THE OCTAGON

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In This Issue:

806th Meeting of the LVACS
Cedar Crest College

Thursday February 26, 2009

Location: Cedarcrest College - Harmon Hall of Peace and Lachaise Gallery
Reception: 6:00 PM beverage, cheese, and crackers
Dinner: 6:30 PM
Menu: Chicken Piccata, green beans w/red peppers, roasted redskin potatoes, dessert and coffee. Vegetarian choice is Mediterranean pasta

Menu: At the conclusion of dinner-
Cost: $20.00 ($10.00 for students and retirees)
Reservations: Lesley@cedarcrest.edu by Friday February 20, 2009. Please give full name, affiliation and phone number/e-mail
Directions: Visit the Cedar Crest website at www.cedarcrest.edu

Speaker: Brian Gestring - Assistant Professor – Chemistry & Physical Sciences/ Forensic Science Program

Brian Gestring is currently an Assistant Professor with the Forensic Science Program at Cedar Crest College in Allentown, PA. Prior to becoming an academic, Professor Gestring has worked as a: Death Investigator, DNA Analyst, supervisor in a Crime Scene Reconstruction unit, supervisor in the World Trade Center Identification Unit, and a television consultant for Law & Order and Cosby Mysteries. Throughout his professional career he has also worked as a Forensic Science Consultant on active casework in the areas of Trace Evidence, Crime Scene Reconstruction, Forensic Photography and Crime Laboratory Management. He is a fellow of the American Academy of Forensic Sciences (AAFS), President of the Council on Forensic Science Education (COFSE), and a member of the International Association of Identification (IAI) national and New York chapters. He also still holds certification from the IAI as a Senior Crime Scene Analyst. Professor Gestring has taught at three Forensic Science Programs in the North East. At Pace University, he created and developed the Undergraduate and Graduate Forensic Science Programs which he directed for their first five years. He is currently the most senior site evaluator for the Forensic Science Education Program Accreditation Commission (FEPAC) and has served the American Board of Criminalistics (ABC) as a member of the Examination Committee for the Forensic Science Aptitude Test (FSAT).

Talk: The Past, Present and Future of Forensic Intelligence

Upon their first meeting, the slender man with the intense stare and the eagle like face pronounced "you came from Liberton. You drive two horses, one gray, and one bay, and you are probably employed by a brewery." After all the assumptions were confirmed and the man from Liberton left, the slender man explained himself. "I saw the clay from Liberton on the fellow's boots. He had gray hairs on one sleeve and bay

hairs on the other. As for my final bit of deduction, you probably observed the face, especially the nose."

While this exchange has all the hallmarks of the most famous fictional detective, it was neither Sherlock Holmes nor fictional. It was only one of many accounts of the keen observational and interpretative skill of a Scottish physician named Dr. Joseph Bell. This account was originally recorded by Hesketh Pearson. Dr. Bell used what he termed as "the method" every day as he treated patients and taught medical students like the young Arthur Conan Doyle.

Dr. Bell's keen insights did more than just help his patients and provide the inspiration for Conan Doyle to create Sherlock Holmes. Since the 1870's, Dr. Bell used his talents to aid the crown with criminal investigations. He continued on this path for nearly 20 years. For a time he was even involved with the Jack the Ripper investigation. The discretion Dr. Bell exercised regarding his involvement in these cases has resulted in a lack of appreciation for the central role he played in fostering the scientific investigation of crime.

As more of the historic literature in Forensic Science is explored, it becomes apparent that forensic science was not only used at trial, but as an active part of the investigation to develop suspects. Similar feats of observational prowess and interpretive intellect are present in works from Hans Gross and Edmund Locard, to Paul Kirk. Yet somehow over time the laboratory became removed from the investigation assuming a more reactive role. Scientist eventually became detached from the crime scene altogether. Slowly, the concept of a general knowledge of forensic science or a "generalist" started to give way to the concept of a laboratory specialist.

Somewhat ironically, forensic DNA testing which is one of the main disciples responsible for this shift is simultaneously reasserting the role of physical evidence in investigations. The power of DNA is more than its individualizing power. It is also the ability to create searchable databases of the recovered DNA profiles. The next great advance in forensic science will occur when the rest of the evidence found at the crime scene can be characterized and searched as DNA currently is.

