THE VORTEX

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See you in September

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THE VORTEX

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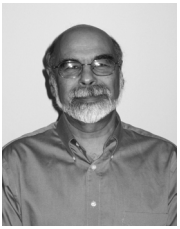

Chair's Message

Paul Vartanian

It has been an interesting first half of 2010. On the international level we have seen major earthquakes in Haiti, Chile, and China, a volcanic eruption that brought north Atlantic air travel to a stop, and an European financial crisis. In the U.S. we have financial markets that seemingly have not yet found stable building points and a runaway oil well in the Gulf of Mexico. The latter shows that the planning for doomsday, in this case a blowout preventer to control an oil well when there is a major catastrophe, does not work 100 % of the time. Locally, we live in a state with an ongoing financial crisis and have to choose among political candidates of all persuasions who "know just how to fix everything". However, for the summer I suggest you set all these aside, except for those that need immediate attention for your own personal comfort.

Enjoy the fact that the territory of the California Section includes some of the greatest places on the planet. From Yosemite and the high Sierra to the Mendocino coast and the Oregon border we have spectacular locations for hikes, and camping, short or long trips. There are places one can have a great visit even if it is only for a day or a few hours. Muir Woods, the Napa Valley. Sonoma, and Livermore valleys all have value for trips as little as a few hours long. The museums of San Francisco are, of course, major attractions in this area, and the Oakland Museum of California has recently reopened after a renovation, but there are many small museums scattered around the Section's territory that are less well known gems worth a visit. Seek these out and let us know what you find.

There are historical sites, such as Fort Ross, the WW II bunkers in Marin County, or the Bidwell Mansion in Chico that are interesting if you like your history to have substance. Check out a local performing group that offer plays and dances worth an evening out. As an example, I found that standing on the top of Mt. Lassen, realizing that the volcano had erupted less than 100 years ago, was a great experience. In general, go out this summer and have a great experience for yourself. You could even make a visit to a place outside the California Section's territory, if you feel such a need. Have a great summer and we will pick this up again in September.

American Chemical Society
June Meeting

Wine Tasting – V. Sattui Winery, St. Helena

Date: Saturday, June 12, 2010
Time: 11:00 AM (Please gather by the fountain by 10:45 am for check-in)
Place: Sattui Winery, SR 29 at 1111 White Lane, St. Helena
Cost $10 /person for the tasting of about six wines
Reservations: RSVP by Wednesday, June 9, to the Section office by e-mail at office@calacs.org or call (510) 351-9922.

Abstract:

The V. Sattui winemaking dates back to 1885 in San Francisco when Vittorio Sattui began his business. In 1975 his great-grandson, Dario Sattui, re-established the winery and a deli in St. Helena. He later bought an adjacent vineyard and built a new stone winery building. Over time, the operations have expanded to include vineyards bordering the Schramsberg estate up the Napa Valley and the historic Henry Ranch in the Carneros district. The winery is celebrating its 125th anniversary this year. The wines produced are sold only at the winery.

There is a picnic ground next to the winery, but only food and wine purchased from the deli/winery are allowed.

Christine Miller will be our host. Join us in a late spring visit to one of the Napa Valley's premium wineries.

March Meeting Report Dogs 4Diabetics Chemistry and Service

The combined March California Section Meeting and Science Café at the new Lafayette Library and Learning Center featured Dogs4Diabetics founder Mark Ruefenacht and his assistance dog Armstrong. Insulin-dependent diabetics occasional have situations where their blood sugar levels fall (hypoglycemia) to life-threatening levels. This can happen during sleep, and the diabetic just does not awaken. Dogs can be trained to recognize the fall in blood sugar levels as body chemistry gives off subtle, but tell-tale scent signs of the changes. The dogs then alert the diabetic in time for intervention. For young diabetic children, the dogs can be trained to alert an adult to intervene.

