

Badger chemist : the newsletter of the University of Wisconsin-Madison Chemistry Department. No. 37 1993

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Badger Chemist



THE NEWSLETTER OF
THE UNIVERSITY OF WISCONSIN-MADISON

CHEMISTRY DEPARTMENT

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DEPARTMENT OF CHEMISTRY

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March 23, 1993

Dear Badger Chemists:

Donations to the Badger Chemist Fund are appreciated. We are trying to build this fund so that it can support departmental scholarships and fellowships as well as the publication of this newsletter.

The UW Foundation is now beginning its annual fund raising campaign for the University. If you wish to donate, please consider directing your contribution to one of the Chemistry Department funds given on the reverse side of this sheet. Financial support of alumni and friends to the Department of Chemistry has an important impact for our program. Thank you for your past support.

I hope that you find this Badger Chemist interesting. As always, we would appreciate hearing from you about the publication. We would also like to receive information that can be included in the next issue.

Sincerely,

Paul M. Treichel, Jr.

Paul M. Treichel, Jr.
Chairman, Department of Chemistry

Gifts/Correspondence can be sent to the Chairman, Department of Chemistry, University of Wisconsin, Madison, WI 53706 or to:

UW Foundation, 150 East Gilman Street, Madison, WI 53706

UW Foundation Accounts for the Chemistry Department

Department of Chemistry Fund: (Acct. No. 1222137) Industrial and individual gifts to this fund are for general use by the Department for teaching and research. Major recent uses have been matching funds for instruments and start-up funds for new faculty.

Badger Chemist Fund: (Acct. No. 1222534) This fund receives gifts from alumni and friends receiving the Badger Chemist; it functions as an endowment with income used for BC publication. We are seeking to build up this fund to support departmental scholarships.

McElvain Seminar Fund: (Acct. No. 12220241) Income from this fund supports the ongoing seminar series organized and run by the graduate students in the department.

Hirschfelder Fund: (Acct. No. 12220310) This provides research funds used by the Hirschfelder Professor of Theoretical Chemistry and will also support activities of TCI.

Institute for Chemical Education Fund: (Acct. No. 1222929) Project SERAPHIM Fund: (Acct. No. 12220404) These are two funds in support of the Department's activities in chemical education.

ALSO: V. W. Meloche Lectureship: (Acct. No. 1222825) for a special seminar series in Analytical Chemistry; John E. Willard Lectureship: (Acct. No. 1222829) for a special seminar series in Physical Chemistry; Farrington Daniels Memorial Fund: (Acct. No. 1222324), to fund special projects relating to the benefits of science to society.

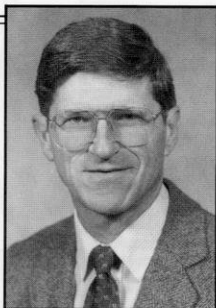
Did you know

1. When responding to UW Foundation telephone solicitations for donations to the University, you can specify that your gift go to Chemistry and further specify any of these funds.
2. Gifts to the UW Foundation are tax deductible.
3. Many companies provide matching contributions allowing you to multiply the value of your gift.

Gifts/correspondence can be sent to the Chairman, Department of Chemistry, University of Wisconsin, Madison, WI 53706 or to:

UW Foundation, 150 East Gilman Street, Madison, WI 53708

FROM THE CHAIRMAN



Reflections

During the last year, the Department seems to have maneuvered successfully through an increasingly dense minefield. We did not have a public scandal about overhead charges, and the state budget was tight but did not include cutbacks of crisis proportions as has occurred elsewhere. Our faculty continues to receive acclaim at the university and national level in research and teaching, the plans for a new building have moved forward at least incrementally; total research funding in the department rose another notch; the department infrastructure for research and teaching was enhanced with the acquisition of several items of major equipment; and there is increased interest in chemistry among undergraduates. The university even managed to provide better than average raises for faculty and staff. With predictions that the country is coming out of its economic slump, there is reason to be optimistic for 1993.

There are also concerns. The job market for our graduates is discouraging. The federal support structure for research is stressed. Single investigator grants, a cornerstone for quality research and graduate education in the field of chemistry, are more difficult to get nowadays. The philosophy that provides support for basic research continues to come under fire.

However, we haven't much time to be pessimistic. We have set high goals for the department for 1993 with every intention of being successful in their achievement. We are underway in a search that is expected to bring a new faculty colleague in Theoretical Chemistry, a further step to our commitment to achieve pre-eminence in this area. We are tantalizingly close to approval for the first stage of a new building; with careful planning, the start of construction on high quality research labs within one year has a reasonably high probability. We continue to dedicate our efforts to the high quality teaching that has long been a characteristic of the department. Through the ICE programs, the department continues its national prominence and leadership in outreach services.

So, we can wrap up 1992 with this report to our alumni and friends, and with the prediction that 1993 presents an opportunity to move forward toward further excellence—in teaching, research, and service.

Paul Treichel



Current Chemistry NEWS

TWO Chemistry faculty members received promotions to the rank of Associate Professor with tenure. The promotions of Ned Sibert and Lloyd Smith became official by Regents' action in early June.

A theoretical chemist, Ned Sibert had joined the department in 1986 after a graduate career at the University of Colorado and postdoctoral fellowships at Cambridge, England and Berkeley. Ned's research is on prediction and description of properties of highly rotationally and vibrationally excited molecules in the gas phase. His research support from NSF includes a Presidential Young Investigator award. Of four graduate students who have worked with him, two have received Ph.D. degrees. Ned teaches physical chemistry lab, general chemistry, and a graduate course in quantum mechanics.

Analytical Sciences faculty member Lloyd Smith is the first person in the department in 15 years to receive early promotion. Prior to joining our faculty in 1987, he had done graduate and postdoctoral work at Stanford and Cal Tech. His research is on devising new and innovative approaches to sequencing of DNA including capillary gel electrophoresis (see article on page 3). He is highly visible in the scientific community, being called on to lecture and participate in conferences and to serve on various study sections and advisory panels for the Genome program. He teaches undergraduate analytical chemistry and recently initiated a graduate course in Biochemical Separations (BC # 34).

Holden Moves to Biochemistry

Hazel Holden made a lateral move in the University, assuming a position in the Biochemistry Department while relinquishing her Chemistry appointment. Hazel's research interests are more closely aligned with Biochemistry.

Visiting & Temporary Faculty

In late August, 1992 the Department welcomed Dr. Carsten Bohm back to Madison. Dr. Bohm, on leave from his faculty position at the Institute for Organic Chemistry at Basel, Switzerland, was Visiting Assistant Professor, teaching undergraduate organic chemistry during the fall semester. He had been in Madison during the 1983-4 academic year as a Fulbright Scholar and earned a MS degree, studying with Hans Reich.

Anthony Jacob (Ph.D. '91, Ellis) was a lecturer in the department during spring semester, 1991-2 and taught Chemistry 108. Dr. Barbara Lewis, a scientist in Tom Record's group (Ph.D. '81, from Yale), was a lecturer in the same semester, teaching in the Physical Chemistry Lab. Dr. Bruce Adams (Ph.D. '84, Trost) taught Chemistry 626, the NMR course, in the fall semester.

Other Faculty & Staff News

ART ELLIS visited several Russian laboratories as part of a NSF Chemistry Division delegation. He spent a week at Procter and Gamble with about 100 UW Madison faculty learning how P & G uses Total Quality Management, and he gave a plenary lecture on materials science at the first Governor's Higher Education Business Partnership Week conference.

Tom Farrar has taken a year leave of absence in 1992-3 to serve as a rotator in the NSF Instrumentation program.

Dick Fronko (Ph.D. '85, Treichel), Director of the NMR Laboratory, received an Academic Staff Professional Development Award from the UW System, funding his attendance at a training program in Palo Alto, CA.

Sam Gellman was an invited speaker at the 17th International symposium on Macrocyclic Chemistry at Provo, UT in August.

Hans Reich traveled in Germany, Switzerland, Austria and Italy during summer, 1992 and presented talks at several universities and at the Third International Symposium on Carbanion Chemistry. He also spoke at the NSF Workshop on Organometallic Chemistry and at the "Reactions and Processes" Gordon Conference.

Dan Rich served as chair of the ACS Division of Medicinal Chemistry in 1992. He was appointed to the Editorial Advisory Board for J. Org. Chem.

Jim Skinner gave invited talks at Washington, Purdue, Indiana, and at the Midwest Solid State Physics Theory. He was also in demand on campus, speaking at Mathematics, Materials Science, and Chemical Engineering Colloquia.

Lloyd Smith gave invited talks at the High Performance Capillary Electrophoresis Conference in Amsterdam in February, at the Congress of the International Society for Preventive Oncology in San Remo, Italy in June, at symposia on the Human Genome Initiative in St. Petersburg, Russia in July and in Oslo, Norway in November.

Bob West taught the "First Annual Short Course on Organosilicon Chemistry" at the University of Guanajuato, Mexico in March. The city of Guanajuato is an old center of silver mining in the mountains north of Mexico City; the University has become the center for organosilicon research in Mexico. In July, Bob spent a month in Germany as a Humboldt Prize Fellow and in November he went to Japan for a lecture tour. He also took part in the Japan Society of Polymer Science meeting.

Bob reports that his group has a strong international character, with seven

different countries represented among the group members.

Howard Zimmerman gave lectures in Saarbrücken, Frankfurt, Freiburg, Mainz, Bochum, Munich, and Innsbruck. His travels in Europe brought the added benefit of being able to spend time with former colleague and friends: Gerhard Quinkert (Visiting Professor, 1967-8), now at Frankfurt; Heinz Durr (PD '61) in Saarbrücken; Wolfgang Roth, Wolfgang Kirmse, Frank Klaerner (Visiting Professor '82 - '83), and Helfried Hemetsberger (PD '70) all at Bochum; Wolfgang Eberbach (PD '71 - '72) at Freiburg; Josh Schantl (PD '66 - '68, and Visiting Professor '89) at Innsbruck; and Rolf Huisgen at Munich. Following this tour, he attended the IUPAC Symposium in Leuven, Belgium, which had in attendance about a dozen of Howard's former students and postdocs from academic institutions across the the US and Europe.



Chemistry Ranks High

Citation of published work is among various criteria that contribute to the ranking of a Department. Articles appeared on this topic in two issues of Science Watch, a magazine published by the Institute for Scientific Information, in early 1992. Chemistry Departments worldwide were surveyed. In the February/March issue, it was reported that the UW-Madison Chemistry Department ranked 6th in the number of papers published from 1984 - 1990, and 8th in citations for the period 1984 - 1991. The following issue subdivided these data. In organic chemistry, UW-Madison was reported to have both the largest number of papers, 362, and the largest number of citations, 3,680. Wisconsin also ranked high in Chemical Engineering, 7th in the number of papers and 7th in citations. However, we were unranked in the two other categories, Chemical Physics and the combined grouping of Analytical, Inorganic and Nuclear Chemistry.

