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Happy Thanksgiving

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EDITOR:

Louis A. Rigali
309 4th St. #117, Oakland 94607

510-268 9933

ADVERTISING MANAGER:

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

781-837-0424

OFFICE ADMINISTRATIVE ASSISTANT:

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

510-351-9922

PRINTER:

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CONTRIBUTING EDITORS:

Evaldo Kothny
William Motzer

EDITORIAL STAFF:

Glenn Fuller
Evaldo Kothny
Alex Madonik
Paul Vartanian

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Chair's Message

Paul Vartanian

As you probably know by now the year 2011 is the International Year of Chemistry (IYC). The year is the 100 anniversary of the Nobel Prize in Chemistry received by

Marie Curie. For twelve months the general population of the world gets to see in greater detail what we chemists and engineers do and what our efforts yield for them. The old DuPont slogan "Better Living Through Chemistry" has many meanings, but since humans began to note medicinal plants and control fire to change their environment, much of the progress of the world has been due to things chemical.

The early ages of mankind are named by successive sophistication (or luck) in metallurgy - from stone to copper to bronze to iron to steel. Chemistry has been involved in many improvements in the human condition. Those who argue against chemistry because of the ways chemical advances can be bent to negative results overlook the fact that all human progress has its pluses and minuses. Copper utensils and knives were pluses, making life easier. Copper weapons gave advantages to

those who made war. Few advances by humans are totally positive.

It cannot be reasonably argued, however, that the current human condition has not benefited from the progress of chemistry. In 2011 we can all get involved in telling the story of our science and how it affects everyone in a positive way. Bryan Balazs, the Chair-elect, is scheduling California Section meetings to fit into the categories of food, water, health, energy, etc., that will be central to the IYC effort. Attila Pavlath, the chair of our IYC Committee, has developed a web site, www.chemistryinyourlife.org that contains the ACS "Technology Milestones in Chemistry" in English and will contain it in all the other languages into which it will be translated. We expect to have many activities in 2011 connecting chemistry and the public.

You can help by organizing an activity, in your company, school, or for the public in general, that brings chemical history alive for them. The members of the California Section have been involved in many big and small chemical developments and by using the International Year of Chemistry as a vehicle to bring these developments to the general public we can help bolster the

(continued on page 10)

California Section November November Meeting

Speaker: Professor J. Bruce German, Director, Foods for Health Institute, University of California, Davis

Title: The Future for Interactive Personalized Nutrition and Science Through Education K1-12

Time: Thursday, Nov. 18, 2010. Refreshments 5:30-6:00 PM. Lecture 6:00-7:00 PM.

Place: Western Regional Research Center, 800 Buchanan St., Albany, CA. Call or email the office for reservations, (510) 351-9922, (office@calacs.org).

Abstract:

Bruce German is Director of UC Davis' Foods For Health Institute and Professor of Food Chemistry. His upcoming ACS talk, "Foods for Health: The Science, Technologies and Business Opportunities of Personalizing Diet and Health" explores the need for and challenges of revising the United States' health versus diet relationship. What are the targets for improving health? How do we measure health? How do you make healthy people healthier? After billions invested in genomics how can this new knowledge of microbial, plant and animal evolution guide us to nourishing humans in new ways and with better outcomes? "At this point we only define health as the absence of disease," says Dr. German, who strives to find a more detailed and personalized definition. In his presentation, he will discuss the tools, targets, implementation and education of personalizing diet and health.

The Foods for Health Institute (FFHI) has established a broad campus initiative to revolutionize the current approach to health education in California schools. The core of this approach is to educate children about their personal health using a wide-ranging array of health and lifestyle monitoring technologies and bring the implications of those measures to the children and their parents. Children will be guided by their teachers and individually assessed for body composition, spontaneous activity, physiological, immunological and nutritional status. The health implications of these measures will be the basis of a new form

of health education in which each student is taught to interpret the measures as indicators of their health and how it can be altered by diet and lifestyle choices.

By personalizing health education, individual children will be equipped with the knowledge of their individual health needs, and as a result, empowered to take the steps to acquire the health behaviors optimal for themselves. Long-term benefits of this strategy include the security of a population that is both healthy and productive, and the generation of cost savings in health care as a result of this effective disease prevention approach.

