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Alex Madonik participating in the Cal Science & Eng. Festival

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Volume LXXII

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Number 2



Chair's Message

Bryan Balazs

The California Section has had a long history of involvement with the Chemistry Olympiad, ably led each year by Al Verstuyft and several other volunteers from

both our section and the Santa Clara Valley Section. The Olympiad is an annual high school level competition, and it is part of the selection process leading up to the international version, the International Chemistry Olympiad (IChO). On a Saturday in late April, students from high schools in numerous ACS sections across the country take almost a full day of exams, with both a written set of questions and a set of laboratory-based questions. After scoring all of the exams, a group of about 20 students is selected to attend a chemistry study camp, hosted in June at the U.S. Air Force Academy. During the camp, the final IChO team members plus alternates are selected.

At the IChO each July, about 70 countries participate, typically fielding teams of four students each. The exam consists of a demanding set of questions that tests the students' laboratory skills as well as their theo-

retical understanding of a wide variety of chemistry principles. In between the exams, the students are treated to tours, hands-on cultural activities, banquets, and visits by dignitaries. Last July in Tokyo, the four students of the U.S. team had an exceptional performance, bringing home two gold medals, one silver medal, and one bronze medal!

The U.S. has been selected to host the 2012 IChO, and planning activities are ramping up for this event, to be held July 21-30, 2012, at the University of Maryland. The 2012 date happens to coincide with the 20th anniversary of the only previous IChO hosted by the U.S., in 1992, and we are especially fortunate that Dr. Ahmed Zewail, 1999 Nobel Laureate in Chemistry, has agreed to be the President of the 2012 Olympiad. And, as if I didn't have enough to do, I have agreed to be the Chair of the organizing committee for this event, which is responsible for coordinating the logistics, scheduling, language issues, and cultural sensitivities associated with hosting almost 300 students, along with their mentors, guests, guides, translators, etc.

For information specific to the upcoming 2011 IChO, see: <http://icho43.metu.edu.tr/>. And, if you're interested in the 2012 event,

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*ACS California Section
and
The San Francisco Section
of the Electrochemical Society
February 2011 Joint Meeting*

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

Dr. James Postma, 2011 ACS CA Section Chair-Elect

Date: Tuesday, February 15, 2011

Time: 5:30 - 6:00 pm social, 6:00 - 7:00 pm dinner, 7:00 - 8:00 pm lecture

Place: Francesco's, 8520 Pardee Drive (at Hegenberger Road), Oakland See:

<http://www.francescosrestaurant.com/>

Cost: Dinner selections are \$29 for Chicken Santa Fe (with mild salsa and guacamole and Monterey Jack cheese) or \$25 for Vegetable Manicotti with a four cheese blend. All meals include a salad, fresh vegetables, Mostaccioli with Napolitana sauce (served family style), dessert, tea and coffee, and all taxes and gratuities. There is no cost for attending only the presentation. For Reservations: Please indicate your dinner preferences by email to office@calacs.org, or call the office at (510) 351-9922. If mailing a check in advance, please mail checks made out to "California Section ACS" to the Cal Section office, 2950 Merced St. #225, San Leandro CA 94577, postmarked no later than Wed. February 9, 2011. (Due to need to provide a head count for Francesco's, dinner reservations at the door cannot be accepted).

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. For more background on a previous version of this talk, see: http://www.chicoer.com/ci_16803820?source=email

Biography:

Dr. Postma is a professor of Chemistry at Cal State University-Chico. He received his PhD in physical chemistry from the University of California, Davis and then returned to join the faculty of the CSU, Chico chemistry department in 1982. He teaches general, physical, and analytical chemistry courses as well

as having served as department chair from 1998 to 2004. Professor Postma is the co-author (along with Julian L. Roberts and J. Leland Hollenberg of the University of Redlands) of Chemistry in the Laboratory, a widely used laboratory text for freshman general chemistry courses, and he is the chief science officer of a local start-up company, Advanced Light Technologies.



