

CHEMISTRY NOTATIONS

Washington State University Department of Chemistry and Department of Biochemistry and Biophysics

Filby's Farewell

by *Royston Filby, chair*
Department of Chemistry

This will be my last "Chairman's Message" in the newsletter because my four year term as chairman of the Department of Chemistry ends on May 15, and I will return to teaching and research. The past four years have been very hectic, but also rewarding in many respects. Time passes quickly when you are having fun! At this time we do not know who will take over the reins of the department, but I certainly wish him or her the best of luck.

One very satisfying event for me over the past four years has been the revival of *Chemistry Notations* which now appears on a regular basis twice a year. Your comments tell us that you welcome news about the department and WSU. We certainly appreciate hearing from you. The success of the newsletter is due, in no small measure, to

(Filby's Farewell continued on page 2)



Jeffrey Pura with his PhD thesis advisor, Gardner Stacey.

Graduate Returns to Inform

Jeffrey L. Pura, who completed a MS in organic chemistry with Gardner Stacy in the early '70's, returned to campus just before the end of the fall semester. Jeff presented a very interesting seminar on chemistry in printing, pointing out the many properties of printing inks which must be balanced in order for them to perform effectively in high speed printing. Viscosity, temperature behavior, dispersant ability, and minimal environmental emission are all important in the performance of a printing ink, and are influenced by the synthetically modified natural resins which are the basis of the technology. This technology is easy to take for granted, but as Jeff put it, "Before anything can be read or marketed, a substrate has to be printed..."

After leaving WSU, Jeff spent three years in the pulp and paper industry in Coos Bay, Oregon, before returning to his native Australia and joining Colley Cooke and Company, a major business in the

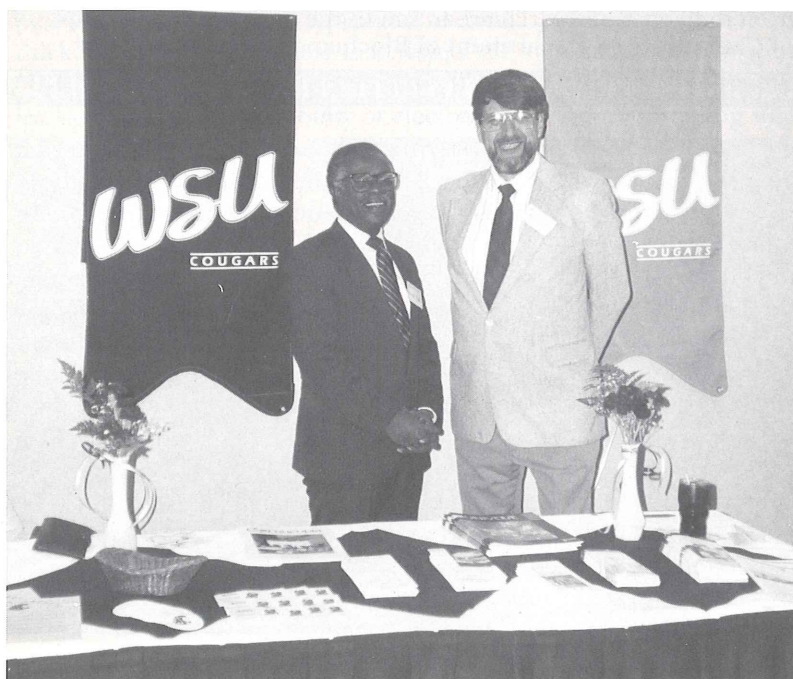
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Cole Still Has Thrill For Molecules

The search for knowledge and understanding has led alumnus Frank Cole from a chemistry PhD at WSU to the private practice of internal medicine in Richland, Washington. This continuous search has drawn the doctor to universities and research facilities throughout the country.



Frank Cole (left) and Roger Willett at the Tri-Cities Reception.

Originally from Memphis, Tennessee, Cole came to WSU in 1961 to begin his graduate study in physical chemistry. His interest in molecular structure drew him into Selmer Peterson's research group. Also in the group at that time were Jack Williams, now a senior scientist at Argonne National Laboratory, and the late Ellis Peterson, who taught for many years at Boise State University. Cole's work in neutron diffraction brought him into frequent contact with Roger Willett, who had just arrived at WSU to set up an X-ray diffraction research program and begin teaching. Cole sailed out of WSU with his PhD in chemistry and minor in physics in four years and headed east with his wife Jacqueline and their family.

They arrived in Buffalo, New York and Frank began a postdoctoral position with a research team at the Center for Crystallographic Research, a unit of the National Institutes of Health. Continuing in a permanent position for the next 14 years, he contributed to the basic knowledge of structural atoms and molecules in biological cells to researchers who could relate this knowledge to cancer cell research. As a final project at the center, he initiated work on an enzyme inhibitor complex.

His work with biological cells brought Cole into contact with people pursuing medical research and he became fascinated with the relationship between chemistry and living things.

(Cole continued on page 5)

(Filby's Farewell continued from page 1)

Jenni Keith, and the format is now being copied by other departments at WSU.

Together with the success of *Chemistry Notations* has come a gratifying increase in financial support from our alumni. Our last phonathon demonstrated that many of you continue to contribute generously, particularly to our scholarship fund which remains our greatest need. This is particularly encouraging in light of the national recession. We still need your help, of course, so please continue to contribute to programs that support students.

This issue contains a write-up about a former Dean of Sciences, Roger Ray. Many of you knew Roger when you were at WSU;

the Department of Chemistry experienced much of its growth in size and stature during his term as dean. This issue also includes advance notice of the 1992 Carl Stevens Lectureship which will be delivered by Peter Dervan of California Institute of Technology this fall. I hope that some of you may be able to attend this lecture which honors our previous chairman Carl Stevens and which has been delivered in the past by several Nobel laureates. Finally, I would like to express my personal thanks to all of you, as well as to my colleagues, staff, faculty, and students, who have supported and encouraged me during my term as chairman. I look forward to keeping in touch through *Chemistry Notations!* ♦

Biochemistry Ranks High

by Michael Griswold, chair

Department of Biochemistry and Biophysics

While reading the draft for this newsletter, I was impressed by the section about our graduates and their current positions. The list includes only a small fraction of the total graduates of the Department of Chemistry and the Department of Biochemistry and Biophysics. When I go to national meetings I continually meet people who identify themselves as alumni or whom I recognize from my years here at WSU. I am impressed by the impact the departments have had in educating chemists and biochemists that are now actively pursuing their trade worldwide. It should be noted that many students whose ideas were forged in these two departments have also gone on to academic careers and trained others. The influence of these two departments is widespread and probably more profound than any of us realize. I think that the alumni section in this issue is evidence that training students is something we do well.