The dogs are trained to identify and respond to the fall in blood sugar levels. They respond more to the rate of fall rather than the actual level of fall. Their response is usually quicker than that of a human. These life-threatening drops become rare in a diabetic with well managed insulin therapy, but can happen in times of stress and are occasionally unpredictable. If untreated, hypoglycemia can lead to unconsciousness or even coma.

Dogs4Diabetics obtains most of its dog trainees from the Guide Dogs for the Blind program. A dog too exuberant for a blind person is usually well suited for service where the dog's response is to alert a person of an impending situation in not a subtle way. The organization trains and places dogs from its Concord training center. The dogs are socialized and trained for two years before being placed with a diabetic partner. The dogs live in foster homes while being trained. No dog in this program ever lives in a kennel. There is follow-up recertification and support for each dog/diabetic team throughout the partnership.

Dogs4Diabetics is a non-profit organization and is accredited by Assistance Dogs International. The dogs are certified "Medical Alert Assistance Dogs" as defined by the Americans with Disabilities Act. For more information visit www.Dogs4Diabetics.com.

Paul Vartanian

Improving Our Lives

At the National ACS March meeting in San Francisco, the California and Santa Clara Sections cosponsored a project that recognizes the contribution of local section members to all of our lives. While this project is ongoing, the National meeting offered the special opportunity to highlight the program with posters of some of the current recipients. These posters were placed in several areas of the meeting halls.

The Sections thank Rachel Bishop, Kristen McCaleb and all those at National ACS that helped produce the Posters. For technical reasons, these posters are not printed in The Vortex but are available on the website, calacs.org. On the main menu bar click on Members>Improving Our Lives

Paula Simms, Founder of the Amador Valley High School Science Extravaganza

Chemistry teacher, Amador Valley High School, Pleasanton, Calif

Has taught students from 1st through 12th grades

Honors Include: Lloyd Ryland Outstanding High School Teacher Award - 2009.

Photo: Kristen McCaleb

Paula Simms has taught science at every level of elementary, middle, and high school for 19 years. Her philosophy of teaching is that the teacher who can make a connection with her students can teach them almost anything. But Simms also knows people become passionate about a subject when they themselves teach it, which is at the heart of her Amador Valley High School Science Extravaganza. Each year, about 1,000 elementary school students from the Pleasanton Unified School District join the Amador Valley High chemistry students for two days of intense science experiments and just plain fun! Simms organizes the event in stations that are managed by 600 chemistry students who work with the younger students on highly interactive endeavors. Many are 'make and takes' -projects that the students can bring home with them and share with their families. All the projects develop the science content found in the K through 5th grade and 9th through 12th grade California State Science Standards. Simms also teaches her students to look for science in their daily life. "We experience science in some form every day," Simms said. "It is exciting to share that with my students."

Improving Our Lives
Attila Pavlath, Fluorine chemisty expert and ACS reformer

Photo: Kristen McCaleb

Scientist Emeritus, U.S. Department of Agriculture, Western Regional Research Center, Albany, Calif., 1967 - 1999; President of the American Chemical Society, 2001; Honors Include: Outstanding Contributions to Chemistry, California Section ACS - 1976; 2001 and Federal Scientist of the Year in California - 1987; Henry Hill Award - 1990 Walter B. Petersen Award - 1990 Chemical Pioneer Award, American Institute of Chemists - 1997; Member of the Hungarian Academy of Sciences - 2004.

Attila Pavlath was one of the early pioneers of fluorine chemistry, but his accomplishments span several fields of chemistry including agricultural chemistry, glow discharge chemistry, textile chemistry, and energy research. Beginning in 1967, Pavlath worked for more than 30 years with the U.S. Department of Agriculture, Western Regional Research Center in Albany, Calif. In 2001, Pavlath was elected President of the American Chemical Society. A longstanding and devoted member of ACS whose contributions were felt from the local to the national levels, Pavlath worked for more than 40 years to reform the ACS. He focused on promoting the public image of chemistry by developing the Technology Milestones in Chemistry exhibit, which has been translated into numerous languages. He also worked to make ACS a home equal for everyone from the most respected researchers to the youngest chemists just starting in the profession. Throughout his work with ACS, Pavlath's motto has been: IT IS TIME

