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May 2011



Neal Byington, recipient of the 2011 Petersen Award

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Chair's Message

Bryan Balazs



We are off to an excellent start in the first few months of the International Year of Chemistry, with almost 20 section events this year, everything from chemistry scavenger hunts,

technical meetings, interviewing workshops, chocolate tours, to science fairs and other outreach programs. I would like to highlight two of them, one which just occurred, and one which is coming up.

The first event, the latest in a series of Family Science Events led by Alex Madonik with a number of enthusiastic volunteers, was at Hill Middle School in Novato. Everyone had a blast, prompting one Hill teacher to write, "I'm so happy to report that it was a resounding success! The kids, parents, and teachers are still buzzing about how much FUN they had last night". And it was because of you that we had such a memorable evening. Unfortunately, you might not know that this is Hill Middle School's final semester; we are closing due to school consolidation. Thank you all for being part of our students' final and fondest memories of our school. I know they'll never forget their final family event at Hill." Makes you want to be part of the action at these events.

The second event, led by our Minority Affairs/Diversity Chair Sheila Kanodia, is called Science Saturday Academy and involves a multi-year partnership with the Bay Area Chapter of NOBCCChE (National Organization for the Professional Advancement of Black Chemists and Chemical Engineers). This program gives students hands-on experience with science and engineering and is designed to motivate students, enhance problem solving skills, provide an opportunity to meet local scientists and engineers and, perhaps most important, to have fun with science. In addition to Sheila, volunteers include Anne and John Frazer, Alex Madonik, and Elaine Yamaguchi. This year the program will span the Saturdays from April 9 through May 14, from 10 a.m. to noon, at Havenscourt Campus, CCPA & Roots, 1390 66th Avenue, Oakland, with experiments planned in Acids and Bases, Polymers, Soil Science, Food Science, and Environmental Science. If you're interested in helping out, email Sheila, sushila.kanodia@gmail.com.

Finally, with all the events that the California Section is supporting, getting the announcements out to our members in a clear and consistent fashion is no small feat. Please let me know your thoughts on how you would like to hear about what we have going on, whether by email, in the *Vortex*, on our website, on Facebook, or by other means. You can reach me at BB@llnl.gov.

SCIENCE CAFE

Co-Sponsored by

*Lafayette Library and Learning Center Foundation and
California Section and WCC of the American Chemical Society*

Topic: Breaking Trail: Mountains to Molecules to Motherhood

Speaker Dr. Arlene Blum

Date: Tuesday, May 17th

Time: Doors Open 6:30 PM, Program 7:00-8:00 PM

Place: Lafayette Library and Learning Center, 3491 Mt. Diablo Blvd.

Reservations: RSVP Required by May 10th at LLLCF.org or (925) 283-6513 x.101

Cost: \$5.00 per person, Boxed Meals Available for Pre-Purchase: \$10 (non-refundable).

Call the above number to order. Beer, Wine, Beverages, Coffee for sale in the Community Hall

Abstract:

Climbing the world's highest mountains is an excellent model for achieving other extremely demanding objectives. Dr. Blum will share photos and stories from her scientific and policy work protecting our health and environment from toxins in consumer products, as well as from her expeditions among the world's highest and most dangerous mountains. Dr. Blum's current challenge is bringing scientists, industry, government, and non-profits together to create a healthier, safer environment. Her work bringing science into regulatory decisions has stopped the unnecessary use of hundreds of millions of pounds of toxic chemicals.

Biography:

Dr. Arlene Blum received her bachelor's degree from Reed College and her Ph.D. in biophysical chemistry from the University of California, Berkeley, where she worked under the mentorship of Dr. Ignacio Tinoco. As a post-doc with Dr. Bruce Ames at Berkeley, Dr. Blum demonstrated the cancer-causing properties of two flame retardants widely used in children's sleepware, which led directly to their regulation. Dr. Blum took a break from science to build a reputation as a mountain climber and author. She led the first American—and all-women's—ascend

of Annapurna I (8,091m), considered one of the world's most dangerous and difficult mountains. She also led the first women's team up Mt. McKinley (6,194m) and was the first American woman to attempt Mt. Everest (8,848m).

After three decades of climbing and writing books, Dr. Blum returned to science and policy work in 2006 after learning that the same chemicals she worked to remove from children's sleepware in the 1970's are currently used in furniture and baby products. Through the Green Science Policy Institute she seeks to bring scientific research to the forefront to inform policy decisions with regard to human health and environmental impact. For her work Dr. Blum has received a number of awards including being named as one of the 100 "Women Taking the Lead to Save Our Planet", the Purpose Prize, given to those over 60 who are solving society's greatest problems, and a Gold Medal from the Society of Women Geographers, an honor previously given to only eight other women, including Amelia Earhart, Margaret Mead, and Mary Leakey.

In addition to the Chemistry Department's Neckers Fund, Dr. Blum's visit is co-sponsored by the Campus Sustainability.



