the course of the fossil fuel industry. It does not seem that the politicians in Sacramento and Washington are likely to pass any meaningful legislation nor do these politicians fear any serious consequences from their constituencies for having a pro fossil fuel industry sentiment.

Media; newspapers, and Yahoo and AOL news blogs on the internet could exercise the power of the media, make critical comparisons and report often and with specific examples on climate change and its relation to the use of fossil fuels. That would seem to provide a better platform for discussion rather than watching a fair and balanced shouting match with

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Awards

Each year, usually in May, the California Section honors selected Members with an award Luncheon. This year we have combined the award meeting with a technical presentation. We invite all to attend, details on the meeting are on page 3 of this issue.

The American Chemical Society honors those members who attain 50, 60 and 70 years of membership. The list of those in the California Section who have attained these honors this year includes:

50 Years

Richard A. Andersen
Orm Aniline
Donald N. Brattesani
Wayne M. Camirand
Sherwood Chang
Richard P. Cotter
Carl E. Cripe
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Evaldo L. Kothny

Ronald E. Leone
Steven Lewkowitz
William J. McKinney
Alexander Mihailovski
Kenneth E. Osborn
Roger W. Phillips
Kenneth N. Raymond
Kenneth K. Rice
Edward T. Sabourin
Sheldon A. Schaffer
Robert Stevenson
Marvin N. Yudenfreund

60 Years

Ray G. Bedford
Elton J. Cairns
Dean M. Coons
Conrad E. Gleason
Paul E. Greene
I. C. Hisatsune
Henry Y. Lew
Scott Lynn
Harold Reynolds
Lloyd R. Snyder

70 Years

Paul A. Devlin

The Community College Faculty Award is presented by the California Section to honor outstanding community chemistry faculty within the California Section of ACS. The 2013 Community College Faculty Award recipient is Dr. Michael Ansell from Las Positas College.

The Walter B. Petersen Award is made annually to a California Section member for outstanding service for an extended period to the Section. This year's recipient is Dr. Wallace (Wally) Yokoyama, served two terms as Section Chair (2003 & 2013), four year as Awards Committee Chair, eight years combined as Councilor and Alternate Councilor. He is presently co-chair of the Long Range Planning and Budget Committees.

Save The Date October 21, 2014

We are finalizing on an October meeting with Carl Djerassi, author, playwright, and emeritus professor of chemistry at Stanford University. The date is fixed, the venue is not. The talk will be "Chemistry in the Theatre" and we will try to incorporate one of Dr. Djerassi's chemical themed plays as part of the program. This will be a very special event.

Chair from page 3

committee meetings will be taking place on Sunday, with some on Saturday as well, and the Regional Caucuses of Local Section Councilors will be held early evening. Many of these meetings are open to visitors, especially if a member has something to share with one of the committees.

Monday is a full day of technical sessions and usually another invited plenary session, along with the very popular Kavli Institute sponsored invited lectures, from 4-5pm for a rising scientist lecture, and 5:30-6:30pm for the primary lecture. These lectures attract an audience of thousands, so plan to get there early. More poster sessions follow these lectures, the largest of which is Sci-Mix at 8-10pm, where almost all Divisions, many committees, and Project SEED students participate. Sci-Mix at the fall meeting is also where the Academic Employment Initiative posters take place, giving members seeking academic positions an opportunity to network and attract potential employers.

Tuesday through Thursday are other full days and evenings of papers and posters. Tuesday starts early for Senior Chemists, with a breakfast and speaker starting at 7:30pm. This sold out in Dallas, so plan accordingly if interested. Tuesday at 5pm

marks the close of the exhibition and the Career Fair, although the career-oriented workshops continue Wednesday morning. The Chemluminary Awards on Tuesday evening recognize outstanding performance by Local Sections and Divisions and are a highlight of each fall meeting. Everyone is invited to this festive occasion that starts at 9pm and ends with music and dancing following the awards. Come and join your California Local Section Officers, Councilors and committee chairs as we anxiously await the award announcements for those who have qualified.

Wednesday morning is the ACS Council meeting, and there is a visitor section for those who want to observe its workings along with our eight elected Councilors. Major poster sessions continue Wednesday evening, and the joint MedChem/Organic one is likely to have a band playing for the last hour.

Space does not allow me to cover the many receptions and other special events, but by now you should have a good picture of what is in store for you at this meeting. For sure, come for the technical sessions, but I encourage you to take advantage of these other events, see old friends and make new ones, and enjoy the unique experience.



Now: continued from page 8)

the only issue being that there is not unanimous agreement for the fact that man and the fossil fuel industry are causing climate change.

On April 13, the UN issued a report that Man still has the ability to reverse the conditions causing climate change. There is hope but... the fossil fuel industry has to change their attitudes and behavior. The entire report, based on the findings of about 1500 experts, can be read at <http://www.un.org/climatechange/news/>

The strategy of divestiture more than thirty years ago regarding apartheid mobilized the world's focus and position on an immoral but accepted policy. It is hard to argue that divestiture was not effective in changing attitudes. Even the position of the US government changed towards South Africa and the ANC, the political party in South Africa and Nelson Mandela, its leader and supporter of both anti-apartheid and divestiture. Prior both were listed a US State terrorists.

Now is the time for leadership in The American Chemical Society and Members in its various sections to publicly announce its support of, and if it applies, divestiture from the fossil fuel industry.

Lou Rigali



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