Chemical Bond

Volume 52
Number 8
November, 2001

St. Louis Section, American Chemical Society

A Nobel Prize for the Home Team

Dr William S Knowles

Monsanto Company

2001 Nobel Laureate in Chemistry

Nobel Comes Home

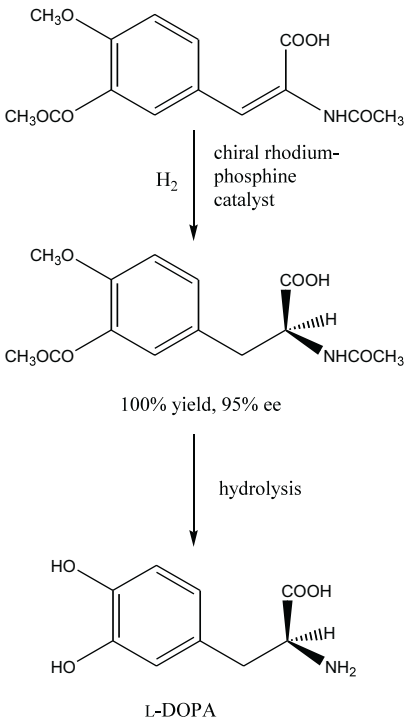
October 10, 2001, Stockholm, Sweden – St. Louisan William S. Knowles, Monsanto Company (retired), is one of three winners of the 2001 Nobel Prize in Chemistry. The prize this year recognizes contributions to asymmetric catalysis, which has enabled dramatic improvements in the synthesis of pure optical isomers. Knowles and Ryoji Noyori share half of the prize for their independent work on asymmetric catalytic hydrogenation, and K. Barry Sharpless receives the other half for asymmetric catalytic oxidation.

Dr. Knowles, 84, received his Ph.D. from Columbia University in 1942. He began the work which led to the award in 1968 at Monsanto Company. His first successful trial yielded a product with about 15% enantiomeric excess, or about 58% of one isomer and 42% of the other.

He and his coworkers developed a commercially viable process in 1974 for producing L-DOPA, the drug used to treat Parkinson's disease, in 95% enantiomeric excess. Symmetric synthesis would produce DOPA (half L, half D). The D-form is not only completely inactive against Parkinson's, but also produces toxic side-effects.

In the intervening years, the therapeutic and commercial promise of chiral pharmaceuticals has been proven. Typically, one isomer of the pair has all the therapeutic activity. Using that isomer, dosage and undesirable side-effects are usually reduced. In 2000, $133 billion (34%) of the $390 billion pharmaceutical market was in chiral compounds.

Dr. Knowles retired from Monsanto in 1986. Robert T. Fraley, Monsanto Chief Technology Officer commented on Knowles' award: "From time to time, we are fortunate enough that the science we pursue makes a profound difference for the world around us. This is one of those times. Dr. Knowles has once again fulfilled a tradition of great science."



Knowles' synthesis of optically pure L-DOPA

We extend our warm congratulations as well to a long-time member of the ACS and the St. Louis section.

For more information on the 2001 Chemistry winners, including a detailed scientific description of the award-winning work, see www.nobel.se

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In this issue

Meeting & Seminars

Board of Directors

St. Louis Section–ACS Board of Directors meets the second Thursday of each month at the Alumni Center, University of Missouri–St. Louis. Meetings are open to all members, and all are encouraged to attend. Elected officers and chairs of major committees have the right to vote; others in attendance have voice but no vote. For more information or to make a reservation for dinner, call the Section Chair, Sue Dudek, at 314-694-2464.

Date: Nov 8
Social hour: 5:30 pm
Dinner: 6:30 pm
Business meeting: 7:15 pm

Future meetings: Dec 13 (Continuity Dinner), Jan 10

American Society of Brewing Chemists

American Society of Brewing Chemists, Local Section 2, and the St Louis Section–ACS will hold a joint meeting. Social hour at 5:00 pm, business meeting at 6:00 pm, dinner and a talk at 7:00 pm.

Wednesday, Nov 28
The Lodge at Grant's Trail
4398 Hoffmeister Ave.
Dr. Greg Wall
Sigma-Aldrich Corp.
To Your Health: The Future of Chemistry in Medicine and You

Dinner is $25. For reservations, please contact Richard Ogle, Anheuser-Busch, 314-577-2399 or richard.ogle@anheuser-busch.com.

