



CHEMISTRY NOTATIONS

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

Chairman's Notes

by *Royston Filby, chair*
Department of Chemistry

After what seemed a remarkably short summer, school is now back in session and Pullman has traffic jams (at least small ones) again. Many of you may recall a difficult housing situation during your stay in Pullman and we currently face a similar situation.

I would like to thank all of you who supported us during the past year, both morally and financially. Your support has been of crucial importance in providing scholarship and fellowship aid to our undergraduate majors and graduate students. Student support continues to be our most pressing need and small amounts of money go a long way toward helping our students succeed in careers in chemistry.

This past academic year has seen some major administrative changes in the university. The Division of Sciences has a new
(Chairman's Notes continued on page 2)



A Century Of Diversity

In the early 1920's, under the leadership of chemistry professor Carl M. Brewster (photo, center), Filipino students banded together to form a club. By 1933 the club had 28 members. Filipinos were among the first minorities to form strong ties to WSU. Historic club photographs show that the students often packed picnic lunches to enjoy in various parks around Whitman County. This is just one story of many featured in *A Century of Diversity: Minority Alumni of Washington State University* recently published by WSU.

Accomplishments of more than 100 people of color - among them educators, health care professionals, corporate executives and public servants - are featured.

"In these pages you will read about minority alumni whose successes over the years have created a tradition against which today's minority students can measure their own honors and accomplishments," WSU President Smith writes in the foreword. While the book profiles only a small number of WSU's outstanding minority alumni, "they stand as representatives of the men and women of all races who have attended our university," Smith says. ♦

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Douglas West Receives Grant



Portions reprinted with permission from the Illinois State Report, 26(25) pg. 3.

The Indo-American Fellowship Program has awarded a research grant to Douglas West of the chemistry faculty at Illinois State University. Professor West received his doctorate from the WSU Department of Chemistry in 1964.

West will conduct his research project during the spring semester at the University of Poona, located about 90 miles southeast of Bombay in a mountainous region near the west coast of India. The fellowship will pay his travel expenses and provide a stipend of \$1,500 a month.

Approximately 110 people applied for 12 long-term and 9 short-term fellowships. In announcing the award, the Indo-U.S. Subcommission on Education and Culture noted the competition for these grants is "quite keen".

In his research, West is creating synthetic metal compounds of heterocyclic thiosemicarbazones that might inhibit the

growth of certain fungi which cause respiratory disorders in humans. He will collaborate with University of Poona researcher Subhash Padhye on a review article discussing the biological importance of this class of compounds. This research is an extension of West's collaboration with ISU biologist Anthony Liberta. West has established an international reputation for his work on the complexes of transition metals.

During the past five years, West has published 20 research papers involving 15 undergraduates and 3 graduate students working on the project. Funding for the students came from a Petroleum Research Fund grant of \$20,000, administered by the American Chemical Society.

West came to ISU in 1975 and chaired the Department of Chemistry for 11 years, a time when the department became noted for its strong undergraduate research program involving more than three-fourths of the chemistry majors.

ISU is honoring West by naming him an Outstanding University Researcher. This award is in recognition of research that is nationally or internationally significant. He will receive \$3,000. ❖

(Chairman's Notes Continued From Page 1)

dean, Leon Radziemski, who came to WSU about a year ago. In July, Tom George, former Dean of Sciences at SUNY-Buffalo, joined WSU as Provost. Tom is a chemist and is a member of our faculty (he also has a joint appointment in the Department of Physics) and has an absolutely outstanding record as a scientist. WSU was very fortunate in attracting him and he is already having an impact in improving teaching and research, particularly in the sciences. Al Yates, the previous provost, was also a chemist and is now president of Colorado State University.

Changes are also taking place in Chemistry. Maurice Windsor, Professor of Physical Chemistry, retired this fall and we have not yet hired a replacement. We now have an extension of the chemistry department at WSU Tri-Cities, one of WSU's new branch campuses. This extension is also being accompanied by stronger ties between this department and the Molecular and Environmental Sciences Research Center at Battelle

Pacific Northwest Laboratories: As an example, three senior PNL scientists, Thom Dunning, Steve Colson, and Rick Ornstein have become Adjunct Professors of Chemistry - we are also initiating a search for a joint PNL-WSU faculty member in chemistry to be hired for WSU Tri-Cities.

This issue of our newsletter contains news about new facilities, new programs in chemistry education and faculty news. Most importantly, however, it contains news about you. We are proud to include short write-ups about two of our alumni in this issue and we hope to do more of these pieces in future newsletters. Please write and let us know what you are doing and give us your suggestions about what you would like to see in our newsletter.

Finally, I would like to acknowledge the outstanding job done by your newsletter editor, Jenni Keith. Jenni collects information, does all the design and layout work, and puts the whole thing together. The success of the newsletter is mainly due to her efforts. ❖

Biochemistry's Steve Fodor



Stephen P.A. Fodor (MS, Biochemistry, '82), senior scientist at Affymax Research Institute in Palo Alto, CA, was recently interviewed in *Chemical and Engineering News*. His research group is responsible for developing a technique that combines synthetic chemistry and photolithography to produce thousands of different, but identifiable, compounds simultaneously. The technology could greatly accelerate the pace of new drug discovery, company officials say.

Affymax calls the new technology VLSIPS for "very large-scale immobilized polymer synthesis." It harnesses photolithographic techniques developed by the semiconductor industry, solid-phase chemistry, and photolabile protecting groups to achieve light-directed, spatially addressable, parallel chemical synthesis of a highly diverse set of products [*Science*, **251**, 767 (1991)].

"The state-of-the-art in drug discovery today is essentially a linear process which is inherently expensive and slow," says J. Leighton Read, managing director of Affymax's parent company in the Netherlands. "With VLSIPS, certain types of problems can be approached with massively parallel experimentation, an advance directly analogous to what is happening in supercomputing today."

The notion behind the VLSIPS technique is straightforward and ingenious. Synthesis occurs on a solid support, explains Fodor. The pattern of exposure to light through a mask determines which regions of the support are activated for subsequent chemical reaction. Activation results from the removal of photolabile protecting groups from areas illuminated by light passing through the mask.

After deprotection, the first set of building blocks is exposed to the entire support surface. Each of these reactant building blocks is itself protected by a photolabile group to prevent the addition of more than one unit per reaction cycle. Chemical coupling occurs only with regions on the support that were exposed to light in the preceding step. A series of steps, each

consisting of illumination of the support through a carefully chosen mask followed by reaction with a protected building block, results in synthesis of a well-defined array of different compounds.