This year the Department of Biochemistry and Biophysics was reviewed by the graduate school. This exercise is a scheduled self-study and internal review which is planned to take place for each department every 10 years. The department did a critical

self-analysis which was then reviewed by two WSU faculty members from outside the unit. The two reviewers then wrote a report to the graduate school which contained the following statements: "The accomplishments, research funding and scholarship of the faculty are outstanding. The faculty can compete favorably with the very best in the United States. The accomplishments and scholarship of your students are outstanding. Not only are the post-doctoral positions which they accept among the best in the world, but also the publications resulting from their thesis research are found in the very best journals within the respective subdisciplines. Graduates in the past 3 years (the review period) have gone on to remarkable achievements and serve as clear evidence of the quality of the program, a feature with which Washington State University can be proud and other universities envious."

The reviewers also suggested some changes to the requirements in the undergraduate and graduate programs. These changes which have already been adopted, underscore the transitions occurring in our field. We had to recognize that biochemistry, as a discipline, has continued to broaden, and a single set of requirements did not satisfy students interested in the spectrum of possible subdisciplines. Biochemistry, in its broadest sense, has become the Rosetta stone for deciphering the secrets of the biological sciences from biophysics to ecology. ❖

(Graduate Returns continued from page 1)

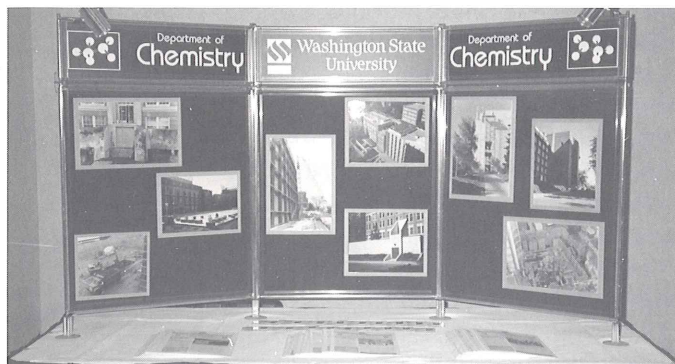
printing industry. During his time with Colley Cooke, Jeff worked on printing ink systems and other coatings systems, and on the side, developed with his wife a growing business in acrylic based artist's colors. Two years ago, Jeff and a partner contracted to manage the analytical services of the electric utility in the Australian State of Victoria. This arrangement affords them the opportunity to perform outside analytical and consulting services from a well instrumented laboratory. Jeff is also involved on a consulting basis with Monash University, his BS

alma mater, where there is an upsurge of interest in industry–university ties.

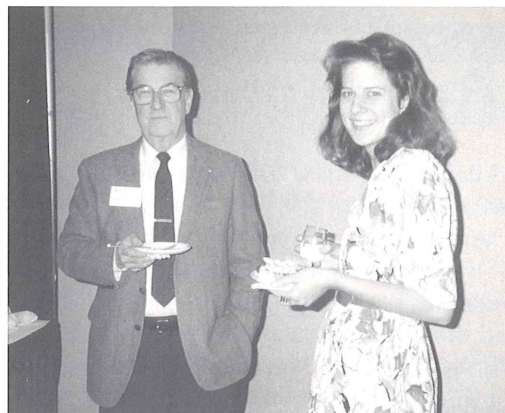
Jeff and his family were able to visit WSU on a consulting trip. The Bookie reported a bulge in Cougar sweatshirt sales at that time, and we enjoyed a chance to renew acquaintances, tune our ears again to an authentic Australian accent, and find out how an enthusiastic alumnus is doing chemistry. ❖

Tri-Cities Reception A Success!

The Department of Chemistry held its first annual Alumni Reception at the Hanford House in Richland, Washington on October 29. It was a wonderful opportunity for alumni to become acquainted with faculty members from both the Tri-Cities and the Pullman campuses. Colleagues from Pacific Northwest Laboratories and Westinghouse also attended the festivities.



Pictorial display highlighting our recent construction projects.



Emmett Moore and Rita Pool

A drawing for door prizes, including the famous WSU speciality Cougar Gold cheese, a slide show, a pictorial display of the construction of new departmental buildings, hearty hors d'oeuvres, and the comradery made it a special evening. Hope to see everyone next year! ♦



Karl H. Pool with Carl and Sue Sutter.



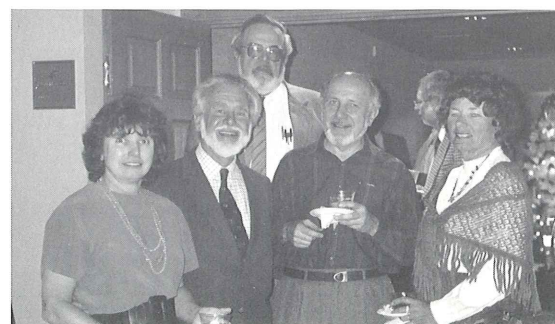
Glenn Crosby with Fran and Chuck Windisch.

Retirement Reception Held for Professor Windsor



Former Dean Roger Ray, Maurice Windsor, Dean Radziemski and Glenn Crosby.

A reception honoring Professor Maurice Windsor was held December 6, 1991.



Helen Place, Maurice Windsor, Don Bushaw, Jack Schuman, and Charmian Windsor.

(Cole continued from page 2)

“It is obvious that so much is unknown and it made me want to look one step beyond just the structure of the molecule. For me, it is a personal connection between my PhD in chemistry and medicine. It has furthered my search for knowledge,” Cole said. This fascination was so intense, he decided to enhance his understanding of biological systems by going to medical school.