(Continued from page 3)

our preliminary web page is up at <http://www.icho2012.org/>.

We are always looking for California Section members to assist in the local competition in April, so let me know if you are interested. It's an impressive group of budding chemists, and well worth a Saturday of your time!



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Thursday March 10, 2011 | 2pm-3pm EST

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Dr. Dawn Mason and Dr. Catherine Hunt

Thursday March 17, 2011 | 2pm-3pm EST

CSI Reality: Chemistry in the Crime Labs

Get the inside scoop from an FBI chemist! Learn the different disciplines within forensic chemistry, and hear an in-depth perspective of day-to-day life in a forensic laboratory.

Dr. Jason Schaff

Thursday March 24, 2011 | 2pm-3pm EST

Know Your Drugs - A Pharmacology Primer for Chemical and Life Science Professionals
Learn insights into how pharmacology can help guide your structure-activity relationships in discovery chemistry, and what assays can (and can't) tell you.

Dr. Terry Kenakin

Thursday March 31, 2011 | 2pm-3pm EST

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Dr. Charles Bamforth

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Save the Dates

- * Today's Job Search Strategies - Tuesday March 1, 2-3pm
- * Resume Writing for Scientists - Tuesday March 8, 2-3pm
- * Sharpening your Interviewing skills - Tuesday March 15, 2-3pm
- * Get the most from the Anaheim ACS National Conference and Career Fair - Tuesday March 22, 2-3pm

What You Will Learn

- * Follow the changing times - Where to target the job market
- * Sell yourself on paper - Preparing an effective résumé
- * Make an impactful impression - Insider interview tips
- * Secure that offer and choose between multiple job offers
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Lisa Balbes, founder, Balbes Consultants and author, Nontraditional Careers for Chemists.

John Engelman, project manager and formulator, S. C. Johnson & Son, Inc.

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Cal Science & Engineering Festival Report

The Cal Science & Engineering Festival at UC Berkeley on Sunday January 23 was a great success. There were over a thousand visitors. At least half of them crowded into the lecture room sometime between 11 AM and 3 PM to watch Dr. Alex Madonik present various fun chemical demonstrations. There were nonstop hands-on activities for children as they examined pH changes during electrolysis of water and then using a bicycle pump to pressurize a five gallon water bottle and sent chemiluminescent Cartesian divers to the bottom of the bottle.

Alex presented demonstrations every 15 or 20 minutes that included burning a candle in a bottle, plus the ever-popular methanol flame in a really big bottle (another five gallon polycarbonate water bottle). See picture on page 13.

Also exhibited were "Technology Milestones in Chemistry" posters describing chemistry's contributions in four areas: En-

(Continued on page 9)

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The First Chemists (Part 3)

Bill Motzer

In parts 1 and 2 (*The Vortex*: December 2010 and January 2011), I discussed the ancient

Egyptian's ability to understand and use chemical principles in the manufacture of pigments such as Egyptian blue. The ancient Egyptians also had very practical physicians who were renowned and even revered throughout the ancient world because the study and practice of medicine was vital to their civilization. [The 1954 epic film "The Egyptian" starring Edmund Purdum, Jean Simmons, and Victor Mature depicts the life of an Egyptian physician during the reign of Amenhotep IV aka Akhenaten (1353 to 1336 BCE or 1351 to 1334 BCE)]. Throughout their history, the ancient Egyptians were particularly concerned with cleanliness and disease because their population was largely concentrated in a tropical to arid climate along the Nile. The populous (believed to have peaked at 6 million) suffered from many ailments typical to tropical climates such as schistosomiasis (caused by worms), influenza, tuberculosis, and malaria. Pneumonia was also a common occurrence believed to be from excessive amounts of sand and dust taken into the lungs.