"The pattern of masks used in these illuminations and the sequence of reactants define the ultimate products and their locations," Fodor says. "Combinatorial masking strategies can be used to form a large number of compounds in a small number of chemical steps."

Besides the advantage the VLSIPS technique offers in drug discovery, Affymax plans to develop DNA-based diagnostics and fingerprinting technology using the technique. The company has filed for numerous patents on the technology and plans to form partnerships with major corporations to commercialize many of these other potential VLSIPS applications. ♦

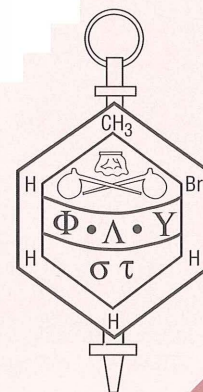
Portions excerpted with permission from Chemical & Engineering News, February 25, 1991, pgs. 21-22.

Nominations Requested for Phi Lambda Upsilon Awards

- Outstanding Faculty
- Outstanding Graduate Student
- Outstanding Undergraduate Student

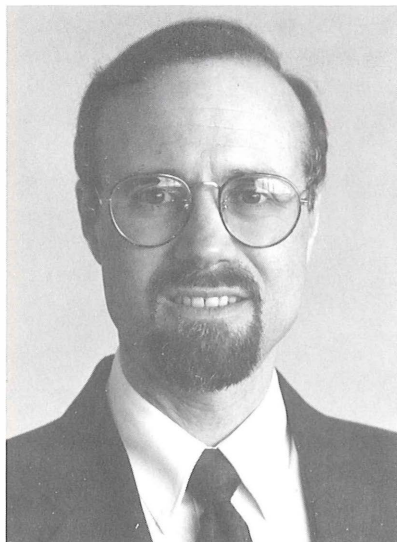
If you would like to nominate someone, please call (509) 335-1516 as soon as possible and nomination forms will be sent to you.

(Prizes will be given to those who nominate the winning candidates!!!)



Thomas George Named Provost

Thomas F. George, dean of natural sciences and mathematics at the State University of New York and Buffalo, became provost and academic vice president at WSU on July 1.



Thomas F. George

A professor of chemistry and physics, George, 43, has been dean at SUNY-Buffalo since 1985. Before that, he was a chemistry professor for 13 years at the University of Rochester in New York state.

A distinguished teacher and researcher, George is a fellow of the American Physical Society, the New York Academy of Sciences, and the Sloan and Guggenheim foundations. His research, including laser-induced chemical physics, molecular collision dynamics

and superconductivity, has produced more than 400 major publications. He is also the co-author of a graduate-level textbook on classical and quantum physics.

"This is the provost who will lead Washington State University to the next level of academic excellence," WSU President Sam Smith said. "With his credentials in both academics and leadership, Tom George has the ability to recognize and foster quality. He has the ability to stimulate people and to help them reach their goals."

The newly named provost said it was an honor to be offered the position and he accepted enthusiastically. "I look forward to working with WSU's outstanding regents, President Smith, administrators, faculty, staff and students to lift WSU to an even higher level of academe, second to none," he said. George will continue his active research program as a professor in the chemistry and physics departments. He has established his research group in Fulmer Hall and one paper from WSU has already appeared in *Physical Review*.

Born in Philadelphia, George graduated with honors from Gettysburg College and earned his master's and doctoral degrees

from Yale University. He was a postdoctoral appointee at the University of California, Berkeley, in 1971-72 and a research associate at the Massachusetts Institute of Technology in 1970-71.

He is a member of Phi Beta Kappa, the liberal arts honorary, and Sigma Xi research honorary. He was honored as a Camille and Henry Dreyfus Foundation Teacher-Scholar, and received the Distinguished Alumnus Award from Gettysburg College.

Active in professional organizations, George chaired the American Chemical Society's Physical Division in 1987-88, and served on the executive committee during 1979-82 and 1985-89. He also has been active as a conference organizer and member of chemistry journal editorial boards.

George will succeed Albert C. Yates, former provost and executive vice president, who became president of Colorado State University last summer, and Ronald Hopkins, acting provost this year, who became academic vice president at San Diego State University last summer. ❖

Mentor Program

The WSU Student Alumni Connection (SAC) has added a program through the Alumni Center that will benefit departments, students, and alumni of WSU. The program is designed to further acquaint students with the positive and negative realities of the professional careers they are pursuing. At the same time, the students can bring alumni up to date on life at WSU.

The objectives of the SAC Mentor Program are to connect WSU students and their specific career interests with alumni who are employed in matching fields, and to establish liaisons (Cougar alumni) between prospective employers and Career Services.

Current WSU students will have an opportunity to experience and observe what a particular career or employer would be like, as well as increase their opportunities for internships through desired employers.

We are looking for alumni that are willing to donate their time to help a fellow Cougar. Alumni willing to participate as mentors may call (509) 335-ALUM. ❖

First Plant Polypeptide Hormone Isolated

A team of scientists in WSU's Institute of Biological Chemistry, led by C.A. "Bud" Ryan, professor of biochemistry and biophysics, has isolated and synthesized the first polypeptide hormone ever found in plants.

The discovery was described in the August 23 issue of *Science*, the weekly magazine of the American Association for the Advancement of Science.

The hormone, named "systemin," was isolated in tomato plants and is part of the plant's natural defense system against attack by pests.

Polypeptide hormones, chains of amino acids, have been known for years to exist in humans and animals. They regulate dozens of human body functions from reproduction to neurological and immunological responses.

A minuscule amount of polypeptide hormone is all that is needed to activate a response, a reason why scientists have not found them in plants before. "The quantities are so small and so difficult to detect that other laboratories have not been successful," Ryan explained.

He said the discovery will lead to an understanding of how the hormone activates plant genes and will encourage other scientists to isolate additional peptide hormones that are important in plant systems. "The long-range objective is to genetically engineer plants to induce or improve natural defense mechanisms similar to the system we have been studying," he added.

Ryan credits their success to a team effort and particularly the work of his assistant, Gregory Pearce, who spent more than three years analyzing 30,000 tomato plants.

Eventually, Pearce, with the help of technician Scott Johnson, was able to extract one microgram of systemin from 60 pounds of tomato leaves — the equivalent of one part of polypeptide to 30 billion parts of leaf material.

