

THE VORTEX

AMERICAN CHEMICAL SOCIETY
VOLUME LXXI NUMBER 4

CALIFORNIA SECTION
APRIL 2010



The "Ginerator" is Arne Hillesland, shown with his botanicals that give the gin its flavor.

Table of Contents

CHAIR'S MESSAGE (P. VARTANIAN)	PAGE 3
APRIL WCC AND SECTION MEETING	PAGE 4
MARCH MEETING REPORT (P.VARTANIAN)	PAGE 5
MODERATION AND COMMON SENSE (A. PAVLATH)	PAGE 6
ELK-N-ACS (E. KOTHNY)	PAGE 7
RELIEF FOR CHILE	PAGE 7
THE IMPACTS OF IMPACTS (W. MOTZER)	PAGE 8
WCC CAREER FAIR	PAGE 9
DISTILLERY 209 STILL	PAGE 9
IN THE NEWS AGAIN:GMO (L. RIGALI)	PAGE 10
HAITI EARTHQUAKE RELIEF INFORMATION	PAGE 13
APRIL CHEMICAL ANNIVERSARIES (L.MAY)	PAGE 13
ACS CAREER FAIR	PAGE 14
BUSINESS DIRECTORY	PAGE 14&15



Solvents
Salts
Acids
Solutions

We have all the pieces...

www.emdchemicals.com/analytics

www.caslab.com



Trusted technical expertise.

3860 S. Palo Verde Road, Suite 302
Tucson, AZ 85714
520.573.1061
tucsonlab@caslab.com

Our Tucson Laboratory provides professional
Micro-Elemental and Fuel Testing Services

- CHNOS
 - Carbon & Sulfur
 - Halogens & Anions
 - Metals - ICP-OES, ICP/MS, AAS
 - Fuel Analysis
 - Air Sensitive & Hygroscopic Samples
 - Contact Columbia Analytical for a full list of capabilities.
- Same day to 4-6 day rush services available.

 **Columbia
Analytical Services™**

An Employee-Owned Company

STOP WASTING \$\$\$ on vacuum pumps!!

Rebuilding is smart.

A new pump costs **four times** what rebuilding costs.

Rebuilding is easy.

Just call 978 667 2393 for service second-to-none.

Mass-Vac does the job right.

- ▀ Factory trained technicians.
- ▀ Rebuilt and new pumps in stock.
- ▀ No-hassle parts and labor guarantee.
- ▀ Complete line of filtration and trap systems.

Because a really old, really healthy vacuum pump is a beautiful thing!



Mass-Vac, Inc.

247 Rangeway Road • PO Box 359 • North Billerica, MA 01862
978 667 2393 Fax 978 671 0014 sales@massvac.com www.massvac.com

MAGAZINE OF THE CALIFORNIA SECTION, AMERICAN CHEMICAL SOCIETY

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:

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

510-268-9933

CONTRIBUTING EDITORS:

Evaldo Kothny
William Motzer

EDITORIAL STAFF:

Glenn Fuller
Evaldo Kothny
Alex Madonik
Paul Vartanian

For advertising and subscription information, call the California Section Office, 510 351 9922

California Section Web Site: <http://www.calacs.org>

Volume LXXI

April 2010

Number 4



Chair's Message

Paul Vartanian

The American Chemical Society has had a successful meeting in San Francisco again. Thank you to all the members of the California Section and the Santa Clara Valley Section

who volunteered for the activities at the meeting. Special thanks to Trudy Lionel for coordinating the event at the California Academy of Sciences and Alex Madonik and Sheila Kanodia for the work in the early stages.

We had several meetings starting last year with some members of the Santa Clara Valley Section, our co-hosts for the meeting, and thanks to Natalie McClure, Bruce Raby, and Sally and Howard Peters of SCVS and Rollie Myers of CS. Kristen McCaleb (SCVS) did a great job getting the posters for the "Bay Area Chemistry" series done. These grew out of the "Local Heroes" idea Attila Pavlath had for the 2006 ACS meeting in San Francisco. Bonnie Charpentier (SCVS) and Lee Latimer (CS) were also very involved in the meetings and brought good information to help the collaborative process. As always, Eileen Nottoli brought great energy and ideas to the meetings.

The advertising team obtained enough advertisers to support a special run for the March edition of *The Vortex*. To all those of you who participated in local section booth, gave papers, or contributed in any way to make the visitors to our Section more enjoyable, thanks.

The next ACS National Meeting to be held in San Francisco will be in 2014. Neal Byington of our Section is on a team trying to organize an ACS Western Regional Meeting in our area for 2012. This is not a certain thing due to the uncertainties in how it can be done without running deeply into the red. If you have any interest in making a Regional Meeting a possibility, please contact Neal.