Biography

B.S. in Biology, University of Western Ontario, Ontario, Canada, 1976 M.S. in Plant Biochemistry, University of Western Ontario, Canada, 1979 Ph.D., Food Chemistry, Cornell University, Ithaca, NY, 1983



Science Cafe for the California Section

Speaker: Mark Fenn, Associate Head of Conservation of the Asian Art Museum of San Francisco

Title: Exploring the Science of Art Conservation of Sacred Art Treasures of Bhutan

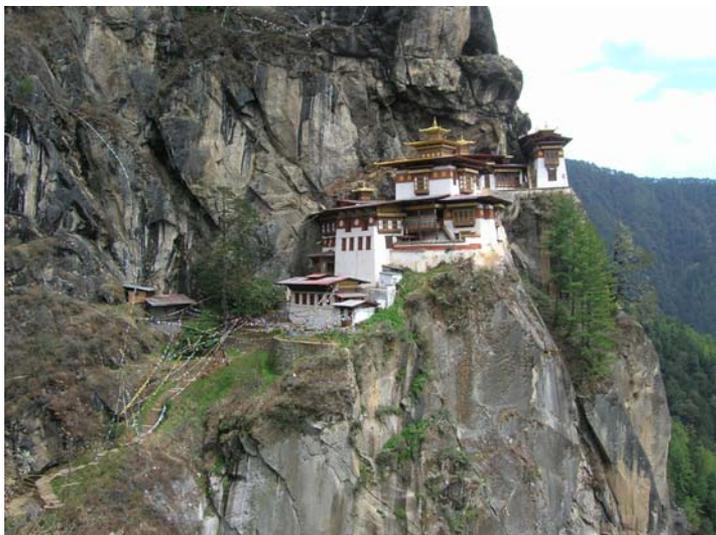
Time and Place: Monday, November 29 from 7-8pm at the Community Hall of the Lafayette Library at 3491 Mt. Diablo Blvd., Lafayette, CA 94549. Simple food and beverages available at the Lafayette Library Bookmark Café. Please see www.calacs.org for more details and RSVP at office@calacs.org or (510) 351-9922 by Nov. 23.

Abstract:

Art conservator Mark Fenn conducted three month-long workshops with a group of Buddhist monks from the remote Himalayan kingdom of Bhutan to prepare sculptures for their international exhibit, *The Dragon's Gift: The Sacred Arts of Bhutan*. He will offer an introduction to Bhutan, its culture and its people and relate how he taught the monks to better care for their artistic heritage. He will also discuss some of the challenges and surprises they all faced in treating these extraordinary objects.

Biography:

After serving as a high school biology teacher in the Peace Corps in Ghana, West Africa, Mark Fenn earned an MS in Art Conservation at the University of Delaware. During a one year post-graduate fellowship at the Smithsonian, he conserved archaeological objects as they were excavated on digs in Syria, Pakistan and El Salvador. He then worked as the conservator at the Wyoming State Museum for four years before returning to the Bay Area to join the Conservation Department of the Asian Art Museum of San Francisco in 1998.



ACS Northern California Subsection Fall dinner/seminar Meeting

Speaker: Dr. James Postma,

Title: "The Electric Car; Murder Victim, Suicide, or Still a Gleam in Its Parents' Eyes"

Time and Place: Thursday, December 2, dinner at 6:00, seminar at 7:00 p.m. in the Bell Memorial Union (BMU), room 210 on the California State University, Chico campus. Dinner is \$25 (\$10 for students) No charge for seminar only. Call or email the office for reservations, (510) 351-9922, (office@calacs.org). Campus map can be downloaded from the website, www.calacs.org

Abstract:

Electric cars have existed since the inception of the automobile, but to date have not penetrated the consumer market to a significant degree. This talk will present the significant advantages of an electrochemical energy source (batteries) relative to a combustion source for automotive power. But the challenges that have limited the success of electric car technology will also be reviewed. We will try to make educated, but speculative, predictions about the scientific, engineering, and societal progress that will be necessary for the success of electric cars.

Biography:

Dr. James Postma is a physical chemist at California State University, Chico. He received his Ph.D. from UC Davis in 1982, studying electrochemistry with Dr. Peter Rock to evaluate the Born-Oppenheimer Approximation. He joined the faculty at

CSU, Chico in 1982 and teaches courses in physical and analytical chemistry as well as general chemistry courses. He is the co-author of General Chemistry in the Laboratory, 7th edition, a widely-used laboratory textbook in freshman chemistry classes. He has been nominated to run for chair-elect of the California Section of the American Chemical Society and is currently the Chair of the Academic Senate of the California State University system.