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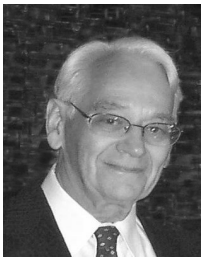

ELK-N-ACS

Evaldo Kothny

Antimony

One day, working in the garage, I discovered a box containing some metals saved for a long time. There were bars of silver, tungsten, pieces of lead, little casts of tin saved from the caps of wine bottles, a round cast of cadmium and two crystalline and shiny pieces which are thought to be either antimony or bismuth. How to find out? Soon I mounted each of the two pieces in sequence with a thin wire on a balance and found out their density by weighing them first in air and then submerged in water. Both had a density around 6.6 (see table below). In the meantime I discovered, that the etymology of "antimony" is unknown. It is not a mix of anti- and mony-, or the opposed of "unique", according to the meaning of the Greek prefix and suffix terms. The chemical symbol Sb fortunately has some etymology: it is derived from Stibnite, the ubiquitous sulfide of Sb observed in many deposits or stains found practically in most countries of the world. Stibium, the Latin term for antimony is of early Greek and Egyptian origin.

World abundance (ppm) and density of group 5 elements.

Phosphorus	1100	2.30
Arsenic	5	5.73
Antimony	1	6.68
Bismuth	0.2	9.80

Thus, its abundance can be compared to that of Ta and some of the less abundant rare elements (Eu, Ho, Tb, Lu). Genetically, Sb concentrated in the second parting of the rocks (in that category are olivine, gabbro and granite), but especially in pegmatite. It occurs camouflaged in accessory minerals or in fissures, i.e., as pyrargirite ($AgSbS_2$). This is because a number of elements have ions too large to fit into other structures, and antimony is one of these. The largest deposit is in China. Other important deposits are in a few European countries, Borneo, Mexico and Peru. Also found in California, Nevada and Idaho. Apropos of the Nevadan deposit in Gabbs: years ago, a poor prospector found beautiful stibnite needles sticking out of volcanic light grey rock. He tried to market this find, and fortunately at that time, companies were interested in an antimony based fire retardant. So the FMC corporation purchased that property with the idea of extracting its antimony. However, analyses showed that this greyish hard rock contained some silver, and surprisingly some gold. The silver alone would pay for the cost of the whole extracting operation, and the gold was a bonus. Later it happened, that the byproduct mecury left from the gold recovery operation, covered the whole demand of mercury in the U.S. Afterwards, antimony was then forgotten. A really rare element, Sb has little preference for accumulation whether it is in soils, oceans, rocks or sediments. Ocean content is 0.2 microgram/Liter with a residence time of 45,000 years (this data is variable and depends on the source of information). Igneous rocks may have 0.2 parts per million either in basic or in acid silicates. Soils and sediments may contain 1 ppm; coal, lignite and manganese nodules have been found to contain up to 25 ppm. Plants accumulate Sb up to 50 ppm, but this is uncommon. Usually the content hovers around 0.2 ppm. Of the 0.9 ppm Sb in soils, 50% is water soluble. Biologically, it is found in tissue and bone, with a maximum of 0.2 and 0.6 ppm, respectively; blood content is 3 microgram/Liter; measurements done on the liver of some people may have been exceptionally high due to the use of Sb emetics in past times. The LD50 of Sb is about 100 mg/kg. Someone may recall a picture entitled the "triunfal car of antimony" against Kala-azar, a feverish disease brought about by a sand fly. The antischistosomiatic medicine for it was tartar emetic (K-antimonyl tartrate), a compound known for almost 400 years. The structure of this substance was studied for a number of years. Also the famous Linus Pauling had something to say

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A Chemist's Conundrum:

Bill Motzer

If the 19th century is now considered as the Century of Physics, then the 20th century surely was the Century of Chemistry. Consider just nylon and plastics: synthetic polymer plastics were invented in 1909 with significant manufacturing by about the mid 20th century. Modern chemistry has greatly improved and extended our lives but there have been some unintended consequences when chemicals are released into and impact the environment. Such chemical releases are known as emerging chemical contaminants or emerging chemical compounds (ECCs). ECCs have occupied our consideration for at least the past three decades, through which I have been involved in numerous investigations and research for water districts, wastewater treatment plants, landfills, and research foundations. Earlier investigated ECCs are now referred to as "post" emergent or "old" ECCs as contrasted with newer ECCs; and there are established parameters for determining what is a post- or new-emergent ECCs. This and subsequent articles will discuss problems associated with ECCs and what is being done to identify, prevent, and rectify ECCs from impacting our environment.

Brief History of Older ECCs. In the 1970s and 1980s, soil and groundwater investigations focused on contamination from leaking underground fuel tanks (LUFTs). Many local and state fire ordinances required burial of single-walled steel gasoline storage tanks to decrease possible fire and explosion. Unfortunately, many steel underground storage tanks (USTs) corroded through in less than 20 years (and some even more rapidly, depending on the tank's steel gage thickness and soil pH) releasing gasoline and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Most steel USTs have now been replaced with double-walled fiber glass USTs, mitigating the corrosion problem. In the late 1980s and into the 1990s, the focus of ECC investigations switched to chlorinated solvents such as trichloroethene (TCE) and tetrachloroethane (TCA), both used in the microelectronics industry as cleaning solvents/ agents, and tetrachloroethene (PCE) which was used (and continues to be used) in dry cleaning. TCE, TCA, and PCE are soluble and mobile. Leaks and spills from drums, tanks, and facilities have caused considerable groundwater contamination, particularly in the South San Francisco Bay area (Silicon Valley). Released PCE/TCE also biodegrades to vinyl chloride, a known human carcinogen. By the late 1990s and early 2000s "newer" EECs were found; some of these are briefly discussed below.As example Newer" Arsenic (As) in soil and groundwater occurs mostly as As(III) and As(V) compounds derived from weathering of the minerals arsenopyrite (FeAsS) and arsenic-bearing pyrite (FeS_2). It can also occur from former pesticide usage, industrial manufacturing, and even food additives for chickens (see Arsenic and Old Poop, February 2007 Vortex). In California, anthropogenic soil and groundwater contamination first emerged in the late 1980s, primarily from gold and base metal mine tailings, landfill leachate, and some older pesticide applications. Because arsensic compounds are considered carcinogenic, in January 2006, the U.S. Environmental Protection Agency (USEPA) lowered the drinking water maximum contaminant level (MCL) from 50 to 10 ug/L. Another EEC, are Chromium-VI [Cr(VI)] compounds. They occur naturally (from the oxidation of Cr(III)-bearing minerals, but they are also found in industrial contaminants (e.g., plating shop effluent and cooling tower water). Cr(VI) in water generally occurs as complex chromate ($Cr_2O_4^{2-}$) and dichromate ($Cr_2O_7^{2-}$) anions, which have been incorrectly called "hexavalent" chromium (see Valencing Oxidation States, October 2007 Vortex). It became a public concern with the 2000 film Erin Brokovitch, which focused on discharge of Cr(VI)-laden cooling tower water discharged from a PG&E facility in the desert town of Hinkley, California. The resultant lawsuit settlement caused many California water districts and water supply companies

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to sample and analyze surface and groundwater supplies for Cr(VI). Although a total chromium MCL (50 ug/L) exists, there currently is no Cr(VI) MCL; however, in January 2009, California issued a draft drinking water public health goal (PHG) of 0.06 ug/L (60 ng/L). T

The solvent stabilizer 1,4-dioxane (dioxane) ($C_4H_8O_2$; CAS = 123-91-1) first emerged in 2000 with the publication of a white paper by the Santa Clara Valley Water District. Dioxane is used to stabilize other solvents such as TCA and TCE and as an additive in some cosmetics, detergents, and shampoos. It is miscible in water and therefore highly mobile and recalcitrant in the environment; it is also quite toxic. Groundwater plumes have been found to extend well downgradient from other more degradable contaminants such as TCE and TCA. A federal action level (AL) and California notification level (NL) of 3 ug/L has been established.