*American Chemical Society
May Meeting Luncheon
Honoring 50 and 60 Year Members of the
American Chemical Society
&
Walter B. Petersen Award Presentation*

Date: Saturday, May 14, 2011

Time: 12:00 noon, social; 1:00 pm, lunch; 2:00 pm, presentations

Place: The Solano Bar and Grill, 1133 Solano Avenue, Albany, California

Lunch: Cost \$23, Salad and choice of: Grilled Agra Farm Pacific Bass, or Vegetarian Dirty Rice, or 1/2 Braised Chicken

Reservations: RSVP by Monday May 9, to the Section office office@calacs.org or call (510) 351-9922

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" that covered news of promotions, awards and

general information about Section members. 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.

Nominees must be a member, a former member, or an affiliate of the Section. This year's recipient is Neal Byington, former Section Chair, Alternate Councilor, and co-chair of the 2013 ACS Western Regional Meeting in San Francisco.



50 Year Members

Mr.	Ronald	Walter	Buxton
Mr.	Fred	W.	Davis
Mr.	Harry	Y.	Gee
Dr.	Gilbert	S.	Gomes
Dr.	John		Hennings
Dr.	W.	Glenn	Howells
Mr.	Charles	L.	Kibby
Dr.	John	Mathews	King
Mr.	Robert	J.	Klett
Mr.	Roland		Quong
Dr.	Janet	Z.	Tarino

60 Year Members

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Dr.	Elliot		Bergman
Dr.	Norman	A.	Bonner
Dr.	David	B.	Cox
Mr.	Frank	G.	Delfino
Dr.	John	W.	Donovan
Dr.	John	L.	Ellingboe
Dr.	Roger	G.	Ketcham
Mr.	Bob	N.	Mc Lean
Dr.	Milton	M.	Mozen
Dr.	P.	Harold	Parker
Dr.	Hans		Reimann
Mr.	Richard	H.	Reuther
Mr.	James	H.	Rogers
Mr.	John	M.	Skarpelos
Dr.	Ignacio		Tinoco



ELK-N-ACS

E. Koethy

Iodine

The element N 53, atomic weight 126.932 has an interesting history of its discovery in France by Bernard Courtois in 1811. During the British blockade of France (1805-1813), when Chilean saltpeter shipments were cut off, production of black gunpowder (a mixture of potassium nitrate, charcoal and sulfur) was halted. French chemists thought of making potassium nitrate by reacting calcium nitrate with ash from kelp. Both products were available for the reaction. However, they did not know that a strange impurity in the ash would be oxidized by the nitrate. A bluish vapor emanating from the mixture condensed as a black crystalline substance in the vats and was described as a new element. This was confirmed by the famous chemist Gay-Lussac. Soon after discovery, the outstanding antiseptic value of the element was noted. Early formulations contained 1 to 5% free iodine dissolved in ethanol. A less irritating formulation was introduced by Jean Lugol into the French pharmacopoeia in 1829, which is still called Lugol's solution. This is made up by dissolving iodine in an aqueous potassium iodide solution. Nowadays, iodine dissolved in an aqueous povidone solution is generally used in hospitals.

Iodine is a halogen and is readily accessible from natural sources. It is contained in kelp, a mixture of certain red and brown algae, and in salts from dry lakes. The immediate question is, from where is this element originally coming from? The answer is, its primordial content is found inside rocks, i.e., basalt and granite, same as the other halogens (conflicting contents, depending on the source literature. Listed from 0.1 to 5 parts per million). During comminuting of such rocks, a large percentage leached into seawater which is the largest reservoir of halogens on Earth (seawater contains about 60 parts per billion, or 60 mg per cubic meter iodine). Iodides in solution are oxidized photolytically by a variety of reactions.

Due to its volatility, it is emitted from the sea and then carried by trade winds inland. There it is deposited and it accumulates in a decreasing pattern from western coastal areas to inland.

Nowadays iodine is in the news and on the mind of many people. Until recently, it received little attention and was considered a technological product (halogen lamps, pharmaceutical products, chemical reagent) and one more of a needed trace substance of biological importance. It was known to exist in seawater and that it accumulated by plankton and algae, from where it can be commercially separated. Such operations are practiced in France, Great Britain and Japan. The volatile transportation past the shores has accumulated iodine compounds in desertic salt deposits, most notably as iodate (NaIO_3) camouflaged in nitrate in the northern deserts of Chile. Iodine is also found in brines and dry lakes. In brines from oil wells, iodine can efficiently be separated on metallic silver.

The deficiency of iodine in soils and in foods of inland and mountainous areas is what causes goiter, a prominent swelling of the thyroid gland (the normal size is under 30 grams; in some goitrous individuals the increase may well go over 500 grams). The swelling is produced by an enzymatic stimulation of thyrotropin generated by the pituitary gland in response to iodine deficiency. In turn, the thyroid gland, in the front of the neck, generates thyroxine whose function is to stimulate the cellular metabolism. The gland may hold 25% of the total iodine of the body or about 500 times the iodine level in the blood. Deviations of the hormone content generated from the thyroid gland produces a serie of deficiencies and diseases, i.e., hyper- and hypothyroidism, the first characterized of increased functional output and the second in generalized sluggishness. This is an oversimplified scheme. In any event, some hyperactivity forms of the thyroid gland can be treated by partially destroying some tissue by administration of a controlled amount of radioactive iodine. More of this subject farther below.