WCC October Meeting

Saturday October 30 at Mills College, with Cheryl Martin of KPCB as speaker. Details will be posted to the website.



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INTERNATIONAL YEAR OF CHEMISTRY. YOUR HELP IS NEEDED

Attila Pavlath
The United Nation
officially declared
2011 the Interna-

tional Year of Chemistry. It will be officially opened next January in Paris, followed by a worldwide effort during 2011 to publicize the importance of chemistry. If you read the newspapers, no doubt you are aware that the public image of chemistry is not what it was 50 years ago. Then a large chemical company proudly used the "Better things for better living through chemistry." slogan as its logo. It is no longer there. Our youngsters are more and more hesitant to select chemistry as their profession. Politicians are more reluctant to provide funds for research in an area, which is not valued by their constituents.

In 2001, at the 125th anniversary of the ACS an exhibit was created which described in layman's term the many contributions of chemistry to our life on four electronic posters: Energy & Transportation, Communication & Information, Health & Medicine, and Agriculture & Food. To overcome the difficulties of transporting these large electronic poster boards, the exhibit was converted to 32 colorful posters. This solved the problem of transportation. Placing the content in Power Point program made it easily transferable through the electronic highway.

The California Section created a web page: www.chemistryinyourlife.org, which contains the exhibit both in poster format and as Power Point presentation on these four areas. You can access both and freely download them. This is the point where I am asking for your help in two ways.

1. Search out non-chemist audiences, e.g.

Lions, Rotaries or any other groups, which hold luncheon and/or dinner meetings. They are frequently looking for speakers after their meals. You could use any of these Power Point presentations. If you are not comfortable with public speech, just let us know that the group is interested and we will find speakers. The talks are easily understandable; they have very little if any chemistry in them. They are concentrating on describing what chemistry has done for our everyday life, pointing out developments, which the average population takes for granted, but without them we would be back to the Stone Age.

2. Help with the translation to other languages. The posters were publicized at various international meetings and induced their translation to various languages to be used in the appropriate countries. Presently the translation is done or almost finished to Chinese, Estonian, Finnish, French, German, Greek, Hungarian, Italian, Japanese, Korean, Norwegian, Portuguese, Romanian, Russian, Slovakian, Slovenian, Spanish, Swahili, Thai and Turkish. Those, which are finished, are also on this webpage and others as they are completed will be also uploaded. This makes them accessible throughout the world. Some of the translations were done in the appropriate countries, but especially the smaller ones do not have the capabilities to do it. Bilingual chemists who wanted to help did the others. This is the point where we are asking for your help. If you are bilingual in any of the languages not listed above or know someone, please, let us know. There is no money involved in the work. The translator will get credit on the front page and also the satisfaction of helping another country.

If you have questions and can help in any of these two are, please, contact me by e-mail at AttilaPavlath@yahoo.com, by telephone: 510-559-5620 or by mail: WRRRC, 800 Buchanan, Albany, CA 94710. I will help you with any problem to make your work easier.





Splenda™ in the Water

Bill Motzer

In 1999, the artificial sweetener sucralose ($C_{12}H_{19}Cl_3O_8$ or 1,6-Dichloro-1,6-dideoxy-β-D-fructofuranosyl-4-chloro-4-deoxy-α-D-galactopyranoside; CAS no. 56038-13-2) was introduced into the U.S. market under the brand name Splenda(r). This chemical has a molecular mass of 397.64 g/mol and a relatively high solubility of 283,000 mg/L at 20 °C. Sucralose, developed by the British firm Tate & Lyle, Ltd. was created by substituting three hydroxyl groups on the sugar molecule with three chlorine atoms using a five step process. It is 600 times sweeter than sugar so that smaller amounts can be used in recipes. Sucralose is also quite stable when heated without losing its sweetness and therefore can be used in cooking and baking or anywhere one would use sugar. Sucralose is now included in more than 4,500 food and beverage products such as candy, breakfast bars, and soft drinks; it is considered safe for consumption by diabetics.