The Section also supports an ACS Undergraduate Research Symposium. This year it is at California State University, Sacramento, on Saturday, May 8. Go to www.csus.edu/indiv/g/ghermanb/2010_website/index.htm for more information. Steve Bachofer of St Mary's College is our representative. We also support the Chemistry Olympiad and the local testing is this month, in collaboration with Santa Clara Valley. Al Verstuylt is the California Section coordinator for this.

(continued on page 12)

*California Section
American Chemical Society
Women Chemists Committee
and April Section Meeting*

"Porphyrinic Pigments and Their Use in the Detection and Treatment of Diseases"

By Dr. Uschi Simonis

Date: Saturday, April 24, 2010

Time: 11:30 am Check-in and Social; 12:00 noon Lunch; 1:00 pm Talk

Place: San Francisco State University, Towers Conference Center–

Cost: \$18 for lunch (Deli Sandwich Buffet, beverages)

Reservations: RSVP by Tuesday, March 23 to the Section office by e-mail at office@calacs.org or call (510) 351-9922. All are welcome.

For directions to Towers Conference Center on State Drive at San Francisco State University, see <http://www.sfsu.edu/~meetings/location.html>

Abstract:

With 12 million deaths projected for 2030, cancer is the leading cause of death worldwide and affects people at all ages. Due to the systemic toxicity of traditional therapies, new strategies are urgently needed for combating the disease. Such strategies may be found in photodynamic therapy (PDT). PDT is minimally invasive and uses for its mode of action a photodrug as the photosensitizer that is retained longer in malignant tissue than in healthy tissue. Upon its activation by light and energy transfer to tissue oxygen, reactive oxygen species are formed locally, among which singlet oxygen is a key cytotoxic agent causing localized destruction of tumor cells and/or the tumor neovasculature.

Although regulatory-approved for the treatment of selected cancers, PDT remains underutilized in clinical practice. There remains an urgent need for the development of improved photodrugs. Dr. Simonis will give an introduction to PDT and present the approach that her research laboratory is taking to prepare better photodrugs.

Biography:

Dr. Simonis is Professor of Chemistry and Biochemistry at San Francisco State University (SFSU), where she is also Assistant

Dean for Research of the College of Science and Engineering. She attended the Westfälische Wilhelms Universität Münster (WWU Münster), Germany to receive her Ph.D. in Bioinorganic Chemistry. She also earned a BS degree and a Diploma in Chemistry at the WWU Münster. She received a NATO fellowship to undertake her postdoctoral training in bioinorganic chemistry at San Francisco State University, where she became an expert in paramagnetic nuclear magnetic resonance spectroscopy of model heme complexes. Upon joining the SFSU faculty, she initiated a successful research and teaching program. Her research was at first centered on modeling the electronic structure of heme proteins. Recognizing the importance of porphyrins and porphyrinic pigments in medicine, she started carrying out biomedical research, which laid the foundation for her current work that is centered on the syntheses of porphyrins and related compounds to develop photodrugs. Dr. Simonis has authored or co-authored more than 50 publications and three chapters in books. Her role as a researcher, educator, and mentor was recognized by the Camille and Henry Dreyfus Foundation, who awarded her the Henry Dreyfus Teacher Scholar Award.



Meeting Report: Tour of Distillery 209

Paul Vartanian

We were fortunate to schedule two tours of Distillery No. 209 at Pier 50 in San Francisco for the February California Section Meeting. The history of the Distillery No. 209 was mentioned in the February announcement, but the additional information of when it was decided to restart No. 209 as a gin distillery was revealed at the tour. It could not be made in the original No. 209 location in the Napa Valley because of local opposition to a distillery of gin, which is not a grape related product for which the Napa Valley is famous. The location at Pier 50 in San Francisco, along the waterfront south of the SF Giants ballpark, was a good choice since Arne Hillesland could be engaged as the distiller.

The distillery makes a premium gin in small batches of about 500 gallons using a still designed and built in Scotland. The copper still is heated using rather low pressure steam to keep the heating even and avoid hot spots. While the definition of gin is that it is a distilled product flavored predominately by juniper berries, the exact formula at Distillery No. 209 was developed by Arne from juniper berries and 8-12 other botanicals in-

cluding, cardamom, coriander, cinnamon, dried lemon peel, and bergamot. The tour participants were told the background of the specific botanicals Arne uses and some of the reasons specific sources were chosen. Where a plant is grown has a big effect on its final flavor. Arne buys the botanicals and his starting high proof alcohol from specific sources. He weighs out a batch of botanicals and steeps them in the mix of water (purified SF tap water) and alcohol overnight. The distillation starts early morning and takes all day. The first “head” cut and last “tail” cut are discarded. The “heart” cut of the distillation is what becomes the 209 Gin. The heart cut must be a complete thing as different parts of the final product comes off the still at different times during the distillation. Both the steam water and cooling water are in recirculating systems to conserve water and energy. The product is bottled for distribution by a team.

