



# Chemical Bond

Volume 53  
Number 1  
January, 2002

**St. Louis Section, American Chemical Society**



**The New Sigma-Aldrich Life  
Science Technology Center**

*(story on page 10)*

## Message from the Incoming Chair

My year of training and learning is over, and it's time for me to step (sit?) into the Chair (where did the time go?). I've certainly learned a lot, and am continually amazed at the large number of dedicated volunteers and active programs our section is fortunate enough to have.

I am proud to be a chemist and a member of ACS, and honored to have been chosen to serve the section as chair for 2002. I have gotten a great deal of personal satisfaction from my volunteer work with ACS, as well as learning valuable skills and long-term friendships.

I have two goals for my term of office.

First, I want to better communicate the advantages of ACS membership to all chemists, and especially communicate the benefits of ACTIVE membership to your professional and personal life. Many people join ACS, but never become involved. Not only does volunteering give you a sense of satisfaction from giving back to the profession, and to the community, but you can learn new skills and explore new avenues. Nothing compares to seeing the joy on a child's face when they witness an exciting chemical



demonstration, or the thrill of a student when they win a science fair award, or the personal satisfaction of helping a colleague find their ideal job. Whatever your skills and interests, there's a way you can contribute.

Second, I'd like to expand the public's interest in and appreciation for science, especially chemistry. Too much of what we do on a daily basis is not known to the general public. We all see the ads for the new blockbuster drug that's going to cure the world's ills, and certainly the recall when it has unexpected side effects. What we don't see is the years of research and thousands of scientists involved behind the scenes, not only discovering and developing new products, but working to make our food safer, our water cleaner, and improve our lives in so many ways. While not everyone can or should be a chemist, everyone should at least have an understanding of how science works, so they can make informed decisions about things that affect their lives - health, food, the

see **Balbes**, p 14

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The Chemical Bond is published in January through May and September through December by the St. Louis Section American Chemical Society. It is mailed free of charge to members of the section at their address on file at ACS National Headquarters. Changes of address for members will be made automatically upon notification to National ACS Headquarters; send old and new address with zip codes to ACS Subscription Service Department, 1155 16th St. N.W., Washington, DC 20036 or visit [www.acs.org](http://www.acs.org) and find Members Only | Online Address Update. Allow eight weeks for change to take effect.

The domestic subscription rate for non-members/affiliates is \$8.00 per year. Subscription orders and changes of address for non-members/affiliates should be mailed to Editorial Production Office, 125 West Argonne Drive, St. Louis, Missouri 63122 or e-mailed to the Editor.

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# Meeting & Seminars

## Dept. of Chemistry & Biochemistry at UMSL Winter 2002 Seminar Schedule

Seminars will be held at Benton Hall in room B451 at 4:00PM. Refreshments are served at 3:45. For further information, please contact Prof. Don Becker, 314-516-7345, [chedbeck@jinx.umsl.edu](mailto:chedbeck@jinx.umsl.edu).

### January

14 Vijay Pillai  
Applications of self-assembled monolayers for Biomolecular Electronics  
18\* Vladimir I. Bregadze  
New Aspects in the Chemistry of Substituted Polyhedral Boron Compounds

### February

4 Ray Bergeron  
18 Barry Gold  
25 Jacques Baenziger

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11 Andy LiWang  
18 J. Fraser Stoddart

### April

1 Peter H. Seeberger  
8 W. Dean Harman  
15 Cal Y. Meyers  
22 Peter Tipton  
29 Susan Martinis

\* Begins at 1:00PM

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## ***Ethics in the Education of Scientists, Clinicians, and Engineers***

Friday, February 8, 2002

Margaret McCormick Doisy Learning Resources Center, Saint Louis University Health Sciences Center Campus

### **Key Note Address:**

Fostering Integrity in Research: Why, How, and the Cost?

