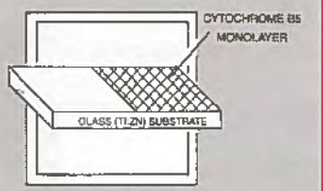
School of Chemical Sciences
ALUMNI NEWS
Spring 1991
University of Illinois at Urbana-Champaign

INSIDE

*E.J. Corey wins Nobel Prize*




*Sligar & Bohn engineer biotransistors*

*Folkers awarded National Medal of Science*

*The SQUIDs*

# Seemon Pines of Merck Led the Team That Developed Primaxin

The Directors' Scientific Award, displayed on his office wall, demonstrates that Merck recognizes the outstanding achievement of Seemon H. Pines, chemistry Ph.D. of 1951. As Vice President for Process Research and Development, he brought the development of Primaxin, the broadest spectrum antibiotic ever produced, to a successful conclusion. Also adorning his office, Pines' exquisite photographs of scenery in the U.S. and in Europe, show that he has other interests and talents which he will have occasion to enjoy after his retirement in January, 1991.

Seemon H. Pines

Dr. Pines has devoted his entire career to Merck, beginning in 1951 as a bench chemist on the team that introduced the process for cortisone. While his interests have broadened to include other fields, along with other responsibilities, he has remained aligned to developmental research throughout.

## *Early Days*

Pines has vivid memories of hardships during the depression of the 30s when he lived in the anthracite coal region of Pennsylvania. Although his own family did not actually suffer hunger, many of the miners in the surrounding area lived on a diet of bread and potatoes. That recollection was in part responsible for his seeking out the practical rather than the theoretical applications of science. As he states it, the job at Merck has meant 40 years of "getting paid for having fun, for doing what I have always wanted to do."

Although his work on Primaxin was the crowning achievement of his career, Pines has been involved in a wide variety of projects. He contributed to manufacturing processes on niacin, glutamic acid, penicillin, and other antibiotics and holds about 30 patents. He also worked on other key Merck products, including methyldopa, indomethacin, carbidopa, and sulindac.

Pines' first projects were in synthetic organic chemistry, but he switched to natural product isolation chemistry for eight years at the urging of his superiors, with the understanding that he could return to synthetic organic chemistry if he really liked it better. When he ultimately returned to synthetic chemistry, he found that the field had become even more exciting because of the variety of new techniques that had been developed in the interim, such as NMR, which opened up new vistas in chemical research.

## *Beginnings of Primaxin Development*

During the years that Primaxin was under development at Merck, Pines led the team as Executive Director of Process Research. According to company literature, Primaxin has been one of the "most difficult, most costly, most frustrating, and most rewarding programs in the history of Merck research. (It is also) the culmination thus far in the pharmaceutical industry's 40-year search for wider spectrum, more potent antibiotics."

Part of the problem was the complexity of the total chemical synthesis that required stringent stereochemical control. Ten of the 16 reactions used in the process

*continued on page 2*

of synthesizing the natural product thienamycin were unknown when the process was first undertaken. Secondly, the thienamycin molecule was so unstable that it was difficult to design in appropriate scale-up methods for a robust, efficient route of manufacture. The time frame was also a significant constraint in that clinical and toxicological studies demanded continuing supplies throughout the program.

## *Complexity Went Beyond Chemistry*

Economics was an extreme challenge, especially since the antibiotic was to be coadministered with cilastatin sodium to prevent deactivation of the drug in the urinary tract. Both entities were produced optically pure, leaving no isomers to compromise safety. As Pines said, "Probably no other company than Merck would have undertaken this project and there were times when I wondered whether we should do it." But they did, and today Primaxin is still the drug of choice in the case of serious infection, especially where the harmful microorganism(s) cannot be identified.

As leader of the total process project, Pines had to forgo the satisfaction of being in the laboratory where the chemical development was taking place. He left the laboratory in 1978 when his administrative responsibilities became more than a sideline. He now gets his satisfaction vicariously through a team that is not only successful but also world renown.

## *Team Management*

Pines credits the U. of I. with teaching him chemistry but he learned management by observation. By watching his bosses, he learned how to manage and how not to manage. Perhaps the most important lesson was that people do not need to be treated equally but equitably. He finds it a real challenge to bring out the best in all members of his team, remembering that people have different aptitudes that determine their accomplishments. As for communications, the toughest element of managing, he notes, "Every time you open your mouth you give three messages: what you said, what you thought you said, and what the other person heard. The art of management is to minimize the discrepancies."

## *The U. of I. Post WWII*

Through all the years since his graduation in 1951, Pines has made many trips back to the U. of I. and remains a staunch supporter of our chemistry program, which he considers one of the very best. Pines first arrived at the U. of I. in 1948. Having had his education interrupted with service in the navy during WWII, he was in a hurry to get through. Housing was tight and he spent his first year in an attic. After his marriage in the summer of 1949, he returned to the campus to find that the house on Church Street, containing the apartment he had rented, had been sold by the landlord.

After further search they found a little house. One room was a combined kitchen-livingroom, one a bedroom, and the last one was a combination closet-bathroom. In the autumn, a "pet" cricket frequently came into the bedroom from the closet and walked out the front door. Because the apartment was directly on a cement slab, it was so cold in winter that they left the water running to keep it from freezing, but it froze anyway.

Nevertheless, they both loved their years in Champaign-Urbana. The faculty was marvelous, "the best in the world." The senior faculty taught classes, something that was not true of many other schools. Pines finished his work in just three years due to his fellowship and the kindness of his excellent advisor, Professor Nelson Leonard.