Over the past 8 years significant progress has been made to address this. A unique partnership developed between NASA's Goddard Space Center, Forensic Scientists, Law Enforcement, Academicians, and Prosecuting Attorneys to adapt space exploration technology developed by Goddard to problems encountered at the crime scene. As a result of this partnership, a small portable x-ray fluorescence (XRF) unit has been developed. XRF has already been used in laboratory settings to characterize various forms of trace evidence. The technology now exists to take it right to the scene or even the battlefield allowing real-time elemental data of numerous forms of evidence. Just as with DNA, the power of elemental analysis is related to the ability to interpret the results with known databases. Many industrial materials already have extensive elemental databases. The steel industry is a good example. Elemental data from fragments of exploded improvised explosive devices (IEDs) can be used to show common origin and possibly even trace the origin based upon information from the industrial databases.

Although initially a strange concept, adapting the science of space exploration to both the crime scene and even the battlefield makes sense. These systems are initially designed to be robust, operate remotely off of telemetry, and produce rapid results. They are also designed to be compact and can even share common components. It is not inconceivable to have a field portable unit that combines an XRF, Fourier Transform Infrared Spectroscopy (FTIR) and Raman and other optical spectroscopies into one system. The system would conduct all the analyses from a single sample and provide results in minutes. In some cases like the analysis of soil, it might also be possible to combine these data with orbital data from satellites as well. Numerous other combinations of instrumentation such as gas chromatography mass spectrometry and infrared spectroscopy can also be designed to fully harvest the information potential of other evidence encountered.

These field portable technologies can also be applied to biological samples. Preliminary results from real-time PCR research indicates that it might be possible to differentiate alternate forms of DNA (alleles) present at

a given location on the DNA molecule (loci) through what are known as melt-curves. While this wouldn't give the same depth of information as a full DNA profile, it could conceivably become an incredible new tool for screening biological samples found at a crime scene to determine common origin. An instrument could automate the DNA extraction procedure and send the sample directly to real-time PCR in an integrated fashion. This would significantly aid investigators in finding different DNA profiles in complex scenes with multiple DNA donors.

Another advantage of using space technologies is robotic systems. Since most space missions are not manned, many of these technologies are designed to be operated off of robotic platforms. These robotic systems have already been designed, and are mission-tested technology that operates off of solar powered systems, batteries or radio-thermal generators. They are also in constant redevelopment for future missions. From an investigative point of view, this would allow a safe exploration of situations where weapons of mass destruction (WMD) are suspected. Since instruments used by robotics systems also do not require the same level of shielding as those used by humans, more instruments that are a routine part of space exploration can be employed. Neutron/gamma ray systems can easily be used for the investigation of bulk samples or even concealed samples.

Data from the scene can now provide actionable intelligence for investigators at crime scenes and troops in the battlefield. Much like a Jules Verne novel, these well interfaced field portable instruments provide a window into the future of forensic intelligence.

Spring 2009 LVACS Meetings

***March* - TBA -**
High School Teachers' Night
***April - Moravian College* -**
Student Poster Session -
Student Awards Night
***May* -**
Winery tour and wine tasting

This Month in Chemical History

Harold Goldwhite, California State University, Los Angeles - **hgoldwh@calstatela.edu**

Part I:

Although I was born in London, England, my most formative years were spent in Sussex, in the twin towns (now unified) of Brighton and Hove. I have enjoyed cooking since my graduate student days at Cambridge; a group of us would gather on Sunday evenings to enjoy a home-cooked meal with the responsibility for its preparation rotating among the group members. Later in life, I became quite interested in baking bread, a pursuit I continue to this day, and I regularly prepare home-baked bread for my family. And what, you may ask, has all this to do with the history of chemistry? Well, it explains why I recently purchased a book published in 1886.