Remaining in Buffalo, Cole received his MD at the State University of New York with intentions to return to his former job. Instead, he applied for his residency at the Mayo Clinic in Rochester, Minnesota, where he focused on internal medicine. After three years of residency, Cole decided to put his knowledge and hard work into practice and returned to the Northwest.

“I have not lost my thrill for molecules, but I enjoy being able to put my knowledge of medicine into action. And my knowledge of chemistry gave me an awesome background for my practice,” Cole reflected.

After ten to twelve years of private practice, Cole says his mind is still restless, but he is content to “stay put.” Cole has continued to apply his knowledge, enthusiasm, and concern for society to the Richland community. Besides his private practice, he serves at two local hospitals—Kadlec Hospi-

tal and Kennewick General Hospital. In 1988-89 he served as chief of staff at Kennewick General Hospital.

Frank lives in Richland with Jacqueline, a 1965 WSU education graduate, and his youngest daughter Joey, a freshman in high school. His oldest daughter Stacey, currently the assistant district attorney in Atlanta, Georgia, also graduated from WSU in 1986 with a political science degree before attending Gonzaga Law School in Spokane. His other daughter, Cecily, is a freshman at Dartmouth College in New Hampshire. Cole said he is defenseless when all the women in the family gang up on him.

He also keeps in touch with WSU’s chemistry department. While attending the alumni reception in Richland in October, he gregariously entertained other guests with his relaxed and jovial manner.

Cole’s interest in the community and WSU is evidenced by his service on a Citizen’s Advisory Committee. This committee researched the role the new WSU Tri-Cities branch campus would need to fill to appeal to non-traditional students in the area before it opened four years ago. Cole was putting his concern for the education of the young into action. ❖

“My knowledge of chemistry gave me an awesome background for my practice.”

—Frank Cole

Researchers Receive NSF Grant



A group of scientists at WSU has received a grant for \$140,968 from the National Science Foundation to develop a process for producing mammalian antibodies in genetically modified plant cells.

Combining their expertise to develop this innovative system are James Lee of chemical engineering; Gynheung An of the Institute of Biological Chemistry; Nancy Magnuson of microbiology; and Raymond Reeves of biochemistry/biophysics and genetics and cell biology.

The researchers will use tobacco plant cells to produce the antibodies. The plant

cells themselves are grown in “bio-reactors,” sterile vessels filled with an artificial nutritive medium.

According to Lee, the creation of plant tissue culture cells capable of synthesizing antibody proteins has great commercial potential for cheaply and efficiently producing large quantities of specific antibodies. Currently, most genetically engineered proteins are produced in bacteria. For example, recombinant human insulin has been grown in bacteria since 1982. However, bacteria are not necessarily suited to the synthesis of mammalian gene products.

Although the procedures for introducing and expressing an animal gene in plants were first established in 1986, the actual amount of protein produced has been small. The goal is to increase the yield of animal protein expression in plants through the use of antibody proteins as prototypes.

Once antibodies have been produced by the plant cells, they must be separated. Lee and his colleagues will test the feasibility of using plant cell walls as “bio-filters.”

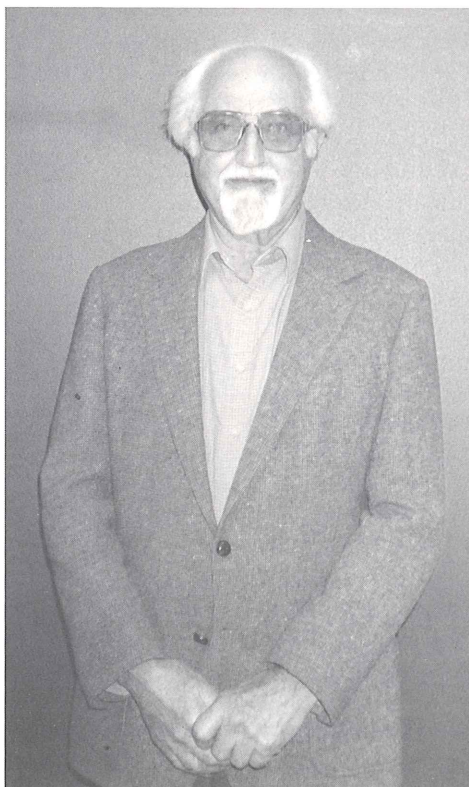
The ultimate goal of this research is to provide an economical method of producing large amounts of important animal proteins easily and quickly by using plant cells. ❖

Former Dean Visits The Chemistry Department

B. Roger Ray, former professor of chemistry and dean of the Division of Sciences at WSU from 1957 to 1978, still resides in Pullman with his wife, Dorothy. We had a chance to visit with him recently when he came by the department office. Roger and Dorothy spend part of their time at their cabin on Lake Coeur d' Alene. Roger still finds time to fly fish on his favorite river, the St. Joe. During the winters, they frequently spend time in Arizona and California.

Ray is originally from Hoquiam, Washington. He holds degrees from the College of Idaho, Oregon State University and the University of Michigan. Roger received his PhD in chemistry at the University of Michigan in 1945. He performed three years of postdoctoral work, first as a National Research Council Fellow at the Rockefeller Institute for Medical Research and then as a Merck Fellow in the Natural Sciences. He taught chemistry for nine years at the University of Illinois and was assistant head of the Department of Chemistry and Chemical Engineering from 1955 to 1957 before joining the WSU faculty in 1957. Before he became dean at WSU, he was associate dean and a professor of chemistry from 1957 to 1964. Ray's research interests involved surface and colloid chemistry; he worked on a wide variety of problems from the nature of colloidal species in petroleum to the surface characterization of proteins

and polymers. He supervised 17 PhD theses and worked with several research associates during his science career, some of them while he was dean here at WSU.



B. Roger Ray

Dean Ray's only regret is that administrative duties gradually reduced his research and teaching activities, although he continued to teach in the chemistry program during part of his tenure as dean. On the positive side, he feels that being dean gave him the unique opportunity of promoting academics, supporting good faculty and attracting successful graduate students. There is no doubt that his contributions laid the foundations for the growth in size and stature of both the chemistry and biochemistry departments and other science units. Many of the

senior faculty members throughout the division were hired during his tenure.