Ultimate success came when a synthetic model of the protein, produced by WSU's Laboratory for Biotechnology and Bioanalysis, switched on the production of proteinase inhibitors precisely the way the naturally occurring hormone did.

"That was the night we celebrated," Ryan recalled. "It's the kind of discovery that occurs once in a lifetime, and one that would not have been possible without the support of a large number of people who understood what we were trying to do and gave us their support." ♦



AHA Scholarships

In an effort to attract talented young scholars to careers in medical research, the American Heart Association, Washington Affiliate, has awarded seven summer research scholarships to Puget Sound area high school students.

The Introduction to Cardiovascular Research Award is designed to give junior and senior level high school science students a hands-on research experience.

Winners receive a \$3,000 grant to pursue research in their area of interest, under the supervision of an appointed medical research professional. Three will study at WSU, and two each at the University of Washington and the Veterans Administration Medical Center.

Edwin Chang of Bellevue High School in Bellevue is one of three winners who will work at WSU. Chang will work under Christine Cremo in biochemistry/biophysics. Cremo, who studies muscle contraction, recently received a five-year Established Investigator Award from the American Heart Association.

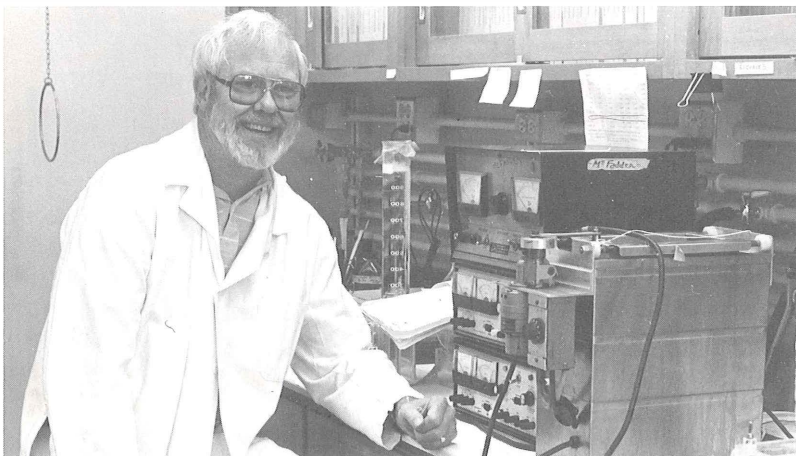
More than 100 outstanding students from across Washington applied for the newly created award. The American Heart Association's research committee judged students based on academic record, letters of recommendation and their statements of interest. ♦

McFadden Receives Award



Bruce A. McFadden, biochemistry professor, was presented with a 1991 President's Faculty Excellence Award for research and creative activities during commencement exercises May 11. McFadden's friends, colleagues, and students honored him by attending a reception hosted by the Department of Biochemistry and Biophysics. Professor McFadden joined the WSU faculty in 1956 after receiving his Ph.D. from the University of California, Los Angeles. He is an outstanding teacher/scholar whose work has significantly influenced students and advanced knowledge in biochemistry.

The importance and innovative nature of his work has resulted in a continued record of support from major granting agencies.



He has received nearly \$4 million in support during his career. Among his outstanding accomplishments is the pioneering work in the function and regulation of isocitrate lyase. This enzyme has a key regulatory role in the metabolism of fatty acids in microbes, in germination of seeds, and embryo development in mammals. His demonstration that chloroplasts can be modified and reintroduced into plants has the potential to greatly improve the growth of important food crops.

McFadden has published close to 160 refereed articles and book chapters. His published research spans more than three decades and represents a lifetime of significant contributions to the enzymology of plants and bacteria.

His professional recognition is extensive. He is frequently invited to address international conferences and has received many prestigious awards. He has been a National Institutes of Health career development awardee, a Guggenheim Fellow, a National Institutes of Health Special Fellow, a fellow of the American Association for the Advancement of Sciences, and an Alexander von Humboldt distinguished senior U.S. scientist for work in West Germany. His alma mater, Whitman College, awarded him an honorary doctorate of science in 1978. He has been invited to give nearly 40 talks at major national and international meetings around the world. He also has given more than 60 invited talks at universities, industrial companies and government laboratories. He gave WSU's 35th Distinguished Faculty Address in 1974.❖

Alumni Events



October 19, Tempe, AZ

Enjoy a delicious spaghetti dinner, \$8.50, at the Spaghetti Company on Mill Avenue at 3:00 pm. Cougars play the ASU Sun Devils at 7:00 pm. RSVP to Paul Troeh, 1860 Sunburst Lane, Tempe, AZ 85284. Call Judy Ryan (602) 885-2291.

November 2, Pasadena, CA

The Cougs take on UCLA at the Rose bowl. Join us at the Brookside Golf Course (17th fairway). The fun starts at 12:30 pm. Look

for the Cougar tent. \$5 donation. Call Shari Halldorson at (714) 646-2287.

November 23, Seattle, WA

Apple Cup Tailgate Party at the of 1st Interstate Bank parking lot at 15th and 45th NE. Join us two hours prior to kick-off. Call 1-800-ALUMWSU to reserve your place.

Young Alums Homecoming Bus Trips

Take the "Cougars Coach" with your fellow alums as the Cougs pounce on the Beavers. All prices include round-trip transportation, food, and beverage on the way to Pullman, alumni give-aways, and plenty of Cougar spirit. Call 1-800-ALUMWSU.❖

Faculty and Staff News



Karen Brewer, assistant professor of chemistry, recently received two grants for \$18,000 each. One was awarded from NSF entitled "The Development of Supramolecular Systems with Unique Photochemical and Electrochemical Properties." This is a preliminary research planning grant for new materials that might be useful for solar energy conversion and electronic flow. The second award was from the ACS Petroleum Research Fund. The project entitled, "Photoinitiated Charge Separation" will investigate one-way electronic relays for solar energy conversion.

Bruce Eaton, assistant professor of chemistry, recently received a grant from the American Chemical Society, Petroleum Research Fund (ACS-PRF) for his study "Catalytic Transition Metal Mediated [4+1] Psclopentenone Assembly: Stereospecific Synthesis of Bis-3,5-Alkylidenecyclo-3-Pentenones and New Methylenomycin Derivatives." This is the first example of a [4+1] reaction catalyzed by a metal. These antibiotics stimulate enzymes that help protect cells against DNA damage. Included in the grant are supplemental funds to support an undergraduate to work in the laboratory. Professor Eaton was one of 30 U.S. scientists who received these supplemental funds from ACS-PRF.