Ultrathin Slab Gel System Released

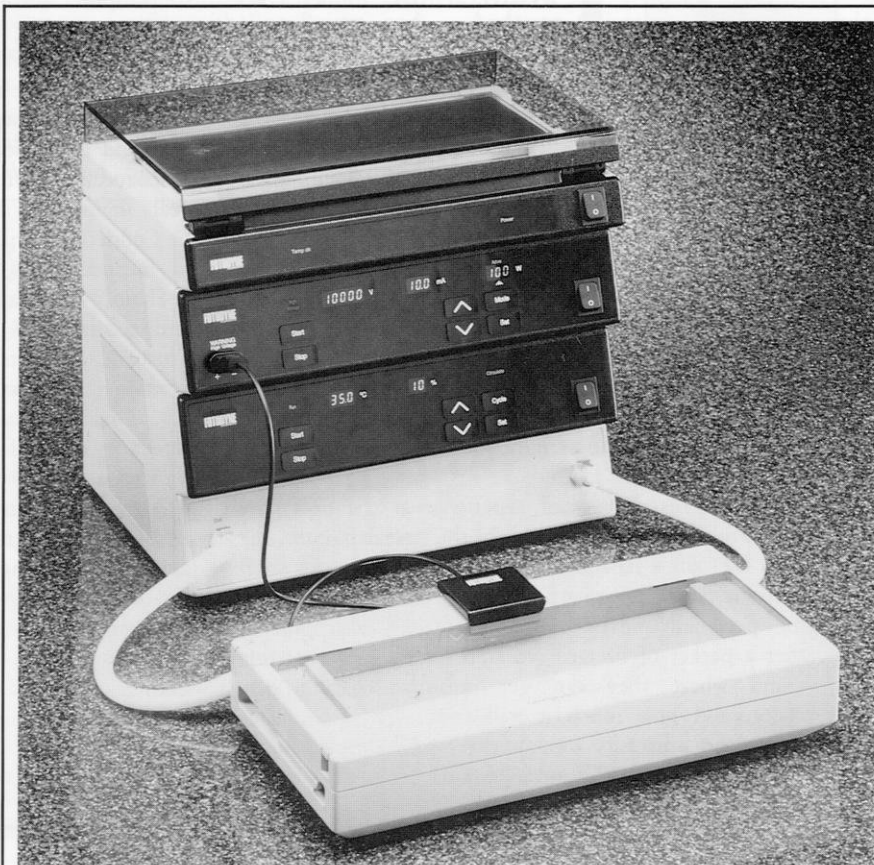
An electrophoresis invention developed by the Smith group has been commercialized by Fotodyne, Inc., an instrumentation company located in New Berlin, WI. DNA sequence determination by gel electrophoresis relies upon size separation. The speed of these separations is limited by the heat generated during the electrophoresis. The thicker the gel, the poorer the heat transfer efficiency. This has limited the electric field that could be applied to DNA sequencing gels, and since the speed at which the molecules move in the gel is determined by the electric field, the speed of separation is also limited. The solution to this problem is to reduce the thickness of the gel systems.

Earlier, the Smith group had demonstrated that separation times could be reduced as much as 26 fold by performing the electrophoresis in very thin (50 micron i.d.) gel-filled capillaries similar to those used in fiber optic communications. Associate Researcher Bob Brumley was the major developer of an electrophoresis system in which equally

thin slab gels were prepared and used for DNA sequencing. Using the slab gel procedure, as many as 50 samples can be sequenced in parallel on a single gel. As with the capillary system, it is possible to apply much larger electric fields to these gels, and thereby perform much more rapid separations.

Research on this project was reported at the 1992 ACS meeting in San Francisco in early 1992 and abstracted in C&EN (April 27, 1992). Some of the work has been published: *see Smith, Kostichka, Marchbanks, and Brumley Bio/Technology*, 10 78 (1992).

WARF filed a patent application on the new electrophoresis device and the patent was issued this year (Brumley and Smith, U.S. Patent #5,137,613, issued August 11, 1992). Through Smith's membership on their Scientific Advisory Board, Fotodyne became aware of the technology and obtained a license from WARF for its commercialization. The first commercial units became available this summer, marketed under the name "Genesprinter."



The Genesprinter

Hirschfelder Prize Created by Theoretical Chemistry

A NEW PRIZE, the Hirschfelder Prize, has been created by the Theoretical Chemistry Institute. It is the largest award specifically directed to theoretical chemistry research. The first winner of this prize is Professor Benjamin Widom of Cornell. Professor Widom was also the first Hirschfelder Lecturer, as reported last year in *Badger Chemist* #36. (An announcement of the new award appeared in *C & EN*, Sept. 7, 1992.)

The annual award of \$10,000, honoring our late colleague and theoretical chemist Joseph O. Hirschfelder, was made possible by a donation from Elizabeth S. Hirschfelder. A national advisory committee will assist in the selection of winners. Awardees will also spend a week in the department and present a series of lectures.

Joe Hirschfelder, who retired from the department in 1980 at the age of 70, was the founder of the Theoretical Chemistry



Elizabeth and Joseph O. Hirschfelder

Institute. He was a member of the National Academy of Sciences and received the National Medal of Science from President Ford in 1976. He continued to be active in research in the department until his death in 1990.

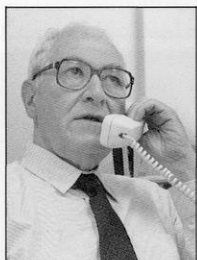
Jim Skinner, Hirschfelder Professor of Chemistry in the department, was quoted in *C & EN* article: "That his widow—a wonderful and remarkable mathematician who just celebrated her 90th birthday—saw fit to donate a

very substantial sum of money to endow this prize is a testament to Hirschfelder's devotion and wisdom."

In mid-fall the awardee of the 1992-3 Hirschfelder Prize was named. This is Professor Rudolph Marcus of Cal Tech. A week after this selection, Marcus won the Nobel Prize in Chemistry. He will receive his award and lecture in the department on the week of April 12, 1993.



Helping Businesses Navigate the UW



IRVING SHAIN, former UW-Madison chancellor and emeritus professor of chemistry, is back on campus in a third role.

As a volunteer consultant for the University Research Park, his job is to let the park's nearly 40 tenants know how to take advantage of the UW-Madison's enormous technical and

research resources and to encourage other firms to locate in the park.

"My main assignment is to work with the tenants and see what ways the university can assist them in becoming even stronger contributors to the Wisconsin economy," he said during an interview in his 12th floor office in the Wisconsin Alumni Research Foundation building, where the park's headquarters is located.

Drawing on his decades of experience at the university and his work in helping establish the research park, he will help the park's tenants navigate through what can seem like an overwhelming sea of technical resources. Not only can he personally advise the tenants, he's also putting together a packet of literature that tells the park's tenants how and where they can get information from the university, and how much it will cost.

Because the university can appear overwhelming, Shain says, the tenants, whose businesses range from engineering

to computer software to communications services, need a guide to finding their way around the university to get the help they want.

Shain in many ways is a perfect guide himself. His long-standing familiarity with the university - he spent 35 years here and progressed from an assistant professor of chemistry to chancellor - will help outsiders fathom it. And his five years in industry as a scientist and executive at Olin Corp. in Connecticut will help him understand the point of view of businesses.

Shain, who was instrumental in establishing the park, and continues as vice president of the park's Board of Trustees, said its success not only benefits the state economy, but also brings in research dollars to the university. Once the park's infrastructure - such as roads and sewers - is paid for by tenant rental fees, income will go to the university to help fund research.

Although Shain has returned to live in Madison after a five-year absence, he says he feels as though he never left. During his years in Connecticut, he returned to the city every six weeks for the park's Board of Trustees meetings.

His loyalty to UW-Madison is strong: While living in Connecticut, he needed minor surgery and insisted it be done at University Hospital. "I wouldn't let it be done anywhere else," he says.

Ed. Note: Abstracted from an article in "Wisconsin Week", April 1, 1992.

Chemistry 103 Evolves

Based on the work of his Ad Hoc Committee on Solid-State Instructional Materials, Art Ellis has been incorporating solid state topics into his lecture of Chemistry 103. Art has made other changes as well. These include helping overcome test anxiety by providing students with hints that are covered by aluminized scratch-offs like the ones on lottery tickets. Using a hint costs the students points.

For the second year, John Moore is teaching a special lecture section of Chemistry 103 that is recommended for students with weak math or chemistry backgrounds. John has been using a developmental version of a new textbook in this class on which he is a coauthor. The book's goal is to stick to the essentials. It is intended to be considerably shorter than the standard books currently on the market. It also attempts to develop problem solving skills beyond rote numeric calculations. As part of the course, students have "Chemistry You Can Do" assignments, experiments that they can do in dorm rooms or at home with simple, inexpensive equipment. Many of these are based on experience gained in the ICE programs. Students also have extensive computer-room assignments, some using unpublished software created by SERAPHIM Fellows.

Lab Director Lynn Hunsberger has developed a new way of handling the 103 labs and is trying it out in John Moore's lecture, where it ties in with the problem-solving theme. Instead of completing fill-in-the-blanks lab directions, students are keeping lab notebooks. They are expected to prepare their notebooks, including space for data, before coming to lab. They must complete all lab work including data analysis and conclusions during the lab period. This reduces the amount of time devoted to lab manipulations, but greatly increases understanding of what is being done. To provide additional problem-solving opportunities, Lynn has developed two laboratory practical exams that challenge students to use the lab techniques they have learned to identify unknown substances or analyze unknown mixtures. This new approach to the introductory lab program shows considerable promise. More news about it next year!

Record's Record

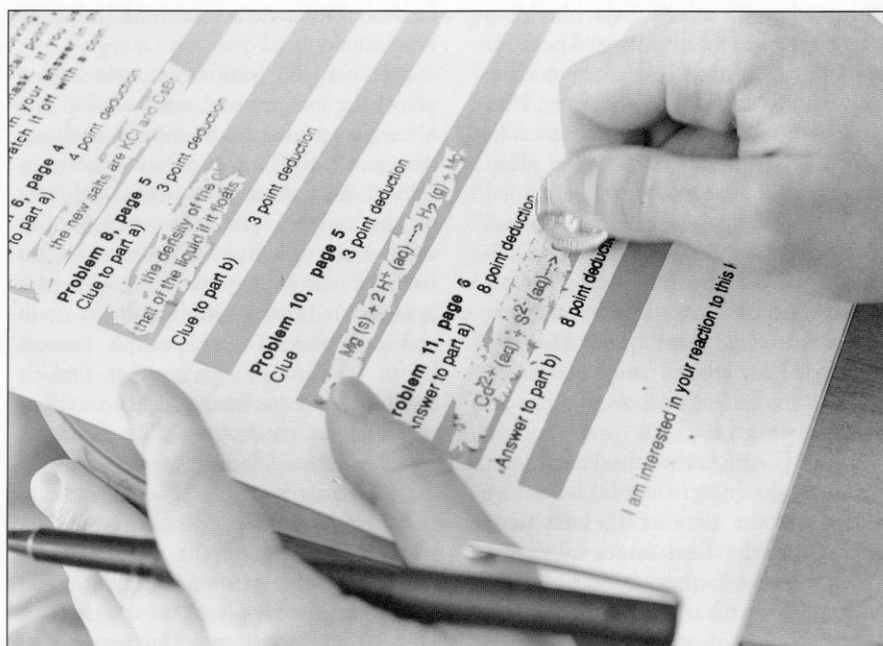
TOM RECORD and coworkers moved their labs to the Biochemistry Department over a year ago. They regret leaving behind their many friends in Chemistry, but the research group is thriving in its new quarters in the Biochemistry building (4th floor, 1985 wing). Anyone trying to find Tom learns that only this wing has a 4th floor, which either simplifies or complicates the search process, depending on what stairs or elevator is used.

Chemistry Ph.D.s in the last year have gone to **Ruth Spolar** and **Marty Olmsted**, who have taken postdoctoral positions with **Ron Raines** in (UW-Biochemistry) and **Paul Hagerman's** lab at UC Denver (Biochemistry and Biophysics) respectively. Currently Ruth, in addition to her postdoctoral research on the hydrophobic effect, is working with Tom and Mike Cox to organize the 1993 Steenbock Symposium on Protein-DNA Interactions, to be held in Madison May 22-26. They hope that lots of you who are reading this will come. Other recent Ph.D. graduates of Record's laboratory include **Jeung Hoi Ha** (Biochemistry), now completing a postdoc with Ron Raines, and **Jeff Livingstone** (also Biochemistry), now a postdoc at Genetech.

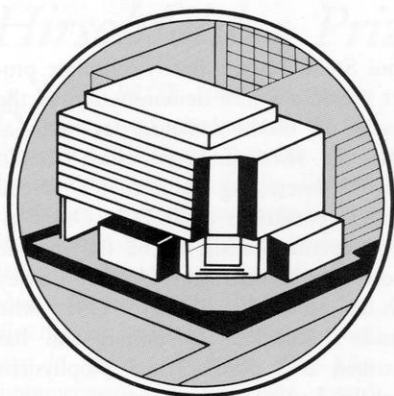
Chemistry students in the final stages of their Ph.D. research include **Won-Chul Suh**, **Harry Guttman**, and

Roni Stein. Harry's nearly-complete project provides a nice demonstration of the power of thermodynamics as well as NMR in vivo, findings which should provide interesting projects for several further generations of Ph.D.'s. Other in-vivo experimentalists in the lab include **Scott Law** (Biochemistry), **Scott Cayley** (Ph.D. Molecular Biology, 1991, who couldn't abandon the project and has returned as a postdoc) and Biophysicist **Barbara Lewis** (Asst. Scientist).