The two most important places around town were Farwells and Katsinas where you went for special occasions. He remembered having dinner at the Urbana-Lincoln Hotel for his first wedding anniversary and hearing Marian Anderson sing, soon after she had been refused permission to perform in Washington DC because she was black.

**The Directors' Scientific Award** ▶


Whereas,
Seemon B. Pines, Ph.D.
led the discovery and development of practical chemical processes for imipenem and cilastatin, the two compounds that are combined in the uniquely broad-spectrum antibiotic Primaxin; and
Whereas, he directed the development of a novel, highly efficient synthetic process for imipenem to meet the requirements of large-scale practica-bility and ultimate profitability; and
Whereas, he guided the development of a superi synthesis for cilastatin, which utilized a no catalytic reaction and was economical and sim and
Whereas, his outstanding performance was element in providing a manufacturing pr for Primaxin that has been acknowledged by aca and industrial chemists alike as a benchma drug synthesis and the most difficult ever b to commercialization; Now therefore be i solved that the
Board of Directors
of
Merck & Co., In
hereby awards to Dr. Pines th
Directors' Scientific
in recognition of his outstanding scienti
Rahway, New Jersey
May 26, 1987

**Seemon Pines showing one of his photographs from Italy**

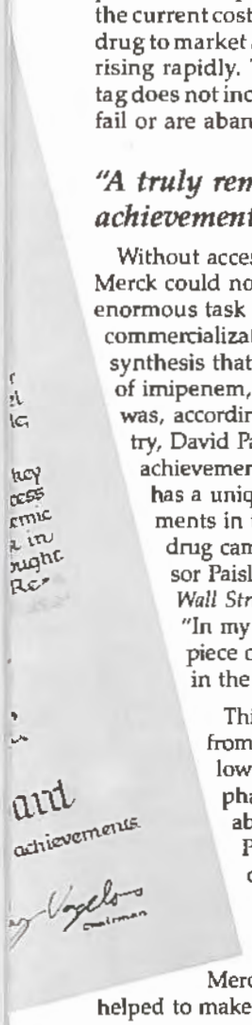
### *The Seemon Pines/Merck Allerton Conferences*

Pines has watched the changes in Urbana and at the U. of I. with frequent returns to his alma mater. In 1987 he designated the organic chemistry program at the U. of I. as recipient of the money portion of the Directors' Award. This grant instituted the annual Seemon Pines/Merck Allerton conferences, which Pines usually attends.

Pines has noted a subtle shift in the career patterns of top chemistry graduates. In days past, the best students went to academia, but due to financial stringencies in research support, an increasing number of top students now come to industry. This shift has been a boon to companies like Merck that can afford the costs of bringing new drugs to market only if they can attract excellent researchers who can produce the products and processes. Pines estimated the current cost of bringing a successful drug to market at about $130 million and rising rapidly. This astronomical price tag does not include the many leads that fail or are abandoned.

### *"A truly remarkable achievement even for Merck..."*

Without access to first class scientists, Merck could not have undertaken the enormous task of bringing Primaxin to commercialization. The total chemical synthesis that led to the development of imipenem, the basis of Primaxin, was, according to Professor of Chemistry, David Paisley, "a truly remarkable achievement even for Merck, which has a unique reputation for achievements in total syntheses." After the drug came on the market, Professor Paisley was quoted by the *Wall Street Journal* as saying, "In my opinion, it was the best piece of developmental science in the pharmaceutical industry."



This is high praise indeed from an expert who has followed developments in the pharmaceutical industry for about twenty years. Seemon Pines has made an extraordinary, unique contribution to the pharmaceutical industry. The U. of I. shares the pride of Merck's directors in having helped to make this possible.

# By The Way . . .

## Where Did "Speed" Marvel Get His Name?

To date, three versions have come to light. According to one account Marvel always took an overload of courses and got to bed very late. In the morning, he slept till the last possible moment and then made a dash for the dining room, getting in to breakfast just before the doors closed.

In the most recent newsletter, **Karl Heumann, Ph.D. '51,** provides an alternative version. According to him, the name may have emerged from the "Marvel Rule." Evidently, the students taking his organic chemistry course believed that if you dropped your pencil you would flunk the course by missing 30 seconds of facts.

In response to the latter, **Dr. George (Doc) Symons, Ph.D.'32,** offers a third version. In his letter to the editor, he said,

> *The story told on campus (1926-33) was: Dr. Marvel earned the nickname when taking an organic chemical analysis lab course as a grad student. He had a keen nose which could identify chemicals by their odor. He finished the course in 6 weeks – hence "Speed."*

Are there any other versions out there? Maybe, we will ask his son, Jack, or his daughter, Molly, to serve as final arbiters.

## What was the shortest final oral?

I read the article about Dr. Lester Coleman in the SCS Alumni Newsletter with interest. However, I feel I must comment on the reference to his final oral exam being completed in "record time," namely 45 minutes.

I obtained my Ph.D. under Speed Marvel in 1950 and will always recall his comments to me on the day of my final oral exam. The exam was scheduled at 2 p.m. in May 1950. Upon his return from lunch at 1 p.m., Speed stopped by my lab and said that he had some instructions for my exam. My immediate reaction was to wonder why he waited until only one hour before the exam to issue instructions. When I asked what his advise was, he replied, "For C_____'s sake keep it short because it is as hot as H_____ today." I immediately relaxed and took the advice to heart. Thus, my final oral exam lasted only 8 minutes and that included the questions. Then we adjourned to Farwell's where the beer was readily available in the afternoon.