This volume, deaccessioned [no hyphen per Webster's] from the public library of the city of Cincinnati, is titled *The Chemistry of Wheat, Flour, and Bread: and Technology of Breadmaking*. [is that the correct title? I googled it, and other variations Jago's book came up, but not that title] The author is William Jago, Analytical and Consulting Chemist, Headmaster, Science Schools, Brighton [England], and it was self-published by William Jago of Springfield Road, Brighton. The Open University's biographical database of the British chemical community is informative about Mr. Jago. He was born in 1854 in Cornwall and died in 1938 in Hove. At the Royal School of Mines, he studied under the distinguished British chemist Edward Frankland. He became an Associate and then a Fellow of the Institute of Chemistry, and later in life, at the age of 50, became a Barrister. He was head of the Department of Science at Brighton College (a public school) and a teacher at the Brighton School of Science and Art (a technical college). He was a friend of Magnus Volk, a local inventor who built the first electrically powered train line in Britain (it still runs along the Brighton seafront), and the first telephone line in Brighton that connected the houses of Jago and Volk.[as meant?] Jago was also the author of *Inorganic Chemistry: Theoretical and Practical*, one of Longmans, Green and Co. Elementary Science Manuals, the 10th edition of which appeared in 1889.

The Chemistry of Wheat, Four, and Bread was considered as sufficiently significant when it was published to receive a substantial, and generally favorable, review in *Nature* (Sept. 30, 1886), though the reviewer urged the author to employ pruning shears if the work went to a second edition. It is bulky, running to 465 closely printed pages. It is based in part on a lecture by Jago to the Annual Meeting of the National Association of British and Irish Millers, which was followed by a series of articles requested by the Editor of the *Millers' Gazette*. Sixty-four (!) of these articles appeared, and then Jago revised them into the book. It was intended for students studying in Applied Chemistry Departments specializing in milling and baking, and for those studying for technological examinations of the City and Guilds of London Institute. In addition to the topics that I will outline later, it does include some original research by Jago on yeasts and fermentation.

In looking over Jago's magnum opus *CWFB* (if I may so abbreviate its lengthy title), it strikes me that the *Nature* reviewer was unduly harsh, perhaps being misled by the book's title. Jago's intent is clear from the book's contents. He begins by writing three substantial chapters on, respectively, an introduction to the science of chemistry, the chemical elements and their inorganic compounds, and organic compounds. Thus the beginning of the text can be seen as either a refresher course in chemistry, or even a self-contained brief introduction to the science. Chapter 4 on the microscope and polarized light is the first chapter that is specific to the book's title. I conclude this first of two columns on this interesting book with some comments on inorganic chemistry. Jago is a firm believer in the reality of chemical atoms, and he includes a table of "Combining or Atomic Weight" values, somewhat blurring over the idea of chemical equivalents. Included in this table are also values of the atomicities of elements, what we would term their maximum valencies. Somewhat unexpected, to me at least, is the complete absence of any reference to the Periodic Law and the Periodic Table, which many chemistry texts of even a decade earlier were including as a useful device for organizing inorganic chemistry.

LVACS Organic Scholarship Opportunities for Students

The Lehigh Valley Section of the American Chemical Society's Scholarship for Organic Chemistry Competition takes in April this spring. Please see the website and the March issue of the Octagon for date and place. The competition entails taking the ACS Organic Chemistry Examination 50%), a letter of recommendation from the student's organic chemistry professor (10%), and an essay on a topic in organic chemistry (40%). The value of the scholarship is $1000. Additionally the top essay will receive $100. Details for the letter and the essay follow.

The student should be below the junior level currently enrolled in organic chemistry attending college at an institution in the section. The student also must be a chemistry, biochemistry or chemical engineering major. Please email Dr. John Freeman at jfreeman@po-box.esu.edu if you plan to compete for the scholarship.

Letters of Recommendation: When writing a letter of recommendation on behalf of a student who is applying for Lehigh Valley ACS Scholarship, please speak to the student's skills in lecture and laboratory from Organic Chemistry I and Organic Chemistry II. In addition to performance on written exams and a course grade for Organic Chemistry I, it would be helpful to comment on the student's proficiency in organic lab and his or her participation in recitations. We would also like, if possible, the letter to address the students' quantitative skills by commenting on their performance in quantitative analysis or its local equivalent. Please place your letter of recommendation in a sealed plain envelope and place your signature over the seal. The student will be required to bring the sealed letter to the ACS Organic Chemistry Standardized Exam (date TBA in March Octaton)

Essay: The student should choose a molecule, a group of molecules or a process in organic chemistry. The essay should include the synthesis or structural elucidation for a molecule or a representative molecule of a group or a number or examples and

mechanism for a process. Judicious use of structures is expected. The essay should address the impact of the molecule or process on society, and the student's personal interest in the process or molecule. The essay should be approximately 3 pages +/- a quarter page of text, not including figures in times new roman 12 point font or equivalent with 1 inch margins on all sides. The students name, a brief title, and page number should appear in the header of each page. An additional page with references should be included. References should be presented as end notes according to the style of the Journal of Biological chemistry. (See http://www.jbc.org/misc/ifora.shtml).