Conflicting information can be found about the content of iodine in foodstuff.

(Continued on page 10)

The ACS Network: Where Chemists Connect

Marinda Wu, ACS Board of Directors

The ACS Network was launched in August of 2008 and currently has almost 200,000 members. ACS provides it as a free on-line social and professional networking tool designed to enable chemists to “connect, communicate, and collaborate” more easily. Last fall, all ACS members were added to the ACS Network with an option to opt out.

Are you aware that a California Section Group exists on the ACS Network? Bryan Balazs set up this group for the California Section a couple of years ago.

What can you do in the ACS Network? Create a professional profile to promote your work and interests. Add to your personal network and find new opportunities. Use it to help manage your career and grow professionally. Interact within a community of other chemists from around the world.

A few current ACS Network features include the following: Send and receive in-system private messages. Collaborate and share documents in private or open groups. Stay engaged with the latest discussions within your communities of interests. There

are many more features and new ones being added so stay tuned.

You are encouraged to sign onto the ACS Network at www.acs.org/network. To access the California Section Group once you have logged on to the ACS Network, simply click Browse on the top menu bar. Then using the pull down menu, you can click on Groups and type in California Section to search for the California Section group. Although we already have our own local section website at www.calacs.org, the California Section Group on the ACS Network allows for more interaction, discussions, and communications between our local members.

ACS staff is adding new features to the Network based on user feedback and suggestions. New features including iPhone and iPad apps are in the works. The world is certainly changing with the power of on-line networking around the globe. There is no charge for using this valuable new on-line communications tool for chemists. Log on at www.acs.org/network and share your feedback with me at m.wu@acs.org. ACS needs your feedback to make improvements!



Section Councilors and Officers attending the National ACS meeting in Anaheim
left to right: Mark Frishman, Elaine Yamaguchi, Paul Vartarian, Jim Postma, Marinda Wu, Bryan Balazs, Sheila Kanodia, Lee Latimer, Alex Madonix



How Rare is Rare? (Part 3)

Bill Motzer

In Parts 1 and 2 (March and April 2011 issues of the Vortex), I discussed the relative non rarity of the rare earth elements (REE) or lanthanide/lanthanoid series. In this last part of the series, I will discuss some of REE production, uses, toxicology, and environmental problems associated with extraction and processing, and forensic geochemistry.

Domestic Production

In 2010, no REE were mined in the U.S; however, REE concentrates that had been previously produced at Molycorp's Mountain Pass, California mine, were processed into lanthanum concentrate and didymium (75% neodymium and 25% praseodymium) products. Additionally, REE concentrates, intermediate compounds, and individual oxides continued to be available from these stocks. In 2010, the U.S. continued to be a major consumer, exporter, and importer of REE products with an estimated value of \$161 million, an increase from 2009 imports valued at \$113 million.

Uses

In 2010, the U.S. Geological Survey (USGS) reported REE usage in the following products: chemical catalysts (22%), metallurgical applications and alloys (21%), petroleum refining catalysts (14%), automotive catalytic converters (13%), glass polishing and ceramics (9%), phosphors for computer monitors, lighting, radar, televisions, and x-ray-intensifying (contrast) film and agents (8%), permanent magnets (7%), electronics (3%), and other uses (3%). Some of the more interesting applications are described in more detail below:

Chemical catalysts: REE oxides have wide uses as chemical processing catalysts (for oxidation, amidoxidation, and polymerization) and in automobile catalytic converters. They are also found in silicone stabilization additive packages, and diesel fuel additives (for particle control), and are used as corrosion inhibitors. Heated REE metals are used as oxygen and nitrogen scavengers

or "getters". Lanthanum-rich mixed REE compounds are used in petroleum refining fluid cracking catalysts (FCCs). In the mid-1980s FCC applications substantially declined when state and federal legislation mandated use of unleaded fuels; however, the yield of gasoline and other light-fractionated petroleum products became so reduced that consumption of REE-containing FCCs soon were restored.

Glass, glass polishing, metal alloys, and ceramics: Cerium and lanthanum have large markets because their oxides and other compounds have broad industrial applications in products ranging from camera lenses to polishing compounds. Recently improved technologies include aluminum-scandium alloys in sporting goods such as golf clubs, baseball bats, and bike frames. Yttria (as Y_2O_3) has long been used to stabilize zirconia (as ZrO_2) in high temperature ceramics but recent research has resulted in additional applications for ceramic-containing REE oxides.

Supermagnets and superconductors: One of neodymium's major uses is as an alloy for high strength magnets (i.e., supermagnets). These are the strongest known permanent magnets, widely used in microphones, professional loudspeakers, ear headphones, and computer hard disks that require low mass, small volume, or strong magnetic fields. Larger neodymium magnets are used in high power/weight electric motors (e.g., in hybrid cars) and in aircraft and wind turbine generators. Supermagnets are often composed of gadolinium-cobalt, samarium-cobalt, or neodymium-iron-boron alloys containing minor amounts of other metals.