Jeremy Evans, associate professor of chemistry and biochemistry/biophysics has recently received a four-year, \$550,000 grant from NIH for a project entitled "Enzyme-Intermediate Structures by NMR." This research will aid in the design of various classes of drugs and agrochemicals. Professor Evans has also received an equipment grant from NSF for the purchase of a 300 MHz NMR Spectrometer.

Roy Filby, chemistry professor and chairman, was elected in June to the International Committee on Activation Analysis. This committee organizes the international conference on activation analysis held every four years. Past conferences have been held in Copenhagen, Beijing and Vienna.

Gerald Hazelbauer, biochemistry professor, has accepted an invitation from the National Institutes of Health to serve as a member of the Microbial Physiology and Genetics Study Section. The study section makes recommendations on grant proposals submitted to the NIH in the area of the use of microorganisms to study fundamental processes in biology.

Bruce Kerwin, a postdoctoral fellow for Ralph Yount, and his wife Laurie had a baby girl named Erin Elizabeth on August 12, at 6:50pm. Erin weighed in at 7 lbs. 10 oz. and was 21 inches long.❖

In Memoriam...

Henry Bayard Milne



H. Bayard Milne was an organic chemistry professor and researcher at WSU for 31 years. He made many contributions to research and teaching in the Department of Chemistry. Bayard Milne died last December, at the age of 75, of age-related causes at Sacred Heart Medical Center in Spokane.

"He was a dedicated teacher who inspired many students in the paramedical and chemistry fields," said his son, David B. Milne of Grand Forks, ND, "and his profound love of learning and discovery was very contagious. He took the time to understand each individual student's needs."

Milne was born August 15, 1915, to William E. and Bessie Grace (Porter) Milne in Walla Walla, WA. He spent his youth in Eugene and Corvallis, OR. Milne graduated

from Oregon State College (now Oregon State University) at Corvallis in 1937. On September 5, 1937, he married Frances Witzig at Corvallis.

Milne received a doctorate in organic chemistry at Northwestern University in 1941.

He served in the U.S. Army, beginning in 1942, and spent one year at the California Institute of Technology at Pasadena. He moved to Pullman in 1946 to become assistant professor of chemistry at WSU. He retired from WSU in 1977.

Milne enjoyed hunting, fishing and camping trips with his family and friends.

Survivors include his wife at Pullman; three sons, David B. Milne of Grand Forks, ND, R. Bruce Milne of Seattle, and Richard W. Milne of Albion; a daughter, Louise Bridges of Terrell, TX; and five grandchildren.❖

"He was a dedicated teacher who inspired many students..."

—David B. Milne

Professor Hamm: Amazing!



A recent picture of Professor Hamm (right) and his first Ph.D. student, Charles Shull.

Randall Hamm, emeritus professor of analytical-inorganic chemistry, still lives in Pullman and often stops by the department after his daily tennis match. He regularly frustrates people half his age with his skill. Randy retired in 1978 after 15 years with the chemistry department at WSU and 21 years at the University of Utah.

Randy has remained very active since his open heart surgery in 1980. In addition to his daily tennis matches, he bowls on two

leagues and enjoys downhill skiing. It has been reported that he is a black-diamond hotshot! Randy also volunteers his computing talents to his church by managing the finances. Presently he is paid by campus contractors to photograph their construction progress on the Holland Library addition and the new Food Science Building. He got his start by volunteering his photography talents to document the recent construction of the

V.I.F. and Synthesis additions for the department.

Randy was born in 1913 in Auburn, WA, and earned his B.S. in 1935 and Ph.D. in 1940 from the University of Washington. He worked for the Navy during WWII teaching beginning and explosive chemistry to Naval officer candidates. He taught chemistry at Western and Central Washington before accepting a faculty position at the University of Utah in 1942. He taught one year at the University of Idaho after retiring from WSU. During his career, he was mentor to 25 Ph.D. graduates and had over 50 publications to his credit including the discovery of Manganese III E.D.T.A. which is used commonly today as a one electron oxidant.

He and his wife of 54 years, Vivian, have a daughter, Jackie Gerlutz; twin sons: Tom and Terry; and seven grandchildren. Vivian is active in community service including the Whitman County Historical and Genealogical Societies. Randy and Vivian, both railroad buffs, have taken many of the train rides still operating in the Northwest.

Randy keeps up with the university grapevine through his tennis contacts and keeps us informed during his daily visits. His zest for life and consistent physical conditioning is an inspiration to us all! ♦

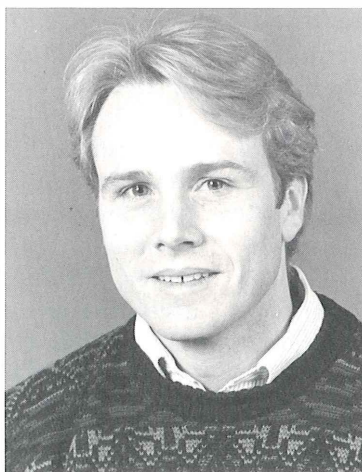
45 Year Search Ended



For 45 years, Amoco Chemical Company has been trying to improve the process for producing one of their polyolefin products. Bruce Eaton, professor of chemistry, was hired by Amoco in 1987 to develop a catalyst superior to the one that is currently used, in order to make the polymer more reactive and valuable to their customers. As a result of computational and experimental structure property studies on polymerization catalyst design, Professor Eaton was able to formulate a catalyst that yielded the most reactive polyolefin possible.

Professor Eaton faced not only the problem of improving the chemistry, but also was required to do this under the

restrictive environment that the current Amoco plants provided. Perfecting the catalyst would not have meant much if the company had to build new plants to produce the polymer. The final touches to the process were perfected while Professor Eaton has been at WSU. He was recently issued a U.S. patent for the specific Olefin polymerization catalyst.



Amoco sells 300 million pounds per year of the former polymer, which is approximately 70% of its merchant market. The catalyst used now gives 10% of the more reactive polymer. The new catalyst can give up to 100% of reactive polymer. The polymer is used in a wide variety of products, such as oil additives, adhesives, caulking, and water seal products. ♦

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.