Chemistry student **Stephanie Ross** and Biochemistry graduate students **Diane Frank** and **Mark Levandoski** constitute the lac repressor-lac operator group, and are examining the thermodynamic origins of specificity and stability of this increasingly complicated paradigm of gene regulation. Chemistry students **Won-Chul Suh**, **Paula (Richey) Schlax** and Biophysics student **Peter Schlax** along with Biochemistry graduate students **Maria Lee** and **Kristi McQuade**, are working to define the kinetic basis of specificity in RNA polymerase-promoter interactions, and the mechanism of open complex formation. Chemists **Charles Anderson** (Scientist), **Jeff Bond** (postdoc) and **Roni Stein** form another subgroup focused on polyelectrolyte properties of DNA. Specialist **Mike Capp** and Program Assistant **Sheila Aiello** help everyone and keep the laboratory functioning.



Peeks for points: Scratch-off test hints in Chemistry 103.



BUILDING ADDITION UPDATE

One year ago, Chemistry's building project stood as the second ranked project in WISTAR, the State/University program to upgrade science and technology related facilities in the UW System. The State Building Commission had approved expenditure of \$1.4 M to prepare a design report and preliminary plans for this project. Much has happened since then. The bottom line is that the original design is dead and we are now working to devise a new plan. How this came to pass is presented here.

There is a standard procedure to expend building funds. The Department for Facility Development (DFD), a state agency, administers all major building projects approved by the state. The DFD sought bids from architect-engineering firms to draw up the plans and, after a primary screening, interviewed four finalists on February 28, 1992. Dan Cornwell and Paul Treichel attended these interviews, participating in informal discussion. At the conclusion, DFD members ranked the finalists by ballot, choosing Flad and Associates, a Madison based architectural firm to head the project. Flad had teamed with Affiliated Engineers in its bid; AE would handle laboratory design.

Flad and AE have considerable experience in designing scientific laboratory facilities. At the time of the selection, they were in the final stages of design of a chemistry facility at the U. of Washington at Seattle. Flad is 13th ranked nationally in experience in design of laboratories and has aspirations to rise

to a top 10 ranking by 1995. The firm had made a strong bid for this project; expecting it to be a showcase for their talents, they also committed their best people to the project.

During the bid process, the department made a strong plea to hire a consultant for this project. Flad concurred with this idea and subcontracted with Earl Walls Associates; with this decision, Ulrich (Uli) Lindner became a member of the design team.

The first step in a building project is program verification. Working from Chemistry's original building proposal, this procedure verifies the accuracy of the proposal in its final detail and produces a document that codifies this information in a way useful to the architectural team. The starting point for verification was a 3.5 day meeting between the Chemistry Department Building Committee and a 10 member team from Flad and AE that included consultant Lindner.

The major portion of verification procedure took about a month. The department was introduced to the concept of modulization, in which the new labs were developed in modules of standard size, a procedure that altered the request minimally. For about four months following, there was a series of communications between Dan Cornwell, Flad personnel, and Uli Lindner in which further clarifications and small changes were made.

Even as the verification was taking place, the architectural team at Flad was investigating alternatives for the addition. About 18 different options were considered but ultimately rejected in favor of the original plan, an addition just west of the building. Unsuccessful ideas included wrapping additional space around our existing building on its north and east sides. This is possible because floors 3 through 9 in the Daniels building have a smaller cross sectional area than do the bottom three floors. A set of scale models were used to portray these alternatives.

As plans developed, more and more attention focused on the 12 foot floor-to-floor in the existing building. This serious impacted plans to upgrade air flow, arguably the most important part of the project.

The Daniels and Mathews buildings were built in the '60s, when laboratories were built like any other building and then fitted with the necessary utilities. Air handling is done in vertical shafts in the interior of the building and along the outside, the latter from a major remodeling project a decade ago to improve hoods. A vertical arrangement limits flexibility of use. It also becomes both difficult and costly to increase the amount of air flow since additional shafts must be built within the building or appended to it. Current technology would typically use a 16 foot floor-to-floor height, with air handling in horizontal shafts in the ceiling.



This situation posed a series of questions. Should we construct a new addition with old technology, with 12 foot floor-to-floor heights in order to line up floors? Or should we build with the 16 foot dimension, with cost and use advantages? If so, only one floor in four would line up with the existing

building. To remodel the existing building, costly new ductwork for larger air handling would be needed, taking up considerable space, substantial cost. Such remodeling would be highly complex from an engineering standpoint; for example, it would not be possible, given the ceiling height, to allow ducts to cross.

The Flad team concluded that a 12 foot floor-to-floor plan was the best option given the site and the needs of the department. But their analysis turned up an even more serious problem. They estimated a cost for this project in the \$60 M range, almost twice what was projected by UW Planning and Construction a year ago.

Where did the differential in cost come from? The answer is complicated, because it arose for a series of reasons:

1. The scope of the project had grown since the previous estimate was made; notable, the decision was made to add remodeling of the organic teaching labs to the project;
2. Remodeling of the old building would result in loss of assignable space for duct work. Almost 10,000 asf of new space had to be added to compensate;
3. Earlier estimates of

cost had not included recent code changes. If 25% of the existing building is remodeled, then the rest of the building would have to be remodeled to meet code; 4. Finally, the complexity and cost of remodeling was greatly underestimated.

Being in the WISTAR program added constraints. The WISTAR list includes seven new projects totaling \$150M and a series of remodeling projects totaling \$75 M, to be done over 8 years. If Chemistry's costs doubled, then one or more of the projects on the construction list would likely be displaced.

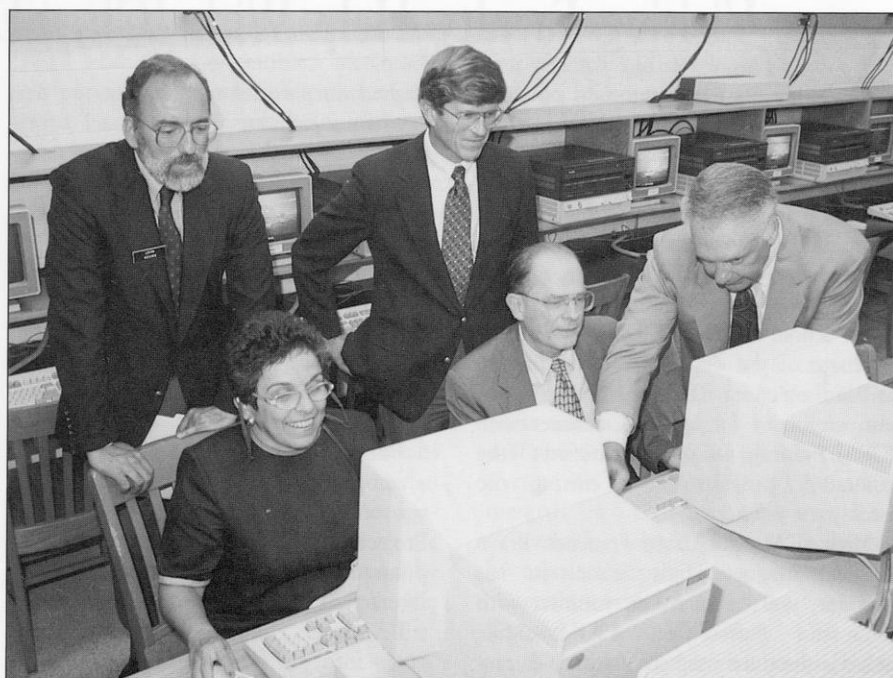
And, \$60 M was not far removed from the cost to build a completely new building. A new building, on a site bounded by University Avenue, Randall and Johnson Streets, was briefly considered but at this time seems unlikely.

A more reasonable scenario for Chemistry is a two stage project, an immediate first stage at \$30 M and a later second stage for the rest of the project. We are now working toward this goal.

Some preliminary thoughts on this: In the original plan, the small size of the proposed site was a serious problem. We are now looking carefully at alternative sites. A phased project is almost a necessity, with the first phase addressing the two most critical needs: more space, and high quality synthetic labs. New construction in the 70K to 120K asf range would house most or all synthetic chemistry and the organic teaching lab. Without the need to upgrade air flow in the existing building, less costly remodeling could provide space for non-synthetic research.

In this plan the second phase of the project would then be largely directed to the teaching program. A considerable portion of the needs outlined in this project were in teaching area—a new computer lab, upgraded teaching labs, TA offices, lecture rooms. It is reasonable to hope that these needs would be accommodated within other university priorities, outside of WISTAR.

To retain the priority of this project and to sustain the momentum, careful and rapid planning is needed. In addition, the need for matching funds (a prerequisite in WISTAR) remains with us. The next year appears likely to be a critical time. Look forward to the next installment of this saga next year. ■



▲ Standing (left-to-right): Chemistry Professor John W. Moore and Chairman Paul M. Treichel; sitting: UW-Madison Chancellor Donna E. Shalala, Dean of the College of Letters and Science M. Crawford Young; leaning: Morton R. Kagan of IBM Corporation.

IBM COMPUTER FACILITY DEDICATED

On July 20, 1992 Donna Shalala of UW-Madison, Morton R. Kagan of IBM Corporation, Acting Dean of L & S, Crawford Young, and Chemistry Professors Paul Treichel and John Moore dedicated new instructional computer facilities. Funded largely by IBM with partial support by the University of Wisconsin-Madison Laboratory Modernization Program, the new facility consists of a 40-station, networked computer room and four laboratories equipped for computer-facilitated experimentation. In addition to more than 80 IBM computers and more than 40 IBM Personal Science Laboratory devices for conducting experiments, the facility has 27 video laser-disc players and IBM M-Motion adapters to show motion video on the computer screen, providing state-of-the-art multimedia instruction.

In brief introductory remarks, Chancellor Shalala pointed out that the United States cannot afford to create another generation of scientifically illiterate Americans. This computer facility should be a significant aid towards promoting science literacy; over 4000 students per year will be using the approx. \$1 million worth of computer hardware.

The seed for this successful collaboration of industry and academia was planted at an IBM Academic Computing Conference held in the Disneyland Hotel in June 1989. John Moore and J. J. Lagowski of The University of Texas at Austin approached Morton Kagan and IBM with the idea of integrating computers and multimedia equipment into the chemistry curriculum. This idea had first been enunciated at the Tenth Biennial Conference on Chemical Education at Purdue University in August, 1988 in a series of lectures sponsored by the Fund for the Improvement of Postsecondary Education (FIPSE) and published in the January 1989 issue of the *Journal of Chemical Education*.

In February 1990, at its Higher Education Conference, IBM announced the launching of Project CATALYST, a program for focusing the creativity of chemists onto the task of integrating computers and technology into the curriculum. CATALYST brings to both Texas and Wisconsin summer and academic-year fellows to develop new technology-based instructional techniques. After these fellows return to their home campuses they will integrate these innovations into their chemistry curricula.

Visiting Faculty Help With ICE, SERAPHIM, JCE

During the summer of 1992 several faculty members from other institutions spent time in the department.

C. Marvin Lang and Donald Showalter, both of UW-Stevens Point, and Susan Nurrenbern from UW-Stout, taught in ICE workshops for middle school and high school teachers. David Shaw, a graduate of the department who teaches at Madison Area Technical College, was also on board for another summer with ICE, helping with instruction, the laboratory program, and editing the weekly newsletter.

Michael Morgan, from Francisco Bravo Medical Magnet High School in Los Angeles, was back in the summer with ICE and Project SERAPHIM. Mike helped introduce teachers in the ICE programs to computers, videodiscs, and other technology and showed them how to incorporate them into their teaching.