The essay will be rated on:

•20% - Ease of reading, including grammar, spelling, and logical flow of the material.

• 40% - Appropriate depth of coverage on the development of the molecule.

• 30% - Appropriate depth of coverage on the impact on society and student's interest.

• 10% - Appropriate use of references.

• 5% - Adherence to the formatting rules provided.

Award Announcement
ACS Local Section Partnership Minigrant

Dr. Matt Junker of Kutztown University, LVACS member, and Dr. Julia Kibelbek of the Lincoln Elementary PTO have been awarded a Local Section Partnership Minigrant for Family Science Night at Lincoln Elementary in Emmaus, Pa. The award represents a partnership between the LVACS and the Lincoln PTO. Dr. Junker and Dr. Kibelbek co-wrote the grant in response to the national ACS leadership's "Call to Arms" in the Nov. 3, 2008 issue of C and E News. ACS members are being asked to partner with local organizations to support educational opportunities for the public about chemistry and what chemists do. Family Science Night (March 27, 2009) will provide an evening of hands-on science activities for about 100 K-5 students and their parents. If you would like to roll up your sleeves and volunteer and are comfortable and experienced working with children, please email Dr. Junker at junker@kutztown.edu.

News from National ACS

ACS 237th National Meeting – Salt Lake City, Utah

On January 12, 2009, registration opened for all attendees to register for the ACS 237th National Meeting to be held in Salt Lake City, UT, March 22-26, 2009. Early registration fees started on January 12, 2009, and will last through February 23, 2009.

ACS Short Courses in 2009

ACS Short Courses are one- to five-day, in-person seminars designed to help chemical scientists and technicians keep current in today's competitive marketplace. Please visit www.acs.org/shortcourses to register and for more information.

Short Course Circuits

The ACS Short Course Circuit offers the opportunity to take advantage of a wider range of course offerings in a single location and network with a variety of your colleagues.

February 9 – 13, 2009 | Woodbridge, NJ

Courses in Analytical Chemistry, Organic Chemistry, Medicinal Chemistry, Laboratory Safety, Chemical Engineering, Management, and Cheminformatics

February 23 – 27, 2009 | San Francisco, CA

Courses in Analytical Chemistry, Organic Chemistry, Medicinal Chemistry, Biochemistry, Laboratory Safety, Chemical Engineering, Management, Quality Assurance, and Cheminformatics

Short Courses at the ACS National Meetings

Going to an ACS National Meeting? Short Courses are held at each National Meeting and offers the opportunity to take advantage of a wide range of course offerings before and during the meeting.

March 21 – 26, 2009 | Salt Lake City, UT – ACS Spring National Meeting

Courses in Organic Chemistry, Chemical Engineering, Management, Cheminformatics, Spectroscopy, Polymer Chemistry, Intellectual Property, and Toxicology

Laboratory/Lecture Courses

Get in-class and hands-on experience with Laboratory/Lecture Courses from the ACS.

March 30 – April 3; July 13 – 17; October 5 – 9 | Chicago, IL
High Performance Liquid Chromatography: Fundamentals, Troubleshooting, and Method Development
April 20 – 24; July 20 – 24, November 9 – 13; | Chicago, IL
Gas Chromatography: Fundamentals, Troubleshooting, and Method Development
March 15 – 20; August 9 – 14; December 6 – 11 | Virginia Tech, Blacksburg, VA
Polymer Chemistry: Principles and Practice

Chemistry-Based Technology Students Receive Award

The Committee on Technician Affairs is pleased to announce the winners of the ACS Chemical Technology Student Recognition Award for the 2007—2008 academic year. The award honors the hard work and accomplishments of undergraduate students preparing for an industrial career. Winners have completed at least 75% of their course work and demonstrated the following:

* Strong academic performance across all courses
* A high level of integrity and reliability
* Outstanding oral and written communication skills
*Excellence in laboratory work, including experimental design, equipment use, safety, teamwork, problem-solving, and data analysis

Chemistry-based technology programs cover the same topics and concepts as traditional chemistry programs, but with extra emphasis in instrumentation and application. Because chemistry-based technology programs typically incorporate instrumental analysis classes, semester-long projects, and internships, they are usually more intense than traditional chemistry programs.Since it was established in 2004, the award program has recognized 221 graduates from 25 different institutions. During the 2007-2008 academic year, 42 students from 8 programs were selected by committees at each institution to receive the award.