I also enjoyed the contribution by Karl Heumann which reflected on the organic activities following WWII. That was certainly an interesting and inspiring time in the Illinois Chemistry Department.

Keep up the good reporting through the SCS Newsletter.

Sincerely,

H. Wayne Hill
Jr., Hill Associates
1236 S.E. Greystone
Bartlesville, OK 74006

***Alumni:***
*Your letters to the editor are welcome and if space permits they will be included.*

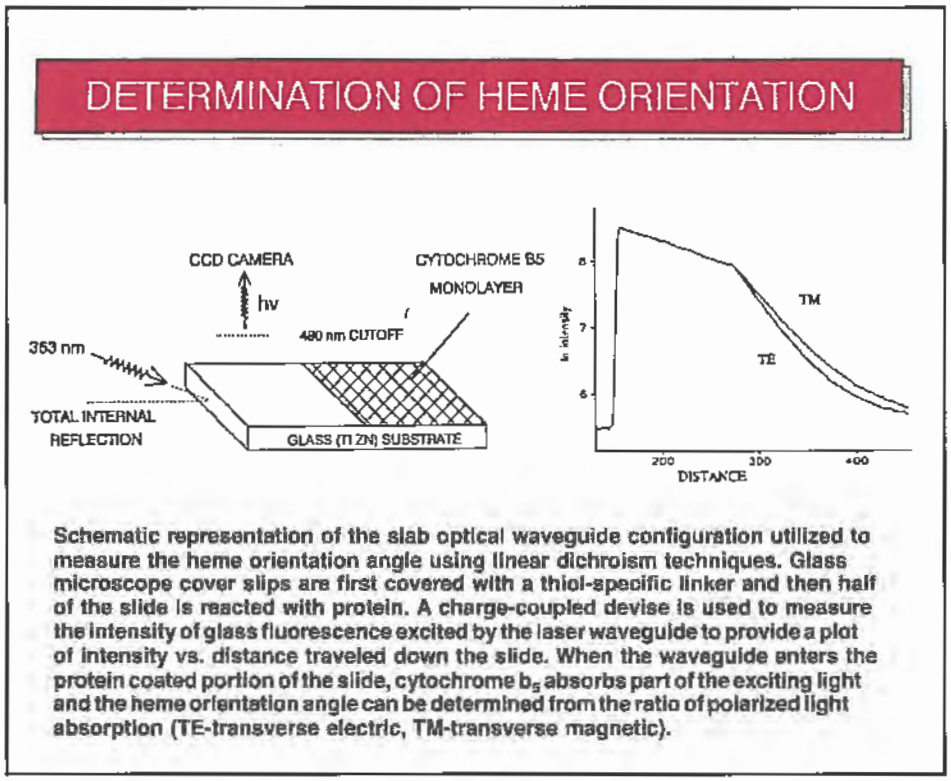
# Bioengineering Produces Biotransistors and Smart Sensors

After three years of joint effort, a group led by Professors Stephen Sligar and Paul Bohn, working with postdoctoral researchers Patrick Stayton and Jill Olinger, has succeeded in harnessing previously untapped power of protein molecules to produce novel ordered structures and biosensors. The program is inherently interdisplinary, since it requires multiple methodologies, some only recently developed in material science, chemistry, physics and molecular biology.

Organic polymers of various kinds have been with us for a long time, due, in part, to the pioneering work of Professor Marvel and other chemistry Illini. For nearly a decade Sligar has developed techniques of bioengineering to understand and manipulate the processes of molecular recognition. Now the same techniques for modifying protein molecules have been used to control the orientation of proteins in a two-dimensional array on a glass or silicon substrate. Once this step was mastered, the proteins could be induced to function as ordered polymers of amino acids with many of the functions of other organic polymers, plus additional attributes that give them special powers.

Stephen Sligar

Paul Bohn




**Schematic representation of the slab optical waveguide configuration utilized to measure the heme orientation angle using linear dichroism techniques. Glass microscope cover slips are first covered with a thiol-specific linker and then half of the slide is reacted with protein. A charge-coupled devise is used to measure the intensity of glass fluorescence excited by the laser waveguide to provide a plot of intensity vs. distance traveled down the slide. When the waveguide enters the protein coated portion of the slide, cytochrome $b_5$ absorbs part of the exciting light and the heme orientation angle can be determined from the ratio of polarized light absorption (TE-transverse electric, TM-transverse magnetic).**

## *Laying the Foundation*

The first step in this potentially massive program, and the one which has already been successfully solved, is to control the orientation of proteins in a two-dimensional monolayer, chemically linked to a glass or silicon substrate. The protein was altered by recombinant DNA technology to add to its surface, at a predetermined location, a specific amino acid known as cysteine. Cysteine, which contains a sulfhydral group, reacts with a chemical linker layer which, in turn, binds it to the substrate.

The heme prosthetic group of the proteins Bohn and Sligar utilize plays a crucial role in absorbing and transmitting light and for electronic transfer events. Bohn's experience with thin films was crucial for measuring the optical and electronic properties of the molecules, using laser surface spectroscopic techniques such as slab wave guide linear dichroism and Surface Enhanced Raman Spectroscopy. Since the heme group absorbs light of specific wavelengths, the orientation of the molecules could be measured through the optical output of the monolayer of protein molecules with exquisite sensitivity.

## *The Protein Monolayer*

Current work has focused on the optical features but the group is gearing up to analyze the electronic properties of the monolayer with equal precision. Stayton and Sligar's use of scanning tunneling microscopy, through a collaboration with the RIKEN research institute in Japan, was also critical for structural information.