Phosphors: In the 1960s, color television tubes began replacing black and white tubes. This resulted in an increased demand for yttrium and europium compounds used as color phosphors; gadolinium and terbium compounds were added later. More recently, their consumption has increased because of their usage in trichromatic phosphors for fluorescent lighting.

Nuclear applications: Europium, gadolinium, and dysprosium have large thermal neutron capture cross-sections and there-

(Continued on page 12)

Partnering with Expanding Your Horizons (EYH)

ES Yamaguchi and J Schunk

On April 2 the authors traveled to Santa Rosa Junior College to participate in the Sonoma County “Expanding Your Horizons Conference”, which is a nationwide program for middle and high school age girls. EYH organizers had recruited 120 girls from as far away as Mendocino to enjoy 3 different workshops based on math and science. Fifteen workshops were offered during the day.

The authors presented 2 forty-five minute sessions of “Chemists Have Solutions,” which were about paper chromatography. Using 3 different brands of paper towels, they asked the students to study the effect of the stationary phase on the separation of a given black ink. They were surprised to find that black is separated into many colors. Then they asked them to study the effect of different black inks (all water soluble) on a given brand of paper towel. Again, to their surprise, the black inks separated in a different manner.

They had many different colored pens that were tested by the girls in order to find their different components in the paper chroma-

tography experiment. There were about 13 students/session, and they were provided individual work stations .

Reviews of the sessions were quite positive; many girls said the session was fun, and they learned a lot, exactly what the organization was trying to achieve. This was a wonderful volunteer activity that has been done for over 10 years. Before the workshop activities, the girls had learned from Sonoma State University’s Pre-College Outreach Advisor and from the Dean of Instruction in Science, Technology, Engineering and Math at Santa Rosa Junior College. With such a rich program, girls come away from the conference encouraged to study math and science, something that had been stressed heavily in the sessions.

A fee was charged to attend the conference, but scholarships are available, funded by many local companies and organizations.

This is just one of the many activities of the Women Chemists’ Committee of the CA Section of the ACS. If you want to be a workshop leader or participant, please contact the CA Section, ACS: office@calacs.org.



California Section - American Chemical Society 2011 San Francisco Bay Area Science Fair Special Awards

The Section again participated in the San Francisco Bay Area Science Fair held on March 29 to 31, at the San Francisco County Fair Building in Golden Gate Park by judging entries for special awards of a certificate, \$100, and a subscription to the ACS magazine CHEMMATTERS. Two entries were selected by Dr. Margareta Sequin for the Section awards. The awards are made for excellent entries that involve some principle of the chemical sciences. The awards were presented to the students at the Awards Ceremony held by the Fair on March 31.

We congratulate all the Fair participants and especially the two students who received the Section’s awards:

STUDENT	SCHOOL	TEACHER	ENTRY TITLE
Bella Penza	St. Perpetua (Alamo)	Ms. Deininger	Unbeleafable
Mira Partha	Challenger (Newark)	Mrs. Sampath	Bioplastics for a Better Tomorrow

(Continued from page 6)

Vegetation is being listed as containing between 0.1 to 20, potatoes as 0.1 and grains between 0.07 and 0.1 parts per million. In warm blooded animals content are listed as follows: blood 0.8 to 6 microgram per cubic decimeter, muscle 0.05 to 0.8 parts per million and hair 0.03 parts per million. Iodized table salt is made from sodium chloride with 0.01% iodide. Safe intake levels are listed as 150 micrograms per day or between 0.1 and 0.5 mg per kilogram body weight per day (note that both values are quite different). In agricultural soil, iodine is higher in moist, acidic humic soils, and low in sedimentary, basic soils.

Since the beginning of nuclear testing of the fifties, concerns about health effects from exposures increased. A test ban treaty enacted in 1963 resulted from these concerns. However, a different kind of accidental radioactive fallout represents a potential source of uncontrollable local contamination (i.e., 3 Mile Island, Chernobyl, and the latest mishap in Japan). Radioactive contamination may result from nuclear fission. Whether this fission occurs close to the ground, in the atmosphere, troposphere or stratosphere, makes a large difference in the persistence of the particles. In the case of a nuclear accident, most of the particles do not penetrate the troposphere and since there might not be an explosion, only a relatively small amount of fission debris is being released. Usually, the bulk 99% decays in the first hour. The most usual radioisotopes remaining have long half-lives, such as strontium-90, cesium-137 and car-

bon-14. Iodine-131 (8 days half life) occupies a special place because of its volatility and the rapid biological transformation cycle. Soon after a release, iodine-131 settles on grass that is consumed by cows. Within hours, such iodine appears in milk which is a perishable consumer product. This radioactive iodine then is absorbed into the thyroid gland. Other iodine isotopes of longer half lives are also produced in a fission reaction, but the amounts are comparatively small and of secondary importance (e.g., 124 of 4 days half life; 125 of 56 days half life; 126 of 13 days half life; 127 is the stable isotope; 129 of 17 years half life).