Professor Manning Cooke recalls that during one of his first lectures to a large class just after he arrived here, he noticed an older gentleman in the audience and later discovered that it was Dean Ray. Other faculty members have told similar stories of Ray's continued interests in teaching. For years, Dean Ray took the time from his responsibilities as dean to teach at least one freshman chemistry laboratory each year. He obviously felt the importance of remaining close to the day to day academic challenge. ♦

Michael J. Smerdon, professor of biochemistry and biophysics, presented "*DNA Repair and Chromatin Structure*" at the workshop on DNA Repair with Emphasis on Eukaryotic Systems in Noordwijkerhout-The Netherlands under the auspices of the EEC Concerted Action on DNA Repair & Cancer in April of 1991. He also presented "*Repair Heterogeneity in a Yeast Minichromosome*" at the AACR Special Conference in Cancer Research: Cellular Responses to Environmental DNA Damage held in Banff, Alberta, Canada in December of 1991.

Daryl Clerc, a graduate student in chemistry, and his wife Pam recently were blessed with a new arrival. Jennine Clerc was born at Pullman Memorial Hospital December 2, 1991. She weighed 6 pounds and 15 ounces and was 19.5 inches. The Clerc's came to WSU from Carbondale, Illinois in 1990.

Toshiko Ichiye, assistant professor of biochemistry, biophysics and chemistry, recently received a \$500,000, 5 year grant from the National Institutes of Health. The project is titled "*Computer Simulations of Electron Transfer Proteins*" and is focused on understanding respiration and photosynthesis at a molecular level.

Jim Schenk was recently promoted with tenure to associate professor in the chemistry department. Jim also received a three

year, \$230,000 grant from the National Institutes of Health to study drug abuse chemistry of cocaine and amphetamines.

Paul Swartz, a biochemistry graduate student, and his wife Carol recently added a new member to their family. On December 29, their son Daniel was born at 6:30am. His vital statistics were listed as six pounds and 17 inches. Congratulations!

Jeremy N.S. Evans, professor of biochemistry, recently received a grant from the American Cancer Society's Institutional Research Program. The ACS grant provides "seed money" to encourage promising young investigators to conduct cancer research. Evans will be working with a "high mobility group peptide (HMG-I)." The HMG-I peptide is part of a protein called HMG-I that has been discovered in a number of different kinds of cancer cells. Why it exists in cancer cells is not clear. However, computer modeling indicates that it binds to the cell's DNA in a way similar to a class of anti-tumor drugs such as netropsin. Evans will use nuclear magnetic resonance spectroscopy to confirm the modeling predictions. This should lead to an understanding of how the peptide binds to DNA. Such findings may help to develop anti-tumor drugs similar to netropsin but less toxic. ❖

Faculty, Staff, and Student News



Undergraduate Receives Award



Jennifer Olney, an undergraduate major in genetics and cell biology and minor in chemistry, was recently awarded the Distinguished Achievement Award from the College of Sciences and Arts at WSU. Her outstanding work in the classroom and the laboratory earned her the respect of both her professors and her fellow students.

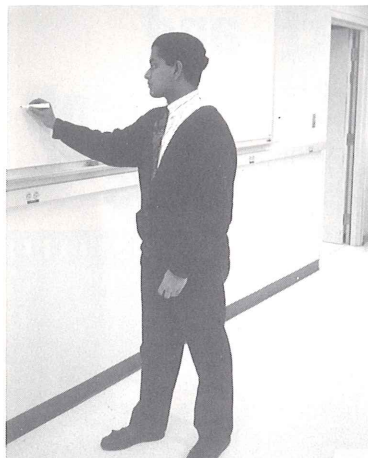
Jennifer found organic chemistry to be challenging and fun. Her chemistry professor, Robert Ronald, informed her of an opportunity to participate in organic synthesis research in the lab of Christine Cremona, professor of biochemistry. Jennifer completed a 499 independent research

project on the synthesis of an organic chromophore and has continued to work in the lab on a new project studying the photochemical reactions of vanadate with proteins. Jennifer says, "Working with Dr. Cremona has given me the opportunity to perform research experiments instead of just instructional experiments." She plans to remain at WSU to pursue work on a PhD in biochemistry. She would like to do research on birth defect prevention or on cancer. Jennifer is also deeply committed to encouraging young women to enter science fields. ❖



Jennifer Olney and
Christine Cremona

Scholarship Recipients Send Their Thanks



Receiving the Chemistry Development Scholarship couldn't have been more timely. It helped me buy my books at a time when I hit one of the periodic downs in a typical student budget.

—Srikanth Seshadri

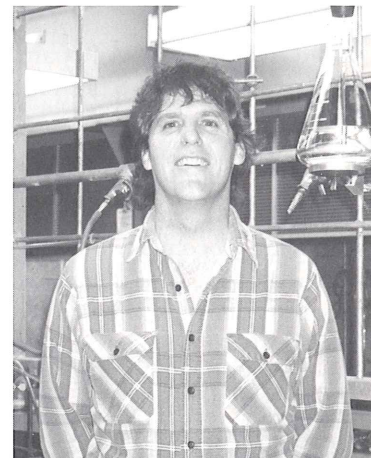
I am very thankful for the money I received from this scholarship! The money helped to purchase my books for the fall semester.

—Sherry Wise



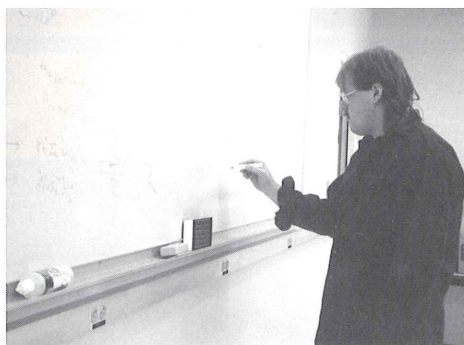
The scholarship helped me in many ways. I used the award to partially pay my tuition and textbook costs. Also, the scholarship made me feel good about being a chemistry major. Thank you very much for the scholarship!