Robert C. Rittenhouse (Walla Walla College) spent part of the summer with Project SERAPHIM where he worked on creating computer images to show chemical phenomena and updating his program "HPLC: An Instrument Simulator". HPLC, published in 1988 by *Journal of Chemical Education: Software*, combines emulation of a typical modern binary gradient HPLC system with sophisticated modeling of reversed-phase column behavior. It is often used as a training exercise prior to hands-on work with a real instrument.

Janice Smith (York College of PA) spent five weeks with ICE developing the Super Science Connections program for K-3 teachers. Janice planned and hosted a meeting of outstanding teachers here that included four elementary school teachers: Celeste Bunting, Carol Colegate, Karen Perkins, and Linda Pils; Patricia McKean, a middle school teacher; and Ron Perkins, a high school teacher. During three and one-half days the group had a brainstorming session on incorporating more physical science education at the K-3 level. Named "Super Science Connections", the program aims to develop physical science activities into which are incorporated children's literature, displayable art projects, and other classroom activities. At the end of the five weeks several activities had been

fleshed out, workshop plans for the next two summers were in place, and a proposal was in the mail to NSF.

The 1992-93 academic year has brought four Project SERAPHIM Fellows to Madison: Robert Allendoerfer, SUNY Buffalo; John Cannon, Brigham Young University; Richard Cornelius, Lebanon Valley College; and William Robinson, Purdue University. Each is working on at least one project integrating technology with teaching chemistry.

Bob Allendoerfer is developing further a computer-based quizzing program that was originally written by Jay McCormick, Project SERAPHIM Programmer. The program will present students with interactive quizzes that can incorporate still images, animations, and motion video into the quiz questions. Since the most difficult aspect of such a project is collecting videos of reactions, lab techniques, and other possible quiz subjects, Bob will spend many hours planning and shooting video in one of Project SERAPHIM's labs.

John Cannon is working with Lynn Hunsberger, Director of the General Chemistry Laboratories, to create software that can be used with the IBM Personal Science Laboratory interface devices that were donated to the department by IBM Corporation. He is currently working to update software originally written by former Lab Director Steven Gammon for the kinetics experiment that we have done for the past two years, and he will eventually develop new computer-based laboratories and software.

Dick Cornelius, who did postdoctoral work in Madison in the mid-70s with Mo Cleland in Biochemistry, is exploring the capabilities of spreadsheets for solving general chemistry problems. He is working with both Macintosh and IBM PS/2 Windows systems to develop a series of spreadsheets that he calls *Answer Sheets*. These can either generate practice problems or provide solutions to problems that arise as a result of laboratory work or from a book. *Answer Sheets* also can provide on-screen tutorial help if students ask for it.

Bill Robinson, who has strong interests in the solid state and crystal structures, is working with both the SERAPHIM group and with Art Ellis's Ad Hoc

Committee for Solid-State Instructional Materials. Bill is contributing to the latter group's Solid State Compendium, which will be published by ACS, and he is creating computer graphics of crystal structures of the elements that will be incorporated into the *Periodic Table Toolkit*, a multimedia presentation of information about the elements written by Paul Schatz, John Moore, and John C. Kotz, who was a Fellow last year.

Shorter term visitors have included Professor Richard Ramette, recently retired from Carleton College. Dick is working on two instructional programs. One deals with the kinetics of chemical reactions and provides students with simulated data that they can use to learn how to deal with real data; the other deals with chemical equilibrium and provides a means by which students can solve complicated equations that describe the concentrations of substances in equilibrium mixtures. Two Russian scientists joined the group during September and October. Olga Agapova and Alexey Ushakov come from the Ministry of Education of the Russian Federation. One of their projects while here was a computer program to teach solid state crystal structure. Another was to begin steps to set up a branch of Project SERAPHIM within the Education Ministry to serve the entire Federation. Agapova and Ushakov, who are married, were accompanied by their son Anton, who experienced middle school in Madison.

Publications

Publications in many different forms emanated from the group. In the print medium there were two ICE guidebooks: *Chem Camp Handbook* for those who want a complete guide to running a five half-day summer or weekend chemistry lab program for middle school students; and SPICE—Student-Presented Interactive Chemistry Experiences—all you need to know about organizing and carrying out an outreach program directed toward middle and elementary schools. Also from ICE was a publication in an entirely different medium: *The Solid State Model Kit* was published in late 1992. The kit allows students to construct models of crystal

lattices by stacking layers of spheres that are kept in appropriate positions by means of vertical rods; this idea was patented by Ludwig Mayer of San Jose State University more than 15 years ago. In 1990 Ludy Mayer came to Madison to participate in the ICE Affiliate program and brought along an example of his model kit, which up to then had not been widely distributed. Ludy showed the kit to Art Ellis and John Moore, who were impressed by the ease with which models could be built, even if the builder had no previous knowledge of what the structure ought to look like. Subsequently, Ludy Mayer spent the 1991-92 academic year on a fellowship under Art Ellis's NSF grant, to develop the kit further. After a year of concentrated work, development of prototypes, and field trials, the kit is now a reality, ready to be used by students and faculty at a price that has been kept as low as possible (so that as many teachers as possible can afford it) consistent with the quality necessary to realize the fine tolerances in the parts that comprise it.

In the technology arena, there were publications in two different media. *Journal of Chemical Education: Software* continued to publish peer-reviewed soft-

ware on three hardware platforms, IBM PS/2 and PC Compatible, Macintosh, and Apple II. Sixteen different computer programs were published during the year, with subjects ranging from Lake Study (authored by David Whisnant, a graduate of our department) to Atomic Spectroscopy to Demo-Deck (a HyperCard stack for the Macintosh written by Fred Juergens, the department's lecture demonstrator). The other technological medium was videodisc; *The World of Chemistry: Selected Demonstrations and Animations I* was released in August. This 60-minute disc contains selections from *The World of Chemistry* video series and telecourse. It has been designed so that a variety of demonstrations the macro world of chemistry are followed by animations that carry the learner to the molecular world.

Connecting with Chemistry

A theme that has run through the projects in chemical education this year is "making connections". In the General Chemistry Division this has meant linking the lecture more closely with the laboratory and the laboratory

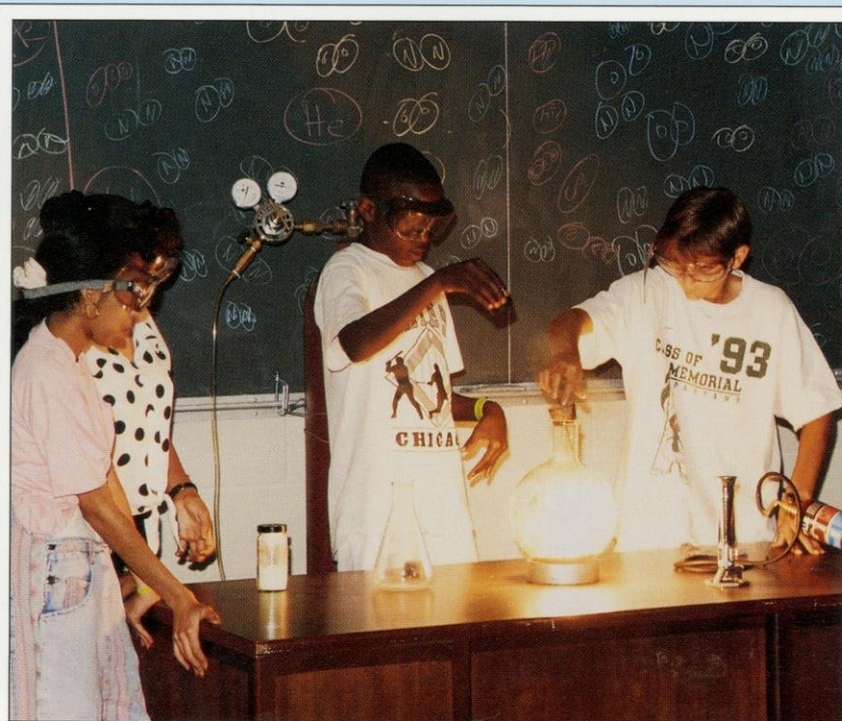
more closely to real-world experiences. In our research and development work it has meant bringing technology of Project SERAPHIM and *Journal of Chemical Education: Software* to the teachers who attend ICE workshops. It has meant trying to portray the dynamic portions of chemistry dynamically, using demonstrations, computer programs, and videodisc technology to illustrate the phenomenon most clearly.

This theme has also been carried out in another venue. Two newsletters have been combined, making what is a more well-rounded and useful whole. The ICE-Cycle and Project SERAPHIM News merged in October 1992 to form "*Connecting with Chemistry*", a quarterly newsletter connecting teachers with materials, events, and other teachers. *Connecting with Chemistry* will report on the world of materials and activities for teachers and students of chemistry. All media will be included, from hands-on demos with grocery store chemicals to the most sophisticated technological wizardry. And, we won't just report what is happening but will be right in there making things happen. Let us know if you have suggestions. Let us know if you want to be on our mailing list.

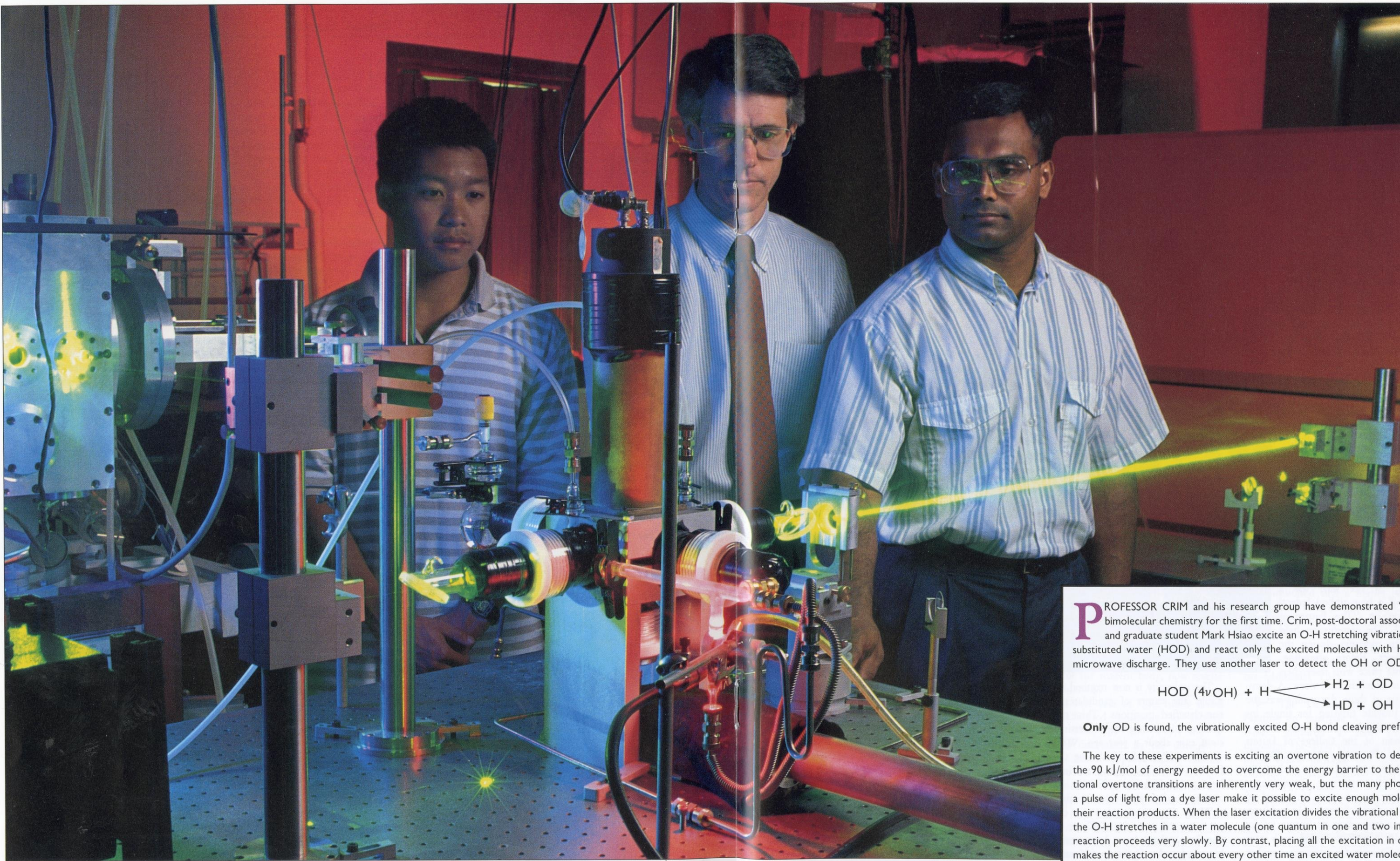
Summer Programs for Middle School Students

For the tenth summer in a row, minority middle school youths came to the department to carry out experiments in the general chemistry labs. Well over 100 students, a record number, attended the summer enrichment program funded by the Center for the Health Sciences. The 7th graders did chemical reactions with metals, the 8th graders studied acids and bases, and the 9th graders completed a special project on gases.

