



**Western New York Section
American Chemical Society
Double Bond**

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November Meeting

Forensic Use of X-ray Diffraction for the Identification of Geologic Trace Evidence

Tuesday, Nov. 29, 2005

6:00 PM

*Casa Di Pizza
477 Elmwood Ave.
Buffalo, NY
14222*

Buffet Dinner

*\$15.00
(students half price!)*

Forensic Use of X-ray Diffraction for the Identification of Geologic Trace Evidence

Elisa Bergslien

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X-ray diffraction (XRD) is one of the most powerful analytical tools available for identifying crystalline materials. All crystals are composed regular, repeating planes of atoms that form a lattice. When an X-ray beam interacts with these planes of atoms, part of the beam is diffracted, or bent at a specific angle. X-rays are diffracted by each type of crystal differently, depending on the atomic composition of the crystal and the spacing of the atoms, creating a diffraction pattern.

By comparing the diffraction pattern created by an unknown sample against a library of known crystalline materials, the unknown can be identified. This works even with mixtures of materials. Each separate crystalline material can be identified and quantified.

Traditionally in geology, powder XRD would be used to identify the mineral components of a clay, soil or ash layer and this information would be used perform such tasks as identifying economic mineral deposits or determining the sources of volcanic ash layers. However, XRD can also be used as a tool to identify certain kinds of trace evidence, which is a general term for any small piece of physical evidence that links a suspect to a crime scene. Forensic geological examination applies to any crime that involves the transfer of mineralogical material from or to a crime scene, such as the transfer of soil to clothing or car tires, or particulate matter found adhering to weapons, in carpets, or under fingernails. XRD analysis of a soil sample from a suspect's shoe can be compared to soil from a crime scene to determine if they are similar in nature or very different in nature. The same principles apply to minerals used in building materials, paints, cosmetics or safe insulation. For example, using XRD analysis of a lipstick smear, it is possible to identify the mineral

components and potentially identify the brand, or at least the manufacturer, of the lipstick.

Note from the Editor

It seems that National Chemistry Week 2005 was most of the month of October. Members of the Canisius College ACS affiliates, in addition to participating in the activities described in NCW coordinator Dave Nalewajek's article on page 28, also spread the word among their peers, hosting a SNIP for students on campus (SNIP = Saturday Night in Penfold Commons). Their activities included element BINGO, slime, liquid nitrogen ice cream, and craft tables to make "mole pencils".

NCW here in Western New York received a boost this year from ACS president William F. Carroll, Jr. as he criss-crossed the country on what has become known as the NCW Extreme tour. The content of Bill's Oct. 18 visit to Buffalo was edited out of the published description of his journey (C&EN 2005, 83, 4-5), but you can read the full account of his visit to Drew Science Magnet School in Buffalo with NCW coordinator Dave Nalewajek on the blog site: [http:// www.chemistry.org/ncw](http://www.chemistry.org/ncw).

The Extreme Tour was a 15-day marathon adventure to meet local section activists, stir up grassroots enthusiasm for chemistry, cheer up tollbooth attendants and raise money for Project SEED. Read more at www.chemistry.org. Add my congrats to all who put in time and talent.

Thanks,
Timothy M. Gregg



Editor, WNYACS Double Bond
Department of Chemistry and Biochemistry Canisius College
Buffalo, NY

CALL FOR NOMINATIONS

Are you interested in becoming more active in our local section?

Are you interested in a leadership position in our organization? If so, we invite you to become a candidate in our upcoming elections. We are looking for candidates for the

position of Chair-Elect and Vice- Chair as well as members-at-large. Interested? Know someone who is?

**Please contact Mary O'Sullivan at osullivl@canisius.edu or Maria Pacheco at pachecmd@buffalostate.edu ASAP!
Thanks! Maria**

**Maria Pacheco
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From the Webmaster, David Hoth

Our website has moved to the National ACS server ([http:// membership.acs.org/W/WNY](http://membership.acs.org/W/WNY)), but you will still be able to link to it through the current site, (<http://www2.canisius.edu/~dblbond/welcome.html>). If you have any items that you would like to have posted on the website, please contact David at david.hoth@honeywell.com

**2005
NATIONAL CHEMISTRY WEEK IN REVIEW**



National Chemistry Day, first celebrated in 1987 by members of the ACS Local Sections,

educators, and other individual volunteers, was a vision of former ACS President, Dr. George C. Pimentel. His vision was for ACS to hold a simultaneous event nationwide to impress on the public the importance of chemistry in everyday life. In 1989, the celebration was expanded to a bi-yearly full-week event, and in 1993 National Chemistry Week (NCW) became an annual celebration. Since its inception, the Western New York Section has been actively involved in bringing chemistry to the public.

The 2005 NCW program continued to build on our past success. During this week, faculty, staff, graduate and undergraduate students from UB, Canisius, Buffalo State College, and industrial participants from Honeywell Buffalo Research Laboratory performed experiments and presented career talks at elementary, middle, and high schools as well as at community centers, the Buffalo Museum of Science, the Boulevard Mall and the Boy Scouts of Western New York. Our theme this year was “The Joy of Toys” and combined an emphasis on critical thinking with a mixture of experiments designed to reinforce students that they can do chemistry.