We know much of this from ailment descriptions translated from numerous medical papyri, inscriptions and depictions on temple and tomb walls and from analysis of mummies (for example, immunological tests and DNA sequencing performed on mummy tissues dating back to 3200 BCE show evidence of malaria infection from the parasite *Plasmodium falciparum*). In addition, medical books written by Greek and Roman physicians credited the ancient Egyptians. According to a report known as the Berlin Papyrus No. 154, an ancient Egyptian doctor described a patient's symptoms as:

"The patient suffers a great epigastric pain. He feels a heavy, hot and inflamed body. He complains of being unable to tolerate his clothes and feels they do not warm him. He

feels thirsty during the night. His saliva has the taste of unripe fruits. His muscles pain him as if he walked for a long distance."

To treat such ailments, ancient Egyptian chemists (the first pharmacologists?) equally excelled in preparing and extracting drugs from plants, animals, minerals, and foods. We know this from recipes contained in medical papyri, such as the Ebers Papyrus, which contains the most information on drug remedies naming over 900 specific drugs. Numerous drugs have also been identified from cross references with non-medical papyri, drawings, and in a few instances from analysis of labeled jar remnants. Ancient Egyptian doctors dispensed such drugs in the form of pills, ointments, and drops.

Plant-derived ancient Egyptian pharmacopoeias were both herb- and food-based, many being derived from vegetables. Headaches and crying babies were treated with crushed poppy seeds, the use of which has been confirmed by recent investigations. Poppy seeds commonly contain morphine with concentrations up to 294 mg/kg. A minimal adult oral dose of morphine is 10 mg/kg. Morphine's sedative properties are well known and a poppy seed extract to stop babies from crying as prescribed by ancient Egyptian physicians may well have been an effective drug. Other medications included the use of bark and leaves of willow trees used to reduce infection and inflammation (e.g., the basis for modern aspirin or acetylsalicylic acid); dill, balsam, apple, onions, and parsley used in diuretics and laxatives; and aloë used to treat burns and skin diseases.

Minerals included malachite [$\text{Cu}_2\text{CO}_3(\text{OH})_2$], a green mineral used both cosmetically and medicinally. It was applied and worn as an eye shadow and would have protected against eye infections from organisms such as *Pseudomonas aeruginosa* (a gamma proteobacteria) and *Staphylococcus aureus*, for which it has potent bactericidal effects. Malachite may also have been the active ingredient described in the Ebers Papyrus for 39 drug mixtures used for treat-

(Continued on page 9)

(continued from page 8)

ment of eye and open wound infections.

Foods such as honey were used in wound dressings because honey is a natural antibiotic. Recent studies have confirmed honey's antiseptic properties when applied to wounds, noting that it also has a demonstrable anti-fungal effect. Other foods used included bread, which was a common food in ancient Egypt. Moldy bread was regarded as one of the best treatments for intestinal ailments, diseases of the bladder, and for purulent wounds. It seems that ancient Egyptian doctors recognized the antibiotic benefits produced by bread moulds without understanding their mechanism of action. Recent analysis of ancient Nubian mummy bones and Nubian beer showed detectable concentrations of the antibiotic tetracycline. Ancient Nubian beer is believed to have been produced from either moldy grain or bread and such beer has been reproduced by the researchers from ancient recipes; it is green and tastes sour but the consumption of such beer may have imparted an unrealized treat-

ment for the many bacterial diseases.

The ancient Egyptians were keen observers of their world having 30 centuries to describe and use their knowledge human anatomy and diseases. Although they did not conduct double blind studies for the medicines they created, they were able to treat numerous ailments and disorders common to their time. Even today, their knowledge and research is impressive and their work paved the way for modern chemistry, medicine, and pharmacology.



(Continued from page 7)

ergy & Transportation, Communication & Information, Health & Medicine, and Food & Agriculture prepared by Attila Pavlath for the International Year of Chemistry.

A special thanks to Lily Lew, Chair of the Younger Chemist Committee for all the photos.