—Ann Marie Lurus



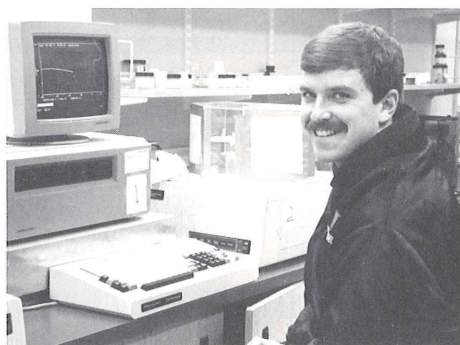
Thanks for helping make it possible for my family and I to move to Pullman from southern Oregon to begin my graduate studies in physical chemistry.

—Kip Kendrick



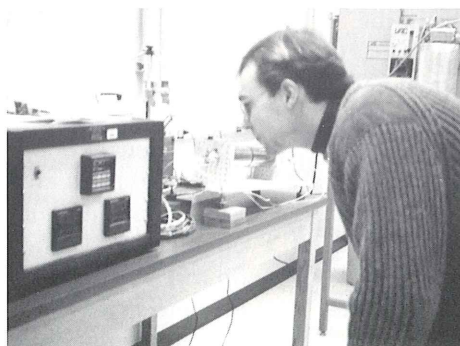
I used my C. Glen King scholarship to purchase textbooks and help pay the damage deposit and utility hookups on an apartment. It really helped pay for all the initial costs of moving to a new place. Thank you very much!

—Robert A. Fairchild



The scholarship helped to defray the costs associated with beginning a new semester, mainly books and fees. Since the Harvey K. Murer Scholarship is performance based, the recognition made me feel great!. Thanks!

—Jeff Lowry



I really appreciate the people whose donations made it possible for me to receive the Chemistry Development Scholarship. The money will easily cover the cost of books for the year.

—Jason Doten

Alumni News



The following information has been sent in by our alumni or submitted by current faculty members. We love hearing from our alumni and encourage you to send us information about what you are doing in the enclosed postage paid envelope.

Mark F. Adams (Tacoma, WA) (PhD '51) retired from WSU-CERD in '74 and since has been working for his own industrial consulting corporation. He continues work on Arabino-Galactan (a western larch extract) with Melvin R. Knudson, a former member of the CERD advisory board. Mark recently attended the WSU-West Side Alumni Luncheon in Puyallup.

James B. Bagby (Woodinville, WA) (BS Chem '78) received a MS (education administration) at the University of Washington in '85 and is now the principal of Bothell High School.

Jacob Bigeleisen (St. James, NY) (MS Chem '41) received a PhD (chemistry) from the University of California-Berkeley in '43. He is now a distinguished professor (Emeritus) at SUNY-Stony Brook.

Art Brunstad (Port Ludlow, WA) (MS Chem '33) is interested in seeing our addition of up-to-date spectrometry instruments. He headed a spectrometry lab at Hanford from '49-'56. We look forward to giving you the grand tour!

Theodore T. Budrow (Bellingham, WA) (BS Chem '23) received a PhD (organic chemistry) from the University of Minnesota in '28 and later retired in '58. He has recently completed an autobiography and is looking for a publisher.

Ruth E. Caputo (Portage, MI) (PhD Chem '75, Willett) is director of Sterile Products at Upjohn Co. Her husband Jim, also at Upjohn, works in the Agricultural Discovery Unit of Growth and Reproduction Physiology.

David S. Casebier (Providence, RI) (BS Chem '86, Crosby) received a PhD (organic chemistry) from MIT. He is currently an NIH postdoctoral fellow at Brown University and is working with Professor David E. Cane on the biosynthesis of macrolides.

James Coke (Chapel Hill, NC) (BS Chem '56) received a PhD (chemistry) from Wayne State University in '61. He is cur-

rently a chemistry professor at the University of North Carolina. This year James was awarded the Tanner Teaching Award for excellence in inspirational teaching of undergraduate students. Congratulations!

Mark K. Dickson (San Francisco, CA) (PhD Chem '82, Hipps) received a JD in '88 at the University of Houston and is now a patent attorney for Townsend & Townsend.

Marion R. (Whiting) Dowell (Richland, WA) (BS Chem '77) is a senior scientist for Westinghouse Company. She tells us that since chemistry is becoming more computerized, a familiarity with BASIC, or preferably FORTRAN, is a very valuable tool.

Sandra K. Fadeff (Richland, WA) (BS Chem '81) is a senior research scientist at Battelle Pacific Northwest Laboratories. She asks if we are educating our analytical students about the paperwork jungle which, as of late, goes with the job. She adds that "legal defensibility" seems to be the motto.

John L. Herrman (Switzerland) (PhD Chem '70) works for the International Programme on Chemical Safety, a joint program of the World Health Organization, International Labour Organisation, and United National Environment Programme. He is the technical secretary of committees that evaluate food additives, contaminants, pesticide residues, and residues of veterinary drugs in food.

Paul L. Johnson (Woodridge, IL) (PhD Chem '68, Willett) is a chemist at Argonne National Laboratory in the Analytical Chemistry Laboratory within the Chemical Technology Division. He lives with his wife JoAnne and their children Aaron, Keith, and Lisa. They hope to make it back to Washington for a visit sometime in the future. We hope to see you soon!

Charles M. Miller (Los Alamos, NM) (BS Chem '76, Crosby) is a staff member at Los Alamos National Laboratory. His research involves laser applications to chemical analysis, applications of radiochemistry and mass spectrometry. He is also busy organizing the RIS-92 conference.

D. Archer Mortland (Yakima, WA) (BS Chem '31) was very interested in seeing Prof. Carl Brewster's picture in the last issue. He adds that he is amazed at the changes that have taken place in the last 60 years. He also jokes that much of what he reads in the *Notations* is a mystery to him, but believes that is the way it should be.

Kenneth H. Russell (Fresno, CA) (PhD Chem '64, Wagner) is a professor at California State University in Fresno. He retired following 28 1/2 years of service, but will be teaching fall semesters for another five years. He was department chair from '86-'90.

Michael F. Schultz (Denver, CO) (BS Chem '74) received a MD from the University of Washington in '86 and is now a fellow (Renal Diseases) at the University of Colorado. He is continuing research in renal vascular hormones and acute renal failure.