Donald F. Adams (Pullman, WA) (BS Chem '41), is a research professor at the University of Idaho. He received the Frank A. Chambers Award from the Air & Waste Management Association for outstanding achievement in the science and art of air pollution control. He also was named a Fellow in the association.

Harry Ako (Honolulu, HI) (PhD Biochem '72) is a professor at the University of Hawaii.

Edward L. Anderson (La Jolla, CA) (PhD Chem '55) left chemistry for Wall Street in 1966 and later retired in 1983. He is now working in the fields of behavior analysis and human sexuality via volunteer service.

Donald F. Averill (Portales, NM, Eastern New Mexico University, associate professor of chemistry) (BS Math '64, MS Chem '71) was promoted to associate professor of chemistry at Eastern New Mexico University in 1990.

Ron Butler (Warrenville, IL) (BS Chem '73) is a senior scientist at AG Communication Systems.

Eugene L. Bulgozdy (Dublin, OH) (BS Chem '51) retired on February 1 from his positions as vice president and general manager of Ashland Chemicals, Specialty Polymers and Adhesive Division.

Ronald L. Casebier (BS Chem '55) is vice president, Technical Control and Quality, at ITT Rayonier Research Center in Shelton.

Russel K. Edwards (Manson, WA) (BS Chem '40) died of cancer at age 73 on January 18 in Prescott, AZ. He was a research chemist for Anaconda Copper Mining Co. and Argonne National Laboratories.

John Geigert (Clayton, CA) (BS Chem '69) was asked to take over as vice president of Quality Control for Immunex Corp in Seattle after 18 years as senior director of Quality Control at Cetus Corp, Emeryville, CA. He is also national director for the Parenteral Drug Assoc. John and his wife

Nicki have a daughter, Heather, who currently attends WSU.

Dan Herron (Seattle, WA) (BS Biochem '84) is a physician at the University of Washington Hospital in Seattle.

Terry W. Hopkins (Longview, WA) (Chem '69) is a pulp technician for the Weyerhaeuser Paper Co.

Kent A. Howard (Baton Rouge, LA, Exxon Chemical, staff chemist, special laboratory technician) (BS Chem '70) is currently doing surfactants marketing technical support.

Frank S. Jacobs (Imo State, Nigeria, Jacobs Wines Limited, Owner) (PhD Chem '84, Filby) has successfully established the largest winery in Nigeria. He was given an award for innovation in 1986 for developing an industry that utilizes local fruits. In recognition of his contribution towards the industrial development of Nigeria, he has been invited by the Chemical Society of Nigeria to present a plenary paper on "Chemical Industries and the Nigerian Environment" during their annual conference.

Richard Knochenmuss (Kennewick, WA, Battelle Pacific Northwest Laboratories) (PhD Chem '84, Hippi) recently returned to the US from the University of Baer in Switzerland where he had a postdoctoral fellowship. He is now working at Battelle Pacific Northwest Laboratories and studying the dynamics of clusters.

Robert A. Kramer (Shelton, WA) (Chem '55) is associate director at ITT Rayonier Research Center in Shelton.

Todd M. Martensen (Bethesda, MD, National Science Foundation, director, Biochemistry Program) (BS Biochem '66) directs the review process for biochemical research proposals. Successful proposals are awarded grants from NSF.

Michael F. Schultz, M.D. (Denver, CO, University of Colorado) (BS Chem '74) is in a two year research program to study acute renal failure at the University of Colorado Medical School. His wife, Virginia, and their 2 daughters enjoy hunting, fishing, skiing and camping in the Colorado Rockies.

Douglas X. West (Bloomington, IL) (PhD Chem '64) is a chemistry professor at Illinois State University where he was named an Outstanding Researcher. He was awarded a research grant by the Indo-American Fellowship Program and will do his research at the University of Poona, India.

Stephen D. Williams (Boone, NC) (PhD Chem Phys '83) is an associate professor at Appalachian State University. ❖

You Are Invited....

Department of Chemistry
Alumni & Friends Reception

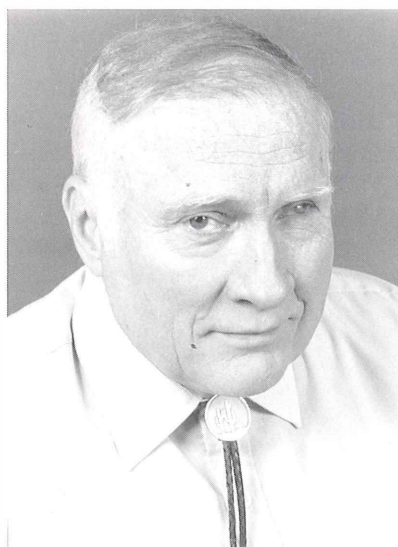
Red Lion Inn - Hanford House
802 George Washington Way
Richland, WA 99352
Hearty hors d'oeuvres & no-host bar

Tuesday, October 29, 1991
5:30pm - 7:30pm
R.S.V.P. by October 20
(509) 335-2733

WSU To Advance Chemistry Teaching



Chemistry Professor Glenn Crosby and the Department of Chemistry proposed a new degree program aimed at enhancing



Glenn Crosby

chemistry teaching in the public schools. A long-time advocate of improving public school science instruction, Crosby said the program is innovative in combining the resources of a public university with those of private organizations.

Funded in part by a \$650,000 National Science Foundation grant and with the cooperation of the Pacific Northwest Battelle Laboratories, the program would bring 90 Washington high school chemistry teachers to WSU, 30 enrolling each summer for three years beginning in 1992.

Targeted are teachers conducting chemistry classes who did not major in chemistry as undergraduate students. They

will enroll in two summers of instruction and spend a third working at Battelle laboratories in Richland. They will earn Master of Arts in Chemistry degrees. The university will present the concept to the Washington Higher Education Coordinating Board for approval this fall.

The NSF grant will pay student expenses-tuition, fees and a monthly stipend-during the first summer. Additional funding is being sought for the second summer of each group and for a postgraduate portion of the program.

"This project is so innovative that it will serve as a prototype for others across the nation," said Dean of Sciences Leon J. Radziemski. "These 90 teachers represent nearly a quarter of all high school chemistry teachers in the state. Through this program, we should see a quantum jump in the effectiveness of high school chemistry programs."