Wendi Webster, the gin brand manager, offered tastes of the 209 Gin and explained how it bloomed when water was added. The 209 Gin is a little less dry than some other gins and makes a good cocktail just with a splash of water. It has a hint of citrus to go with the other flavors. The participants left the tour with a new appreciation of practical distillation and gin.



Tour group of Distillery #209 led by Ginerator, Arne Hillesland

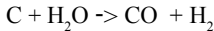


MODERATION AND COMMON SENSE, XXI

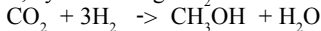
Attila Pavlath

I have just returned from an Asian tour lecturing about alternate energy resources. It is quite a different situation in the developing countries, where not

only does the population increase rapidly, but also their need for more energy to satisfy the population's demand for appliances and devices, which in the past were considered a "luxury". At many places where the smog level would be unacceptable by our standard, there is less concern for "carbon footprint". In contrast to the dearth of oil, coal is more readily available and there is less concern about its environmental effect. The question I was most frequently asked was about coal gasification. To refresh your memory, I addressed this topic at the very beginning of this series, because the world's resource of coal is five times more than that of oil. Both hydrogen and methanol can be obtained by reacting steam with coal at high temperature: which produces carbon monoxide and hydrogen.



The use of hydrogen was described earlier. It is evident that it does not add more to our energy supply regardless whether we gasify coal or electrolyze water. It allows us to drive our cars without generating smog, but its difficulty in transportability, especially in aviation, makes it a considerable problem. This is where methanol has an advantage over hydrogen, by converting CO₂ to methanol:



Just as in case of hydrogen, methanol does not increase energy supply, it just uses it a different way. It has both advantages and disadvantages. In comparison to gasoline, its energy density is about 50% and the cars would have to have larger tanks for driving the same distance. In contrast to ethanol it is

highly toxic, but it will blend easily with gasoline. In contrast to gasoline a fire can easily be extinguished with water. A methanol fire is colorless and less noticeable. During burning it also generates CO₂ but it is generated with manufactured CO₂, thus reducing atmospheric concentrations. Naturally, the question is economy. First we would have to "mine" CO₂ from the air, and then we need to generate hydrogen and finally react them according to the above equation. How inexpensively we can do this is the question which needs an answer.

Are we back to square one on the alternate energy question? It is evident we need to approach the problem without prejudice. While keeping an eye on possible long-range solutions the nuclear reactors can provide imminent relief. The 104 nuclear reactors in operation in 31 states provide only 20% of the nation's electricity. But they provide 70% power from air pollution-free sources, including wind, solar and hydroelectric dams. There is hope that the prejudice against nuclear energy is fading. The President in his State of the Union speech promised to create more clean-energy jobs by building a new generation of safe, clean nuclear power plants. It is evident that if we really want to reduce by 80% the greenhouse gases - as planned - by 2050 this is the best way to go. The Environmental Protection Agency estimates that this would require 180 new reactors to come on line. Naturally, safety and disposal of waste products are important factors, yet we have to accept that there is no zero risk solution whatever road we follow toward fulfilling the world's energy need.

For more than two years, I was writing about alternate energy. There are a few loose ends I plan to tie up before the summer break. I hope that I was already able to convey the message what the title of this series indicates. Moderation and common sense is the only available solution to our problem. I invite you to let me have your opinion - good or bad - by e-mail (AttilaPavlath@yahoo.com) or by "snail-mail" (WRRC-USDA, 800 Buchanan, Albany, CA 94710)





ELK-N-ACS

Evaldo Kothny

A note on heat exchangers and corrosion.

Twenty students in a chemical engineering class listened attentively to the professor explaining heat exchange in an industrial setting. Finally, the students got an assignment for the following class. They had to calculate the length of a heat exchanger of a given diameter, material, temperature gradient and flow parameters. Sounds familiar? Guess what? There were 20 different answers in that 1950 assignment. With this anecdotal information in mind, I clipped an article found in *Chemical Engineering* of June 1966, page 112, with the intention of repeating the calculation, which I never did because it involves higher math with integrations and derivations. The simple reason is that by being away from that sort of task, one would have to refresh for hours and hours that kind of knowledge, just to satisfy the curiosity. In practice, such problems could be solved by constructing a small model and testing it, then expand its size to the given task. However, this method is only good for laboratory purposes. Besides, each exchanger has its specific heat transfer characteristics which depends on several physical factors. The most common shape are concentric tubes and shell, however, helical inserts are also being used. These increase the contact time for a more efficient exchange of energy. Another aspect of heat exchangers is the corrosion factor. This depends on the fluids circulating on both sides of the exchanging walls. Water could be any sort of fluid selected from ground water, tap water, river or ocean water, or any sort of specially formulated water (i.e., with a biocide, chromate or molybdate to avoid fouling) or for that matter any organic or inorganic liquid or gas (i.e., air conditioners). The heat exchanger walls could be made of a variety of materials and smoothness, i.e., glass, pyrex, enameled

metal, copper, aluminum, common or stainless steel, specialty alloys. Corrosion also depends on the grain size and the intergranular impurities of such materials, smaller size grains and inclusions corrode faster. The reason for this is that impurities act as electrodes for galvanic currents. This is most noticeable at welded joints and surfaces. Also pH, dissolved oxygen, temperature, flow velocity and viscosity of the fluid has to be considered. There have been cases of generation of sound by vibration that created nodes with intensified corrosion. The worst offenders are electrolytes such as chlorides or sulfates. Chloride in contact with reducing surfaces generates oxychlorides and hydrogen whereas sulfate generates hydrogen sulfide.