Like many other artificial sweeteners, sucralose has zero calories and therefore, it is not metabolized by the body. About 96 to 98 percent of it passes virtually unchanged through the human digestive system to be eliminated in feces and urine. Well, you might ask, what's so unique about that? The answer is that it is also unchanged by waste water treatment systems and is extremely persistent, with a half-life in water, depending on pH and temperature, ranging up to several years. Its degradation breakdown components are chlorinated monosaccharides, 1,6-dichloro-1,6-dideoxy-dfructose, and 4-chloro-4-deoxy-d-galactose, which currently have unknown environmental effects. Therefore, sucralose has become quite ubiquitous in trace quantities in the environment. (Trace amounts are not yet considered as toxic. Sucralose is extremely insoluble in fat and does not bioaccumulate; however, higher doses of between 1.1 to 11 mg/kg

sucralose have been found to decrease the good intestinal bacteria in rats. These effects have not been reported in humans. One other study reported that it triggered migraine headaches in humans.)

For forensic geochemists, sucralose's geochemical characteristics are quite exciting! For tracing leaking sewage and septic system effluent we've been using standard sewage tracers such as nitrate, ammonia, phosphate, methylene blue active substances (MBAS) for surfactants, and total and fecal coliform bacteria. Most of these substances have highly variable transport and fate and degradation rates and therefore are not completely reliable as environmental tracers. Geochemists have now begun relying on other waste water micropollutant tracers such as pharmaceuticals and personal care products (e.g., see June, September, and October 2010 issues of *The Vortex*: "A Chemist's Conundrum") many of which are persistent in the environment.

Since 2005, sucralose has been known as a wastewater tracer (ES&T, v.39, pp. 5157-5169). Other artificial sweeteners such as acesulfame potassium (Sunett(r) and Sweet One(r) CAS= 55589-62-3) and saccharin (benzoic sulfimide; CAS = 81-07-2) have geochemical characteristics similar to sucralose. Recent investigations by Dr. Andrew Eaton and his colleagues of MWH Laboratories in Monrovia, California have focused on multiple wastewater indicators including sucralose to assess impaired waters. Dr. Eaton presented his team's initial findings at the September 2010 Groundwater Resources Association of California (GRA) annual meeting in Burlingame, California. MWH's investigation found that sucralose was present in waste water effluent from all 20 wastewater treatment plants sampled and that concentrations generally exceeded 10,000 ng/L. Sucralose was also present in about 30 percent of 43 raw water sources sampled at concentrations generally exceeding 1,000 ng/L. It was also present in just under 30 percent of 115 finished drinking water samples at concentrations just

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ELK-N-ACS

Evaldo Kothny

Thomas Alva Edison and light

The development of light started with the need of two scientists (S. Langley and H. Draper) in early 1878, who wanted a system for measuring small temperature differences of the sun's corona. For this purpose, Edison invented the "microtasimeter" a very sensitive carbon button. During the discussion, the men advanced the concept of subdividing the intense arc light invented in 1862 and introduced in 1878 by Charles Francis Brush with smaller individual units connected in parallel, similar in light emissivity as gas-light. Edison thought he could do it. Unbeknown to him was that in 1801 Sir Humphrey Davy had already demonstrated the possibility of light emitted from electrically heated platinum wires and that in 1841, Frederick de Moleyns of England, was granted the first patent for electrically heated glowing carbon powder for lightning. However, the first practical carbon filament lamps were only possible after obtaining a good vacuum and an appropriate source of electricity. Thus, the first light bulb with a carbon filament was invented by Sir Joseph Wilson Swan in 1878. Similarly to Sir Humphrey Davy (see above), also Edison had experimented in 1879 with drawn Pt wires which resulted impractical. After his long experimental work he applied for the carbon filament invention in 1880 and decided on using carbonized bamboo fibers instead. Carbon filament lamps displaced slowly the gas mantles. Although Edison was not the first inventor of the carbon filament lamp, Edison got the most credit for this invention, largely due to the simultaneous development of electrical generation and distribution systems with assistance of Francis Upton. Financing for developing a practical lighting system got support from a financing syndicate which included J.P. Morgan and the Vanderbilts. Thus, the Edison Electric Light Co. was established for research and