Saint Louis University

Seminars start at 3:30 pm in Room 204 Macelwane Hall. Coffee and doughnuts before the seminar; refreshments after in Room 115 Monsanto Hall. For more information, contact Dana Spence, spenced@slu.edu or call 314-977-2836.

Wednesday, November 7
Dr. Scott Gilbertson
Washington University
TBA

Wednesday, November 14
Dr. Frank Bright
SUNY–Buffalo
TBA

University of Missouri–St. Louis

Refreshments at 3:45; seminars at 4 pm in B-451 Benton Hall. For further information, Contact Prof. Keith Stine, 314-516-5346, kstine@jinx.umsl.edu.

Washington University

Seminars are in McMillen 311 at 4 pm unless otherwise noted. Coffee is available outside the seminar room 20 minutes prior to the talk, and refreshments follow. For up-to-date information, check wunmr.wustl.edu/Events/seminars.html

Thursday, Nov. 1
Prof. Timothy S. Zwier
Purdue University
Experimental probes of the potential energy landscapes and folding dynamics of small, flexible biomolecules

Monday, Nov. 5, CBI Seminar
Prof. Tom W. Muir
Rockefeller University
Synthetic Protein Chemistry Lab
TBA

Thursday, Nov. 8
Prof. Greg Girolami
U. Illinois–Urbana-Champaign
TBA

Thursday, Nov. 15
Dr. Robert Tycko
National Institute of Diabetes and Digestive and Kidney Diseases
Probing the Structure of Amyloid Fibrils with Solid State NMR

Thursday, Nov. 29, 2:30 pm
Dr. Harm-Anton Klok
Max-Planck Institute for Polymer Chemistry, Mainz, Germany
Stimuli-sensitive, self-assembled materials generated from peptidic/synthetic block copolymers

Computational Chemistry Discussion Group

Locations vary, but the time is generally 5:30 for refreshments, and 6 pm for the talk. For more information, contact Marcia Fenley, 314-862-0451, sfenley@artsci.wustl.edu or Philippa Jayatilleke, 314-647-1099, pjayat@tripos.com

NMR Discussion Group

All seminars are in 241 Compton, Washington University. For more info, call Mark Conradi at 935-6418 or 935-6292. Seminars are followed by an informal discussion over beer, soda, and chips.

Nov 13
3:45 coffee, 4 pm seminar
Prof. Peter Rinaldi
University of Akron
NMR of Polymers

Keeping Up

by Jack Bornmann

Knowledge depreciation is something for all of us to consider. Science is fluid and changes all the time. Take for example the model of the atom. At first we thought of the atom as a nice solid object.

Letters & Words & More

Then we realized that it was mostly empty space. Then we pictured it as a wave function. Sometimes it's hard to accept new interpretations. Imagine yourself pounding on a table and saying, "You can't convince me that this table is mostly empty space!"

Luis Alvarez noticed that in the dining hall at the University of California in Berkeley, the diners had segregated into two groups: the young physicists talked about new developments, and the codgers talked about the old days. Alvarez turned the tables on his two new graduate assistants. He moved three desks together; his students taught him the new physics.

Alvarez was a physics professor at a famous university. But even he found that physics was passing him by and he had to work to catch up.

It is much worse for professors in small colleges. There are no graduate students and no graduate courses. There is just an insidious opportunity to slip behind. The professor uses the same textbooks for many years and the same yellowed lecture notes. They teach what they were taught 20, 30, or even (gasp!) 40 years before.

see **Keeping Up**, *p. 8*

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Keeping Up, *from p. 6*

If you fail to keep your courses up to date, you fail your students. I heard of a professor who never used notes in his lecture; he had promised himself that he would never have a packet of yellow notes. But one day a student compared his classnotes with a student from the previous year. They were almost identical. Comparisons with years further back showed that this professor was giving extemporaneous talks that were almost verbatim year after year. This professor had written a textbook many years before but it was out of print. One student managed to find a copy and there was the source of the professor's material. Unconsciously, the professor had modelled his course around the presentation he knew best.

As hard as it is at small colleges, high school science teachers are faced with an even greater challenge. They must work harder to keep up, and it is less likely that they will be forced to recognize how far behind they have gotten.