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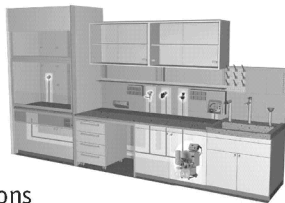
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Some 2010 ACS Highlights

Marinda Li Wu, ACS Director-at-Large

The ACS Board welcomed the 2010 December Board meeting newly elected members — President-elect Bassam Shakhashiri, District II Director George Bodner, District IV Director Larry Krannich, and Directors-At-Large Kathleen Schulz and Kent Voorhees (re-elected).

Despite a challenging economic environment, ACS remains strong financially and ended 2010 with a favorable balance. The probable Net from Operations is \$20.1M which is \$8.1M favorable to the 2010 Approved Budget. Much of this anticipated favorable balance is attributed to cost containment initiatives implemented in 2009 including an extended hiring freeze lifted in April 2010 and strategic expense reductions with minimal impact on member services and products.

The Governing Board for Publishing announced last November, the upcoming new journals from ACS Publications and improvements to Sci-Finder from Chemical Abstracts Services. C&EN Archives recently launched online of a complete history of the chemistry enterprise from 1923-2010.

Other new information resources launched in 2010 by ACS can be viewed at www.acs.org/PrizedScience and www.middle-school-chemistry.com. Both of these valuable resources can be shared with schools in your local communities.

The ACS Network continues to grow as a free forum for chemists and scientists worldwide to connect, communicate and collaborate online. Visit www.acs.org/acsnetwork to check out new features added. This past fall, all ACS members were included in the ACS Network with an option to opt-out. The ACS Network now has 170,000 plus members with over 20,000 from overseas since non-ACS members are also welcome to join.

The ACS Comment on “Chemistry Ambassadors Go Global!” (C&EN, Sept. 13, 2010) describes how chemists worldwide can help talk to nonchemists about the wonderful things that chemistry brings to the world. The Chemistry Ambassadors program is growing with over 6,000 members signed up,

although many more of our members have been active “chemistry ambassadors” for years. At great Regional ACS meetings and elsewhere this past year, some of these fabulous “chemistry ambassadors” can be found. They visit school districts and their local communities. Please see www.acs.org/chemistryambassadors for helpful resources to share with others.

Please help spread the word about “ACS on Campus” in the Jan.19 issue of C&EN. This is a wonderful new program from ACS Publications that helps ACS connect with students, faculty, and science libraries across the nation. See <http://pubs.acs.org/tr/acsoc> for more details. In these challenging times it is most rewarding to help not only students but mid-career chemists with their resumes and job searches in these challenging times.

One additional highlight to mention among many for 2010 includes ACS advocacy efforts at both the national and local levels on behalf of funding and support for R&D and K-12 STEM (science, technology, engineering and mathematics) education. At the state level, our CAL-GALA (California Government Affairs and Legislative Affairs) is happy to see that a Task Force on STEM Education will be established at the state level by the state legislator who was recently elected as the new State Superintendent of Public Instruction. With the recent changes in Congress, it will be more important than ever for ACS to advocate on behalf of science and technology.

Personally, thanks to our countless ACS volunteers, dedicated ACS staff, and all their families without whose efforts and support none of the above would be possible. Please contact me at (m.wu@acs.org) with any feedback or suggestions on how ACS can be of more help.

As chemists, one can look forward to celebrating the many achievements of chemistry during the International Year of Chemistry (IYC 2011). Visit www.acs.org/iyc2011 for exciting ideas and details. Again, any suggestions are always welcome!



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Professional Growth Strategies for Applied Chemical Technology Professionals
with Mary Moore and John Engelman

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February 1, 2011 2pm-3pm EST

Fundamentals of Effective Science Writing: Manuscripts and Grants

with Dr. Kristin Sainani, Stanford University

acswebinars.org/Sainani

To improve one's technical writing is to improve one's entire career. Join this webinar to discover ways to communicate your ideas more clearly and effectively, get more of your papers published, and win that major grant!