This protein monolayer has several advantages over traditional building blocks of computational machines. The

*continued on next page*

## Biotransistors *continued from page 4*

protein molecule can act as a switch which is much smaller than other such semiconductor device components. The speed of response is extremely fast because of the small size of the molecules and because the signal travels through only a single layer and therefore is not slowed by diffusive effects of multilayer devices. Also a biotransistor does not build up heat, which is a limiting factor in traditional types of devices. A computational machine built of genetically engineered proteins can be thought of as a massively parallel processor and could become the memory element of a computer chip.

In addition to light and electronic transmission, the monolayer of oriented proteins on the glass or silicon substrate can function as an extremely sensitive sensor. Biogenetic engineering techniques have also been used to change the active site of a protein to create an effective receptor for specified organic substrates. Various proteins that the Sligar group have genetically engineered, in fact, have two receptors, one with the cysteine based attachment site, and one to bind a specified external ligand. For example, myoglobin, like hemoglobin, binds oxygen and carbon monoxide. The investigators have been able to engineer the receptor site so that the myoglobin is 1000 times more receptive to carbon monoxide than to oxygen. Such a sensor is likely to have practical applications as a very sensitive detector of carbon monoxide with life saving implications.

Cytochrome P-450s are another class of heme protein that have been used in sensor design. Such genetically engineered ligand binding heme proteins can serve as sensors of environmental polutants and toxins, as well as drugs, sugars, hormones, and metabolites in the human body.

### *Extensions of Current Work*

For the future, the scientists have plans to build multilayer devices to harness diffusion and proximity effects. New effects may be found as the proteins turn on or off in response to light traveling through a multilayered device in search of a molecule with an appropriate binding site. Other effects may depend on the ability of molecules to communicate with each other, depending on whether neighboring molecules are in the "on" or "off" state.

The current patent that the work has generated is for the self assembly of a monolayer of protein molecules to a glass or silicon surface, and for the biogenetic engineering techniques used to control the orientation of the molecules on the substrate. The researchers envision far more sophisticated devices in the future, built with new chemical linkages. Linkers of the future might be more structurally rigid than those currently used and might be capable of inducing two-dimensional crystallization. This phase of the research may require yet further scientific specialties and enlarge the group of scientists working on the project.

The vistas for this line of research appear to be vast and limitless. Sligar and Bohn credit the facilities of the Beckman Institute and the generous financial support of the industrial arm of the Biotechnology Research and Development Corporation for making this project possible. It is apparent, that despite their significant accomplishments to date, this group of "hot shots," as the director of the Beckman Institute has characterized Sligar, has even more ambitious plans for the future.

## *KEEP IN TOUCH*

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E.J. Corey

Karl Folkers

Arnold Beckman

## Corey Wins Nobel Prize

**E.J.** Corey, Professor of Chemistry at Harvard, formerly at the U. of I. from 1951-1959, was awarded the 1990 Nobel Prize in Chemistry. In awarding the prize, The Royal Swedish Academy said,

> *It is probable that no other chemist has developed such a comprehensive and varied assortment of methods which, often showing the simplicity of genius, have become commonplace in the synthesizing laboratory.*

Corey is probably best known for his technique of retrosynthesis whereby the researcher works backwards from the desired molecular structure to immediate precursors, using certain rules and algorithms. The process is repeated to find the precursors of the precursors until a tree is constructed of possible synthetic routes that branches out from the end structure. Chemists choose among the routes according to feasible reactions and available starting materials.

Among Corey's most significant achievements is the synthesis of prostaglandins, which occurred in 1969. In 1987, by using "rational" molecular design, he created the first of many chemical enzymes which he called "chemzymes." These are small molecules that catalyze certain reactions in such a way that only a biologically effective product is made. The chemzymes have made possible the production of ultra-pure drugs with reduced side effects.

The U. of I. awarded Professor Corey an honorary D.Sc. in 1985. He has received the Japan Prize and countless major awards. As his friend, Harvard Chemistry Professor Dudley Herschbach has said, "E.J. changed the whole way that modern chemistry is done."

## Folkers Awarded Medal of Science

**D**r. Karl Folkers who received a B.S. from the U. of I. in 1928 and an Hon. D.Sc. in 1976, received the Medal of Science from President Bush on November 13, 1990.

Best known for his work on coenzyme Q-10, which helps convert raw forms of energy into energy sources the body can use for tissue functions, Dr. Folkers is Ashbel Smith Professor and Director of the Institute for Biomedical Research at The University of Texas at Austin. During his 29 years at Merck and Co. where he rose to the position of Vice President for Exploratory Research, he helped elucidate the structure and synthesized vitamin $B_6$. He also isolated and characterized crystalline vitamin $B_{12}$, which is used to treat pernicious anemia. His current research, in addition to continuing investigations of coenzyme Q-10, concerns vitamin $B_6$, riboflavin, and peptide hormones.

Dr. Folkers has received numerous other honors for his research in the application of organic chemistry to biomedical research. In 1986 he received the Priestley Medal of the ACS. He also received the ACS Award for Meritorious Work in Pure Chemistry, the Robert A. Welch International Award and Medal for Research on Life Processes, and the Merck & Co. Inc. Board of Director's Scientific Award. He is a member of the National Academy of Sciences, a former president of the ACS and has received honorary doctorates from four universities.

## Beckman Receives "Order of Lincoln"

**T**he Lincoln Academy awarded Arnold Beckman, M.S. 1923, the "Order of Lincoln," the state's highest award. The Lincoln Academy was established 26 years ago to honor Illinoisians by birth or residence for exceptional achievements.