•Nicholas H. Steneck, Ph.D.  
Professor of History, University of Michigan Consultant  
Office of Research Integrity (ORI), DHHS

### **Session II:**

What Ethics Education Should Be vs. What It Is: The Case of Medical Education

•David W. Musick, Ph.D.  
Vice-Chair for Education & Director of Development  
Department of Rehabilitation Medicine and University of Pennsylvania  
Bioethics Center University of Pennsylvania

•James M. DuBois, Ph.D., D.Sc.  
Associate Professor  
Center for Health Care Ethics, Saint Louis University

### **Session III:**

Promoting Responsibility in the Sciences and Professions

•Michael Pritchard, Ph.D.  
Professor of Philosophy, Director, Center for the Study of Ethics in Society  
Western Michigan University

### **Session IV:**

Strategies and Goals in Assessing Outcomes in Ethics Education

•Muriel J. Bebeau, Ph.D.  
Professor of Preventive Sciences, School of Dentistry, Executive Director  
Center for the Study of Ethical Development, University of Minnesota

This Conference is Sponsored by Sigma Xi - the Scientific Research Society, and Saint Louis University's Ethics Across the Curriculum Program, the School of Medicine, Parks College of Engineering and Aviation, the Center for Health Care Ethics, and the Graduate School.

For Registration Information, please visit: [www.slu.edu/centers/ethics/activities.html](http://www.slu.edu/centers/ethics/activities.html) or contact Donna Werner at [ethics@slu.edu](mailto:ethics@slu.edu) or (314) 977-3424.

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# Letters & More

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*by Jack Bornmann*

When I was a freshman at Carnegie Tech nearly a half century ago I learned about the Principle of Le Chatelier, sometimes called the Principle of Le Chaetlier and Braun. This principle states that if a system in equilibrium is disturbed, the system reacts to minimize the disturbance. Some people simplify this by saying that the equilibrium system will offset an upset.

In the summer between my freshman and sophomore years I worked at the Belle, West Virginia DuPont plant that produced ammonia using the Haber process. That plant was the first Haber process plant in the United States. It reacted nitrogen and hydrogen to form ammonia by using high pressure and low temperatures. That equilibrium is often used as an example of equilibria in freshman chemistry classes. It was my good fortune to work in such an example.

In my sophomore year at Tech we were introduced to the equilibrium constant and we learned to calculate a quantitative answer to a shift in equilibrium instead of the qualitative answer given by the Principle of Le Chatelier. The mathematical calculations were fun as long as the equations were quadratic but not so much fun when they became higher order. We had slide rules, paper and pencil in those days. We did not have hand

held calculators or computers to do the calculations for us. Successive approximations for us became exhaustive approximations.

In my junior and senior years I learned to use thermodynamics to calculate the equilibrium constant and its temperature dependence. Using thermodynamics I could obtain a quantitative solution to the effect of a temperature change on an equilibrium system instead of simply a qualitative answer using the Principle of Le Chatelier.

I was so fascinated by all this equilibrium stuff that I tried to apply the Principle of Le Chatelier to other systems in equilibrium besides chemical equilibria. Such as a boy and girl. I was young and was also fascinated by girls.

One time I was with a young lady and we were standing close together in a crowd. We were comfortable, a system in equilibrium. My hand slipped (accidentally, of course) to a spot which disturbed the equilibrium. Immediately she responded to minimize my disturbance by moving my hand about three inches. I thought about trying again to disturb the equilibrium but was afraid it might lead to an explosive response. This experience suggested to me that it might be possible to find other applications for equilibrium. And the Principle of Le Chatelier.

In the summers of 1970 and 1971 I worked at the Manned Spacecraft Center, now the Johnson Space Center. I worked in the part of the Lunar Receiving Laboratory where the

astronauts were quarantined. There was a complete pathology laboratory and I worked in that area examining the measurement of calcium ions in the blood. During the weightlessness of space flight, and also during extended bedrest, bones demineralize i.e. dissolve like in osteoporosis. We wanted to know more about what was happening in the blood.