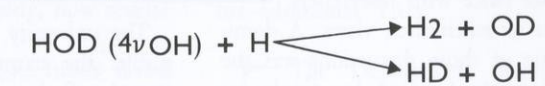
The program was supervised by Cathy Middlecamp (Ph.D. '76, West), Director of the Chemistry Learning Center. Two past graduates of the department, Derrick Arnelle (Ph.D. '89, O'Leary) and Matt Fisher (Ph.D. '91, Record) assisted in the program. Derrick has been an instructor for 6 years. Twenty six graduate students, mostly from the department, provided individualized instruction to youths who worked in groups of four.



Instructor Derrick Amelle assists 7th grader with experiment on copper sulfate.



PROFESSOR CRIM and his research group have demonstrated "bond-selected" bimolecular chemistry for the first time. Crim, post-doctoral associate Amit Sinha, and graduate student Mark Hsiao excite an O-H stretching vibration in isotopically substituted water (HOD) and react only the excited molecules with H atoms from a microwave discharge. They use another laser to detect the OH or OD products.



Only OD is found, the vibrationally excited O-H bond cleaving preferentially.

The key to these experiments is exciting an overtone vibration to deposit more than the 90 kJ/mol of energy needed to overcome the energy barrier to the reaction. Vibrational overtone transitions are inherently very weak, but the many photons available in a pulse of light from a dye laser make it possible to excite enough molecules to detect their reaction products. When the laser excitation divides the vibrational energy between the O-H stretches in a water molecule (one quantum in one and two in the other), the reaction proceeds very slowly. By contrast, placing all the excitation in one O-H stretch makes the reaction occur about every other time an excited water molecule collides with a hydrogen atom. This clear example of mode selectivity agrees with chemical intuition about the reaction coordinate for the $\text{H} + \text{H}_2\text{O}$ reaction. One of the O-H stretches becomes the reaction coordinate as that bond breaks. Putting energy into that coordinate selectively promotes the reaction.



THE VERVIEW

*New UW President, Madison Chancellor,
College Dean... Quality Reinvestment...
Chemistry enrollment up...*

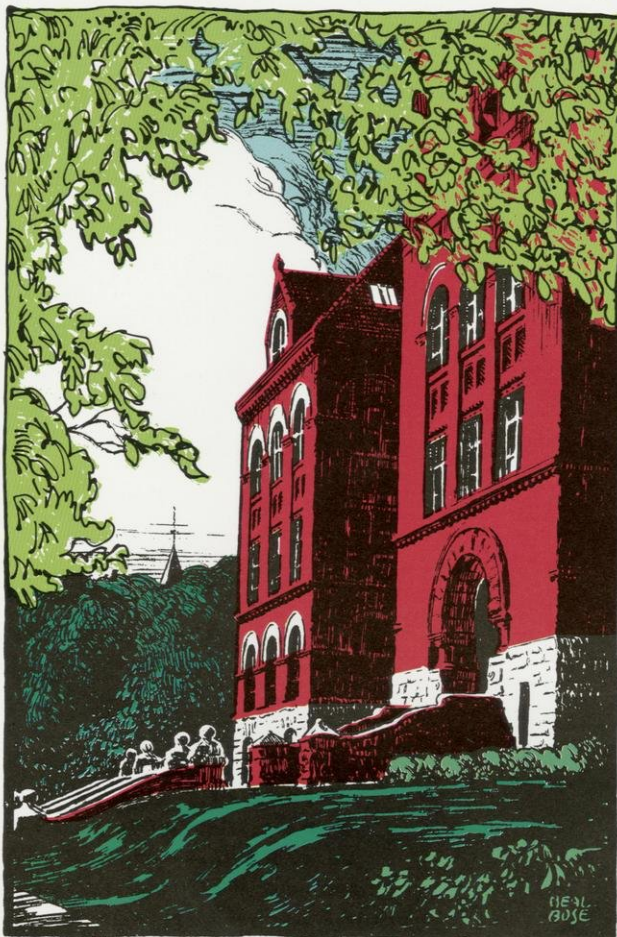
Catherine Lyall was confirmed as the fifth President of the UW System on Apr. 1. Lyall had served Vice President and was acting President prior to selection for the top UW post. Before coming to the UW System 10 years ago, she had gained strong academic credentials (as a Professor of Economics at Johns Hopkins) and experience in federal government (as Deputy Assistant Secretary for Economic Affairs at HUD). The choice was widely acclaimed within the university and the state.

In early December, UW-Madison Chancellor Donna Shalala accepted President Clinton's call to be Secretary of the Department of Health and Human Services. She had been Chancellor for five years. Vice Chancellor David Ward was immediately named Acting Chancellor and a search committee was created to select Shalala's replacement by the start of the fall semester, 1993.

Shalala, by the way, was a member of a blue ribbon federal commission on "The Future of the NSF". The commission held three open meetings during the fall semester. Before attending, Shalala met twice with researchers on campus to solicit their views. A dominant theme of those discussions was the need to provide funding for single investigator research in basic sciences.

The Dean of the College of Letters and Science, Philosophy Professor Donald W. Crawford, resigned at the end of the spring semester to accept a position as Vice Chancellor at the University of California at Santa Barbara. He had served for three years. Political Science faculty member M. Crawford Young took over as interim Dean and a nineteen member search and screen committee was constituted to select his replacement.

Chemistry faculty member Larry Dahl is a member of that committee. As this is being written (mid-December) the committee had concluded interviews of 8 candidates, and has sent a short list to acting Chancellor Ward who will make the final selection.



The university is now required to make public the names of candidates for all non-classified positions. This rule has been in place since the university lost a court case about a year ago. While this applies to all searches including those for faculty, the major interest are in higher level administration officials and, of course, coaches for athletic teams.

While the economy has not taken as great a toll on the UW as it has elsewhere, there have been some problems. In the College of Letters and Sciences the problems were magnified since the College had overspent its

budget for several years. Among other things, this has meant a freeze on the university line item funding for capital equipment and remodeling, and a reluctance to fill open positions.

The largest budgetary crisis occurred during the fall semester when the state imposed a 1.5% cutback on funds budgeted for the current year. This meant a cutback of \$3.9 M on the Madison campus. The timing was especially bad, since it required that

almost all cuts come out of the second semester. L & S imposed a 5% cut on TA appointments.

The 1993-5 budget, being prepared at this time, reflects economic uncertainties in the state. A proposed \$352M capital (building) budget for the UW System was approved by the Regents in December; it is \$8M less than the budget for two years ago. Fully three-fourths of the budget is for repair and renovation. At UW-Madison, funding was proposed for new Art and Law buildings, a Biochemistry addition was proposed for inclusion in WISTAR, funds were included for classroom remodeling, and the conversion of the Red Gym project to a student center was designated to receive planning funds. This budget must still receive state approval; before that occurs, some cuts are likely.

There have been other interesting campus developments in the past year, including:

- Deliberations of the Governor's Commission on UW Faculty Compensation occupied the news over eight months, with the committee issuing their report in late August. An important recommendation was that faculty salaries be considered separately from salaries of other state employees and that market analysis should be a principal determinant. It was suggested that the Board of Regents be delegated more authority in this process. In turn, the University would also be called on to be more accountable and it was suggested that a more systematic evaluation procedure be established.

- A recommendation was offered by a Gender Equity Committee to equalize faculty and staff salaries, by selective

and/or across the board raises. It was determined that faculty salaries are between 1.6% and 6.0% lower for women than men, after factoring out variables such as years of experience and the nature of a discipline.

► The Teaching Quality, Evaluation, and Rewards Committee reported to the Faculty Senate during fall. Chemistry's Jim Taylor chaired this committee which suggested that at least 20% of the merit raise funding be allocated to reward excellence in teaching. Recommendations also included formation of a "Teaching Academy" of former teaching award recipients with funding to support seminars and workshops.

► A policy mandating post-tenure review was instituted. Despite a strong objection of the Madison campus, the Board of Regents adopted, by a 14 - 1 vote, a policy entitled "Guidelines for Tenured Faculty Review and Development". Individual campuses are called upon to develop a policy that would review activities of the tenured faculty at least once every five years; the policy must provide criteria, identify who is responsible for the review, and document methods for rewarding excellence and remedying problems.

► There was a review and reassessment of 300 academic staff appointments including two persons in Chemistry. In 1986, academic staff positions throughout the state system had been codified in the Academic Staff retitling exercise. In this process the prefix "Senior" was initially included and then somewhat arbitrarily deleted. The loss of the "senior" title was contested, and Dane County Circuit Judge Mark Fraenkel ruled against the earlier university action, requiring the university to upgrade salaries, retroactive to 1987.

► The UW-Madison was one of eight universities chosen in spring to participate in a Total Quality Management project with five major corporations. About 100 UW faculty and administrators (including Chemistry Professor Art Ellis) participated in a week long TQM workshop at Procter and Gamble in September. Then in October, it was announced that the UW-Madison was one of nine academic

institutions chosen by IBM to receive a million dollar grant of cash and computer equipment over 5 years in IBM's TQM University Competition. This program is intended to support teaching, research and use of TQM principles.

► The University completed its first year of a three year program of quality reinvestment (QR). This program will decrease the size of the university and reallocate resources saved to other needs. All departments in the university were called on to carry out a self study, with goals of identifying strengths and weaknesses, setting priorities and goals, and developing strategies for the coming years with recognition of the prospect of downsizing. For Chemistry, the self study was not difficult; during the past five years, strategic planning has occupied the department's full attention, with the Department's Long Range Planning Committee taking an aggressive role.

Self study reports went first to review committees set up to advise the Dean of the College. A major function of the review committee was to suggest how departments might cut their program size; not surprisingly, most departments had been loathe to suggest this in their own evaluations.

Cuts would be, of course, a prerequisite to provide funding for reinvestment and they had to come from the "base budget", meaning salaries, in large part. Occurring over several years, the decreases would mainly be accomplished by not replacing faculty and staff members. Estimates suggested that one-third to one-half of vacated positions over several years would not be filled. The decrease would coincide with a decrease the size of the student body, now several years underway.

In the first year of QR, funds saved were reallocated primarily to faculty salaries. This, by the way, was a calculated risk taken by the university. The state has to approve faculty salaries and there was no assurance that the QR savings would even be returned to the university. Special salary treatment for faculty is even more contentious, and this has been a difficult year financially with cutbacks occurring elsewhere in the state government. However, these fears did not become reality and departments received QR funds to supplement regular

merit exercise funds.

The Department

Chemistry was in a strong position in the QR exercise. The department does not have sufficient faculty to teach all of its classes and no retirements or departures were expected. In addition, we have a strong program and salaries well below peer averages. In the 1991-2 merit exercise, the department received one of the highest increments of QR funding for faculty salaries.

As this is being written, the department is gearing up for its first faculty addition in two years. In January, the department will interview candidates for a faculty position in theoretical chemistry. This is the next step in a planned strategy to expand the strength of our theoretical chemistry program.