Each person must find his or her own method to keep up to date. Doing research at the home institution may not be possible. Some small colleges discourage faculty from "wasting" time doing research. Such colleges and most high schools lack support facilities such as machine shops and glassblowers. If research is not an option, then reading and studying may be possible.

I had a colleague in the mathematics department who approached me with a plan to set up a facult study program on "Chaos." He was disheartened because we were the only two who showed any interest ... and I was leaving town for the summer. When I suggested that he could read and study the material by himself, he objected that one cannot learn without a teacher. I felt sorry for him. I had hoped his college education would prepare him to learn on his own.

If you are lucky you will find seminars, workshops and courses that meet your needs. The St. Louis Section of the American Chemical Society provides many of these.

There is no age limit on the need to keep up. And the problem is not limited to academics; industrial chemists can suffer from it, too. If it has been ten years since you were in school, it is time to examine your understanding of chemistry from all points of view. If it has been twenty or more years, you have almost certainly fallen behind.

Your biggest problem will be recognizing that you have a problem. Research, self-study, seminars, workshops or courses can be your solution.

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QUINTILES is the world's leading full-service contract research organization specializing in accelerating the drug, biologic and device development process from pre-clinical studies through regulatory submission. At Quintiles Kansas City (home to 900+ employees) we are expanding our Analytics group within the Preclinical & Pharmaceutical Services division. This organization provides discovery support and early development services based on state-of the-art facilities and globally recognized expertise in the areas of pharmaceutical sciences, toxicology, pharmacology, drug metabolism and pharmacokinetics. We have opportunities available at entry through advanced level positions for individuals with B.S., M.S. or Ph.D. in chemistry, biology, biochemistry or related fields.

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World's Largest Water Clock

The largest water clock in North America is housed at the Children's Museum of Indianapolis. It is over 33 feet tall, composed of more than 40 specially blown glass pieces, 100 metal pieces, and 70 gallons of a blue tinted water/methanol mixture.

This impressive and highly accurate time piece stops most visitors in awe as they enter the welcome atrium.

Water clocks date back to ancient Egypt and Greece. This clock was designed and built by Bernard Gitton, a renowned French physicist turned artist. His towering clocks, found in cities all over the world—including Paris, Berlin, Tokyo, and Rio de Janeiro —are unmatched in accuracy and innovation.

This particular clock was built and assembled in France in 1925. Gitton and two assistants then disassembled it, brought the components to Indianapolis, and spent two weeks reassembling it with the museum staff. It was moved to its current location in 1946; an expansion in 1976 made it the world[1]s largest water clock.

By looking at the number of filled hour spheres lining the left side of the clock, and the number of filled two-minute disks on the right, visitors to the museum can easily tell the current time.

But how does it work?

A pump hidden below the base of the clock pushes liquid up into a reservoir at the top. From there, it flows into a glass cupel (a shallow cup or scoop) attached to a green pendulum. As the cupel fills, the increasing weight causes its arm to dip, empty the liquid, and then return to its upright position. This occurs every two seconds, forming a steady stream of liquid flowing into the clock[1]s system of siphons.

The Indianapolis Children's Museum water clock. Hour sphereson the left, 2-minue disks on the right. The time is now … 10:32.

The siphons produce vacuums in the tubes, which in turn pull a fixed amount of liquid into the minutes column of disks every two minutes. Every hour, the minutes column empties, creating a vacuum that draws enough liquid to fill one of the hour spheres.

Bonus Question: At what time do the hours and minutes columns both empty?

Hint: "No" to noon.

Back Bonds

One man's trash...

You know how dangerous it is to store combustible materials in your garage. Now you can make your home fire-safe and do a good turn for the Section at the same time.

The *Chemical Bond*, the newsletter of the St Louis section, was first published in 1950. The Section is attempting to archive all issues of the *Bond*. We have only a few holes back as far as the late 1960s, but almost nothing of earlier volumes.