We think of bones as being inert like a steel framework in a tall building. Actually the bones are alive within the body. The bones are constantly being dissolved by osteoclasts and being rebuilt by osteoblasts. Osteoclasts and osteoblasts are cells that work in equilibrium (we hope). There are other equilibria in the blood. For example, the carbon dioxide generated by the cells creates carbonic acid that dissociates into hydrogen and bicarbonate ions. There are proteins in the blood which have acidic groups that dissociate to give hydrogen ions and a negative protein that can attach to a calcium ion. The loss of calcium ions can be ameliorated by dissolving bones. Thus there is a fascinating series of interacting equilibria that can be manipulated by someone who understands the Principle of Le Chatelier (like me).

By hyperventilating I could drive out some of the carbon dioxide from my blood. As a result some bicarbonate ions reacted with hydrogen ions to replenish some of the lost carbon dioxide. Some of those proteins I mentioned above give up hydrogen ions to replace some of the ones gobbled up by the bicarbonate ions. Thus there was more protein ions

available to react with calcium ions and thereby reduce their concentration.

Reduced calcium ion concentration in the blood leads to or toward tetany, a condition in which the nerves fire and can cause muscle contraction and tingling of nerves. For me it causes tingling in my fingers and lips and flashes of lights in my eyes. A medical technologist withdrew samples of my blood while I was hyperventilating. I experienced the approach of tetany and I had a blood gas analyzer to follow the pH and carbon dioxide content of my blood during the progress of the experiment. Along with the approach of tetany my blood had a concomitant rise in the pH and a decrease in the dissolved carbon dioxide. This was exactly what the Principle of Le Chatelier predicted.

Next month I want to write about the application of the Principle of Le Chatelier to economics. "Stay tuned to this station."

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# Bond Briefs

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You are invited to attend a free seminar series sponsored by the Saint Louis Zoo and the Academy of Science of St. Louis.

All seminars are held at the Living World at the north end of the Saint Louis Zoo, Wednesday evenings at 7:30-9:00PM. For further information, call (314) 768-5466

### **January 23, 2002**

Some Like it Hot: The Life of Microorganisms Near Active Volcanoes  
Dr. Jan Amend  
Washington University

### **March 20, 2002**

Using Archaeology to Teach about our Diverse Heritage  
Dr. Pam Ashmore &  
Dr. Tim Baumann  
University of Missouri-St. Louis

### **April 17, 2002**

Medical Criminal Entomology  
Dr. Robert Hall  
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# Sigma-Aldrich Life Science Technology Center Opened

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The scientific landscape in St. Louis dramatically changed in late November as scientists from Sigma-Aldrich moved into the company's new, \$55 million, state-of-the-art Life Science Technology Center.



This 145,000 square-foot facility is located in the Old Laclède Town part of St. Louis. With 133,000 square feet dedicated to laboratories, this operation will support 220 bench chemists researching new and innovative approaches for life science.

This facility includes laboratories, conference, break and training rooms and a cafeteria. The building was designed to foster collaboration, interaction and conversation amongst Sigma-Aldrich and visiting scientists. There are nine complete laboratory modules (groups of labs) in the laboratory building for cell culture and other life science areas of research. There are even open-air kitchen areas on each floor complete with tables for scientists to discuss the latest research methods over a cup of coffee.

In addition to the commercial opportunities, the Center will help support continuous education and presentations. Inside the facility, there is a Learning Center for large group meetings, presentations, seminars and lectures. The room has a divider separating a 100 seat, auditorium-style area and a flat floor meeting room that can hold 200 people. The divider can be removed for larger group meetings. Just off the Learning Center are two breakout conference rooms that can be opened up to act as one larger room.

For more information on Sigma-Aldrich, go to their Web site at [www.sigma-aldrich.com](http://www.sigma-aldrich.com) or call 314-771-5765.

## ***St Louis Section of the American Chemical Society Officers and Committee Chairs 2002***

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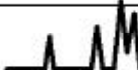
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Chemistry Olympiad - Myron Reese  
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Chemistry is Fun - Marie Sherman  
Undergraduate Research Symposi-  
um - Don Becker, Michael Shaw


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**Balbes**, from p.2

environment, and so on. Science touches every aspect of our lives, and we should make sure everyone knows that.

While attending ACS leadership training in the Spring and again in the Fall, I had many chances to talk with ACS employees from the national office. Over and over, I heard "You're from St. Louis? You guys are great; you're so active!" It's gratifying to hear, but daunting to live up to that reputation. With your help, I'm confident that we can do it.