Beckman was cited for the invention of scientific instruments, including spectrometers that helped in the production of synthetic rubber and a key element in radar equipment. In addition, the award cited his philanthropic activities including his gift of $40 million to the U. of I. for construction of the Beckman Institute and his prior gift of $5 million to kick off the "Campaign for Illinois" drive.

# Winners

Ernest Eliel

J.W. Carmichael

Michael Musci

## Eliel Chosen President-Elect of ACS

Ernest Eliel, Ph.D. 1948 (Chemistry with Snyder), is the new President-Elect of the ACS and will become its President in 1992. In addition, he will be serving his third consecutive, three year term on the Board of Directors.

Dr. Eliel, the W.R. Kennan Professor of Chemistry at the University of North Carolina at Chapel Hill, is probably best known for his work in stereochemistry, asymmetric synthesis, and conformational analysis. In his recent autobiography, *From Cologne to Chapel Hill*, published by the ACS in 1990, he credits Professor Nelson Leonard with introducing him to stereochemistry, his life's work. He also points out that his advisor, Harold Snyder, impressed on him the importance of careful experimentation and of publishing his results with clarity and organization.

Professor Eliel is a member of the National Academy of Sciences and the American Academy of Arts and Sciences. He holds honorary doctorates from the University of Notre Dame and Duke University.

## Carmichael Selected Professor of the Year

The Council for Advancement and Support of Education (CASE) has named Dr. JW Carmichael, Ph.D. '65 (Chemistry with Belford) "Professor of the Year," its highest national teaching award. As part of the award, he will receive a cash prize from the Carnegie Foundation for the Advancement of Teaching.

Carmichael is a professor of chemistry at Xavier University in New Orleans, the only historically black Roman Catholic college in the United States. Carmichael has built his reputation through his innovative pre-college summer programs, his relentless recruitment of students with science potential, and his development of outstanding introductory level teaching materials that help ease the transition into college-level chemistry and biology. He has also had notable success in gaining support for his programs within and outside his institution.

He designed a program called SOAR (Stress on Analytical Reasoning), which has become the cornerstone of a Summer Academy for students interested in science. Today, 50% of the students at Xavier are science majors. By 1985, Xavier was the number two producer of black graduates for medical schools nationwide and the number one producer of black pharmacy students.

As a result of his efforts, Carmichael has raised nearly $4 million for Xavier during his 20 years on the faculty. Outside sources, including the largest grant that the Howard Hughes Medical Institute has ever given to a black college, support his non-teaching programs.

Dr. Carmichael has received numerous other national awards for his educational innovations including the 1988 Faculty Award for Excellence in Science and Technology from the White House Initiative on Historically Black Colleges and Universities. He also received the Chemical Manufacturers Association's Catalyst Award for Chemistry Teaching in 1981.

## Biochemistry Undergraduate Receives CICI Award

Michael Musci, a senior in biochemistry, received a $1,000 scholarship award from the Chemical Industry Council of Illinois. His senior thesis advisor is Mary Schuler, Professor of Biochemistry and Plant Biology. The thesis involves sequencing a cDNA library of wheat snRNA. Sequence analysis with different species will reveal trends in snRNA structure and function.

Michael has been an outstanding student ever since he arrived at the U. of I. In his freshman year he was inducted into the Phi Eta Sigma honorary society, and since then he has become a member of the Golden Key Society, Phi Kappa Phi, Phi Lambda Mu, and OCSA (Outstanding College Students of America).

After graduation, Michael plans to enter an MD/Ph.D. program and obtain his Ph.D. in biochemistry or physiology. At this time, his main question is where.

# Services of Computer Center Offer Attractive Bargains to Users

Maria-Pia Gratton and Mark Sandrock

Many people are only peripherally aware of its existence. All-campus and world-wide networks are used by researchers at barely noticeable cost and many users never see the hub. But a visit to 151 Noyes Lab will show an active computer center, staffed by two very busy professionals plus occasional student help.

Mark Sandrock, supervisor, assisted by Maria-Pia Gratton, preside over a hardware empire of mini computers, work stations, and sophisticated printers. Together they maintain and operate the data networks which are available to everyone at the School either through Ethernet or through a special phone jack in every office that was installed along with the new telephone system.

Many users with small PC systems cannot maintain some of the very large programs and databases that are needed for research. Therefore, the center makes available specialized software such as Macromodel (for molecular modeling), the Brookhaven Protein Database, the Genbank data base (for genetic analysis) and the Cambridge Crystallographic Database. If a researcher's data set is too large to handle locally, the center offers disk storage space at minimal cost.

Another typical service of the center is to assist staff in setting up work stations and installing new software. They also troubleshoot hardware and software problems. For this and more their charges are a fraction of comparable costs at other units around campus, an outstanding bargain for users.

Despite the low prices, user charges cover most current equipment purchases. Originally, equipment was bought with faculty grants, but this is no longer necessary as a result of the computer revolution that has drastically lowered the costs of computers and maintenance. At present the center does not charge for consulting even though they handle a great many calls, typically by telephone.

## *New Services*

With the transition to UNIX, Mark and Maria-Pia have begun to offer introductory courses for newcomers to the UNIX operating system. Last semester, they were overwhelmed with requests and gave their course offerings, "Introduction to UNIX," "Using the 'vi' and 'ex' Editors," and "ELM - Electronic Mail on UNIX" six times. This semester, they have doubled their offerings, including "Intermediate UNIX Instruction," "Programming on UNIX" and "nn - Reading News on UNIX." Unfortunately, their current cramped quarters make teaching difficult, and they hope to move their instructional program to a more suitable setting.