February 3, 2011 2pm-3pm EST

Chemists in Love: Strategies and Tactics for a Dual Career Relationship

with Drs. Al and Carolyn Ribes, Dow Benelux

acswebinars.org/Chemistsinlove

To succeed in the laboratory of love, it may take more than the chemistry that brought you together. Lucky for you, the love chemists are in!

February 10, 2011 2pm-3pm EST

Chemistry without Borders - Immigration for International Scientists

With Martin Lawler, Lawler & Lawler

acswebinars.org/lawler2011

Foreign-born scientists and scholars have and continue to contribute to the technical wealth and economic growth in the US. Join our webinar to learn about paths to legal citizenship in the United States.

February 17, 2011 2pm-3pm EST

Employment Trends: Past, Present and Future

With Gareth Edwards, American Chemical Society

acswebinars.org/employment2011

Layoffs, restructuring, and unemployment are now the headline news to watch. Hear from ACS and Bureau of Labor Statistics analysts as they describe recent trends in unemployment and provide projections about the future of employment in the chemical enterprise.

February 24, 2011 2pm-3pm EST

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“Technology Milestones in Chemistry” posters



Electrolysis Demonstration



Alex Madonik, Kate Markham, Vedud Purde, Roxana Farjadi, Margareta Sequin



Oops, that is a really big flame

February Historical Events In Chemistry

Leopold May

February 3, 1900

Crompton & Knowles, Inc., was incorporated on this date.

February 5, 1914

Alan L. Hodgkin in 1963 shared the Nobel Prize in Physiology or Medicine with J. C. Eccles and A. F. Huxley for ionic mechanisms involved in excitation and inhibition in the peripheral and central portions of the nerve cell membrane. He was born on this date.

February 8, 1777

Two hundred years ago, Bernard Courtois, who discovered iodine (I, 53) in the liquor from the lixiviation of kelp, was born on this date.

February 11, 1894

Izaak M. Kolthoff, who was born on this date, performed important research in analytical chemistry. His book written with E. B. Sandell is a standard reference in this field.

February 14, 1961

Fifty years ago, Lawrencium (Lr, 103) was produced at University of California, Berkeley, on this date.

February 16, 1886

One hundred and twenty-five years ago, Robert R. Williams, Jr., was born on this date. He was a telephone company researcher who in his spare time developed ways to synthesize vitamins. For the Process for Obtaining Vitamins, Patent Number 2,049,988, he was made a member of the Hall of Fame of Inventors. He isolated thiamine in crystalline form in 1933 and synthesized vitamin B.

February 17, 1838

Friedrich K. Beilstein, who published what is now known as the standard reference work on organic chemistry and has been updated

ever since 1880, was born on this date. It can now be accessed on line.

February 19, 1764

Two hundred years ago in 1811, Gottlieb Sigismund Kirchoff applied the first controlled catalytic reaction to produce glucose from starch. He developed a method for refining vegetable oil and established a factory in St. Petersburg capable of producing two tons per day. Also, he experimented with brewing and fermentation and was born on this date.

February 20, 1836

One hundred and seventy-five years ago, Isaac Adams, Jr., who was born on this date, was a pioneer inventor in nickel plating.

February 23, 1886

One hundred and twenty-five years ago on this date, Charles M. Hall was the first to produce electrolytic aluminum in his woodshed laboratory at his family's home.

February 26, 1903

Giulio Natta, who was born on this date, discovered and elucidated stereospecific polymerization and stereoregular polymers; and developed commercially important polymerizations.

February 28, 1814

Philip Hench shared the Nobel Prize in Medicine in 1950 with Edward Calvin Kendall and Tadeus Reichstein for their discoveries relating to the hormones of the adrenal cortex, their structure and biological effects. He was born on this date.

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



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