development. Soon, this latter company purchased the Sprague company forming the Edison General Electric Company and then merged with Thomas Houston in 1892 creating the General Electric Company. Another assistant of Edison in the Menlo Park laboratory, William J. Hammer, while testing the globes, noted a blue halo around the positive pole and ablacking of the support wire and the bulb at the negative pole. This was named the "Edison effect" after patenting the lamps in 1883. The patent included the threaded base and corresponding socket, which was aptly named the Edison base. The Edison effect is based on thermionic emission of electrons and became the starting point of the electron tube and ultimately the electronic developments of nowadays. Thanks to his geniality, he invented the phonograph (the foundation of RCA broadcasting, radio transmission, electronics), developed the motion-picture industry (movies, photography) and created the nickel-cadmium alkaline battery (developing later into rechargeables for telephony, toys, cameras, etc.) still in use today. In the meantime, the Auer Society abandoned the use of osmium and in 1906 experimented with tungsten. Almost simultaneously, in 1908, also Edison experimented with tungsten. A pioneer in tungsten technology in 1908 was William David Coolidge. The "Coolidge X-ray tube" was named after him and was made of a solid heavy piece of tungsten. As a result of this knowledge, the drawn tungsten filament was introduced in 1911 which together with a good vacuum produced a practical electrically heated metal-wired lamp. However, carbon filament lamps did not disappear after the introduction of tungsten wired lamps because they proved to be resistant to vibration. Personally, I did see carbon filament lamps in the late sixties on a street car bridge overcrossing a busy railroad and not long ago, a local newspaper mentioned a carbon filament lamp burning day and night in a fire station some-

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where in the Bay Area. Light bulbs using tungsten were produced by Westinghouse and exported in 1911 to South America (my Dad was involved with this import). The first tungsten wires proved to be very brittle and produced large breakage loss during transport (according to my Dad, up to 40%) because they did not resist vibration. The Osram lamp company also adopted the Edison threaded base, although they also employ the "bayonet base", which resisted loosening of the bulbs. Lamps with such a base are still used in trains, in automobiles and for special applications. Further technological developments included gas-filled bulbs. First, bulbs were filled with nitrogen only but soon after, mixtures of argon (e.g., 14% nitrogen in argon) or Krypton were used. The gas filling had to be very dry, as traces of water increased the blackening of the bulbs interior and produced instability by arching, extremely dan-

gerous in the older D.C. circuits. Other advances over the 1911 single filament lamps were the coiling introduced in 1913, followed by the frosting in 1925, later only double coiling of the tungsten filament. These technologies have built-in secrets for efficient performance, which cannot be expanded in this space. More of that in a following article.



(Continued from page 3)

ongoing need to support science education and the rational discussion of scientific solutions to our problems. Please let us know what you are doing along these lines during the IYC and how we can help your efforts. While we expect many good things to happen in 2011, we hope everyone treats the twelve months as just the beginning of a continuing effort for chemical education.



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 UC Berkeley Extension



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under 400 ng/L. A comparable European study conducted in 2008, found sucralose concentrations ranging to 1,000 ng/L in 27 river water samples from 27 countries including the UK, Belgium, the Netherlands, France, Switzerland, Spain, Italy, Norway, and Sweden.

So why is tracking sucralose in the environment so important? With the delay to 2012 of the \$11.1 billion Proposition 18 - the California Water Bond (Safe, Clean, and Reliable Drinking Water Supply Act of 2010), which contained \$3 billion for water supply storage and \$1.0 billion for groundwater protection and water quality, California's water suppliers may be stretched thin in supplying water to a growing population. (Even if it passes there is a lag time of several years for implementation.) Therefore, future water supply demands (particularly if there is a prolonged drought) will increasingly rely on more groundwater and recycled municipal water now largely employed for landscape irrigation and industrial supply. Many wastewater treatment plants deploying recycled water have been able to lower and even eliminate many organic micropollutant concentrations by upgrading to tertiary water treatment with reverse osmosis and post-ozonation/UV oxidation followed by sand filtration (ES&T, 2009, v. 43, pp. 7862-7869).

The potential impact to our groundwater resources from micropollutants should not be underestimated. Water agencies and regulators are becoming increasingly cognizant of the potential impact on groundwater micropollutants and therefore want to know the impact of recycled water applications. Using sucralose and other artificial sweeteners as forensic tracers can better aid scientists in tracking such micropollutants and assessing impacts of recycled water use. Unlike the unrequited love in the 1961 movie starring Natalie Wood and Warren Beatty, the results should not end in regret.