Similar as milk the uptake of radioactive substances exist via contaminated food supplies. Careful washing removes most of these sources. For counteracting the effect of radioactive iodine the best defense is to ingest the stable natural isotope in the proper safe amounts such as between 50 to 100% of recommended daily requirements.

As explained above, short life radioactive iodine is medically used to partially destroy thyroid tissue to control clinically extreme cases of hyperthyroidism. Unchecked exposure, however, may produce hypothyroidism and increase the risk of cancer. Such extreme cases may occur in cases of large releases of radioactive fallout produced after nuclear explosions and involves uncertainties related to concentrations, weather conditions and exposure to large populations. Then, evaluations are necessary until radioactivity is reduced to a safe level.



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Quality in your hands

Report From The ACS National Meeting Anaheim, CA, March 26-30, 2011

Mark Frishberg

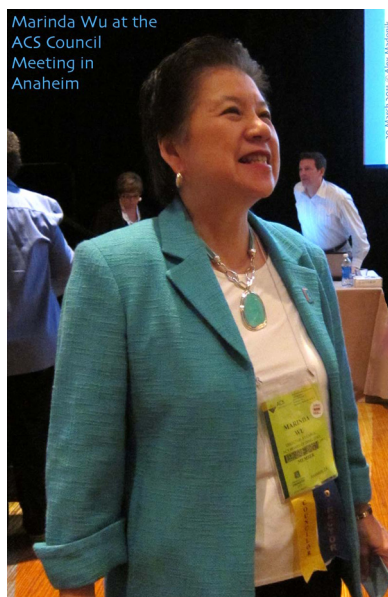
(Highlights from the Anaheim meeting-complete text is on the website, calacs.org, click on Members then National.)

Apparently some of the March, chilly Bay area weather came with us to Anaheim, as the first few days of the Spring ACS National meeting were a bit on the cool and damp side. There did not seem to be too many complaints from attendees from the East Coast, as even that weather provided a respite from the brutal winter weather they have been experiencing this year.

Although National ACS meetings are scheduled in cities at times when the needed hotel rooms are available, the ACS sometimes finds itself sharing convention areas with other groups. The overlap with the National High School Cheerleaders competition, and the NCAA Southwest Regional basketball finals was an interesting juxtaposition that led to occasionally noisier hotel hallways in the evening than normal for the initial weekend of the meeting, as you might imagine.

For California local section members, the foremost meeting highlight was saved until Wednesday at the Council meeting when one of our very own members, Dr. Marinda Wu, a current member of the ACS Board of Directors, was selected by Council from a slate of four nominees as one of the two candidates for President Elect of the ACS for 2012. Congratulate Marinda when you see her. (The other candidate is Dennis Chamot, from the Chemical Society of Washington Section and the National Research Council.)

The overall theme of the Anaheim meeting was “Chemistry of Natural Resources.” There were over 185 sessions across the various ACS Divisions, Committees, and plenary events at the meeting related to this theme, including a Sunday afternoon plenary session that featured a talk by Nobel Laureate, Harry Kroto on “Carbon in Nano and Outer Space.” The Kavli Foundation has joined with the ACS to sponsor keynote presentations on Innovations in Chemistry



at National meetings through 2013, and the inaugural presentation, entitled “Bioinspired Synthesis of Complex Molecular Systems,” was made by Dr. Virgil Percec of the University of Pennsylvania on Monday evening, March 28th. “Sustainability” has become an ongoing meeting topic, and there were several symposia related to this topic, especially as it applies to water. A new probationary division, the Division of Catalysis Science and Technology was launched and held its first programming. As always, this was a very full meeting, with many interesting, yet conflicting events that provided a scheduling challenge, especially considering how spread out the hotel venues are in Anaheim.

Data from the ACS Career Fair at the Anaheim meeting continues to reflect a challenging employment situation for chemistry related careers. Comparing numbers reported by the Committee on Economic and Professional Affairs (CEPA) since the Fall 2008 meeting in Philadelphia, the Spring 2009 meeting in Salt Lake City, the Fall 2009 DC meeting, the Spring 2010 SF meeting, the Fall 2010 Boston meeting, and the latest Spring Anaheim meeting, the

(continued on page 13)

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fore are often incorporated into control rods to regulate nuclear reactor operations. REE can also be used as burnable neutron absorbers to maintain a more constant level reactor flux. Radioactive yttrium and terbium wire are used in medicine as cancer therapy (e.g., in the so-called 'gamma-wire' therapy) implants.

Toxicology and Environmental Problems
Little systematic work has been done on REE metal and compound toxicology. Insufficient data currently exists to complete material safety data sheets (MSDS) toxicity information and many MSDS include statements indicating only that the identified REE is toxic. REE metals such as yttrium and terbium recently have had limited uses in medical implant materials; the general literature indicates that they are benign and harmless metals. However, this does not entirely agree with their known reactivities. Therefore, more research is required and meanwhile, REE metals and compounds should be handled with caution.