If you have copies of the following issues or issues dated before 1967, and you'd be willing to donate them, we would love to have them. Mail to:

Pauline Bellavance
Fontbonne College
6800 Wydown Blvd.
St. Louis, MO 63105-3098

1995–February
1994–April
1992–April
1978–Oct, Nov
1977–October
1976–February
1975–January
1974–December
1973–March
1972–January
1971–Jan, Feb
1969–All exc May
1968–Oct, Nov, Dec
1966 and earlier - all issues

Happy Birthday to Us

Approximately 60 St. Louis Section members attended the ACS 125th anniversary celebration held on October 5th at Kemoll's. Guest speakers were Dr Ann Nalley, ACS District V Director, and Dr Ernest Jaworski, retired Distinguished Science Fellow at Monsanto Company. Dr Nalley spoke about the past, present, and future of the ACS and Dr Jaworski shared his thoughts on the history and future of biotechnology in the St. Louis area.

The enjoyable evening was made possible by efforts of Bob Friedman, who chaired the event, assisted by Donna Friedman. Samir El-Antably arranged for the venue and refreshments, and musical entertainment was provided by Karl Markl.

Thanks to all who attended and contributed to this outstanding event celebrating our organization's 125th anniversary.

Bond Briefs

Hoist One with the Brewers

Our own Dr. Greg Wall will be speaking on *To Your Health: The Future of Chemistry in Medicine and You* at the joint St Louis ACS and American Society of Brewing Chemists meeting on November 28th. For reservations, please contact Richard Ogle, Anheuser-Busch, 314-577-2399 or richard.ogle@anheuser-busch.com.

Check the announcement under Meetings & Seminars for details.

Your section needs you!

Exciting volunteer opportunities are still available for the 2002 season. Rewards include personal satisfaction, gratitude of your colleagues, and you just might learn something. Contact Lisa Balbes at 314-966-5298 or lisa@balbes.com to find out what you can do!

For instance....

Career Fair Days

Calling Chemvolunteers for the 19th St. Louis Public School Career Awareness Fair at the America's Center, March 13-14, 2002. The section has participated for over a decade in presenting careers in chemistry to 8th grade students.

Come share your work experience and the schoolday skills that you apply to your profession. You can make a difference in the life and career choice of a young student.

To volunteer, contact Greg Wall, 800-521-8956 ext. 3139, or gwall37@msn.com. Make 2002 a year for you and the Section to make a difference.

Making Science Accessible to All People:

a free seminar series sponsored by the Saint Louis Zoo and the Academy of Science of St. Louis.

Plan ahead to attend any or all of the seminars this season. All are held at the Living World at the north end of the Saint Louis Zoo, Wednesday evenings, 7:30–9pm. For further information, call (314) 768-5466.

November 14, 2001
Music and Healing in Peruvian Amazon
Joe Moreno, RMT-BC
Maryville University

January 23, 2002
Some Like it Hot:
The Life of Microorganisms
Near Active Volcanoes
Dr. Jan Amend
Dept of Earth & Planetary Sciences
Washington University

March 20, 2002
Using Archaeology to Teach about our Diverse Heritage
Dr. Pam Ashmore &
Dr. Tim Baumann
Anthropology Department
University of Missouri–St. Louis

April 17
Medical Criminal Entomology
Dr. Robert Hall
Dept of Office of Research
University of Missouri–Columbia

Nominate a Local Colleague

The St. Louis Award, sponsored by the Monsanto Company, is presented to an individual who has made outstanding contributions to the profession of chemistry and demonstrated potential to further the advancement of the chemical profession. The award, consisting of a $1,500 honorarium and a plaque, is presented at the St. Louis Award Banquet, the final event of Chemical Progress Week in April.

Please help the Awards Committee identify outstanding chemists in the St. Louis Section by submitting your nominations to the St. Louis Award Chair. The nomination should include a nominating letter, two or more seconding letters from individuals who have had a close profession affiliation with the nominee, a brief biography, a description of the nominee's accomplishments, and a list of publication and patents.

At the time of the nomination, the nominee must not have previously received the Midwest Award or any national ACS-sponsored award. The nominee must be a member or affiliate of the St. Louis Section of the ACS. The deadline for nomination packets to be received is December 10, 2001. Please send nominations and inquiries to:

Dr. Joseph Ackerman
St. Louis Award Chairman
Department of Chemistry
Campus Box 1134
Washington University
1 Brookings Drive
St. Louis, MO 63130-4899
Phone: 314-935-6593
FAX: 314-935-4481
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on purpose.

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in some official document

and realize,

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Rush—Dated Material Inside