To see the winners, or to learn how to nominate students, visit the ACS Chemistry-Based Technology Student Recognition Award website (www.acs.org and follow the path, Funding & Awards> Awards> Other ACS Awards> Awards for Students). You may also contact Blake Aronson, CTA staff liaison (cta@acs.org, 1-800-227-5558, ext. 6108).

Mini-Grants Available for Collaborative Activities

Proposals are being sought for **Equipping the 2015 Chemical Technology Workforce** mini-grants. Up to $500 will be awarded to collaborative activities that support technician education and career development.

Equipping the 2015 Chemical Technology Workforce has three goals:
1. Raise awareness of the changing needs of chemical technicians, operators, analysts, and other applied chemical professionals.
2. Highlight opportunities for industry, academia, professional societies, and the community to collaborate on meeting those needs
3. Increase involvement of applied chemical professionals in the American Chemical Society

To qualify for a mini-grant, one or more sectors of the chemical enterprise (industry, academia, professional organizations, etc.) must collaborate on the activity. Activities must also support one or more of the goals of **Equipping the 2015 Chemical Technology Workforce** and take place in the 2009 calendar year.

The deadline for proposals is 20 February 2009.

To learn more about **Equipping the 2015 Chemical Technology Workforce** and the mini-grants, to get ideas for activities, or to gather information about the chemical technology profession in today's marketplace, please visit the Equipping the 2015 Chemical Technology Workforce website (go to www.acs.org and follow the path, Funding & Awards > Grants > Chemical Technology Partnership).

ACS Spring Regional Meetings

The 2009 Regional Meetings are online and planning their programs. All three of the spring meetings will have programming pertaining to the environment, and GLRM and CERMACS have planned their meetings around an environmental theme. Plans are underway to open their abstract programs and advance

registration in the immediate future.

The Great Lakes Regional Meeting (GLRM), http://www.glrm2009.org/ will take place in Lincolnshire, IL, just outside Chicago, May 13 – 16. Their theme is "A Better Environment through Chemistry." Symposia planned include plant biochemistry, material science/polymer chemistry, ethics in college education, non-crystalline x-ray structural chemistry and the environment, and molecular simulation in and for the environment.

The Central Regional Meeting (CERMACS), hosted by the Cleveland Section, which will be celebrating its 100th anniversary. Mark the dates, May 20 -23, and visit their website at http://www.case.edu/cermacs/ for details. Their theme is "Meeting Energy and Environmental Challenges through Functional Materials." Four other societies will co-sponsor and submit programming to CERMACS. They are the Electrochemical Society, Society for Applied Spectroscopy, American Vacuum Society, and the Yeager Center for Electrochemical Science. Case Western Reserve University also is a contributor.

The Northwest Regional Meeting (NORM) will take place June 28 – July 1 at Pacific Lutheran University, Tacoma, WA. Visit their website at http://www.chem.plu.edu/norm2009/ for information on their plans. Included in their program are sessions on bioanalytical mass spectrometry, chemistry of the bioregion; chemistry, energy, and sustainability; clinical chemistry, and instruments for the teaching laboratory.

Former ACS President Bursten Praises House Speaker's Support for Science

Bruce Bursten, Ph.D., immediate past president of ACS, has praised U.S. House Speaker Nancy Pelosi for her promise that science will be of major importance in the upcoming Congress.

Leaders of major institutions representing government, academia, business and science were invited to attend the Innovation Roundtable hosted by House Speaker Nancy Pelosi at Princeton University last December. In his remarks to the gathering, Dr. Bursten said "Science and engineering must be the engines of the innovation that assure our economic prosperity, our national security, our energy independence, and our responsible stewardship of our planet." Dr. Bursten is Dean of the College of Arts and Sciences at the University of Tennessee, Knoxville.

The purpose of the annual roundtable was to discuss how Congress could move ahead to renew the national commitment to the physical sciences and energy research.

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