Other news:

► General Chemistry fall enrollment (mostly in Chemistry 103) increased by almost 7%, even though the freshman enrollment on campus decreased by 5%. Colleagues at several other universities indicate that they have seen similar increases in enrollment and we hope that this reflects increased interest in science. Fortunately, funds to open additional sections were available through the "Freshman Access Program", a new initiative from Chancellor Shalala.

Preregistration data for spring semester, 1993 indicated that a higher percentage of students will continue in Chemistry 104. We had projected a need for 58 sections, but ended up with 64 sections being completely filled. The department was rescued by Freshman Access funding for additional TA's.

► The Department received NSF funding to purchase a new 300 MHz NMR, acquired a new ESR, and upgraded the x-ray crystallography equipment which includes two new diffractometers, an area detector, and auxiliary computers. Funding for these purchases was provided by NSF grants, with matching funding from the Graduate School and the Department. Amoco donated a used ZAB high resolution mass spectrometer from their Naperville facility. This has been installed and is being used at this time.

NEW BADGER CHEMISTS

PHD

ARCHIBALD, ROBERT SCOTT

(WEST) "Recent Advances in Low Valent Organosilicon Chemistry".

BAKER, MARK R.

(ZIMMERMAN) "The Synthesis and Photorearrangements of Allenic Analogues of Cyclohexenones and 2, 5-Cyclohexadienones: An Investigation of Allenic Excited States".

BARTZ, JEFFREY A.

(CRIM) "The Ultraviolet Photodissociation of Organometallic Molecules Using Vacuum Ultraviolet Photoionization and Time-of-Flight Mass Spectrometry for Detection".

BUCHANAN, JOHN L.

(BURKE) "Progress Toward Halichondrin B: Enantioselective Synthesis of the C(22)-C(34) Bis(tetrahydropyran) Template".

CARTER, MARY BETH

(BURKE) "I. Studies Directed Toward the Total Synthesis of Scytopyncin C. II. Studies Toward the Synthesis of the C(1)-C(12) Subunit of the Halichondrin Skeleton".

CHANG, HAO

(NELSEN) "Intramolecular Electron Transfer in Bis(Tetraalkyl-Hydrazine) and Bis(Hydrazyl) Radical Cations".

CHEN, PETER

(WRIGHT) "Infrared Four Wave Mixing: A New Spectroscopic Technique Used to Probe the Interactions Between Vibrational Levels in Chlorobenzene".

DROSSMAN, HOWARD

(SMITH) "Construction and Evaluation of a Capillary Electrophoresis DNA Sequencer".

EIDEN, GREGORY C.

(WEISSHAAR) "Photoelectron Spectroscopy of Polyatomic Organic Radicals at cm^{-1} Resolution: The Benzyl Cation".

GALLOWAY, DOUGLAS B.

(CRIM) Determination of the Pathways, Kinetic Energy Disposal, and Internal Energy Content for the Photodissociation of Nitrobenzene".

GAVNEY, JAMES A.

(DAHL) New High-Nuclearity Nickel-Phosphinidene Carbonyl Clusters: Synthesis, Characterization and Chemical-Electrochemical Behavior".

GISSER, DANIEL J.

(EDIGER) "NMR Relaxation Studies of Polymer Solution Dynamics".

GISSER (COLLEN), KATHLEEN R.

(ELLIS) "Structural, Chemical and Electronic Characterization of Nickel-Titanium Shape-Memory Alloys".

HARRINGTON, JOEL F.

(WEISSHAAR) "High Resolution Photoelectron Studies of Vanadium Monoxide".

HSIAO, MARK

(CRIM) "Vibrational State-and Bond-Selected Reactions of Water with Hydrogen Atoms".

HUEY, LEWIS G.

(CRIM) "The Photodissociation of 2-Nitropropane and Nitroethane in a Molecular Beam".

JAMES, PATRICK M.

(ELLIS) "The Chemical and Electrical Consequences of Chemical Modification of $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ Through Selective Removal of Copper and Barium".

KAHAIAN, ARTHUR J.

(DAHL) "Synthesis and Structural-Bonding Analysis of Three Types of Nickel Carbonyl Chalcogen Clusters".

KIM, SANGHOON

(YU) "Lateral Diffusion of Surface-Active Molecules at the Air/Water Interface".

KRAHLING, MARK D.

(FARRAR) "Instrumental and Experimental Aspects of Quantitative Ion Abundance from Time Domain Ion Cyclotron Resonance Mass Spectrometry".

LEE, KEVIN C.

(BURKE) "Synthesis of Erythronolide B Seco-Acid Equivalent Via Double Ester Enolate Claisen Rearrangement".

LEE, NAMKYU

(VEDEJS) "Enantioselective Protonations of Enolates Using Optically Pure Amines".

LEWIS, GREGORY J.

(DAHL) "Synthesis, Separation, and Characterization of Platinum Carbonyl Cluster Anions".

LIANG, GUI-BAI

(GELLMAN) "Studies on Noncovalent Interactions Associated with Protein Folding".

MA, CHEUK KI

(DAHL) "Synthesis, Characterization and Stereochemical Bonding Analysis of Iron Nitrosyl Chalcogenide Clusters".

MAYRHOFFER, RUDOLPH C.

(SIBERT) "Classical and Quantum Mechanical Studies of Molecular Vibrations for Triatomic Molecules".

MCCOY, ANNE B.

(SIBERT) "Theoretical Investigations of Highly Excited States of Polyatomic Molecules Using Van Vleck Perturbation Theory".

MEINHARDT, MICHAEL B.

(ZIMMERMAN) "Synthesis and Properties of Oligomers of Bicyclo[2.2.2]octanes: Molecular Rods".

NICCOLAI, GERALD P.

(CASEY) "Fenske-Hall Molecular Orbital Studies of $[\text{CpM}(\text{CO})_n]_2$ Complexes: The Interplay of Metal-Metal Bonding and Bridging and Semi-bridging Ligands. The Photolytic Dehydrogenation of the Diiron Alkylidene Complex, $[\text{CpFe}(\text{CO})_2]_2(\mu\text{-CO})(\mu\text{-CHCH}_2\text{CH}_2\text{CH}_2\text{CH}_3)$ ".

PARK, SANGSOO

(YU) "Chain Diffusion in the Bulk State and in Concentrated Semidilute Solutions".

PETERSON, MATTHEW

(VEDEJS) "Methodological and Mechanistic Studies of the Wittig Reaction".

SAEZ, EDNA

(CORN) "In situ Polarization Modulation Studies of Phenazine and Phenothiazine Films on Polycrystalline Gold Surfaces".

SEVIAN, HANNAH M.

(SKINNER) "Studies of Spectral Broadening Mechanisms and Correlations in Condensed Phase Systems".

SONG, YUNTAO

(BURKE) "Enantioselective Synthesis, Structure and Study of Macrolides Composed of Hydroxyran Subunits".

STEIN, THOMAS M.

(GELLMAN) "Investigation of Synthetic Surfactants with Unusual Topology: Toward the Development of Metaphiles".

TAN, ROBIN P-K.

(WEST) "1. Reactions of Tetramesityldisilene with Se, Te and As₄. 2. Synthesis and Structural Characterization of Lithium t-Butylsilaamide".

THODEN, JAMES B.

(DAHL) "Synthesis and Stereochemical Analysis of New Compounds from Reactions Involving Metal-Promoted Carbon-Carbon Bond Conformation by Reductive Head-to-Head Coupling of Carbon Disulfide".

TURCO, GREGORY P.

(YU) "Polyelectrolyte Dynamics; Diffusion and Electrophoresis in Complex Media".

UNDERINER, TODD L.

(CASEY) "Rearrangements of Organorhenium Compounds".

WAGNER, MARCIA

(TOBIN) "Growth and Surface Morphology of AgBr/Ag (011)".

WANG, PATRICIA A.

(ZIMMERMAN) "The Regioselectivity of the Birch Reduction".

MS

GU, YING (WOODS)

HSIAO, MICHAEL (KIESSLING)

JAHNKE, MARK (SCHRAG)

LENNOX, JOSEPH (BURKE)

LEE, RIP A. (DAHL)

LI, XUYE (YU)

SMITH, DARYL L. (WEST)

SUNDARI, JOSYULA (LANDIS)

ZHOU, HAIRONG (BURSTYN)

BS

CLEARY, BRENDA A.

DECKER, CHRISTIAN C.

HERBOEK, BARBARA A.

HUYETT, JENNIFER E.

JENSON, MICHAEL C.

KAUNAS, ROLAND R.

KIEFER, ANTON D. JR.

KLAMERUS, JEFFREY M.

KLEIS, KATHLEEN

KOHN, TODD J.

KOWACH, GLEN R.

KRAUS, DENNIS R.

MASCHL, ROBERT J.

NAUJOK, ROBERTA R.

PHILIPP, MICHAEL D.

POCHAN, DARRIN J.

ROZOWSKI, PETER M.

RUHLAND, LISA A.

SANDERS, WILLIAM J.

STEINKE, GREGORY A.

TOLLEFSON, MICHAEL B.

WENDLAND, STEPHANIE A.

WENTZ, BRIAN J.

WILKES, DAVID J.

AWARDS ♦ AWARDS ♦ AWARDS

Hamers named Presidential Faculty Fellow

Associate Professor Robert Hamers was one of 30 scientists and engineers nationwide (and one of only three chemists) to be awarded a Presidential Faculty Fellowship by the National Science Foundation. The PFF program, new this year, was established to "recognize and support young faculty members who demonstrate excellence and promise both in scientific and engineering research and in teaching future generations of students to extend and apply human knowledge." The award consists of an unrestricted research grant of \$100,000 per year for five years. Additionally, the 30 PFF's were invited to Washington, D.C. for three days of activities in conjunction with the awarding of the National Medals of Science and National Medals of Technology. The first day (Sunday), PFF's were invited to a reception at the famous Willard Hotel adjacent to the White House, where there was a reception in honor of the recipients of the National Medals. On Monday, PFF's were invited to the National Science Foundation where they met with Walter Massey and various NSF program directors; a press conference was held, and PFF's received award certificates signed by President Bush. In the evening, they attended a black-tie dinner at the National Building Museum which was also attended by D. Allan Bromley, Assistant to the President for Science and Technology. Finally, the PFF's three-day visit was capped off on Tuesday by visiting the White House and attending the Rose Garden ceremony in which President Bush presented the Medals of Science and Technology and gave a short speech.

Professor Hamers' research centers on the use of scanning tunneling microscopy and related techniques to study the chemical and physical properties of surfaces with atomic resolution. STM uses



Robert Hamers at the White House

an atomically-sharp tip to directly sense the contours of solid surfaces, providing atomic-resolution images. He is using the PFF award to augment his current research and to initiate new research in which the very high current density in the STM will be used to induce local chemical reactions, with the ultimate goal of developing the ability to control surface chemistry on nanometer distance scales.

Upjohn Awards for Outstanding Teaching of Chemistry

With Upjohn Co. sponsorship, the Department now has the opportunity make awards for excellent teaching annually to two faculty members. In selecting recipients for these \$2,500 awards, the department is directed to consider both undergraduate and graduate teaching. It is also possible for a faculty member to win the award more

than once.

Since award nominations are one of the regular duties of the Finance Committee, this group was the selection committee. Even with many good candidates, it was easy to select the first recipients, Professors Fleming Crim and Professor John Wright. Fleming had received a University Teaching Award two years earlier, and is widely regarded by students and faculty as one of the most outstanding teachers (and researchers) in the department. John had equally good credentials, and had contributed further in a unique way, developing an interactive computer program over the last several years for the undergraduate analytical chemistry labs.

To highlight the 1991-2 awards, a minisymposium was held on November 17, 1992. Brief introductions by the Department Chair, Paul Treichel, and by Dr. James Freeman of the Upjohn Co. preceded presentations by Professors Wright and Taylor. This symposium was a fringe benefit to the department, which now has few events directed to a department-wide audience. About 150 students, faculty and staff were in attendance.

Professor Jim Taylor played a pivotal role in persuading Upjohn to contribute funding to the department for this important program. Upjohn already has ties to the department including, notably, their sponsorship of the Charles N. Reilly Award for the outstanding student in Analytical Chemistry.