REE ores, commodities, by-products, and waste materials from processing, are naturally radioactive, because most REE minerals also contain thorium. In the U.S., handling, shipping, storage, and disposal of such materials are controlled by federal and state agencies. Less than 10 tons of thorium commodities, all from imported or stockpiled material, are annually consumed. Even so, thorium produced during REE processing has become an expensive industrial disposal problem. It may also become an ore extraction problem: most REE are relatively insoluble generally forming

stable precipitates [e.g., $\text{La}_2(\text{CO}_3)_3$] under alkaline and oxidative condition, but under acid conditions, soluble ions may form (e.g. La^{3+}). If acid is used in situ mining to extract REE, considerable environmental problems may result because soluble REE may be discharged to surface and groundwater.

Forensic Geochemistry

Sewage treatment plant (STP) effluent discharges to surface waters may be a substantial source of both regulated and unregulated contaminants, including complex organic compounds derived from household chemicals, pharmaceuticals and personal care products (PPCPs), and industrial and medical by-products. In some urban areas, STP effluents contain positive gadolinium anomalies or signatures because gadolinium is used in injected medical solutions for magnetic resonance imaging (MRI) contrast agents (e.g., Gadodiamide: $\text{C}_{16}\text{H}_{28}\text{GdN}_5\text{O}_9$). Such REE compounds may be either excreted by the patient or discharged from the medical facility. Therefore, STP waters may display large gadolinium enrichments when compared to other REE. However, most STP sludges (including primary and end-product sludges) do not display such enrichments, because the excess gadolinium remains in dissolved phases throughout STP operations. Such REE concentrations are relatively easy to measure when compared to many organic wastewater compounds and therefore provide a more effective tracer of environmental STP effluents (see Environ. Sci. Technol., 2010, 44, n. 10, 3876-3882).



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key indicators respectively are: Employers (80, 32, 38, 40, 68, 39), Positions (488, 176, 309, 116, 484, 182), and Job seekers (1024, 504, 787, 1018, 1066, 795)

If you do the math, this means for every position available there were 2.1, 2.8, 2.5,

M	E	P	J	RATIO
F08	80	488	1024	2.1
S09	32	176	504	2.8
F09	38	309	787	2.5
S10	40	116	1018	8.7
F10	68	484	1066	2.2
S11	39	182	795	4.3

8.7, 2.2, and 4.3 applicants respectively, over these meetings, a considerable change if you have the historical perspective of harkening back to the 1960's when there were about four positions available for each applicant. It was noted that the unemployment rate for chemists increased from 2008 to 2009 and reached its highest recorded level, with unemployment at 15% for B.S. chemists, 18% for M.S. chemists, and 9% for Ph.D. chemists. The average time for an unemployed chemist to find a new full time position has risen from 6 months to 10.7 months. There was a 5% drop in B.S. starting salaries in the past year. The Career Services area continues to offer many career related workshops at National meetings, including resume reviews and mock interviews. A "virtual" career fair was held on-line in November with 2513 job seekers, 26 employers, and 196 positions available.

In the exhibition area, the ACS unveiled its new major exhibit booth that pulled together the wide range of ACS exhibitors such as Chemical Abstracts and Scifinder, Publications, Membership, Insurance, etc. all under one roof, complete with a presentation theatre area and bringing back the ACS Store of chemistry gifts, which had been discontinued for budgetary reasons last year. However, other than the new ACS booth, the number of exhibitors appeared to be down from last year and the totals

were not disclosed during the Meetings and Expositions report to Council, as they usually are.

Report from the Council Meeting and other Society governance activities

California Local Section Councilors, our Board member, and our former ACS President were very active in Anaheim in representing the section at numerous governance functions including the Board and Chemistry and Public Affairs (Marinda Wu) and ACS committees. They included Committee on Committees (Bryan Balazs), Community Activities (Sheila Kanodia), Committee on Public Relations and Communication (Attila Pavlath), Local Section Activities (Lee Latimer – Chair), Membership Affairs (Mark Frishberg), and Project Seed (Elaine Yamaguchi). The attended Councilors were Alex Madonik, who is active with the Sustainability Engagement Event (SEE) Action Team, Paul Vartanian, who as a first time Councilor attended and spoke highly of the Saturday workshop for new Councilors, and Alternate Councilor and 2011 Section Chair-Elect, Jim Postma.

The Anaheim Council meeting was a quiet and efficient one, without any controversial issues on the agenda. In addition to the normal Society officers and committee reports, the other items on the agenda were fairly routine, including approval of the dues for 2012 (increase of two dollars per dues escalator linked to CPI), confirming the dues allocation for Divisions, a name change in the charter for the Committee on Technician Affairs, a name change for the Northeast Oklahoma local section to the Northern Oklahoma section, and the formation of two new international chemical science chapters, in Shanghai and Thailand.