(Continued on page 11)

Relief for Chile

Several organizations have mobilized to help the victims of these natural disasters.

The Chilean Red Cross is on Twitter at [@CruzRojainforma](#). Click here to translate from Spanish.

The American Red Cross pledged \$50,000 from their International Response Fund has also been providing donation information and users have been contributing additional information on the organization's blog.

The Salvation Army is responding to the earthquake both on-the-ground in Chile and internationally. The public can support these efforts by supporting The Salvation Army's "Chile Earthquake Relief Fund," where 100% of all donations will support these relief efforts.

Habitat for Humanity has an established presence in Chile and has created an online donation form to help raise funds to create shelters for displaced, low-income victims of the Chile quake. Cell phone users can also text CHILE to 25383 to donate \$10.



The Impacts of Impacts: (Part 2)

Bill Motzer

In my last article, I outlined some climatic and ecological aspects of the K-T impact as found and interpreted in the stratigraphic and fossil record, and what can be expected when another such event occurs (note the “when” not the “if”). This article basically describes events as they may have occurred from the Chicxulub asteroid impact.

Initial and Immediate impact, as shown by modeling and nuclear bomb testing, produced seismic waves ranging from Richter magnitude (M_L) 10 to 13 on the scale with an equivalent energy release (EER) of 1.0 to 100 T_t of TNT. [The largest recorded earthquake ($M_L = 9.5$) in human history occurred on May 22, 1960 at Valdivia, Chile, with an EER of 178 Gt_{TNT} . By contrast the offshore February 27, 2010 Maule, Chile earthquake ($M_L = 8.8$) had an EER of 15.8 Gt_{TNT}]. At the impact site, atmospheric over pressures of several hundred GPa occurred; resultant shock wave may have reached supersonic velocities, with wind velocities of $>2,200$ m/s). If such an impact occurred on or near land today, almost all buildings and bridges within a 200 km radius would be destroyed just from seismic shaking and atmospheric overpressures.

Thermal radiation and the resultant fires (conflagrations) were ignited both locally, from the initial fireball created by the impact, and perhaps on a continental wide basis from glowing ejecta (melt droplets) falling back through the atmosphere. Impact site temperatures $>10,000$ °C occurred, most likely produced from the rapidly rising plasma cloud that may also have radiated in the x-ray band. The calculated fireball radius was 236 km for an 18 km diameter asteroid! Thermal ground temperatures at time of impact and for the first 15 minutes in Colorado ($\sim 2,500$ km from the impact site) have been estimated at >630 °C. Wood typically burns between 425 and 980

°C with spontaneous ignition at 545 °C. Some researchers have suggested ignition of worldwide biomass wild fires from globally dispersed melt droplets and returning ejecta. Evidence for this is fossil charcoal, fullerene spherules, and polycyclic aromatic hydrocarbons (PAHs), which in large quantities are toxic. However, PAHs signatures suggest that they may have been from pyrolyzed petroleum rather than burning biomass; petroleum hydrocarbons are indicative of the Chicxulub impact area's rocks. Other researchers are not certain that global conflagration occurred.

Tsunamis >100 m in height resulted from an open ocean impact in a shallow sea because during late Cretaceous time sea levels were 150 to 200 m higher than present. By comparison, the December 26, 2004, Indonesian tsunamis generated 10 m waves. K-T tsunamis debris deposits have been reported in and around the Caribbean area. Not only were these waves immediately devastating to Cretaceous flora and fauna, but the large input of saline ocean water many kilometers inland would have inundated and contaminated thousands of hectares with salt.

Tremendous quantities of dust were also injected into the atmosphere from the enormous volume of pulverized rock caught in the impact cloud. The amount is not precisely known (~ 100 to 500 GT) because the fine particles have weathered to clay; however, it probably was considerably less than if the impact had been on land. This injected dust resulted in a global “shroud” or thick cloud cover blocking significant amounts of the Sun's radiation from reaching the Earth's surface. The dust, the aerosol effect from enormous quantities of injected SO_2 (see below), and soot from wild fires resulted in a global shroud that caused a “nuclear winter”. The global cloud cover may also have been enhanced by huge quantities of vaporized sea water, which injected OH^* and HO_2^* free radicals and chlorine, contributing to atmospheric ozone destruction. Again, by contrast, the Philippines' Mount Pinatubo injected only 10 Gt of magma as tephra and ash into the atmosphere.