The computer center is one of many service programs that is looking forward to the completion of the new building. Although current plans are to keep the School's service facilities in Noyes, the additional square footage should alleviate the crowding. The computer center hopes to move to a more spacious location where those at the terminals will find room for their legs and where students who take the courses at the center will have time and space for hands-on practice.

## *How Things Have Changed*

Mark is proud of the center's relic from the past, a card reader that is probably the only one left on campus. He looks nostalgically back on the days when "life was simple. We had only one VAX machine and everyone had a direct line into it. Today we have a multiplicity of hardware systems, more operating systems, more applications, and a great many more users. There is more diversification so that consultants are more in demand than ever. Life is more interesting but we have to work very hard to keep up."

Professor Bohn, the faculty advisor to the center, agrees with Mark's assessment. The center does a good job maintaining the networks and providing advice on midscale systems and large-scale software programs, As he points out, the center's remarkably low fee structure makes it very attractive to researchers throughout the school and provides an important underpinning for research programs. "Right now, the computer center is physically cramped and understaffed," he says. "But with time and the new building, we hope to solve that problem as well."

# Ada Doisy Lectures Oldest Series in School

**The 1990 Ada Doisy Lecturers, Edmond Fisher at left and Edwin Krebs at right, collaborating researchers at the University of Washington, in Seattle.**

Initiated with a gift by the late Edward A. Doisy, Nobel Prize winning biochemist and U. of I. alumnus, M.S. '16, the Ada Doisy lectures was the first series established in the School of Chemical Sciences and still the most prestigious in the department of biochemistry. The series was started in 1971 and usually includes two lectures by scientists who have either worked together personally or carry out research on closely related themes.

Professor Doisy initiated the series in honor of his mother, Ada Doisy, to recognize the sacrifices she had made so that he and his sister might pursue academic careers.

Dr. Doisy headed the biochemistry department of the St. Louis University School of Medicine from 1924 until his retirement in 1965. He is best known for his work in isolating vitamin K, the purification of insulin, and studies of antihemorrhagic vitamins. He received an honorary D.Sc. from the U. of I. in 1960, and was one of the first recipients of the Illini Achievement Award.

Because of its high prestige, the Doisy lecture series has been able to attract an outstanding series of speakers. Nearly all have been members of the National Academy of Sciences. Nine were Nobelists, six of them receiving that honor after their service as Doisy lecturers.

Due to the generosity of its alumni, the School of Chemical Sciences has several other lecture series that attract outstanding speakers. Among these are the Bailar, Marvel and Flygare Lectures and the Nelson J. Leonard Distinguished Lecturer series.

# Lucie Langley Opens Art Show at 100

*"Country Living" is the second art show of the paintings of Lucie Langley, AM'20. She told us about the show and sketched the story of her life in correspondence prompted by our invitation to attend an Illini Breakfast at the ACS meeting in Washington, last August. Exerpts from her letters follow:*

I lived in a small town in Southern Illinois and taught in a one-room school for several years before I finally made it to college. At Oberlin College I became interested in chemistry and taught beginning chemistry to soldiers returning from WWI. After finishing my degree at Oberlin, I came to the U. of I. where I spent the happiest years of life right in Noyes Lab. I remember I was always afraid of being late to class so I would run up to the fourth floor to Biochemistry with Dr. H.B. Lewis, who was my all time favorite Professor.

When I finished my degree I looked for a job but there weren't any for women. I finally got a job in the editorial department of the Mayo Clinic. We corrected the spelling and grammar in the papers of the young doctors so that they could be understood by the average reader. It was interesting work but it wasn't my beloved biochemistry.

At Illinois I became engaged to a fine young man who was also interested in biochemistry. He taught at the Medical School of the University of Buffalo so we bought a 50 acre farm with a 100 year old house and I became a farmerette. I told my husband that if he bought me a Jersey cow, I would take care of it. One day, he did. He said, "I just bought you a Jersey cow." "Oh ho ho," I said. "Does she give milk?" "I don't know," was his reply. "But she is a nice looking cow."

We had a barn on our farm and I tied her in it. Two days later I really was surprised to find two dead twin calves.

The two calves were a total loss but our two little porkers thrived on the milk and our chickens loved the clabber and we had all the cream and butter and cottage cheese we could use. My husband called it the best investment we ever made.

*continued on back page*

**Lucie Langley's painting of herself holding the lantern when finding little Ferdinand, the new heifer.**

# We Welcome Alumni Bequests

Two recent bequests have provided a most welcome source of funds. Unfortunately, we cannot thank our benefactors because we heard the news only after their deaths but we guarantee that the money will be wisely spent, according to their wishes.

**Ethyl Forlan Wiebke,** B.S. '40, gave the School a remainder interest in a 2.2 acre parcel of land 90 miles south of Las Vegas. The land was left to her friends during their lifetime and became the property of the School after their deaths. For many years, Mrs. Wiebke was a chemist for the Naval Ordnance Laboratory at China Lake. She was born in Freeport, IL, the daughter of an Illini mother who received her B.S. in "Home Science" in 1908.

**Dr. Chester W. Hannum,** Ph.D. '34, left the balance of his estate to the School of Chemical Sciences for student scholarships. Dr. Hannum worked for 40 years as a dye chemist at the DuPont Company.