This instruction and training experience will assist teachers who run laboratories, maintain inventories, observe new safety regulations and revise the curriculum to reflect new developments in the field. After receiving their degrees, teachers will spend two years working together with their school districts and WSU to improve both the courses they teach and their facilities. ❖

New Chemistry Course Planned



Chemistry Professors Ursula Mazur, Karen Brewer, and Bruce Eaton have collaborated on the development of a new course, Advanced Synthesis and Characterization, CHEM 410. This course was created in accordance with directives issued by the American Chemical Society requiring that the chemistry core curriculum include laboratory instruction in the synthesis and characterization of inorganic and organic compounds using instrumentation for spectroscopy. At the present time no such course exists in our chemistry program.

The course involves the synthesis and characterization of organic and inorganic compounds, solid-state materials with focus

on modern synthetic technology, characterization methods, and laboratory technique development. Six excellent experiments have been developed and tested. The synthetic methods include vacuum line syntheses, inert atmosphere synthesis, high and low temperature and pressure reactions, and photolysis and electrolytic reactions. The identification tools involve IR, Raman, NMR, X-ray, ORD/CD, EPR, UV-visible, magnetic susceptibility, conductivity measurements, and mass spectrometry.

CHEM 410 will provide invaluable experience to chemistry undergraduates and many graduate students who come from schools lacking such an offering. CHEM 410 is an advanced laboratory and requires substantial start-up costs which are not presently available. Possible sources of funding are being investigated. Hopefully funding will be available so this important course may be offered next Fall. ❖

Willett Receives \$117,000 Grant



Roger Willett, chemistry professor, has received a new NSF grant to pursue crystallographic and solid state NMR studies on structural phase transitions. The three-year grant provides graduate student support and an upgrade of the departmental X-ray diffraction facility.

The focus of the research will be on three types of systems: ones which exhibit a dynamic Jahn-Teller effect, ones which contain an incommensurate phase, and layer Perovskite salts which exhibit lipid bilayer-like transitions. The initial studies will focus on the dynamic Jahn-Teller effect in a series of Cu(II) halide salts which exhibit apparent trigonal bipyramidal coordination geometry. The work on

incommensurate phases will be an extension of Mark Pressprich's (PhD, Chem '90) thesis work, in which he studied the structural behavior of three phases of $(\text{Me}_4\text{P})_2\text{CuCl}_4$.

The equipment funds will provide for refurbishing the two X-ray diffractometers, including new computer systems and software for the automatic collection of diffraction data. This software will be even more user-friendly than the existing system, and should make it possible for the routine use of the instruments by graduate students from all fields of chemistry. In addition, faster stepping motors, combined with the more efficient software, should cut data collection time by 50%.

This will complement the recent computer system and software upgrade for data analysis and structure solution. The core of this system is a Microvax 3100 Workstation, which is able to support up to five PC satellite computers. These can be remotely located and obtain access to the Microvax via the University's VAX network. ❖

Poshusta Takes Sabbatical Leave



Professor R.D. Poshusta is on sabbatical leave from the chemistry department until August 1992. He is working at the Molecular Sciences Research Center (MSRC) at Battelle Northwest Laboratories in Richland, WA. He receives partial support from DOE through NORCUS, the Northwest College and University Association for Science.

Dr. Poshusta will be studying electronic structure of solids and theoretical solid state chemistry while at MSRC. This will be a new direction for his research which has previously emphasized single molecules. Poshusta wants to apply quantum chemical methods developed for single molecules in the area of infinite extended materials. While at MSRC, Dr. Poshusta is working with staff scientists who are studying theoretical aspects of environmental problems. In particular they are studying problems of toxic and radioactive waste at the nearby Hanford site.

According to Poshusta, there is an urgent need for better theories of solid state

electronic structure. There are many topics in solid state chemistry, materials science and engineering, and materials physics and chemistry which will benefit from a better understanding of electrons in solids behavior. Not only does solid state theory help to correlate experimental facts, but it will improve our ability to design new experiments and even new materials. Examples include the synthesis of new materials under pressure, interpreting inelastic tunneling spectra, electrical and magnetic properties of metal complexes, and chemistry of intercalated substances.

Poshusta says, "I don't expect to solve all these problems, but I'd like to improve my understanding of them and contribute toward an improved theory of solids."

In the 1992 fall semester, Professor Poshusta will return to WSU to resume his normal teaching and research duties. He will bring new expertise and renewed enthusiasm to our programs. ❖



Ron Poshusta

Student Stars



James Tsuruta, a biochemistry and biophysics graduate student, captured the top prize for the best presentation by a young investigator at the recent annual meeting of the Society for the Study of Reproduction.

Tsuruta, a Seattle native and a graduate of Whitman College, received a cash award of \$700 and a plaque for his presentation on Sertoli cells and germ cells. The paper was based on his thesis work in reproduction science with Professor Michael Griswold. After completing his doctoral degree this fall, Tsuruta will receive a postdoctoral appointment at the University of North Carolina.

Joseph Hoagland, a chemistry graduate student, has won the Battelle Pacific Northwest Laboratories Energy Related Research Fellowship for 1991-92. This is the second consecutive year that a chemistry student has received the award (Scot Fitzgerald 1990-91; Advisor Filby). Joseph has been exceptionally productive during his time in the laboratory of Kerry Hipps. He is co-author of 5 refereed articles in the best journals in his field. He has mastered the many experimental techniques required to perform the supported research - an investigation of molecular conductors. He is currently learning the theoretical and conceptual formalisms appropriate for understanding these electronic devices. It is likely that he will complete his dissertation within the next 12 to 18 months.

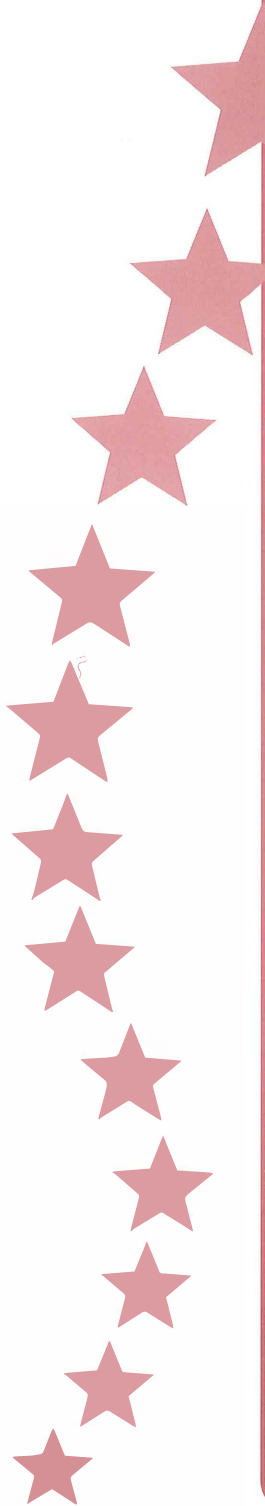
Robert Thomas, a chemistry graduate student working with David A. Cleary, received a summer research assistantship from the WSU Graduate Student Profes-

sional Association. The assistantship was awarded based on a proposal he submitted entitled "Utilization of Intercalation Compounds as Chemical Sensor Transducers." These materials could be of use in aiding the development of low-cost selective chemical sensors. Robert is in his third year of graduate study and this work is part of his doctoral research.