(Continued on page 12)



*The hand-built copper still at Distillery 209
is modeled on one used in Scotland.*

Women Chemists Committee supports Expanding Your Horizons Career Fair together with volunteers from SFSU

On Saturday, April 27, 2010 the San Ramon Campus of Diablo Valley College hosted the Tri-Valley Expanding Your Horizons Career Fair, an event geared to motivate young women to study math and science. The event attracted around 300 interested girls, grades 6 through 9, from the Tri-Valley area. After a talk by a keynote speaker and special workshops, women scientists from organizations like Lawrence Livermore National Laboratory, Hill Medical Group, Chabot Space and Science Center, Kaiser Permanente, UC Berkeley Space Science Lab, and San Francisco State University presented activities for the middle school students. Women Chemists Committee members Elaine Yamaguchi and Margareta Séquin, together with five San Francisco State University science students (Aurore Etienne, Laura Hunt, Elisa Rosales, Robin Thirakul, and Cornelia Yao) got great interest from the Career Fair attendants with their activity on guessing plant smells and building representative molecules from kits. It was a rewarding event for the young girls as well as for the organizers and volunteers.

In The News Again: GMO

Lou Rigali

Once again Genetically Modified Organisms (GM or GMO) are in front-page news in some newspapers. Not in the US however, because we would not want to remind people that GM is not safe even though GM is now in our everyday food supply. Even the battle to require food labels for letting consumers know what they are eating is being lost. We are told GM food is safe and are told that no study has shown that our food supply and our agricultural land is in no way at risk and the declining population of bees is not related at all to the planting of GM plants or the use of GM herbicides.

And who are those providing all these comforting factlets? One is the USFDA who has allowed food companies to change wording on food labels like changing (reducing) the size of portions so that companies can advertise “Less calories or less fat (per portion) or whatever they are forced to acknowledge is bad in the product. Fortunately the food companies do not have to worry about alerting us to less nutritional benefit in each portion because..well you can guess why.

What does a label on Campbell’s tomato soup mean when it says it contains 25% less

salt. You would think that it means that the regular can of tomato soup contains more salt. But no, the regular can of Campbell’s soup contains the same amount of salt, it is however cheaper than the 25%-less-salt can. Campbell’s explanation, *25% less salt compares that soup with the average of all varieties of Campbell’s condensed soup, not just the tomato.* No comment of why the special-labeled- 25%- less-salt- soup cost more.

Back to the latest GM News. The European Union (EU) Health Commissioner, John Dalli, whose stated mandate is “Our job is to help make Europe’s citizens healthier, safer and more confident” has very recently issued the following statement regarding BASF and Monsanto GM products. “The European Commission has announced its intention to come up with a proposal by the summer to allow more choice to Member States in deciding whether to cultivate GMOs. Under the current legal framework, as decided by the Council and the European Parliament, the Commission has adopted two decisions concerning the Genetically Modified Amflora potato: the first authorizes the cultivation of Amflora in the EU for industrial use, and the second relates to the use of Amflora’s starch by-products as feed. The

(Continued on page 11)



Ranchers finding some benefit to GMO fed animals.*

(Continued from page 10)

European Commission also adopted today three decisions on the placing on the market of three GM maize (Monsanto) products for food and feed uses but not for cultivation. All five authorizations were subjected to the highest scrutiny, ensuring that all concerns regarding the presence of an antibiotic resistance marker gene are fully addressed. The Decision to authorize the cultivation of Amflora is the end of a process which started in Sweden in January 2003 and is based on a considerable volume of sound science.”

While it may be implied, you will notice that nowhere in the Commissioner’s statement does it say that these products cause no harm to humans, animals and the environment. There are those who say, either naively or self-servingly, that no study has show proof that GM is risky or dangerous. Even if that is true, it begs the question. What independently or company- financed, long term study has been done on the effects and consequences over a lifetime of eating GM products?

As you may have guessed, there is opposition in Europe by its citizens and some governments to Commissioner Dalli’s authorization.

Opponents of this decree by the EU Ministry in Brussels refer to a 2007 and 2009 analysis of the 2003 study by Monsanto, “A Comparison of the Effects of Three GM Corn Varieties on Mammalian Health” by Seralini et.al., *Int J Biol Sci* 2009; 5:706-726, <http://www.biolsci.org/v05p0706.htm#heading>. The Monsanto study used rats fed with GM maize for 90 days. The data was analysed and the conclusion presented by Monsanto was that their product was safe.