The Presidential Task force on Innovation in the Chemical Enterprise, appointed by past ACS President, Joseph Francisco, and led by George Whitesides of Harvard, reported back with several recommendations for the ACS: develop an organizational unit to assist entrepreneurs with affordable (free?) help; increase public awareness of the value and importance of early stage

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entrepreneurship; partner with academic and other relevant organizations to promote interest in entrepreneurial career paths and educational opportunities; and increase advocacy of policies at the federal and state level to improve the business environment.

The Local Section Activities Committee has funded 25 new innovative program grants totaling \$46,500 at this meeting. The Bridging the Gap mini-grant program that was initiated to provide grants up to \$250 each to help support local section events to engage student members in section activities was renewed for 2011 (deadline Dec. 1st). There is also a Bridging the Gap program to support local section IYC activities (California has received one) with a deadline of June 1st for applications and activities are to be completed in 2011. An exploratory expansion of the IYC grants was announced as a joint effort of the Local Section Activities (LSAC) and International Activities (IAC) committees to fund 20 additional grants to cover programs aimed at involving international members resident

in the local sections in targeted local section activities, such as a poster sessions, during this International Year of Chemistry.

Councilors were encouraged to participate in the ACS sponsored Pennies for PUR Water, an IYC activity partnered with P&G's Children's Safe Drinking Water (CSDW) program to collect donations to pay for water purification packets for use in areas of the world where there is a critical need for water purification to cut down on water-borne diseases (a 3.5 cent packet will safely purify 2.5 gallons of water). Collection containers for donations in bills and loose change were available at the end of the Council meeting, and similar collections at local section meetings would be an excellent way of supporting this activity throughout the year.

While overall ACS membership has grown to over 163,000, there continues to be volatility among our new members, who are more likely to drop their membership within their first five years. The swing in members joining and resigning has been considerable, with 18-25,000 new members

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Councilors Bryan Balazs and Sheila Kanodia attending the ACS meeting in Anaheim

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coming in and 12-18,000 members resigning on a yearly basis. The Membership Office in conjunction with the Membership Affairs Committee is going to try to obtain better data on the distribution of the resigning members to determine whether the ACS can develop benefits or other approaches that will lower this turnover, especially since it is much more economical to retain a member than to recruit a new member.

Looking ahead to Denver

August 27-31, 2011 The overall meeting theme will be “Chemistry of Air, Space, and Water.”

For ACS members seeking employment, but not able to attend the next National meeting in Denver, ACS Career Services will hold a Virtual Career Fair on-line in conjunction with the Denver meeting on August 30 and 31. Look for more information at (www.acs.org/careers) and C&EN this summer. Look for a symposium on “Social Media for Committees” in Denver.

News you might use

Career forums can be accessed through the career website the 2nd Thursday of each month, and a webinar of interest to industrial members within small businesses continues to be scheduled for the 4th Thursday of each month (<http://acswebinars.org>).

The Chemistry Ambassadors program launched by the Office of Public Affairs to assist ACS members who are interested in public outreach continues to pick up steam. Tools, tips, and other resources can be found at www.acs.org/chemistryambassadors. The former “Sparkle Workshops” are being brought back on a limited, invitation only basis to provide ACS local section public relations chairs training and resources in public relations (California section PR Chair, Lisa Aguirre has already attended one, and Lee Latimer will attend one at the end of April representing LSAC).

Efforts are now in high gear celebrating the United Nations designated International Year of Chemistry in 2011. To keep tabs

of the many ACS activities developed in coordination with this year-long event, go to www.acs.org/iyc2011.

The Committee on Community Activities encourages members to support the quarterly outreach themes of environment, energy, materials, and health. Look for experiments for students in the IYC Global Water Experiment at <http://water.chemistry2011.org>.

To view the “Chemistry Dance,” a line dance with lyrics and music written by chemistry students to celebrate IYC, and performed en-mass as a lead-in to the Sci-Mix poster session and reception in Anaheim and immortalized on YouTube, go to acs.org/iyc2011/chemistsdance.

The new ACS Speakers Service has enlisted 75 speakers and is looking for more. Recommended speakers should have interesting presentations and delivery, but do not have to be ACS members.

The ACS Member’s Network was upgraded last summer to make it more inclusive and effective by changing its enrollment approach from an opt-in to an opt-out system and putting all ACS members into the network to start. Please be aware that CAL Section Councilor and Chair, Bryan Balazs has set up a California Section group within this network. Over 190,000 people are now in the network.

The Committee on Environmental Improvement is working on a web presence for sustainability issues, which it plans to launch formally at the Denver ACS meeting. Interested members are invited to view the beta test site at www.acs.org/sustainability beta and comments are invited.

Websites have now been set up to encourage ACS membership recruitment: www.acs.org/memberGetmember; for undergraduates (www.undergrad.ACS.org), graduate students (www.GradStudent.ACS.org), and potential international members (www.international.ACS.org), the latter three containing promotional video clips presented by members of the targeted audiences. Information on NIH Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR)

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programs and grants can be obtained at <http://grants.nih.gov/grants/funding/sbir.htm>.