Methyl-tertiary butyl ether (MTBE) ($C_5H_{12}O$; CAS = 1634-04-4) emerged as an ECC in the mid 1990s, particularly from a 60 Minutes investigation televised on January 16, 2000. MTBE was a gasoline additive/fuel oxygenate designed to replace aromatic hydrocarbons such as benzene. It has a high water solubility of about ~54,000 mg/L. The problem with MTBE is that because of LUFT, extensive groundwater contamination resulted from releases. On Jaunuary 1, 2007, California (with approximately 32% of U.S. production), banned MTBE as a fuel additive, subsequently establishing a 13 ug/L MCL.

N-nitrosodimethylamine (NDMA) ($C_2H_6N_2O$; CAS = 62-75-9) emerged as an ECC around 1998 from rocket fuel (1,1-dimethylhydrazine) production. It may also be a lubricant and plasticizer additive but can form when nitrites are used as a preservative (e.g., smoked meats such as bacon) and when wastewater is treated. NDMA; it is highly toxic (a probable human carcinogen) having a potential groundwater cleanup goal in the ng/L, range thereby resulting in California's response level (RL) of 300 ng/L, a NL of 10 ng/L, and a PHG of 3.0 ng/L.

Perchlorate (ClO^{4-}) anion from dissolution of ammonium (CAS = 7790-98-9), potassium (CAS = 7778-74-7), and sodium (CAS = 7601-89-0) perchlorate, which are associated with solid rocket fuels and pyrotechnics including explosives and fireworks (see Perchlorates in Drinking Water by Lowell Miller, February 2006 Vortex and Perchlorate Revisted, November 2006 Vortex). Previous manufacturing and testing practices involved washing rocket fuel residue from expended rocket canisters into open un-lined pits. Because of its high solubility (217,000 to 220,000 mg/L) ammonium perchorate has impacted and degraded surface- and groundwater across the nation, particularly near some California aerospace/military industrial sites. Perchlorate is considered a thyroid inhibitor and therefore low concentrations in drinking water could affect pregnant women and children. In October 2007, California established a primary MCL of 6.0 ug/L. In Part 2, I'll discuss parameters defining ECCs and some possible new ECCs under consideration.

Council Report From The ACS National Meeting San Francisco, CA, March 21-25, 2010

Recent Spring ACS National meetings have tended to be smaller in attendance than the Fall meetings, with New Orleans and Salt Lake City having significantly lower attendance than Philadelphia and Washington in 2008 and 2009, respectively. However, those of us in the Bay area know that San Francisco is different than these other cities, and always commands an impressive turnout. This was true again this year, even with a continuing tough economy, with slightly over 18,000 people in attendance, almost 4000 more than last Fall's meeting in DC. This made this meeting the third largest ACS meeting ever, with no surprise that the other two were also in San Francisco, albeit in better economic times.

The overall theme of the meeting was "Chemistry for a Sustainable World," and there were over 1600 papers and posters across the various ACS Divisions and Presidential plenary events at the meeting related to this theme, including a Sunday evening key note address on Green Chemistry Solutions, followed by a reception and an early opening to the exhibition area.

Abstracts of the over 12,000 papers and posters presented at the meeting are still archived at www.acs.org and 300 of the plenary and symposium presentations were recorded and will be available with sequenced slides on the website to anyone after April 16th.

California Local Section Councilors, our Board member, and our former ACS President were very active in San Francisco in representing the section at numerous governance functions including the Board (Wu) and ACS committees: Committee on Committees (Balazs), Community Activities (Kanodia), Economic and Professional Affairs (Pavlath), Environmental Improvement (Nottoli), Local Section Activities (Latimer – Chair), Membership Affairs (Frishberg), and Project Seed (Yamaguchi).