Despina Strong (Seattle, WA) (PhD Chem '86, Filby) and Brian Strong celebrated the holiday season with the arrival of a baby boy (Nicholas). Despina has increased supervisory responsibilities in her position as Manager of Analytical Laboratories at the Washington Department of Ecology, Manchester Laboratory.

Marianne Y. Uyeda (Silverdale, WA) (BS Chem '64) received a MA from Whitworth College in '82 and MD in '87 from the University of Michigan. She is now a psychiatrist for Kitsap Mental Health Services. ❖

Peter Dervan to Give Stevens Lecture in October



The Carl M. Stevens Lectureship was established in honor of Professor Stevens' outstanding contributions to teaching, research, university governance at WSU, and especially for his contributions as chairman, to the development of the Department of Chemistry from 1960-71. Professor Stevens retired in 1980, the year the lectureship fund was established, after 35 years at WSU.



Peter B. Dervan

To date, we have hosted five distinguished speakers. These lecturers include Nobel laureate Robert W. Holley, Herbert Carter, Nobel laureates William N. Lipscomb and Rould Hoffman, and Harry B. Gray. This year's Stevens Lecture will be given by Peter Dervan from the California Institute of Technology. The lecture, entitled *Designing Molecular Machines to Read the Genetic Blueprint*, will be given on October 6.

Peter Dervan received his B.S. from Boston College in 1967. He began research in physical organic chemistry working with Jerome A. Boston at Yale University where he received the Wolfgang Prize for distinguished graduate studies. After earning his PhD in 1972 he spent a year at Stanford University as an NIH Postdoctoral Fellow. In 1973, he accepted at faculty position at the California Institute of Technology where he is now the Bren Professor of Chemistry. Dervan has pioneered the techniques necessary to analyze the sequence specificities of natural and synthetic DNA binding molecules. Using the tools of synthetic and mechanistic organic chemistry in combination with nucleic acid techniques, Dervan is defining the chemical principles underlying the sequence specific recognition and cleavage of double helical DNA.

(Dervan continued on page 12)

Golden Graduates of '31 & '41



Every spring WSU invites Golden Graduates (those who graduated fifty or more years ago) to a reunion on campus. Several special events and luncheons are held for these special alumni. In the spring of 1991, several chemistry graduates attended the reunion. The following excerpts were obtained from questionnaires that were filled out for the 1931 and 1941 reunion booklets.

Edwin J. Hart (MS Chem '31, PhD '34 (Brown University)) is a retired consultant chemist. He has worked with Risø National Laboratory in Denmark and Pacific Northwest Laboratories. Edwin has also retired from his position as senior chemist at Argonne National Laboratories after 27 years. In 1984, Hart's accomplishments were recognized by WSU when he was awarded a citation for Distinguished Achievement. He discovered the spectrum of the hydrated electron while on sabbatical leave at Gray Laboratory in Northwood, England. He has also received the Distinguished Achievement Award from Brown University, Alexander von Humboldt Senior US Scientist Award, and the Weiss Medal from the Association for Radiation Research. Hart resides in Port Angeles and has 2 children and 4 grandchildren.

Paul A. Klavano (BS Chem '41, DVM '44) retired as a professor in Veterinary Pharmacology from WSU's College of Veterinary Medicine where he lectured for 40 years and was department chairman for 20 years. At his retirement, the physiology laboratory in the College of Veterinary Medicine located in Wegner Hall was named for Paul. Paul is currently active at the Trinity Lutheran Church in Pullman, and enjoys fishing, hunting, working in his shop and traveling by RV and by car to Canada, Mexico, and the 49 continental states. While a student at WSC, Paul lived in Stimson Hall and was well acquainted with Professors Kies and Covington, two of the outstanding characters on campus. He and his wife Martha have 4 children and 5 grandchildren. ♦

President's Associates Make Us Special!

Over the past century a diverse blend of contributions has brought the Department of Chemistry and Department of Biochemistry and Biophysics to their current state of excellence. Since it opened its doors 100 years ago, WSU has enriched the lives of many thousands of individuals. As a source of educated people and new ideas, it makes substantial contributions to the well-being of our society.

Yet, this is not the time to merely pat ourselves on the back, relax, and revel in our past accomplishments. WSU is the institution it is today because so many responsible people over the years have contributed both their time and money. As a public institution, WSU receives less than half of its total funding from the State of Washington, just enough to cover the basic needs of buildings, utilities, and salaries, but not enough to make WSU something special! That comes from private support from alumni and friends such as the President's Associates.

The President's Associates are those alumni who are making a financial commitment to WSU, giving a minimum of \$1,000 annually. When the President's Association was founded 11 years ago it had 23 members. Today there are 1,800 members who's support totaled more than \$14 million last year. Of those members, 17 are alumni of our own Departments of Chemistry and Biochemistry and Biophysics!

President's Associates receive a newsletter twice a year and are invited to campus and regional events held in their honor, providing them with additional interaction with President Sam Smith and key administrators and leaders. They are also invited to the President's home, and have special parking privileges on campus. The President's Convocation is held in honor of the President's Associates. One does not need to live locally to benefit from being a President's Associate. The support and contributions allow everyone to be involved with WSU wherever you live.

Thanks to the generous support of donations like those of the President's Associates, we are able to fund chemistry and biochemistry activities, programs, and student scholarships that we would otherwise not be able to have. The students are the future of the department and greatly appreciate all that you have given. ❖

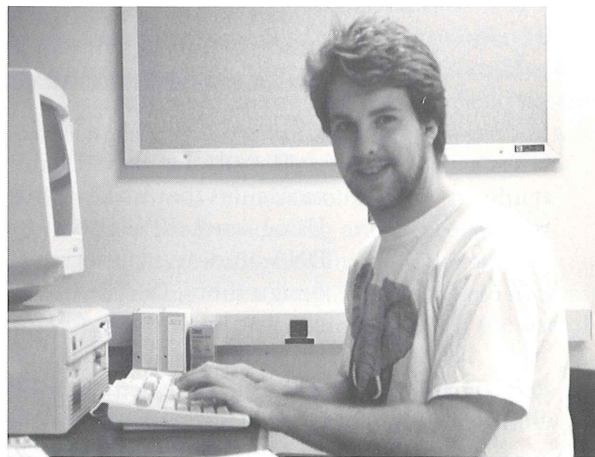
PLU Award Banquet Held

PLU (Phi Lambda Upsilon-Chi Chapter), the chemistry honor society for students, held its annual awards banquet February 5, 1992 at the Hilltop restaurant in Pullman. Professor Mostafa El-Sayed, Editor-In-Chief of the *Journal of Physical Chemistry*, was the featured speaker. He presented a history of the scientific career of Michael Faraday, commemorating the 200th anniversary of Faraday's birth on September 22, 1791.