The department has always had a strong commitment to teaching and a long history of teaching excellence. This is illustrated by the fact that eight chemistry faculty have received university teaching awards. The all-university awards are highly competitive; with a current faculty of almost 2,400 there are only 10 awards given annually. The Upjohn Awards give the department a chance to recognize and reward outstanding teaching.

Chuck Casey was awarded a University Houses Professorship by the UW Graduate School. Six current faculty members in the Department have been so honored. University Houses Chairs provide \$65,000 in unrestricted research funding over a five year period. Chuck chose to honor a former departmental colleague, selecting the title of Homer B. Adkins Chair for his position.

Chuck work in organometallic chemistry has received widespread recognition; we reported two years ago on his receiving the 1991 ACS Award in Organometallic Chemistry.

Phil Certain was elected Fellow of the American Association for the Advancement of Science, for "...physical chemical research, particularly on electronic structure of molecules, and for contributions as a teacher and university administrator."

Larry Dahl was elected to the American Academy of Arts and Sciences.

Mark Ediger was awarded the 1993 John H. Dillon Medal of the American Physical Society's Division of High Polymer Physics. The Dillon Medal recognizes outstanding accomplishment and unusual promise in research for a

young investigator. The prize citation read, "For his insightful experimental and computational investigations of local polymer dynamics and, in particular, for his illumination of the connection between solvent and polymer relaxation in solution."

Emeritus Professor John D. Ferry was one of three UW faculty members elected to the National Academy of Engineering in 1992.

Laura Kiessling was one of two UW-Madison Assistant Professors to receive a Shaw Scientist Award. The James D. Shaw and Dorothy Shaw Foundation of Milwaukee sponsors these annual awards which provide research funding of \$35,000 per year for five years.

Gil Nathanson received a Camille and Henry Dreyfus Teacher Scholar Award. Thirteen recipients were chosen from among 83 nominees. These awards were established in 1969 to recognize and encourage the teaching and research careers of talented young faculty in the chemical sciences.

Dan Rich received three awards in during 1992. He was awarded the 1992 George Herbert Hitchings Award for Innovative Methods in Drug Discovery and

Design, sponsored by the Burroughs Wellcome Foundation. The award will provide funds to initiate research to understand the molecular basis of one form of peptide transport critical for developing orally active HIV protease inhibitors. Dan also won the 1992 Award in Medicinal Chemistry. This biennial award, sponsored by the ACS Division of Medicinal Chemistry, was presented at a Divisional Symposium in Buffalo in June. He was awarded the 1992 Research Achievement Award in Medicinal Chemistry by the American Association of Pharmaceutical Scientists.

In early fall, Dan was named recipient of the ACS's 1993 Ralph F. Hirschmann Award in Peptide Chemistry.

Paul Schatz, Organic Laboratory Director, was one of 11 winners in the sixth annual (1992) EDUCOM Higher Education Software Awards Competition. Five entries including Paul's were designated for the program's highest level of recognition. Paul's entry was for Spectra-Deck/SpectraBook, a highly interlinked and annotated collection of spectral data on 50 organic compounds. Paul collected his award at the Snowmass meeting of EDUCOM in August.



Robert A. Alberty (Ph.D. '47, Williams, and former faculty colleague) is now an Emeritus Professor at MIT. He penned several comments about his second PhD student, the late Robert M. Bock (BS, '49, Ph.D. '52) who died last year in an unfortunate accident at home: "I was an Associate Professor in the Chemistry Department when Bob com-

pleted the requirements for his degree on Jan. 22, 1952, and went to work for the Department of Biochemistry. The first part of his thesis was on the determination of the acid dissociation constants of adenosine phosphates and related compounds. An interesting thing about this is that here I am, 40 years later, working on the thermodynamics of biochemical reactions and using the acid dissociation constants and some of the same thought processes Bob and I learned together so long ago."

Karen E. (Ziege) Bartelt (BS, '71) has a tenure track faculty position at Eureka College, Eureka, IL. (She called attention to the fact that is Ronald Reagan's alma mater). She will teach organic chemistry, biochemistry, general chemistry and physical science.

Jim Bershaw (PhD '75, Vedejs) has relocated in the midwest at the Parker and Amchem Division of the Henkel Corporation, Madison Heights, MI.

Blake Bichlmeir (Ph.D. '73, West) represented DuPont at the memorial sym-

posium for Professor Herman Mark, on "Polymers to the Year 2000 and Beyond", held in October at the Polytechnic Institute in Brooklyn, NY.

Edward S. Bloom (Ph.D. '40, Adkins) related that he and his wife Winnie joined several Wisconsin alumni gathering to celebrate Russell Peterson's 75th birthday in October, 1991. Peterson (BS '38, Ph.D. '42, Walton) had the company of: Alice and John Castle (Ph.D. '44, Adkins), Gerry and Jean Whitman (Ph.D. '40, Adkins), Leona and Al Pavlic (BS '38, Ph.D. '42, Adkins), Norine and Glen Hager (Ph.D. '43, Adkins), Barbara and David England (Ph.D. '43, Adkins), and Jean and Winston Wayne (Ph.D. '40, Adkins).

Ellen Spatz Bunyan (Ph.D. '50, Hirschfelder) retired from the Chemistry Department of the University of the District of Columbia in May, 1991. Then in September, 1991 she began teaching part time at Walter Reed Army Hospital through the UDC's Continuing Education program.

Ray A. Dickie (Ph.D. '65, Ferry), currently at the Ford Motor Co., was recipient of the 1991 Midgley Award and the 1992 Roy W. Tess Award in Coatings. The Midgley Award was presented by the Detroit section of the ACS in November, 1991 for outstanding chemical research related to the automotive industry. The Tess Award, given in recognition of achievements in coatings science, technology and engineering was presented at the August, 1992, ACS meeting in Washington, DC.

Donald Donermeyer (BS '56, Ph.D. '61, Williams) retired from Monsanto where he worked for over 30 years.

Eric Eisenhart (Ph.D. '86, Reich) and Joann Eisenhart (Ph.D. '86, Ellis) participated in a recent project at Rohm and Haas in which the project team was composed entirely of chemists with UW/Madison affiliations: besides Eric and Joann, the group included Mark Kesselmeyer (Ph.D. '87, Sheridan), Bob Solomon (Ph.D. '86, Zimmerman), Al LaVoie (Ph.D. '81, Trost) and Linus Lindner (Ph.D. '84, Zimmerman).

June S. Ewing (BS, '59) would like to hear from other Badger Chemists. She also writes: "After receiving my BS in '59, I went to U. C. Berkeley for an MS. In 1976, I added a Master's Degree in Public Administration. My career has been an equal mix of research and administration and I have been an electron microscopist, university instructor, curriculum specialist, and science administrator. My current employer is the U. S. Public Health Service in Rockville, MD where I direct training programs for one of the research agencies."

Margret Geselbracht (PD '91 - '92, Ellis) is a new faculty member at Reed College, starting Jan., 1993; she joins Wisconsin alumni Alan Schusterman (Ph.D. '81, Casey) and Patrick McDougal (Ph.D. '82, Trost) on the faculty there.

Allen G. Gray (Ph.D. '40, Holt) was at DuPont for 12 years and then joined the staff of ASM International in 1958, becoming Technical Director in 1974. After retiring in 1983, he continued on at ASM as an advisor. He is also Adjunct Professor of Materials Science, Engineering, and Management of Technology at Vanderbilt University. He received the National Materials

IN M·E·M·O·R·I·A·M

Paul R. Austin died at home on July 18, 1992. He was 85 years old. He received his BS degree from Wisconsin in 1927 and went on to receive MS '29 and Ph.D. '30 degrees from Northwestern. Austin had a lengthy career at DuPont, contributing to the development of nylon early in his career, and later serving as Assistant Laboratory Director in the Electrochemical Department and then as Director of the Electrical Chemicals Division. From 1959 until his retirement in 1966 he was manager of the Patents and Contracts Division. After retiring, he continued research at the U. of Delaware. He was a recognized authority on chitin, a component of the shells of crabs and shrimps, and he helped the College of Marine Studies at Lewes, DE to establish its Sea Grant Program. In 1988, the University of Delaware established the Dr. Paul R. Austin Sea Grant Student Fellowship in his honor.

Cheng-e Sun died in Beijing March 13, 1991. After receiving his early education in China, he came to this country for further study, and received his Ph.D. from the U. of Wisconsin in 1933, working with Professor Williams. Returning to China in 1935, he was appointed Professor at Peking University. Later in his career, he returned to the US for a short period, and then went back to Peking University as Dean of the School of Natural Science. He was a well known kineticist with over 50 papers to his credit.

William R. Davie (Ph.D. '51, McElvain) died in an accident, August 25, 1992.

Armand deRosset (Ph.D. '39, Williams) died on Feb. 1, 1992. He had been Director of Separations Research at UOP; after his retirement in 1980, he continued to work as an Adjunct Scientist at Sarasota's Mote Marine Lab.

Richard H. Hunt died Nov. 16, 1991. He had received a BS from U. of Kentucky, and then a MS in 1947 and a Ph.D. in 1949 from Wisconsin, working with Professor William Johnson. He had a 36 year career with Shell Oil Co. at the Houston Research Laboratory.

Edward N. Kramer, died on Dec. 27, 1991 at the age of 83. He had received his schooling at Wisconsin: a BS in '29, MS in '30, and his Ph.D. in '33 with Professor Meloche. He had worked at DuPont for 38 years, rising to an executive position in the Pigments Division.

Rex J. Robinson, died on October 29, 1992 in Seattle; he was 88. He received his BS degree from Depauw in 1925 and a Ph.D. from U. of Wisconsin in 1929 in analytical chemistry with Meloche. He came to the U. of Washington directly upon graduation and he served as a faculty member for 42 years. At the time of his death, he was Professor Emeritus at Washington. His research involved analytical techniques and the chemistry of water.

Ralph E. Wood (Ph.D. '51, Ritter) died in March in Provo, Utah. His research career was at the U. of Utah and at several industrial and government laboratories, where he worked on metals recovery, hydrogenation of coal, and recovery of liquid fuels from oil shale.



R ECOLLECTIONS

JOHN E. WILLARD

Paul Treichel has asked me to provide some recollections about the Chemistry Department for the Badger Chemist to add to those of John Ferry which appeared in the last issue. Here are a few:

... In 1953 I entered graduate school at the University and elected to work with Farrington Daniels as my major professor. (My only previous contact with the institution was when I was in high school in Beloit and filled the family car with friends to drive up to the state basketball tournament held in the old red gym). When I received one of the early WARF research assistantships, it was required that one live in the graduate student dormitory and that part of the stipend be applied to the rent to help with the University's financial problems. I worked in the laboratory next to Daniels' office where he tested ideas which he felt were too much of a long shot to assign for a Ph.D. thesis. His interests at that time included a large battery of electrolytic cells set up to concentrate deuterium from ordinary water, analysis of widely varied geological specimens to determine whether they showed selective concentration of carbon-13, and a thermal diffusion column several stories high set up in a stair well in the west wing for the purpose of concentrating isotopes...

... My long term connection with the university started when, after having taken my degree and taught two years at Haverford College. I was in Madison on a summer research appointment and was offered a position on the general chemistry teaching staff when a vacancy unexpectedly occurred in late August. At that time the starting faculty position for recent Ph.D.s or postdocs was that of instructor. The salary was \$1800 a year; top full professors received \$5000. New instructors were provided with office and research space, could have graduate students, conducted four quiz and lab sections in freshman chemistry and gave no lectures. My first office was in the wooden central section of the building, with mercury in the cracks of the floor. Nearby labs housed

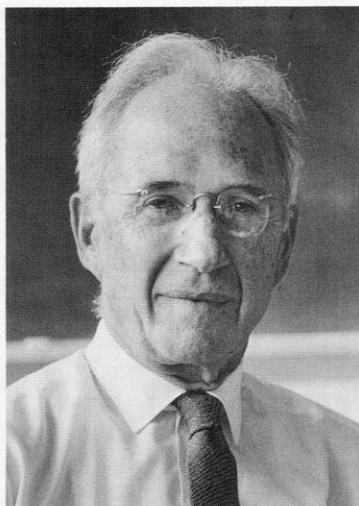
graduate students of Prof. Kahlenberg. They respected him despite his well known iconoclasm about the ionic theory. In those days it was required that both faculty and teaching assistants wear coats and ties in the class room, there were no women T.A.s, women students wore skirts, and blue jeans had not yet come on the scene for men or women...