Using Monsanto’s own raw data, the Seralini analysis indicated that the Monsanto analy-

SURPRISE
our editor by calling and saying you appreciate the quality and content of our newsletter. Our editor works hard to maintain a publication of interest to our membership. Oh, and by the way you could also give credit to our advertisers who financially support us.

sis and conclusions were flawed and that there was kidney and liver damage and an adverse gender issue that was not properly addressed by Monsanto. The confidential raw data was obtained through a European court action. <http://www.greenpeace.org/raw/content/espana/reports/el-caso-mon863-cr-nica-de-un.pdf>.

Daniel A. Goldstein, M.D., Director, Monsanto Medical Sciences and Outreach has published a rebuttal <http://blog.monsantoblog.com/2010/01/12/monsanto-addresses-study/> that among other points claims that nontraditional statistical methods to reassess toxicology was incorrect and expert scientific reviews by global authorities and regulatory agencies were ignored. Of course there are rebuttals to the rebuttal <http://dissentvoice.org/2010/01/three-approved-gmos-linked-to-organ-damage/>

Who to believe? Can any results from a 90 day study be used to justify or demonstrate the lack of biological risk of a food product? Can one trust any company, regulatory agency, or individual who so advocates? Are the foxes and their cousins guarding the hen house?

* April Fool



(continued from page 7)

In such situations, surfaces can be protected with a galvanic countercurrent obtained with a sacrificial electrode of zinc or magnesium.

Corrosion analysis is a very interesting and practical subject, since corrosion is one of the largest destroyer of metals in the world. Probably inspired by the oxidation of railroad tracks, a steel monument was erected with the inscription: “while you read this sign, about 800 kilograms of steel - the size of this monument - will oxidize worldwide by corrosion”. Anyone of our readers remember where it is placed?



(Continued from page 8)

Aerosol effect of SO_2 : Atmospheric model estimates suggest that perhaps 75 to 270 Gt of sulfur, from impact in gypsum-rich ($\text{CaSO}_4 \cdot n\text{H}_2\text{O}$) sediments and sedimentary rocks, were instantly injected into upper atmosphere depending on the impactor's actual size. This sulfur was subsequently oxidized to SO_2 , SO_3^{2-} , and SO_4^{2-} . By contrast, anthropogenic SO_2 emissions that peaked in the mid 1980s have been estimated at 80 Mt per year and natural SO_2 emissions (e.g., volcanoes) at 25 Mt per year. Mt. Pinatubo's June 1991 eruption injected only 20 Mt of sulfur into the atmosphere.

SO_2 and SO_4^{2-} -bearing aerosols are strong long wave radiation absorbers resulting in initial stratosphere heating with subsequent cooling of the Earth's surface. Studies related to SO_2 aerosol cooling effect from the Mount Pinatubo volcanic eruption (at -0.5°C) suggest that such cooling is enough to impact the Earth's surface and shallow seas but not deeper oceans, which have the higher heat capacity capability that ultimately affects Earth's climate. However, global climate cooling would not have lasted for a long period because SO_2 would soon have "rained out" (see acid rain below). Therefore, it is believed that sulfur aerosol effects and associated global cooling lasted for a relatively short period, perhaps only decades to a few hundred years. Sulfur aerosols can also deplete global ozone, resulting in a substantial increase in UV radiation reaching the Earth's surface.

CO_2 atmospheric input was significant because impact occurred in an area with carbonate-enriched sediments and rocks (limestone), particular to Yucatan Peninsula geology. CO_2 levels probably increased by a factor of 2 to 10 and there may have been additional CO_2 dissolution from the ocean's photic zone. Prior to impact, end-Cretaceous estimated CO_2 levels were ~ 850 ppmv. The additional impact-released CO_2 would have caused an enhanced greenhouse effect perhaps raising surface temperatures from 2 to

10°C for a period of 10,000 to 100,000 years. How long the increased CO_2 levels (to 8,500 ppmv?) persisted is not precisely known but the fossil record shows that by the early Neogene (60 Ma), CO_2 levels declined to end Cretaceous levels. (See The Vortex December 2007: Where has all the Carbon Dioxide Gone?)

Heavy acid rain produced from the oxidizing/fusing effect of the impact fireball produced nitrous oxides (NO_2 and NO_3) from atmospheric nitrogen. As previously noted, large quantities of SO_2 , SO_3 , and SO_4 were also injected into the atmosphere. Both the nitrogen and sulfur oxides then combined with water vapor. The resultant rain out was a solution of nitrous/nitric acid and sulfurous/sulfuric, but the pH of this rain is not known ($< \text{pH } 3$ or $4?$) or easily revealed in the fossil record. However, there are indications that rock weathering significantly increased at this time. More recently, some researcher's doubt the importance of acid rain, suggesting that it was neutralized by larnite ($\beta\text{-Ca}_2\text{SiO}_4$) produced in ejecta specific to Chicxulub's area lithology. Therefore, the biosphere acid-rain effect would not have been long, perhaps lasting only a decade or two.