This year's undergraduate award was presented to Matthew D. Wessel. Matt worked in Professor Herb Hill's laboratory before graduating last year. A paper on

supercritical fluids for the derivation and extraction of acidic and neutral compounds from adsorptive matrices will be published resulting from his work with Professor Hill. Matt is currently on a NORCUS fellowship at Battelle in Richland, WA.

The graduate student award went to Joseph J. Hoagland who works in the laboratory of Professor Kerry Hipps. Joe is



Matthew D. Wessel

(PLU continued on page 13)

Beverly Casebier Memorial Scholarship Established

The family of Beverly Casebier has recently established a scholarship fund in her memory. Although Beverly Casebier never attended WSU, she was a Cougar through and through. Her husband Ron received his BS in chemistry from WSU in 1955, and she was delighted when both of their sons

Beverly was a Cougar through and through.

decided to attend WSU. Her older son Joel graduated in chemical engineering in 1984 and married Joan Kordonow who attended WSU at the same time. Their younger son David graduated in 1986 with a

BS in chemistry. As an undergraduate, David carried out research in the laboratory of Professor Glenn Crosby.

While still living in the Puget Sound area, Bev looked forward to trips to the Palouse. She loved the campus and the open, friendly atmosphere. Football weekends and Mother's Day weekends were special treats for her. Of course there were certain needs that must be met — the shopping spree at the Bookie for Cougar paraphernalia and the swing by Ferdinands for a supply of Cougar Gold cheese. She sensed what we all know — WSU really is something special.

Bev passed away at the age of 52 from cancer. As a wife, mother and friend to

many, she was much loved. Since the family has such warm and fond memories of their times at Washington State, they felt that a scholarship established in her name would be a most fitting tribute.

The Beverly Casebier Memorial Scholarship fund will provide scholarships to outstanding students in chemistry. Recipients will be meritorious chemistry majors who are completing their sophomore or junior years.

Ron Casebier is a vice-president of ITT Rayonier and currently resides in Stamford, Connecticut. David Casebier received his PhD from MIT and is currently an NIH postdoctoral fellow at Brown University.

Glenn Crosby, chemistry professor, and his wife Jane were delighted to contribute to the Beverly Casebier Memorial Scholarship. They have fond memories of Beverly when she and Ron came to WSU to visit Dave in the lab and check up on his progress as a chemist. "The chemistry department has few student scholarships based on academic performance and we urge alumni to contribute to the Beverly Casebier Memorial Scholarship so the fund can grow in size and quickly begin to make a difference in the career of a deserving chemistry major at WSU," Glenn Crosby said. ❖

(Dervan continued from page 10)

Dervan has changed the way we view the molecules that make up the genetic code. Using synthetic organic chemistry to prepare DNA binding structures and biochemistry to design them, Dervan has greatly expanded our understanding of oligonucleotide structures and reactivity. His pioneering research on the study of DNA has led to some fascinating and unexpected results.

Much of Dervan's research has concerned the design and synthesis of synthetic nucleases that can cut oligonucleotides in a sequence specific manner. The application of these molecules to the sequencing of

large genomes has been a long-range objective.

In the early '80s, Dervan showed that iron complexes (EDTA-Fe) attached to DNA binding molecules could cleave DNA in a sequence-selective way. More recently, Dervan and his colleagues have used EDTA-Fe tethered to oligonucleotides to affect sequence specific cleavage, both in single stranded DNA (duplexes) and in double stranded DNA by the formation of triplexes. In addition, his group has demonstrated that new binding motifs are possible for triplex formation, greatly expanding the potential sequences that may be targeted. ❖

Cancer Prevention at the Molecular Level

The majority of human cancers are believed to be caused by environmental agents like cigarette smoke and ultraviolet rays from the sun. Cancer probably begins when these agents, or carcinogens, damage DNA, the genetic code in each cell. DNA contains codes—or genes—for the assembly of proteins during cell division. Damage to DNA can cause the cell to divide out of control, creating cancerous tumors. Even on a good day our DNA suffers damage over 10,000 times. Fortunately for us, our cells have a very efficient DNA repair system which removes nearly all of the potential cancer-causing damage. The enzymes that repair DNA can be compared to a “fence-mending crew” continually surveying the genetic code. The fence they mend consists of about 6 billion units linked together to form the DNA molecule, and they repair most damaged sites before they yield dangerous mutations.

Michael J. Smerdon, professor of biochemistry and biophysics, is interested in why the repair system sometimes fails to remove all the damage. One of the obstacles

facing the repair enzymes is finding the damage in the highly compact structure of the DNA in the cell nucleus. Roughly two meters of DNA are folded into about 10 millionths of a meter of space. A number of years ago Smerdon showed that this cable-like structure is unfolded during repair and that the process is much easier in certain regions of DNA, such as active genes. The ease with which a region will unfold may be the deciding factor in how fast a damaged site is repaired and whether cancer is avoided.

Ultimately, Smerdon hopes that our understanding of DNA repair at the molecular level will lead to new gene therapies which can enhance our natural defenses for prevention of human disease. ❖



Professor Michael J. Smerdon

(PLU continued from page 11)

completing his thesis work on electrical properties of organic semi-conductors and will be graduating from WSU this summer. Joe came to WSU in 1987 after receiving a BS in chemistry from Southern Utah State University in Cedar City, Utah.