In addition to those named above, the other California section Councilors or substituting Alternate Councilors present at the Council Meeting were Alex Madonik, and Jim Postma. Current CAL-ACS Section Chair, Paul Vartanian, impressed all of us by attending the entire Council meeting seated in the Visitors section.

Current ACS President, Joe Francisco, had a thorough initiation to the intricacies and challenges of dealing with Council, as he encountered several controversial topics and some contentious debate during this first Council meeting over which he presided.

The last several Council meetings have been highlighted by heated, and sometimes emotional, discussions of Constitution or Bylaws amendments dealing with proposed changes to the petition process for nominating candidates for ACS President that have become highly controversial. The energy behind these discussions resurfaced in SF.

> ### *Editor's Note*
> A more complete report of the meeting is placed on the Section's website, Calacs.org, and can be read by going to the menu bar>Meetings>National.

Time will tell whether this issue is settled for now, or whether a revised form of last year's recommitted amendment will resurface. To further appreciate the differences of opinions that have surfaced; one view is that the current petition process can be disruptive and that all potential candidates for ACS President should have the opportunity to present themselves to, and be vetted by and voted on by Council, and not be automatically placed on the ballot as is the case of the current petition candidate process. The other view is supportive of the status quo, considers that such a petition process is a fundamental process of a democratic society, and while it can be messy at times, that is the nature of a democracy, it has not resulted in any significant problem that would justify changing it. This view also considers it restrictive enough that a recent bylaws amendment has increased the number of signatures required to qualify a petition candidate.

Another petition that came to the Council floor for action was the revised petition on

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election timelines. Already feisty from the debate on the previous bylaws amendment, this amendment also generated considerable discussion among Councilors. While appreciating the concerns of the former and future candidates, others felt that these were outweighed by other factors; those being the very short time to recover from a nominee that had to withdraw late in the process (which indeed happened this year such that only three nominees were brought before Council, instead of the specified four), and that potential petition candidates would not know who they were running against before they had to go to the effort of obtaining signatures and filing their petitions (something that they might not choose to do depending on their knowledge of, and relationship with, the candidates emerging from the regular process). In the end the latter views prevailed and this amendment failed by a vote of 27.4% yea, 72.6% nay.

While most Committee reports to Council are fairly routine and rarely draw much comment once the amendments to the Constitution and Bylaws are dealt with, there was an exception this year as one of our very own California Section Councilors, Lee Latimer, ran into some heated comments and concerns following his first report to Council as the new Chair of the Local Section Activities Committee. At issue were the recent changes in the ACS Speaker Service. As recently announced, the Speaker Service has gone online, with a refreshed list of speakers and much more background information on the speakers and their presentations than ever before.

In other Council action of note, the annual dues escalator was accepted which, due to the poor economy, calls for a dues increase of only one dollar for next year, and local section allotments from dues will remain the same.

Efforts continue to prepare for the United Nations designated International Year of Chemistry in 2011. To keep tabs of the many ACS activities that will be developed in coordination with this event, go to IYC2011@acs.org.

The theme for NCW to be held Oct. 17-23 is "Behind the Scenes Chemistry." During the SF meeting, members of the California Section were able to meet with Marvin Lang, Professor Emeritus from the University of Wisconsin-Stevens Point, who, with Don Showalter, are known as one of the premier teams performing chemical demonstrations around the country of interest to all ages. CAL-ACS has scheduled them to perform a series of demonstration programs around our Section and the neighboring Santa Clara Valley Section throughout the week of NCW. Stay tuned for further announcements regarding dates and venues.

The ACS Member's Network now has 22,000 members. There are plans to upgrade the network this 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.

Interesting Statistics

With the transition of Student Affiliates to Student Members completed in June 2009, 6500 students were transferred immediately and the number of Student Members grew to 8397 by the end of 2009. This year it is expected that Student Members will number 12,000.

There are approximately 1000 High School teachers who are members of the ACS.

Of the 12,000 papers and posters presented at this ACS National meeting, over 50% came from outside of the US for the first time.