I look forward to working with all of you in the coming year. Please contact me anytime, with offers of help, ideas for new programs, or just to let me know that we're doing a great job.

Lisa Balbes  
lisa@balbes.com or 314-966-5298  
(home office)

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## **Recollections: 1968**

*by Lol Barton*

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The year 1968 was a busy one for the Section and for the Board, chaired by Dr. Henry Godt, Jr. The budget for 1968 was \$7,805. Among various initiatives was a new committee structure including such committees as Program, Professional Activities, Public Relations, Publicity, Membership

and Finance. The Bylaws were revised, for the first time since 1964, and a Membership Directory was published. An interesting tidbit from the latter was that in 1968, 41% of the industrial chemists membership worked at the Monsanto Company. In the Bond, and also in the Directory, was an appeal to members to pay their \$2.00 Section dues.

The first major event of the year was a General Section Meeting at Fontbonne College where Dr. Wallace Brode, President –Elect of the ACS, and 1960 Priestley Medallist, spoke on "The Future Growth of Chemistry". Recognition Night dinner was held on March 26 the St. Louis University Busch Memorial Union. The cost was \$3.00 for the roast beef dinner! Among the invited speakers to the Section in the spring was S. Trofimenko from Dupont who spoke on "Boron-Pyrazole Chemistry". The 11<sup>th</sup> Annual Kennedy Lecture at Washington University was presented by Professor Martin Kamen from the University of California-San Diego, who spoke on "Variations on the Theme: Cytochrome C". An important item from UM-St. Louis appeared in the Bond, announcing that Robert W. Murray, from Bell Telephone Laboratories, would join the Chemistry department as the first Full Professor. Another announcement was that the University of Missouri-Rolla was establishing the "St. Louis Gradu-

ate Engineering Center", on Kingsland Avenue. It offered a full range of course leading to MS degrees in engineering management. Some regarded this operation, and it subsequent expansion and move to facilities at UM-St. Louis, as an effort to thwart attempts to establish engineering on the St. Louis campus of the university of Missouri. The program exists today and UM-St. Louis has a joint engineering program not with one of its sister campuses but with Washington University. An interesting aspect of the Chemical Bond in May 1968 was that 75% of the space was taken up by advertisements, whereas today about 20% of the space is typically filled by ads.

The Section presented, the Midwest Award at the Regional Meeting, for the first time, in October 1968. Dr. Byron Riegel, formerly from Northwestern University and then Director of Chemistry Research and Development at G. D. Searle, accepted the award in Manhattan Kansas. His Midwest Award address was "Chemical Discovery of New Drugs". He would later that year be elected President-elect of the ACS. The Section hosted a Fall Symposium at Kelley Auditorium at St. Louis University in October; an all-day event on a Saturday. The speakers were John Waugh from MIT, Harry Pardue, Purdue University, W. T Lippincott, Ohio State University and Nelson

Leonard, University of Illinois. The lunch was "Roast Sirloin of Beef" and it cost \$1.75. The Section also hosted a "November Social" at Le Chateau, on Clayton Road. Cocktails and dinner preceded a program of vocal selections presented by "highly talented students of the Washington University School of Music". Another interesting announcement that fall was of a meeting of the "St. Louis Section Women's Auxiliary". It took place at Monsanto and Mr. John G. Sparkman showed and discussed a group of historical dolls in authentic dress. Another speaker discussed Astro turf.

Among the announcements appearing that fall were the hiring of John Forsberg at St. Louis University and that of Joyce Corey at UM-St. Louis. Eugene Corey was to join UM-St. Louis in the New Year. Peter Gaspar was promoted and awarded tenure at Washington University and Tom Layloff and Tom Curphey were awarded tenure at St. Louis University. Jack Malone became Assistant Dean of the Graduate school at Saint Louis University.

A most interesting article appeared in the December 1968 Chemical Bond. It was a compendium of common poisonous plants, and had been reprinted from the Dayton Section of the ACS Bulletin.