The faculty award was presented to Professor David A. Cleary. Professor Cleary is an assistant professor in physical chemistry. He joined the WSU chemistry faculty in 1987 after receiving his PhD from the University of Michigan and completing postdoctoral work at Cornell University. After the ceremony, Professor Cleary said, “It’s an honor to be recognized by students for your efforts. Certainly our teaching and research activities would be severely curtailed without their tireless commitment.” ❖

IN MEMORIAM...

Lewis Frederic Hatch (El Paso, TX) (Chem '33), 78 years old, April 8. Retired dean of science and vice president at the University of Texas-El Paso. Previously a research chemist with Shell Oil Co. and professor at University of Texas-Austin for 25 years.

Michael S. Jenkins (Midland, MI) (MS Chem '65), December 16. Received his JD in '67 from the University of Washington and worked for Dow Chemical Co. as a patent attorney.

Harmon Allen McCann (Pasco, WA) (Chem '54), 64 years old, June 4. Retired civil engineer for Boeing, Franklin County, and J.A. Jones. ❖

Biochemistry Graduate Receives WSU Alumni Achievement Award

Stephen P.A. Fodor, a senior scientist with the Affymax Research Institute in Palo Alto, California, received Washington State University's Alumni Achievement Award in December of 1991 for "pioneering leadership in the combination of synthetic chemistry as a new technology."

The award was presented to Fodor in Palo Alto by A. Keith Dunker, professor of biochemistry, Fodor's former mentor. Dunker said, "From the beginning of his career, he demonstrated exceptional talent as an experimentalist."

Fodor came to WSU from Seattle. He earned a BS degree in biology in 1978 and a MS degree in biochemistry in 1982. He completed a PhD in chemistry at Princeton University in 1985 and it was there that he received the Association of Princeton Graduate Alumni Teaching Award for the 1982-83 academic year.

Since joining the Affymax Research Institute in 1989, Fodor has led an effort to develop a new technique that combines

synthetic chemistry and photolithography to simultaneously produce thousands of different, but identifiable compounds. Because a chemist can currently screen only a few hundred compounds a year, the technology has the potential to greatly accelerate the pace of new drug discovery.

Fodor's device compresses a large amount of chemical information into a very small space based on peptide chemistry controlled by light. It promises to be an important new analytical tool with a wide variety of practical applications. For example, there are plans to develop DNA-based diagnostics and fingerprinting using the recently developed technology.

Fodor also recently received the 1990-91 Newcomb-Cleveland Prize for co-authoring the best paper published in *Science* magazine during the year. His article, "Light-Directed, Spatially Addressable Parallel Chemical Synthesis," was nominated from all the papers published by the journal during the year. ❖

Distinguished Guest Visits

In December, Frederic Richards of the Department of Molecular Biophysics and



Biochemistry at Yale University presented a seminar for the WSU Department of Biochemistry and Biophysics entitled *Some Problems in the General Theories of*

Protein Structure.

Richards was born in New York City, married in 1959 and has three children. He earned his BS degree in 1948 from the Massachusetts Institute of Technology and his PhD from Harvard University in 1952.

He has been a professor of biochemistry at Yale University since 1962. He has received many awards during his career beginning in 1965 when he received the Pfizer-Paul Lewis Award in Enzyme Chemistry. In 1978 he received the Kai Linderstrom-Lang Award and in 1988 he received both the Merck Prize from the American Society of Biochemistry and Molecular Biology and the Stein & Moore Prize from the Protein Society.

Richards' visit coincided with the annual Molecular Biology Computer Techniques class' "Poster Session Final Examination." This gave the students an excellent opportunity to speak with Dr. Richards (see picture at left). ❖

Honor Roll of Our Special Friends

The Honor Roll of Donors is our way of saying "thank you" for supporting the Department of Chemistry and the Department of Biochemistry and Biophysics. Your generosity enables us to build programs of distinction and provides direct support to our outstanding students and faculty through scholarships, fellowships, research and equipment grants, visiting lecturers and in many ways which build ongoing excellence in our programs. We deeply appreciate the involvement and support of our alumni and friends.

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The Ideal Solid State Sensor System?



Kerry Higgs and Ursula Mazur are working to develop a new kind of chemical sensor. They are making metal-insulator-metal (M-I-M') solid state devices to be used to detect chemical species. Two different metals, Al and Au in this case, are separated by a thin insulating layer typically 2 to 3 nm thick. Because the insulator is so thin, quantum mechanics, not classical mechanics, determines the possibility of electron flow from one metal to another through the insulator. The quantum mechanical phenomena by which electrons move across the barrier formed by the insulator is called *electron tunneling*. Thus, these devices do conduct current and are called tunnel diodes. Over the past several years, Kerry and Ursula have used these devices as a spectroscopic tool.

Amazingly, it is possible to extract vibrational and electronic spectra of the insulating barrier just by measuring the current flow in a special way. This technique, called *inelastic electron tunneling spectroscopy*, or IETS, is the only all electronic method for measuring vibrational or electronic spectra. The entire spectrometer and sample could be integrated on a single silicon chip! What's more, only about 10^{-10}

grams of material is needed to provide a complete spectrum! IETS provides very high sensitivity, high selectivity (like IR), and the whole thing can be placed on a chip.

IETS sounds like the ideal solid state sensor system, but there are a couple of problems. One of the biggest ones has to do with how to get the material you are testing for, the analyte, into the barrier region of the device. The answer turns out to be simple: make holes in the top electrode so that the analyte can get in. Making the holes the right size and shape is hard, but Kerry and Ursula have had some early successes.

They have demonstrated the ability to detect small molecular acids, such as HSCN and HCO_2H at ppm levels in the gas phase. In solution, μM quantities of KSCN produce good tunneling signals. Thus, they believe that this technique can be applied to sensitive detection of many other small molecules and ions.

At the moment, there is still a lot to be learned. Solving practical problems like extending the shelf life of the device and increasing the usable temperature range requires that Kerry and Ursula delve deeply into basic chemistry and physics of thin and ultra-thin films. They hope to kill two birds here: develop a useful device and extend the frontiers of ultra-thin film chemistry.

Their work is partially supported by the US Environmental Protection Agency. They are looking for additional sponsors so they may support one or more students who wish to work on this problem of current relevance. ❖

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