Of new ACS members, 70% join on-line, while 35% renew their membership on-line. The number of High School Chemistry Clubs chartered by the ACS is now 258.

Mark Frishberg, Councilor

Letter to the Editor

Very good report! The only addition worthwhile to mention is MAC's report about the total membership increase to over 160,000, included the conversion of student affiliates to full members (6500). At the same time the number of members not renewing their membership is at an all time high of over 20,000.

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about its structure. In antique Egypt, 3000 years ago, stibnite was finely ground and used as a cosmetic eye shadow with the Arabic name of "Kohl". A vase of an earlier era, 4000 years ago, contained Sb based decorations. Antimony was also described around the first century AD. followed by Basil Valentine in the 15th century and by Andreas Libavius in 1615.

No doubt, Sb is important as a source for colored pigments. For example, Naples yellow, a lead antimonite, and red Sb sulfides are described in the September 2008 Vortex. The bright red pigment called Sb cinnabar, can be made by fusing Sb trichloride with sodium thiosulfate. This red pigment is an allotropic form of stibnite. Usually, precipitated Sb sulfides made in the laboratory are red. The naturally black Stibnite can be obtained by heating the red modification. Before 1800, occupational exposure and high levels of air pollution of Sb were common in industrial operations. A very important characteristic of Sb-containing alloys is that they expand during cooling, thus they fill casts with great detail. Such are the type caster (linotype) alloys, others named Britannia alloys with about 10% Sb, and a similar series called Babbitt or antifriction bearings alloys. The hardening characteristic in mixtures with lead found application for grids (1.5 to 8% Sb) in everyday car batteries. However, when overcharging lead batteries, the hydrogen generated at the negative terminal is likely to contain the highly toxic and inestable antimonide SbH_3. Safety match heads contain stibnite together with red phosphorus. Another important application together with selenium is in the fabrication of ruby glass. Also, small quantities of antimony oxide confer exceptional elasticity to common glass. Such kind of glass is used in the production of light bulbs and fluorescent tubing. By the way, the fluorescent material - halophosphate - contains antimony oxide which shifts the output spectrum to the blue end. In the laboratory, K antimonate was used in the 20th century before the advent of spectral analysis as a reagent for sodium. Also, early in the past century, thermoelectric piles (a multiple series of Sb-Cu or Sb-Fe thermocouples) provided some low voltage electricity, especially employed for electronic equipment in areas without central power. Addition of Sb oxide prevents the chalking in white Ti paint after exposure to actinic light. Cheap ceramics which may contain Sb in glaze are a source of intoxication, similarly to Cd or Pb. Also mentioned at the onset, Sb-containing flame retardants were promoted but later abandoned. The easy hydrolysis of Sb compounds has application as a mordant for dyes. Minor uses are in electronics, in transistors and light-emitting diodes (LED). Maybe our readers feel the urge of playing with Sb-containing substances. How about making some Sb cinnabar?

Improving Our Lives

Gabor Somorjai, Father of modern surface chemistry

Photo: Roy Kaltschmidt - LBL photographer

Professor, Department of Chemistry, University of California, Berkeley Faculty Senior Scientist, Materials Science Division, Lawrence Berkeley National Laboratory. Honors Include: National Medal of Science - 2002 Priestley Medal - 2008 Wolf Prize in Chemistry - 1998 Elected to the National Academy of Sciences - 1979.

For more than 40 years, Gábor Somorjai has pioneered research in surface chemistry and heterogeneous catalysis. His work focuses on the structure, bonding, and reactivity at solid surfaces on the molecular scale. This knowledge is then used to understand macroscopic surface phenomena such as adsorption, heterogeneous catalysis, and biocompatibility on the molecular level. Somorjai also develops instruments for nanoscale characterization of surfaces. These include sum frequency generation surface vibrational spectroscopy (SFG), high pressure scanning tunneling microscopy (high pressure STM), and high pressure Xray photoelectron spectroscopy (ambient pressure XPS). He has mentored more than 300 graduate students and postdoctoral fellows, published more than 1,000 papers, and three textbooks. He is the most cited person in the field of surface chemistry, and his expertise was called upon during the 2002 Winter Olympics to make the skating ice as fast as possible.