Biota poisoning by metals is unknown but could have occurred if the impactor was a nickel-iron asteroid. However, evidence for heavy metal poisoning in not particularly evident in the fossil record except for the large Ir anomaly at the K-T boundary.

In Part 3, I will summarize the importance of understanding the environmental/envirochemical effects of asteroid/comet impacts and what we can do to avoid such a calamity.



(Continued from page 3)

Finally, the Educational Grant Committee makes grants to high schools for equipment and activities not funded by their districts. Bryan Balazs has chaired this committee for many years with excellent results.



April Historical Events In Chemistry

Leopold May

April 1, 1860 T Sergei N. Reformatsky was born on this date. He synthesized organozinc halides (Reformatsky reaction)

April 4, 1939 Synthesis of Vitamin B6 was announced by Merck, Sharp & Dohme on this date.

April 9, 1930 F. Albert Cotton, a researcher in inorganic and structural chemistry, was born on this date.

April 11, 1899 Seventy-five years ago in 1935, Percy L. Julian synthesized physostigmine with Josef Píkl. In 1953, he founded Julian Laboratories, prepared intermediates for commercial production of steroid hormones and was the first black chemist member of National Academy of Sciences. He was born on this date.

April 13, 1760 Two hundred and fifty years ago, Thomas Beddoes was born on this date. He studied medical treatment of disease by the therapeutic inhalation of different "factitious airs" or gases and vapors and established Pneumatic Institution for Inhalation Gas Therapy in 1798.

April 15, 1710 Three hundred years ago on this date, William Cullen was born. He was the first to notice that heat is produced during compression of a gas.

April 16, 1921 Marie M. Daly, the first black woman to earn a PhD in chemistry in 1948 at Columbia University, was born on this day.

April 18, 1864 Samuel C. Hooker was a sugar chemist, who was born on this day.

April 21, 1889, Paul Karrer was born. Seventy-five years ago in 1935, he synthesized Vitamin B2 (riboflavin). He synthesized vitamins A in 1931 and E (tocopherol) in 1938. In 1937, he shared the Nobel Prize in Chemistry for his investigations on carotenoids, flavins and vitamins A and B2 with Walter N. Haworth for his investigations on carbohydrates and vitamin C.

April 21, 1960 One hundred and fifty years ago, Aleksandr Oparin died. He did studies on the origin of life from chemical matter and

extended the Darwinian theory of evolution backward in time to explain how simple organic and inorganic materials might have combined into complex organic compounds. He was born on February 18, 1894.

April 21, 1970 The first Earth Day was founded by Sen. Gaylord Nelson, Father of Earth Day and organized by Denis Hayes on this date. It is celebrated by ACS on April 22

April 24, 1817 Jean C. de Marignac, who was born on this date, discovered gadolinium in 1880.

April 27, 1896 Seventy-five years ago in 1935, Wallace H. Carothers developed Nylon. He was born on this date.

April 28, 1954 Fifty years ago, Champion International was incorporated on this date.

April 29, 1870 Atlantic Richfield Co., was incorporated on this day.

April 30, 1897 Joseph J. Thomson announced the discovery of the electron as a body smaller than and a constituent of all atoms on this date.

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



Relief for Haiti

Here are a number of organizations that you can Google that are accepting cash and in-kind donations: World Vision, Clinton Bush Haiti Fund, UNICEF (1-800-4UNICEF), Direct Relief, Yele Haiti, Partners in Health, Red Cross, World Food Program, Mercy Corps (1-888-256-1900), Save the Children, Lambi Fund, Doctors Without Borders, The International Rescue Committee, Care, William J. Clinton Foundation, Meds & Food For Kids, Feed the Children, Habitat for Humanity, Mayor's Fund for NYC, National Voluntary Organizations Active in Disaster (National VOAD), Interaction, International Medical Corps.

BUSINESS DIRECTORY

vacuubrand

Five Decades of Vacuum Innovation

Chemical Resistant Vacuum Gauge

VACUUBRAND's new DCP 3000 Pirani vacuum gauge is designed for applications like Schlenk lines, short-path distillation, lyophilization, and high-boiling-point solvent evaporations that use vacuum in the 10^{-1} to 1 mbar/Torr range. The gauge accepts up to 8 sensor inputs.

The innovative VSP 3000 gauge head isolates the sensor wire from corrosive gases, improves accuracy, and protects the sensing filament from mechanical and pressure shocks. The result is a rugged, long-life gauge head that's a perfect complement to your oil-sealed, rotary vane pump.

Call for a demo today!



DCP 3000 + VSP 3000
vacuum gauge

VACUUBRAND, INC. www.vacuubrand.com

Tel 860-767-5341 Fax 860-767-2563 Cust. Service 888-882-6730

ACS Career Fair

Spring National Meeting, 2010

The Career Fair provides ACS members the opportunity to meet with employers and discuss potential job opportunities, as well as enhance their professional development by participating in mock interviews, resume reviews and attend over 30 career-oriented workshops.