Sucralose

With a forensic geologist perspective, Bill Motzer has written an interesting article about the artificial sweetener Sucralose (Splenda™) starting on page 8 of this issue. It was disconcerting to know that levels of Sucralose in waste water effluents from treatment plants exceeded 10,000 ng/l, drinking water concentrations exceeded 1000ng/l and a study indicated that it was the cause of migraines in humans. I wondered what else one should know about Sucralose.

I remember watching a *60 Minutes* segment around 1996 on the artificial sweetener, Aspartame which was marketed under the name NutraSweet and Equal. That program piqued my curiosity of what else one should know about Aspartame. Among other things I found was that Donald Rumsfeld in 1981 was able to use political pressure to get Aspartame approved by the FDA even after an independent panel recommended that it not be approved without further testing.

One can still view that 60 Minute segment, just Google Aspartame and *60 Minutes*. The web has many sites and references that describe the health hazards and toxicity of Aspartame as well as those sites, supported by the Manufacturer defending the product using the argument that the FDA has looked at all the studies and confirms that there is health hazard to humans. Visit these sites and judge for yourself the pros and cons.

NutraSweet™ (Aspartame) may have lost the benefit of its good sounding name, it is now called Amino-Sweet™ (from the manufacturers' web site..."AminoSweet is a low calorie sweetener that tastes exactly like sugar. It is made from two building blocks of protein just like those found naturally in many everyday foods such as meat, fish, cheese, eggs and milk. AminoSweet is digested by the body in exactly the same way as these other protein foods and so does not bring anything new to our diet."

The pharmaceutical industry has been very interested in artificial sweeteners going back before 1970. Cyclamate, first developed as an artificial sweetener in the 50s and deemed

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Chemistry Olympiad

Al Verstuyft, Ph.D.

The California ACS participates each spring to select nominees for the U.S. National Chemistry Olympiad. The national competition is open to all high school students who are U.S. citizens.

To register your school (teachers) or home-schooled student (parents), contact Al Verstuyft, Ph.D. at AlchemistAWV@gmail.com. If your school will not be registering for the competition, a parent or guardian can contact Dr. Verstuyft directly.

Each year the California Section of the American Chemical Society mails applications to each high school in our Section to solicit nominations for the National Chemistry Olympiad test. The mailing is usually done in February or early March. This test is usually conducted in April, jointly administered with the Santa Clara Valley Section. No more than two students from each high school can participate, and schools can propose alternate students if space is available. We typically get 14-18 nominations, and have been oversubscribed in some years.

Please Note - in the past, more students have wanted to apply for the exam than our allotted spaces. Generally, we can have no more than 18 students taking the test. Please be sure to submit your application as soon as possible because admission is based on a first come, first served basis.

National Chemistry Olympiad Exams will be administered on one Saturday sometime in April 2011.

Students across the U.S. who score exceptionally well are then invited to the camp held by the U.S. Chemistry Olympiad committee for further evaluation leading to the selection of the members of the team for the international competition. On May 3, 2011, the USNCO National Office will telephone the local section coordinators of the 20 students chosen to attend the study camp. (E-mail announcing the final results will be sent to other sections as soon as a final roster has been determined.). Twenty students attend the study camp at the US Air Force Academy in Colorado from June 9-24, 2011. The

43rd International Chemistry Olympiad competition will take place in a place to be named from July 19-28, 2011.

For more information, please see the ACS website. For more information, please see the ACS website at <http://portal.acs.org/portal/acs/corg/content> and search on chemistry olympiad.



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as "safe" in 1958 was ultimately banned by the FDA for use in the US. It is however accepted in a number of other countries, notably, China. Abbott, the manufacturer, has a petition to the FDA for re-approval. There are other artificial sweeteners, and again just Google the term and read about the benefits and hazards.

Sucralose, marketed as Splenda™, was approved for use in the US in the late 1990s as an artificial sweetener. It was first marketed as a natural sugar type product. The natural sugar industry objected stating that the Sucralose was a chlorinated carbohydrate that more closely resembles the chemical structure of a pesticide than a sugar.

Here are some of the things I found out not necessarily in order of importance.