Experiments including Liquid Nitrogen Ice Cream, Candy Chromatography, Secret Writing, Magic Writing, Silly Putty, Polymers in the New MOLE-lenium and more were designed to engage students ranging in age from pre-K through high school in addition to the adult participants. One of the many highlights from the week included a visit from Bill Carroll, ACS President, who just couldn't restrain himself from getting involved in performing experiments with students at the Dr. Charles R. Drew Science Magnet School. In addition to Bill, students from UB and Buffalo State and volunteers from Honeywell also lent a helping hand at the Magnet School. To paraphrase a conversation that was overheard between staff members of the school “This is really a value added lesson for our students, it gives them the chance to interact with 'REAL' scientists.” I guess they were comparing us to unreal or synthetic scientists! To see more details, visit Bill's Blog, which can be found at the www.chemistry.org home page; click on the Extreme NCW Tour link located under the section titled “actions and reactions.”

National Chemistry Week



Extreme NCW Tour
Sponsored by the American Chemical Society
chemistry.org/extremencwtour

Finally, we had some great news coverage ranging from our national exposure on the ACS web site, to coverage in The Spectrum (UB Newspaper) to a listing on Buffalo.com.

To all the volunteers, an Avogadro sized "THANK YOU." The Western New York Section couldn't have accomplished what we did in only a week. A special thanks to Ruth Mistretta and Carrie Buckley of UB, who kept their group of 46 volunteers from UB, Buff. State and Canisius focused and on-time for their many school visits, mall activities and museum programs. Through the efforts of our volunteers, thousands of Western New Yorker's received positive messages of the benefits of chemistry. Now it's time for all of the volunteers to reflect back on the week and celebrate their accomplishments of an outstanding NCW campaign. Don't get the impression that we won't be seen around town doing demos until NCW next year, we will. We have many bookings for the remainder of 2005 and the first half of 2006. We are just going to be aggregated into smaller groups.

As a final note to our volunteers, as you sit back and celebrate your success for the 2005 NCW campaign, I leave you with the following quote for consideration, "Not all chemicals are bad. Without chemicals such as hydrogen and oxygen, for example, there would be no way to make water, a vital ingredient in beer." There is a lot of truth to the messages you were attempting to communicate to the public. See you all next year for NCW 2006. Our challenging theme is "It's Your Home: It's All Built on Chemistry."

Dave Nalewajek
NCW Coordinator

THIS MONTH IN CHEMICAL HISTORY - PART II

**Harold Goldwhite, California State University, Los Angeles hgoldwh@calstatela.edu
Prepared for SCALACS, the Journal of the Southern California, Orange County, and San Gorgonio Sections of the American Chemical Society**

Part I of "This Month in Chemical History" described issues of "The New World" magazine from the early 1840s that contained texts of two of Liebig's most important works. It also mentioned that the publisher of this magazine pirated well-known novels, including Dickens' "Martin Chuzzlewit" and it seems very likely that Liebig never received a penny from these American versions of his works.

Indeed, in "An Appeal to the Reading Public" the Editor (or perhaps the Publisher) harangues against "the outrageousness and absurdity of all arrangements in favor of an International Copyright Law" alleging that it "has been urged by a certain set of aristocrats, to kill the cheap publications and to bring back the cost of books to the old standards." So much for intellectual property.

To return to chemistry the March 1843 issue of the magazine's extra series includes William Gregory's translation of Liebig's "Animal Chemistry or Organic Chemistry in its application to Physiology and Pathology". William Gregory was Professor of Medicine and Chemistry at the University of Aberdeen. Liebig begins by paying tribute to Lavoisier as the founder of the new science of chemistry. Indeed, as Frederick Holmes and Jean-Pierre Poirier have pointed out in recent books about Lavoisier, the French chemist can also be viewed as the first scientific biochemist.

Liebig draws parallels between the physiology of humans and of other animals and suggests that the initial objects of physiological studies should be the understanding of what we might call the mechanical aspects of physiology. He decries "the efforts of philosophers, constantly renewed, to penetrate the relations of the soul to animal life", concluding that such efforts have retarded the progress of physiology.

A penetrating analysis of animal heat refines the conclusions of Lavoisier on respiration as its source. "Even when we consume equal weights of food in cold and warm countries, Infinite Wisdom has so arranged that the articles of food in different climates are most unequal in the proportions of carbon that they contain. The fruits on which the natives of the south prefer to feed do not in the fresh state contain more than 12 percent of carbon, while the bacon and train oil [!] used by the inhabitants of the arctic regions contain from 66 to 80 percent of carbon."