Donations at Work

Due to the generosity of our many alumni and friends, the Department of Chemistry was able to award nine undergraduate and two graduate scholarships for the 1991-92 school year. The Department of Biochemistry and Biophysics awarded one graduate student scholarship. It could not be done without you and we send our sincere thanks to those that have made it possible! Listed below are the scholarship recipients.

- **C. Glen King Scholarship**
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- **Chemistry Development Fund**
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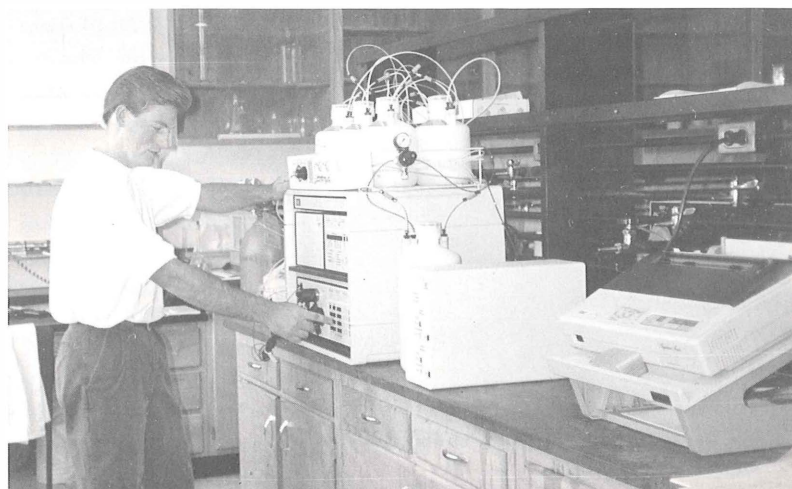


LBB2 Opens

A new analytical research and service laboratory, the Laboratory for Bioanalysis and Biotechnology - Unit 2 (LBB2), began operations this Fall in the chemistry department. A grant of \$379,992 from the M.J. Murdock Charitable Trust, plus \$50,000 in matching funds from WSU, has enabled the purchase of two major pieces of equipment - a liquid chromatograph/mass spectrometer (LC/MS) and an inductively coupled plasma emission spectrometer (ICP/ES) - as well as state-of-the-art instruments for gas, liquid, supercritical fluid, and ion chromatography. Two existing mass spectrometers have been incorporated into LBB2. The instrumentation of LBB2 makes available a broad range of techniques for separation, identification and quantitation of small to mid-size organic molecules (10,000 amu), and for trace level elemental analysis.

The proposal for LBB2 instrumentation was initiated by Professor Herb Hill and supported not only by numerous potential users across the WSU campus, but by other institutions throughout the northwest who plan to use the new analytical capabilities.

The purpose of LBB2 is to provide service and support for basic and applied research in biochemistry, chemistry, and the biological, environmental and materials sciences. Like its sister LBB1 facility, LBB2 addresses the researcher's increasing need not only for sophisticated instrumentation, but for specialists to provide consultation, operations assistance, and maintenance for the equipment. The initial staffing for LBB2 includes a full-time Ph.D. director and three graduate research assistants. Another benefit of the new laboratory is the training gained by analytical chemistry graduate students employed by the facility. As the demand for professionals in analytical instrumentation continues to grow, this experience is important to both potential employers and students. ❖



Student using a new computer interfaced chromatograph.

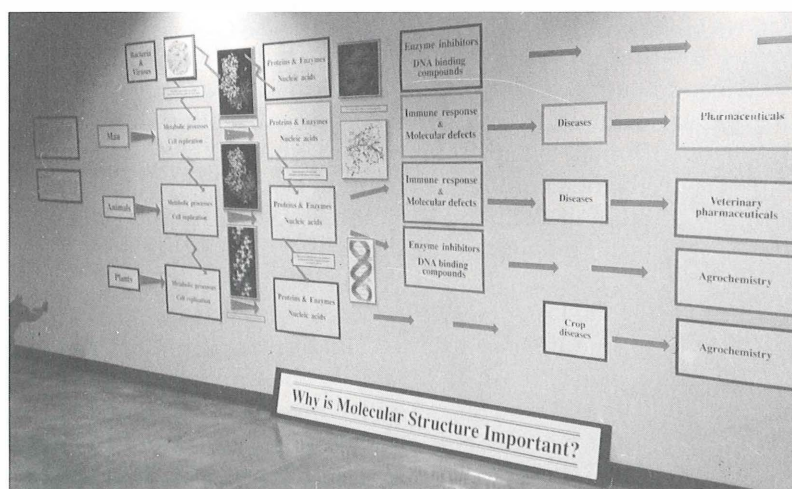
NMR Center Opens

The formal opening of WSU's \$1.5 million Nuclear Magnetic Resonance Spectroscopy Center was celebrated with an open house on May 10. The center, located in the new Synthesis Building, is designed to provide scientists with data about molecular biological structures.

Recent advances in NMR instrumentation and techniques have given scientists the ability to structurally analyze molecules in solution as well as crystals. Typically, experimental determination of biomolecular structures is done by X-ray analysis.

The NMRSC is supported by grants from the National Institutes of Health, National Science Foundation, and Battelle Pacific Northwest Laboratories. It presently houses two state-of-the-art NMR spectrometers and a recent NSF grant will be used to purchase the third high field instrument.

The NMR capability complements other advanced technologies in molecular science that have been or are being put into place at WSU. Computer visualization of molecular structures was made possible three years ago with the VADMS Center, and laboratories for protein sequencing and other biochemical analysis are being established. ❖



Part of a display to explain the importance of molecular structure to the regents who attended the open house.