Interesting Statistics

Final attendance figures at Anaheim were 14,059, which included 7343 regular registrations and 4685 students. The total was down from San Francisco and Boston last year, but quite respectable for a Spring

meeting in Anaheim, especially in the current economic climate.

In Anaheim, 1144 applications for membership in the ACS were submitted.

Anniversaries were celebrated with receptions at the Anaheim meeting for the Committee on Professional Training (75th), and Undergraduate Programming at National ACS meetings (20th).

Eighty local sections now have Public Relations Chair.



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The Women Chemists Committee of the California Section ACS Summer Program

Join us for our Summer Event at Filoli on Saturday June 18, 2011

Located 30 miles south of San Francisco, Filoli is an historic site of the National Trust for Historic Preservation and one of the finest remaining country estates of the early 20th century. Admission to Filoli allows visitors to explore the house, garden, and heirloom orchard located in the hills west of Redwood City. Information at www.filoli.org Our visit includes an optional two hour docent-led tour through both the house and gardens followed by lunch at the Café at Filoli. Meeting Time: 10 am

Admission: \$12 adults, \$5 students, free for children \leq 4 years old.

Lunch: \$14 at the café for our group to sit together. Box lunches include a hearty sandwich, pasta salad, seasonal fruit, cookie and beverage. Sandwich choices are Roast Beef, Turkey, Ham and Swiss, Vegetarian.

Total cost: \$26 for admission and lunch.

Reservations must be made before June 1 to office@calacs.org or call (510)351-9922 and indicate if you are staying for lunch. Please make checks out to "California Section ACS".



ACS honors development of NMR instrument as a

National Historic Chemical Landmark in Santa Clara, CA

The American Chemical Society (ACS) honored the development of the Varian A-60 nuclear magnetic resonance (NMR) spectrometer as a National Historic Chemical Landmark during a ceremony on April 8 at Agilent Technologies, Inc., in Santa Clara, Calif. On April 8, Abby Kennedy, Ph.D., Chair of the ACS Santa Clara Valley local section, presented a plaque on behalf of ACS honoring the development of the Varian A-60 to Nick Roelofs, Ph.D., President, Agilent

May Historical Events In Chemistry

Leopold May

May 1, 1824 Alexander W. Williamson, who was a researcher on alcohols and ethers, was born on this day. He was the first to suggest the intermediate compound theory of catalysis with Kay and synthesized ethylene glycol.

May 4, 1844 One of the inventors of Atwater-Rosa-Benedict respiration calorimeter, Wilbur O. Atwater was born on this day. He established the first agricultural experimental station in the United States at Wesleyan College and determined the chemical composition and nutritive values of fish and animal tissues.

May 5, 1811 Two hundred years ago on this date John W. Draper was born. He was a pioneer in photography; improved on Daguerre's process, and was the first ACS president.

May 10, 1830 François M. Raoult, who was born on this day, discovered the law (Raoult's Law) that vapor pressure of a solution is proportional to the number of molecules per unit in the solution.

May 12, 1803 Justus von Liebig, who is known as the "Father of Agricultural Chemistry", was born on this day. He perfected methods for quantitative organic analysis, divided foods into carbohydrates, fats, and protein, and invented the Liebig condenser.

May 14, 1853 Gail Borden applied for a patent on commercial condensed milk on this date.

May 16, 1845 Ilya Ilyich Mechnikov, discovered the phenomenon of phagocytosis; theory of cellular immunity. He received the Nobel Prize in Physiology or Medicine (1908) with Paul Ehrlich in recognition of their work on immunity.

May 17, 1836 One hundred years and seventy-five years ago on this date, Joseph N. Lockyer was born. In 1868, he discovered helium (He, 2) in the Sun. Pierre J. C. Janssen simultaneously observed this.

May 18, 1889 Thomas Midgley, Jr., introduced tetraethyllead as anti-knock agent in gasoline. He also was a researcher on organic chlorofluorides as refrigerants.

May 19, 1914 Max F. Perutz studied structure of hemoproteins using x-ray diffraction. He received the Nobel Prize (1962) with John C. Kendrew for studies of the structure of globular proteins.

May 21, 1936 Seventy-five years ago, Günter Blobel was born on this date. He received the Nobel Prize in Physiology or Medicine in 1999 for discovery that proteins have intrinsic signals that govern their transport and location in the cell.

May 22, 1927 George A. Olah, a researcher in carbocations and their role in chemical reactions of hydrocarbons, was born on this date. He received the Nobel Prize in 1994 for his contribution to carbocation chemistry.

May 24, 1686 Three hundred and twenty-five years ago on this date, Gabriel D. Fahrenheit was born. He improved thermometers by using mercury (Hg, 80) in 1720 and invented the Fahrenheit temperature scale.

May 29, 1781 Henri Braconnot, who was born on this date, isolated glucose from plant material such as sawdust, linen, or bark by boiling in acid. He also prepared "xyloidine", a precursor for plastics, by treating starch, sawdust, and cotton with nitric acid.

Additional historical events can be found at Dr. May's website, <http://faculty.cua.edu/may/Chemistrycalendar.htm>

BUSINESS DIRECTORY

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