A section on the metamorphosis of tissues has some interesting observations: "...albumen, fibrine and caseine ... contain exactly the same proportions of organic elements. When ...[they] are dissolved in a moderately strong solution of caustic potash, and the solution is exposed for some time to a high temperature, these substances are decomposed. The addition of acetic acid to the solution causes, in all three, the separation of a gelatinous translucent precipitate, which has exactly the same characters and composition, from whichever of the three substances. it has been obtained. Mulder [gave] to this product of the decomposition of albumen &c. by potash the name of proteine [from the Greek word meaning "I take the first rank"]".

Further sections of this fascinating book include analysis of the phenomena of motion in the animal organism; a theory of disease which depends heavily on the idea of vital force; and an appendix that contains the analytical evidence underpinning Liebig's conclusions. The whole text covers 48 pages of closely printed quarto paper.

As a bonus the bound volume in which these chemical texts are found also includes George Borrow's book on "The Bible in Spain"; the first (no doubt pirated) American edition of a novel "The Jewess; A Tale from the Shores of the Baltic"; miscellanea on a vast range of subjects including the American politics of the period; and two long scientific articles, the first, by M. Arago, the distinguished French astronomer, and the second by Thomas Dick, on comets. A brilliant comet appeared in 1843, eliciting, probably from the pen of Noah Webster, the following comment in the New Haven Herald: "The present comet is considered as a very brilliant phenomenon, but it is far inferior to that which I saw when young, either in 1769 or 1770." Things were always better in the old days.

REACT

REACT is sponsored by the American Chemical Society for Pre-k through 8 teachers. The workshops present the latest science program for elementary and middle school teachers. Workshops are held at Canisius College in the Horan-O'Donnell Science Building on the Main Street Campus.

UPCOMING DATES

The next meeting will be Saturday, January 29, 2005, followed by February 26, 2005, and March 12, 2005. Everyone is welcome. The Buffalo Teacher Center will list REACT for district credit.

If you have any questions about this organization please contact Mary Jean Syrek via phone 716-984-2128 or email jmj@intotem.net

SENIOR CHEMISTS

please contact
Joseph F. Bieron
716-888-2357

ACS NEWSLETTERS & ALERTS

Use the ACS website to access electronic newsletters and alerts published by various departments within ACS. This list includes ACS short courses, local section activities, community activities, international activities, and many others.

ACS members can join the Green Chemistry Institute International E-mail Network for rapid information as well as sign up for alerts from the ACS ProSpectives Conferences and Publications. Go to: www.chemistry.org/acsnewsletters.html

CALL FOR NOMINATIONS - ADVANCING DIVERSITY IN THE CHEMICAL SCIENCES

The American Chemical Society Committee on Minority Affairs is pleased to announce a Call for Nominations for the Stanley C. Israel Regional Award For Advancing Diversity in the Chemical Sciences

The American Chemical Society Committee on Minority Affairs is pleased to announce a Call for Nominations for the Stanley C. Israel Regional Award For Advancing Diversity in the Chemical Sciences

Purpose: To recognize individuals and/or institutions that have advanced diversity in the chemical sciences and significantly stimulated or fostered activities that promote inclusiveness within the region.

Nature: The award consists of a medal and a \$1,000 grant to support and further the activities for which the award was made. The award also will include funding to cover the recipient's travel expenses to the ACS regional meeting at which the award will be presented.

Rules of Eligibility: Individuals nominated for the award may come from any professional setting: academia, industry, government, or other independent facility. Nominees may also be organizations, including ACS local sections and divisions. The awardees will have increased the participation and leadership of persons from diverse or underrepresented minority group(s), persons with disabilities, or women.

To Nominate: For nomination of individuals, a letter of nomination of no more than three pages and a CV or resume is required. For institutions or corporations, a brief description of the institution or organization must be included. Nominations may also include up to two supporting letters of no more than three pages and up to five different samples of program materials.

Send nominations to:
Committee on Minority Affairs
American Chemical Society
1155 16th Street NW
Washington, DC 20036

For information regarding the award, contact
Stephanie Allen,
800-227-5558 ext. 6262, or
e-mail: s_allen@acs.org

Deadline for receipt of nominations is January 13, 2006

2006 Schoellkopf Award Nominations

Deadline: January 13, 2006

The Jacob F. Schoellkopf Medal is the oldest award of the American Chemical Society given by a Local Section.

The purpose of the award is to recognize a person who has fostered the objectives or activities of the American Chemical Society. The medalist's contribution might be a discovery pertaining to chemistry, or an invention of a plan, process, or device useful, valuable, or significant in the theory or practice of chemistry, or distinguished service to the Western New York Section or its successor.

Please consider nominating one of your colleagues for this prestigious award. Any nominations received after the deadline date will be considered for the 2007 Award.

This year's Schoellkopf Committee Chair is Joanna Christopher. For further information you may contact Joanna directly at joannachristopher@verizon.net Please send all nominations for the Schoellkopf Award to:

Mary O'Sullivan
Secretary-WNY Section ACS
Department of Chemistry
Canisius College
2001 Main Street
Buffalo, NY 14208

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Note: ACS is committed to e-commerce in its Units. With the new database system, all separate (Membership, Meetings, Pubs, NCW, etc) databases will be combined making it easier to provide services to ACS members.

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