1. There is no formal procedure to monitor the safety of any food additive including artificial sweeteners.
2. Sucralose is in all sorts of foods including bakery and dairy products. The surprise was that it is also in our medicines. There are no requirements to tell the consumer what product and how much.
3. Whole Foods has made it a policy not to sell products that contain Sucralose.
4. Hives is one of the reported side effects of sucralose.
5. There has not been any human testing, short or long term. Why?
6. There are some European countries worried about the increasing amounts of Sucralose in waste water.
7. There is anecdotal evidence of various side effects and articulate defense that the product is safe.

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November Historical Events in Chemistry

Leopold May

November 3, 1921 American Association of Textile Chemists and Colorists was founded on this date.

November 4, 1903 Boris A. Arbuzov, who discovered formation of free radicals of triarylmethane derivatives, was born on this date. He investigated the properties of terpenes and phosphorous containing heterocyclics.

November 7, 1867 Marja S. Curie (later Marie), who was born on this date, discovered radium with her husband, Pierre Curie, 1898 and polonium in 1898. She shared the Nobel Prize in Physics in 1903 with Pierre Curie in recognition of the extraordinary services they have rendered by their joint researches on the radiation phenomena discovered by Professor Henri Becquerel shared with A. Henri Becquerel. In 1911, she was awarded the Nobel Prize in Chemistry in recognition of her services to the advancement of chemistry by the discovery of the elements radium and polonium, by the isolation of radium and the study of the nature and compounds of this remarkable element.

November 9, 1994 Three atoms of element 110 were created at GSI in Darmstadt, Germany on this day.

November 12, 1833

Alexandre P. Borodin, a chemist-composer, a composer of classical music, was born on this date. He was a researcher on organofluorine compounds and the Borodin-Hunsdieker reaction and. Some celebrate his birthday on November 24.

November 15, 1953

Stanley L. Miller published a paper "A production of amino acids under possible primitive Earth conditions" in *Science*, 1953, 117, 528-529 describing an experiment in which he added together methane, ammonia, water, and hydrogen and subjected the mixture to a high-frequency spark for a week, which produced milligram quantities of glycine, alanine, and other amino acids.

November 17, 1850

George T. Beilby, who was born on this date, invented

the process for retorting shale and synthesized alkaline cyanides. He constructed the first factory for the synthesis of cyanides.

November 20, 1862 August F. Horstmann, who did research on dissociation, was born on this date. He also related heat and entropy in chemical reactions.

November 21, 1824 Hieronymus T. Richter who was born on this date, co-discovered indium with Ferdinand Reich in 1863, Because Reich was colorblind, he had Richter the school metallurgical chemist, do the spectroscopic examination. Richter placed some of the material on a loop of platinum wire and heated it with a Bunsen burner. Richter observed a brilliant indigo line, which did not correspond to any known element. Because of this characteristic indigo blue emission spectral line, the new element was called Indium.

November 23, 1837 One hundred years ago in 1910, Johannes D. van der Waals was awarded Nobel Prize in Physics for his work on the equation of state for gases and liquids. He formulated deviations from the ideal gas law (Van der Waals' Equation) and was a researcher on intermolecular attraction (Van der Waals' Forces), electrolytic dissociation, and capillarity. He was born on this date.

November 25, 1960 Fifty years ago on this date, the first atomic reactor for research and development began operation at Richland, Washington.

November 29, 1936 Yuan T. Lee, who used a specially designed mass spectrometer that could separate and identify reaction products, was born on this date. He shared the Nobel Prize in Chemistry in 1986 with Dudley R. Herschbach and John C. Polanyi for their contributions concerning the dynamics of chemical elementary processes

November 30, 1948

Chlorotetracycline, a broad-spectrum antibiotic, was isolated by B. M. Duggar, American Cyanamid Corporation, on this date.



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(Continued from page 13)

8. There seems to be consensus of studies that use of artificial sweeteners does not contribute to weight loss and good evidence of just the opposite is true even though the reasons are not known.

I cannot draw conclusions based on undisputed facts, but I do have an opinion or two.

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children. The statement, "We see no evidence of harm to humans" should always be suspect as meeting the requirements the profit objectives of manufacturers and not the safety of Consumers. We cannot accept at face value any recommendations or test results from those companies who make the products and regulatory agencies which can be and are influence by those who profit from the sale of the product.

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