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



Frederick W. Bollinger

Spring of 1991, several chemistry graduates attended the reunion.

We were delighted to have the opportunity to visit with Dr. **Frederick Bollinger** and his wife, Rita, while they were here. Dr. and Mrs.

Bollinger came to WSU all the way from their home in Westfield, New Jersey. Dr. Bollinger enjoyed seeing old classmates and reminiscing about all the changes that have taken place on the WSU campus since he was a stu-

dent. Dr. Bollinger is a retired senior chemist from Merck & Co., Inc. He received his M.S. degree from WSU in 1941 and his Ph.D. in 1951 from the Illinois Institute of Technology. It certainly was wonderful to see them both!

The following excerpts were obtained from information obtained for the 1931 and 1941 reunion booklets. This is only a partial listing, so look for more in future issues!

Donald F. Adams (MS Chem '42). In 1990 Donald was awarded the Frank A. Chambers Award, for his outstanding work in the science of air pollution control. He has also received a Distinguished Service Award from the Division of Environmental Chemistry, of the American Chemical Society and a Meritorious Service Award from the Pacific Northwest International Section, Air Pollution Control Association. Donald has spent his career with WSU in positions such as professor, the head of the Air Pollution Control Laboratory, and as director of the Air Pollution Training Program. He was the leader for two technical exchange groups to the People's Republic of China and has consulted for the United Nations Environmental Programme. Donald is a research professor at the University of Idaho. He and his wife, Joyce, have 3 children and 2 grandchildren.

Arthur Brunstad (MS Chem '33) was a chemical officer with the Air Corps during WWII in Burma and China. After the war Arthur was a research chemist with G.E. at Hanford for 11 years. He is now retired from the U.S. Atomic Energy Commission after 20 years of service. Arthur came to America in 1920 at the age of twelve, unable to speak English. Arthur's fondest memory of WSC was his last year

when he married Helen Severance, "The best thing I've done!" They are in their 58th year together.

Otis W. Fortner (MS Chem '41) lives in Baton Rouge, Louisiana with his wife Eula. They have 4 children and 11 grandchildren. Otis was a WSC chemistry instructor and later he went to work for the U.S. Bureau of Mines as a metallurgist. He was also a research chemist, a project manager and a works manager at Air Reduction Chemical Co. and at Borden Chemical Co. Otis remembers that as a WSC faculty member he beat two graduate assistants in a foot race from Pullman to Moscow and back (a distance of about 17 miles!) His current interests are rockhounding and traveling.

D. Archer (Mort) Mortland (BS Chem '31) lives in Yakima, WA with his wife Mary. They enjoy spending time with their 2 children and 3 grandchildren. He retired after 38 years in fresh fruit packing equipment manufacturing. In 1974 Mort was sent to Capetown, South Africa to evaluate the equipment being used there. Mort is an active member of the Yakima Valley Audobon Society and the Yakima Rock & Mineral Club. Mort describes a special memory from his time at WSC: "As an usher in an end zone stand I had a good view of the football game in which the Cougars beat the Trojans of USC 7 to 6 in 1930. I also took the special train to Seattle to see the Cougars beat the Huskies 3 to 0 in the mud. Then they [the Cougs] went to the Rose Bowl (but I didn't)."

Dale A. Stauffer (PhD Chem '48) lives in Elkhart, Indiana. He and his wife, Donita, have a daughter, Stephanie, and 2 grandchildren, Sean and Sara. Dale is a retired president of the research products division at Miles, Inc. He has also been employed as an assistant professor of chemistry at the University of New Mexico, and as a medicinal chemist for Miles, Inc. One of Dale's memories of WSC was registering for the draft in 1941 at the fieldhouse and finding the legendary Babe Hollingbery sitting at a small table in the middle of the room. After registering, the coach asked Dale if he was in a hurry. When Dale replied, "no", Hollingbery said, "sit down and tell me about yourself." Dale remembers that no one else came in and they talked for at least a half hour, mostly about football. ❖

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 and 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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Windsor Retires



Maurice Windsor was born in 1928 in England and received his B.A., summa cum laude, M.A. and Ph.D. at Cambridge University. In his doctoral research with George Porter, Nobel laureate in 1967, he used flash photolysis to study rapid (ns to ms) reactions in solution and was the first person to observe triplet states of organic molecules in fluid media. Following his Ph.D. in 1955, he held postdoctoral appointments at CalTech and at Sheffield University.

In 1958 he joined Space Technology Laboratories, now TRW, and created and managed the Chemical Sciences Department which carried out photochemical and laser research for ONR, ARO and AFOSR. In 1967 he developed nanosecond laser flash photolysis and made the first studies in absorption of the excited singlet states of aromatic molecules. In 1971 he extended laser flash photolysis to the picosecond time range. In 1975, Windsor made the first picosecond studies of the primary charge separation in photosynthetic bacteria. This helped stimulate ultrafast laser studies of photosynthesis in dozens of laboratories throughout the world.

Windsor and coworkers have published over 80 scientific papers and book chapters. His contributions to photochemical research are widely recognized and he has been an invited speaker at many international meetings throughout the world. He was a Senior Visiting Fellow at The Royal

Institution, London, 1978-79, and a visiting professor in Paris, May 1979, and at Cambridge University 1984-85. He lectured in China in April-May 1989 and since 1985 has maintained an active collaboration with groups at Technical University, Berlin. He was an invited speaker at the Gordon Conferences on Photosynthesis in 1975, Non-Linear Optics and Lasers in 1977, and organized sessions for the Gordon Conference on Lasers in Biology and Medicine in 1978 and 1980. He has served as a reviewer for many journals and granting agencies and as a member of the Advisory Editorial Board of *Chemical Physics Letters*.

As a popular lecturer in the freshman chemistry program, Windsor taught several thousand students in CHEM 105 between 1975 and 1990. He also created and taught an integrated course on physical science for non-science majors in the Honors Program. Windsor has served on several university committees, most recently as a member of the President's Commission on General Education. He is currently chairman of the Washington-Idaho Border Group of the American Chemical Society.

Maurice plans to maintain some research activity and continue his international collaborative work. He and his wife Charmian will remain in Pullman, but plan to keep up an active travel schedule. They have three children. David is a production superintendent at a glass manufacturing plant in California, and Vanessa works for ZFUN radio station in Moscow, ID. Their younger son, Jonathan, is a sophomore at WSU.❖

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