Deferred giving is a good strategy for benefiting the School without pain to the giver. A bequest is only one of a variety of planned giving instruments. Many deferred giving plans offer tax advantages to the benefactor and/or to beneficiaries as well. The University of Illinois Foundation has a great deal of information about planned giving and can help you meet your needs. For further information, contact

Mr. William T. Sturtevant, Director
Trust Relations and Planned Giving
University of Illinois Foundation
1401 W. Green Street
Urbana, IL 61801
Tel: 217-244-0939

## Faculty Honors

**Paul Bohn,** Professor of Chemistry, received the 1991 Coblentz Award in Infrared Spectroscopy. The award recognizes his contributions to the spectroscopy of thin films. It is given by the Coblentz Society that fosters research on infrared spectroscopy and related fields.

**Kenneth Suslick,** Professor of Chemistry, has been appointed to the Center for Advanced Study to pursue his research on the chemical effects of ultrasound. In addition to his appointment to the Center, Professor Suslick has also been designated a Beckman Associate, a status which gives additional recognition to younger associates of the Center who have made distinctive scholarly contributions in the sciences.

**Richard Alkire,** Professor and Head of the Department of Chemical Engineering, has been elected Honorary Member of the Electrochemical Society, Inc. This is the highest honor that the Society awards. He was cited for "dedicated service to The Electrochemical Society Inc., and his contributions to the science and technology of electrochemical engineering."

## Symposium Honors Coon

Minor J. Coon, Ph.D. '46 (Biochemistry with Rose) was honored by a biochemistry symposium on November 2-3, 1990 at the University of Michigan to mark his retirement from the chairmanship of the Department of Biological Chemistry after 20 years in that position. Professors I.C. Gunsalus, L.P. Hager, and S.G. Sligar of the University of Illinois biochemistry department were among the many distinguished speakers at this symposium.

Professor Coon will continue his research and teaching as the Victor C. Vaughan Distinguished University Professor of Biological Chemistry. He has been selected as the Henry Russel Lecturer for 1991, the highest honor that the University of Michigan gives to a faculty member. He is president-elect of the American Society for Biochemistry and Molecular Biology. Professor Coon was the first winner of the W.C. Rose Award in Biochemistry and Nutrition, an award instituted by Professor Rose's students on the occasion of Dr. Rose's 90th birthday.

## Grant Wins ACS Award

David M. Grant, Distinguished Professor of Chemistry at the University of Utah, has won the ACS Award in Petroleum Chemistry. Professor Grant began his teaching career as an instructor of chemistry at the University of Illinois in 1957-58. He has established an international reputation in nuclear magnetic resonance spectroscopy, especially in the field of carbon-13 NMR, which he pioneered. From 1962-1973 Professor Grant was chairman of the chemistry department at the University of Utah and from 1976-1985 he was dean of the College of Science.

## Herbert E. Carter Honored at Symposium

Herbert E. Carter

The Department of Biochemistry and the Division of Biotechnology of the University of Arizona hosted a symposium on October 6, 1990 in honor of Herb Carter's 80th birthday.

Professor Carter has had a dual career, his first at the U. of I. and his second at the University of Arizona. He began at the U. of I. as a graduate student with "Speed" Marvel, receiving his Ph.D. in chemistry in 1934. He then joined the faculty of the Department of Biochemistry and participated in the isolation and first synthesis of the amino acid threonine with Professor W.H. Rose. In 1954, he became head of the Department of Chemistry and Chemical Engineering and, in 1967, Vice Chancellor for Academic Affairs.

In 1971 he moved to the University of Arizona, first as Coordinator of Interdisciplinary Programs and, subsequently, as head of the Department of Biochemistry. In recognition of his efforts to strengthen interdisciplinary studies, his former colleagues established the Herbert E. Carter Graduate Fellowships in Interdisciplinary Programs in conjunction with the 80th birthday celebrations.

Professor Leonard attended the festivities, bringing a letter of congratulations from Herb's Illini colleagues. The letter cites Carter's many scientific and administrative contributions to our campus and includes appreciation of his extracurricular activities, such as, "free coaching, especially in bowling, squash, and golf."

# Alum News

## In Memoriam

We have received word of the death of **Louis J. Boschelli,** B.S. '87 (Chemical Engineering). Mr. Boschelli was an outstanding student, an Edmund James Scholar who graduated summa cum laude and with highest distinction. At the time of his death he was studying for his Ph.D. at the California Institute of Technology

**David J. Porter,** M.S.'31 (Chemical Engineering) died on August 29, 1990. Mr. Porter had been associate director of research for the former Diamond Shamrock Corporation. Prior to taking this position he had taught in Turkey and was an instructor at the University of Missouri. He was also a member of the International Executive Service Corps.

Mr. Porter was an active and loyal alumnus of the U. of I. He organized a newsletter with contributions from other class of '30 graduates and received the Alumni Association's Loyalty Award in 1973 for his many years of service. He became ill just when he was about to come back to the U. of I. to attend his class' 50th reunion.

Word has reached us of the death of **Franklin Wells,** B.S. '30 (Chemical Engineering), formerly of Memphis, TN.

We have received word of the death of **Thomas de Vries,** Ph.D. '26 (Chemistry with Rodebush), who was F.O. Anderegg Professor of chemistry at Purdue University until his retirement in 1974. His principle research interests were electrode potentials, heat capacity of vapors, and polarography. One of his Ph.D. students described him as a "five-star excellent teacher."

## The Classes

*'30* **Charles H. (Hap) Fisher,** Ph.D. '32 (Chemistry with Fuson), was honored by Roanoke College with an annual lecture series in his name. He is currently adjunct research professor at Roanoke College in Salem, VA. He received this honor at the age of 84.