Vacation

As is the custom, *The Vortex* and its staff take a vacation. The next issue will be in September.

We wish all a pleasant summer and look forward to being with you again in the fall. The website, calacs.org will be kept current. Please visit often.

June Historical Events In Chemistry

Leopold May

June 1, 1936 The paper "Electric Moments of Molecules in Liquids" by Lars Onsager, published in the Journal of the American Chemical Society (1936, 58, 1486-1493), was received on this day.

June 2, 1787 Nils G. Sefstrom, one of the discoverers of vanadium (V, 23) in 1830, was born on this day.

June 3, 1873 Otto Loewi, who was born on this date, was a researcher on chemical transmission of nerve cells. He shared the Nobel Prize in Physiology or Medicine (1936) with Henry H. Dale for their discoveries relating to chemical transmission of nerve impulses.

June 5, 1760 Two hundred and fifty years ago, Johan Gadolin was born on this date. In 1794, he discovered yttrium (Y, 39).

June 7, 1896 Robert Sanderson Milliken, who was a researcher in molecular orbital and electronic structure of molecules, was born on this date. In 1966, he received the Nobel Prize in Chemistry for his fundamental work concerning chemical bonds and the electronic structure of molecules by the molecular orbital method.

June 10, 1848 Johann C. W. F. Tiemann, elucidated the structure of the interrelated terpenes, the Reimer-Tiemann reaction in 1876 and the Tiemann rearrangement of amide oxides in1891. He was born on this day.

June 12, 1890 Wallace R. Brode, an authority on chemical spectroscopy, was born. He also served as president of ACS.

June 12, 1899 Fritz A. Lipmann, who discovered coenzyme A and the central role of ATP in metabolism, was born on this date. He received the Nobel Prize in Physiology or Medicine in 1953 for his discovery of coenzyme A and its importance for intermediary metabolism.

June15, 1885 On hundred and twenty-five years ago on this date, Auer von Welsbach announced separation of didymium into Nd and Pr.

June 16, 1880 Otto Eisenschiml devised means to determine whether vegetable oils were contaminated with fish oils. He was an American Civil War historian and was born on this date.

June 18, 1918 Twenty-five years ago in1985, Jerome Karle, who developed methods for determination of crystal structures with x-rays; shared the Nobel Prize in Chemistry with Herbert A. Hauptman for their outstanding achievements in the development of direct methods for the determination of crystal structures. He was born on this date.

June 19, 1910 One hundred years ago on this date, Paul J. Flory was born. He was a researcher in physical chemistry of macromolecules and in 1974, was awarded the Nobel Prize in Chemistry for his fundamental achievements, both theoretical and experimental, in the physical chemistry of the macromolecules.

June 24, 1835 Johannes Wislicenus who proposed geometric isomers and synthesized acetoacetic esters, was born on this day.

June 26, 1756 Two Hundred and Fifty Years ago, Jean A. C. Chaptal was born. He introduced the name 'nitrogen' and studied viticulture and dyeing.

June 28, 1927 F. Sherwood Rowland, a researcher in atmospheric chemistry, was born on this day. He shared the Nobel Prize in Chemistry in 1995 with Paul J. Crutzen and Mario J. Molina for their work in atmospheric chemistry, particularly concerning the formation and decomposition of ozone.

NOBCChE

Cal ACS is collaborating with Western Regional NOBCChE (The National Organization for the Professional Advancement of Black Chemists and Chemical Engineers) to instruct several sessions of their SaturdayScience Academy class being held at California State University at Hayward, from from April 17 through May 22. The program is for students, grades 6 through 8.The Saturday lab is 2 hours long.

The curriculum resources are from ACS' "Kids and Chemistry" program, and include the "Colorful chemistry of acids and bases" and "Chemistry's rainbow - neutralize an acid and a base", supplemented with a lab on recyling and the properties of plastics.

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