... The main lecture room in the old chemistry building held 400 people. When the bell for the start of class rang the lecturer appeared through a door in the center of the wide blackboard at the front and was greeted by a loud skyrocket, e.g., SSSSS BOOM! AHHH Walton!, which was sometimes repeated during the lecture when the professor, aided by lecture assistant Odell Taliaferro, put on a particularly spectacular demonstration...

... When hand calculators first came on the scene in the early '70s a few students had them. The question arose, should they be allowed to use them in exams? The T.A.s working with me voted against it on the basis that it would give an unfair advantage to those who could afford to buy them. Later, when they were more common and were allowed, one student inadvertently left one of value in the exam room. He was faced with a serious dilemma as to whether to reclaim it, since it had a crib taped to the bottom...

... The Department's first Xerox machine, probably installed in the late 60's, was under the jurisdiction of the librarian. Protracted discussions in faculty meetings were required to decide whether faculty and, later, graduate students should be allowed hands-on use, and whether it was legitimate to copy journal articles...

... In the early days, it was legal to park your car on University Avenue in



front of the Methodist church across the street from the old chemistry building, but only after 9 a.m. when the morning rush had subsided. When people seeking to be sure of a place filled the spots by 8:50 a.m. or earlier the police would make a clean sweep giving everyone a ticket. Thereafter, for a week or so, no one parked before 9:00, following which each day a few would appear earlier

and earlier until the cycle repeated itself...

... Following Pearl Harbor various faculty members were asked to contribute their expertise to the war effort by work in their laboratories in Madison or by joining projects elsewhere. When I counseled with Chairman Mathews about obtaining a leave of absence to accept a request to join a secret project at the University of Chicago we talked with Prof. Krauskopf of the General Chemistry division, under whom I was teaching. Krausy flatteringly said "We can't possibly spare him." Mathews replied "If he was run over on the street in an accident you would find a way"...

... When Joe Hirschfelder returned from war work at Los Alamos, and the Bikini nuclear bomb trials in the Pacific (where he was given the title of "Chief Phenomenologist"), there was not room in the Chemistry Building for the "Naval Research Lab" which he had support to set up. The problem was solved by housing it in a quonset hut on the Ag campus. Years later the group evolved into the Theoretical Chemistry Institute of the Chemistry Department, housed on the eighth floor of the Daniels chemistry building and originally supported by NASA. In transition the group was housed in an old wooden residence on the south side of Johnson St...

... An outgrowth of my wartime experiences was a radiochemistry course designed to meet the interest which the atomic bomb project had generated in nuclear phenomena and in the ready

availability of radioactive isotopes for tracer studies. It had an initial enrollment of 100 students from many departments, and continued for more than a decade until the subject matter had been integrated into the specialized courses of departments....

...To help house the influx of GIs immediately after the war, the University provided trailer homes in the open spaces of Camp Randall for married graduate students. E. B. Fred, who was then president of the University, liked to refer to this area as "the University's most fertile acres"....

...In the '60s Niels Bohr, the Danish theoretical physicist of atomic structure fame, was scheduled to lecture in the large auditorium of the Commerce Building on Bascom Hill. Half an hour before the appointed time the hall was overflowing. To accommodate everyone, the crowd was told that the lecture would be moved to the Union Theater. They poured down the hill to the new location. There still was standing room only. When the great man appeared he was given a standing ovation. He spoke for half an hour, throughout which time you could hear a pin drop

although no one could understand a word he said because of his low voice and accent. When he stopped there was another standing ovation....

...Over the years faculty of the Chemistry Department have contributed generously to the administrative chores of the University. These include Irv Shain, Vice Chancellor and Chancellor; John Willard and Bob Alberty, graduate school deans; Phil Certain, assistant and acting Vice Chancellor, Bob Alberty, Dick Fenske, Dennis Evans and Phil Certain, associate deans of Letters and Science for scientific matters; John Harriman, John Ferry and Jim Taylor, members of the University Committee, including Jim's service as chairman; Farrington Daniels, founder of the all-university course "Contemporary Trends" with an enrollment of over 500; Aaron Ihde, who served a term as chairman of the Integrated Liberal Studies program as well as teaching in it. In addition, a great many of the faculty have served on a variety of important standing and ad hoc all-university committees....

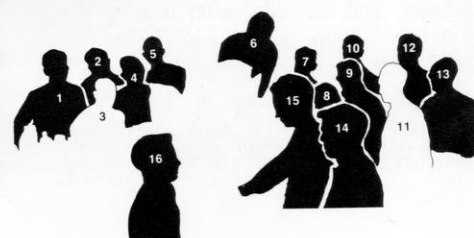
...When Mathews was chairman of the Department he hoped to meet its new

needs for space by a building addition to the east on the land occupied by the tennis courts (now the botanical garden) between Chemistry and Lathrop Hall. Later, when Daniels was chairman, the alternatives included: 1) that site, 2) tearing out the wooden center section of the old building and replacing it with a modern high rise section, 3) building a completely new building across the street. Eventually the latter plan was implemented in two steps, first the Johnson St. wing and then the taller building on Mills St., which was completed in 1967. These were named the J. H. Mathews Chemistry Laboratory and the Farrington Daniels Chemistry Building, respectively, the latter being named, by special resolution of the Regents, while Farrington was still alive. One of the problems the building committee successfully solved was how to convince the state building commission that chemistry faculty require larger offices than the state code allows for non-science areas. The completed buildings were very fine in most respects, with two glaring exceptions. When the wind blew from the south, the exhaust from the hoods of the Daniels building, which vented from many small openings at roof level, fell over the north end of



J. E. Willard and his research group about 1948

1. Roswell Ruka, M.S. 1948
2. David Grant, Ph.D. 1951
3. Alexander Miller, Ph.D. 1949
4. William Rice, Ph.D. 1952
5. Robert Milham, Ph.D. 1952
6. Noboro Endow, M.S. 1948
7. Paul Erlich, M.S. 1948
8. Carol Hermann (Wallace), Ph.D. 1949
9. Donald Ames, Ph.D. 1949
10. Gerrit Levey, Ph.D. 1949
11. William Ginell, Ph.D. 1949
12. Gordon Vandervort, Sr. thesis 1948
13. John Hansen, M.S. 1948
14. Arthur Long, Ph.D. 1949
15. John Willard
16. Francis Johnston, Ph.D. 1952



the building into the intake for ventilating air. (This was later rectified by an octopus-like collector which received the output of all of the vents and shot it upward with a powerful blower). The other major architectural oversight resulted in many of the seats in one of the large lecture rooms being out of the line of sight of part of the blackboard. This, also, was later rectified....

...Vignettes of memory from the activist days of the late '60s and early '70s include: the police band radio in the chairman's office to give forewarning of an imminent attack on the chemistry building; national guardsmen stationed in the building and outside with a jeep with mounted gun in the entry plaza; the removal of the oil paintings of J. H. Mathews and Farrington Daniels from the wall of the foyer of the building to the safety of the chairman's office to preclude their being damaged by flying glass; scores of students massing in front of the Department's liquid nitrogen storage tank to prevent trucks from making deliveries to it; being wakened in the wee small hours of the morning of Aug. 24, 1970, shortly after I had become department chairman, by a noise which I thought was thunder, and receiving a phone call from John Ferry a few minutes later to report that he had received a call from one of his graduate students who was working late, saying that all of the windows on the north side of the chemistry building had been shattered by a blast; arriving at the building to find scenes such as a reagent bottle standing unharmed in front of a shattered window while the door on the inner side of the room had been ripped off by the shock wave; the new Madison chief of police carrying a candle, along with the students, in a war protest parade; highly disciplined national guardsmen protecting students' rights to attend classes, and maintaining their cool even when spat upon; Aaron Ihde offering a protester, who entered his class of 300 students while he was lecturing, the opportunity to speak to the class for 5 minutes, and the class, after hearing the protestor for one minute, setting up the chant "We want Ihde!, we want Ihde!"; trick photos appearing in New York newspapers making it look as though National Guard members were pressing

bayonets against the chests of students who were actually standing across the street; unprecedentedly large faculty meetings filling the Union theater, with the faculty running gauntlets of students to get in....

...So much for such memories. Of course the most significant recollections are those of former students, exciting research and faculty colleagues. It is these that make being a chemistry professor at the University of Wisconsin the best job in the world.



John Willard began his faculty career at Wisconsin in 1937, and retired to emeritus status in 1979. As a faculty member, he held a Vilas Professorship and he served as both department chair and Dean of the Graduate School. At 84 years of age, he is still in good health and calls in at the department occasionally. •

TNT

Continued from page 17

Advancement Award of the Federation of Materials Society in 1989.

HollyAnn Harris (Ph.D. '88, Dahl) is the first holder of the Clare Booth Luce Chair for Women in Science at Creighton University. Larry and June Dahl were in attendance at the inaugural luncheon and symposium, held in Omaha on October 14, 1992.

Professor Hiizu Iwamura (PD '77-'79, Zimmerman), who holds the chair of organic chemistry at the U. of Tokyo, received the "Chemical Society of Japan Award", the most prestigious award given in chemistry in Japan.

Guilford Jones (Ph.D. '70, Zimmerman) is Chair of the Department of Chemistry at Boston U.

Harold O. Larson (BS '43) retired from the Department of Chemistry at the U. of Hawaii in Dec. 1990 after 32.5 years on the faculty.

Alan Campbell Ling (PD '66-'68, Willard) is Dean of the College of Science and Professor of Chemistry, San Jose (CA) State University.

Bob Lyle (Ph.D. '49, McElvain), recently retired from Southwest Research Institute, and his wife Gloria have started

the GRL Consulting firm in San Antonio, TX.

Eija Osawa (PD '66-'67) has left Hokkaido U. to take a position as professor at Toyohashi U. Eija is known for his visionary proposal in 1975 that the C60 molecule should exist (see article in *Badger Chemist* #36). He edits a new journal, "Fullerene Science & Technology".

Richard Peterson (BS, '69) was awarded the Memphis State University Distinguished Teaching Award, May, 1992. He attended an ICE program in Madison during the summer of 1990.

We were pleased to add **William G. Hendrickson** (Ph.D. '46, Daniels) to the *Badger Chemist* mailing list. He resides in Naples, FL.

John Ihde (BS '64), currently teaching chemistry at Wausau West High School, Wausau, WI, was named a Tandy Technology Scholar. This program recognizes academic excellence; 100 teachers are selected annually as finalists to receive awards.

G. Robert McKay (Ph.D. '56, McElvain) retired as Vice President of the Specialty Polymers Division of DuPont on Jan. 1, 1992. He now resides in Telluride, CO.

Robert McClain (Ph.D. '91, Woods) is an assistant professor at Indianapolis University. **Janet Treichel McClain** (BS '86) is a patent attorney with Eli Lilly.

Harry Morrison (PD '63, Zimmerman) is now Dean of the College of Arts and Sciences at Purdue.

Richard Saykally (Ph.D. '77, Woods) was featured in a C & EN article on the structure of the ammonia dimer.

Laren Tolbert (Ph.D. '75, Zimmerman), a faculty member at Georgia Tech, visited Wisconsin to present a research seminar in September. He was last year's organizer of the annual Winter Conference on Organic Photochemistry.

Valery Traven (Visiting Scholar, '72-'73, West) is currently Chairman of Organic Chemistry at the D.I. Mendelev Institute (formerly the Moscow Chemico-Technological Institute). He has recently published a book entitled, "Frontier Orbitals and Properties of Organic Molecules", Ellis Horwood Ltd., International Publishers.