Moscone Convention Center - West Hall, Level One. Sun., March 21: 10:00 a.m. - 5:30 p.m., Mon., March 22 - Tues., March 23: 8:00 a.m. - 5:00 p.m., Wed., March 24: 8:00 a.m. - 12 noon

All job seekers must be registered for the ACS National Meeting. To participate in the ACS Career Fair:

1. Log into your account. (New users need to create an account.) Upload your resume.

2. Search and apply for jobs by field of specialization, work function, employer, etc. before the meeting.

3. Request interviews.

4. Check your account regularly for appointments.

5. Job seekers are encouraged to abide by the ACS Career Fair Code of Conduct.

The Career Fair is open to ACS members. All members must display a meeting badge to gain access to the Career Fair.

Members who have had their membership status changed to receive a 2010 unemployment dues waiver are eligible for a waiver on registration fees for the national meeting. Direct questions about your membership status to ACS Member & Subscriber Services at 800-333-9511 (US only); 614-447-3776 (outside the US); or email: service@acs.org.

BUSINESS DIRECTORY

RECRUITING WEB SITE LISTING DIRECT TO YOUR SITE

There are two important ways to recruit through our services. One is to place a print ad in the Vortex. The other is to place a web site ad reaching out to 40,000 ACS members. We recommend using both low cost methods.

You can view both of these opportunities by going to the link below. Who uses these options?

- Companies for lab, management and sales personnel
- University & College teaching positions
- Hospitals for technical and research personnel

We can provide more qualified resumes because of the highly targeted technical audience.

info -- www.mboservices.net



NEW ERA ENTERPRISES, INC.
NMR-IR/FTIR-UV-VIS-FL
sampling supplies & accessories

Three major catalogs / pricing to view
and download from
www.newera-spectro.com

One source for Spectroscopic
Sampling Supplies

CAGE Code: 44ME9
DUNS: 556785657

1-800-821-4667 cs@newera-spectro.com

TELL OUR ADVERTISERS

Advertisers want to know if their ads are working. When you call or write them, tell them you saw their ad in The Vortex. This will allow us to increase the amount of articles that you have asked for.

ELEMENTAL ANALYSIS

- ◆ C,H,N,O,S,P ◆ Halogens
- ◆ Ash ◆ Metals ◆ TOC ◆ TOX
- ◆ BTU ◆ ICP ◆ ICP/MS ◆ IC

Custom Analysis ◆ Problem Solving

HUFFMAN

Laboratories, Inc
Quality Analytical Services Since 1936

4630 Indiana Street Golden, CO 80403

For: 303-278-4455 Fax: 303-278-7012

Chemistry@huffmanlabs.com
www.huffmanlabs.com

NMR Service 500MHz

*Mass

*Elemental Analysis

NuMega Resonance Labs

numegalabs.com P-858-793-6057

INDEX OF ADVERTISERS

Recruitment	15
ACS Vortex	11&15
Bay Bioanalytical Lab. Inc	BP
Columbia Analytical Services	2
EMD	2
Huffman Labs	15
Mass Vac	2
New Era Enterprises, Inc	15
NuMega Resonance Labs	15
Robertson Microlit	BP

**L^B Bay Bioanalytical
Laboratory, Inc.**

A Contract Analytical Lab Serving
the Pharmaceutical Industry since 1991

HPLC Methods Development & Validation
GC/MS UV-Vis Polarimetry Karl Fischer

**LC/MS/MS Support for
Drug Discovery & Development**

- State-of-the-art equipment
- Fast turn-around times

Services Include:

- Quantitation
- MW Determination
- Structural Elucidation
(unknowns & impurities)
- Proteomics

BBL is cGMP/GLP compliant & FDA inspected
551A Linus Pauling Dr. Hercules CA 94547
phone: 510-724-8052 fax: 510-724-8053
chemists@baybiolab.com
www.baybiolab.com

Non-Profit Organization
U.S. POSTAGE
PAID
Permit No. 2346, Oakland CA

TIME VALUE

CALIFORNIA SECTION
AMERICAN CHEMICAL SOCIETY
2950 Merced St #225
San Leandro CA 94577

PLEASE DO NOT DELAY - DATED NOTICE INSIDE



Robertson Microlit Laboratories

Where speed and accuracy are elemental

Elemental CHN, S, X, Analysis (some day service)

Metals by ICP-OES, ICP-MS, A/A

FTIR, UV/VIS Spectroscopy

Ion Chromatography

Bioavailability

Polarimetry

DSC, melting point

KF Aquametry, Titrimetry

P.O. Box 927 • 29 Samson Ave. • Madison, NJ 07940 • 973.966.6668 • F 973.966.0136
www.robertson-microlit.com • email: results@robertson-microlit.com

Rapid Results • Quality • Accuracy • Competitive Pricing