The inaugural speaker at the Fisher Lecture Series was Dr. Bassam Shakhashiri, past director of the Science Education Directorate at the National Science Foundation. Dr. Shakhashiri was a postdoctoral researcher and faculty member at the University of Illinois from 1968-70.

**'40** **Rachel Kopel Dare,** M.A. '49 (Chemistry), is an associate professor, teaching general chemistry, at Union County College in Cranford, NJ. She noted that Dr. Bailar's influence is still a part of her teaching.

**Julius F. Kaplan,** Ph.D. '41 (Chemistry with Marvel), reports that he has retired. Of his seven grandchildren, one received a B.S. from the U. of I. in '89 and one is currently a freshman here.

**'50** **James W. Berry,** Ph.D. '53 (Chemistry with Leonard), received the 1990 William V. Cruess Award for excellence in teaching food science and/or technology from the Institute of Food Technologists. He is professor of nutrition and food science at the University of Arizona in Tuscon. As a result of his efforts as departmental chairman, the U. of A. Department of Nutrition and Food Science leads all departments in the College of Agriculture in undergraduate enrollment.

**James P. Collman,** Ph.D. '58 (Chemistry with Fuson) has won the 1990 Pauling Award, given by the ACS section of Puget Sound and Portland, Oregon. He is the George A. and Hilda M. Daubert Professor of Chemistry at Stanford University. Collman has previously received the 1975 ACS Award in Inorganic Chemistry and the 1986 Arthur C. Cope Scholar Award. He was elected to the National Academy of Sciences in 1975 and won the Churchill Award in 1977.

**R.A. Esterlund,** B.S. '58 (Chemistry), is now a Senior Research Scientist at the Institut für Kernchemie of the Universität Marburg in Germany.

**Myron R. Feldman,** P.E., B.S. '50, (Chemistry) retired from the U.S. Army as Lt. Colonel and is about to retire from the Federal Civil Service (U.S. Navy) after 13 years with the Strategic Weapons System Program.

**'60** **R.J.C. (Julian) Brown,** Ph.D. '62 (Chemistry with Gutowsky), is a professor of chemistry at Queens University in Kingston, Canada. He reported that he had arranged to invite Dr. Cynthia (Juan) Jameson, Ph.D. '63 (Chemistry with Gutowsky) to become a scholar-in-residence at Queens University last October. Dr. Jameson is a professor at Loyola University in Chicago. Her visit to Queens College was a great success.

**Allan C. Buchholz,** Ph.D. '67 (Chemistry with Rinehart), has taken a position as Director of R & D at Darworth Company in Avon, CT.

**James. L. Foght,** Ph.D. '63 (Chemistry with Rinehart), has become president of Vector Securities International, Inc., an international investment bank specializing in life sciences. Vector was started in 1988 and is presently putting together a venture fund focused on the life sciences.

**Brian W. Moores,** Ph.D. '68 (Chemistry with Belford), became chairman of the department of chemistry at Randolph-Macon College in Ashland, VA.

**'70** **Dr. James Hertenstein,** B.S. '77 (Chemistry), has been granted staff privileges at Eureka Community Hospital. He received his M.D. from the University of Illinois and is a member of the American Academy of Otolaryngology.

**'80** **Dr. Balekudru Devadas,** postdoctoral researcher with Leonard '84-87, received a corporate achievement award from Monsanto in recognition for his outstanding work on the chemistry of N-Myristoyl Transferase.

**Sam Gilbert,** Ph.D. '86 (Chemical Engineering with Eckert), joined Exxon Research and Engineering Company as senior engineer in October, 1990. He is working in the Lubes and Process Technology Division at Florham Park, NJ.

**Sangeeta Ramamurthi,** Ph.D. '89 (Chemistry with Klemperer), joined Batelle in Columbus, OH, as a research scientist in the Metals and Ceramics Department.

**Chuck Sherline,** B.S. '88 (Chemistry), reports that he switched from his position as analytical chemist to become a sales representative for central Illinois for Merck Sharp & Dohme, Inc. He reports that it's good to be back in town.

**Elisavet Vrahopoulou,** Ph.D. '86 (Chemical Engineering with McHugh), joined Exxon Research and Engineering Company as senior engineer in October, 1990. She is working in the Products Research Division in Linden, NJ.

## The B·J·S SQUIDs *COMING & GOING!!*


**That strange name belongs to a winning soft ball team of chemistry grad students. The team plays against city league teams with an impressive win-loss record. Their best year was two years back with 9 to 5 record but even last year they made a good showing at 6 to 8. Their sponsor is Office Two, a well known bar that furnishes half the team fees so that they can participate in the two umpire league.**

**The pictures show them coming and going. The photo with faces (left to right) starts with Doug Lucas, who forgot his uniform, Phil Smith #4, Doug Campbell #3, the captain, Shawn Kerrick #69, Gary Lutz #89, in his own Lutz shirt, and Dean Olsen #34.**

# Lucie Langley Opens Art Show at 100

**Paintings by Lucie Langley, AM '20, to be shown in an exhibit of her art work in Amherst, NY. This is the second showing of her work. Its opening celebrated Mrs. Landley's 100th birthday. The picture below includes a self portrait of the artist.**

## Langley *continued from page 9*

One day, while my husband was away at a meeting, I heard this mournful mooing in the barn. I lighted the lantern and what did I see? I saw a little bull calf on spindly legs. I called him Ferdinand and our Jersey herd was started. Our wonderful cow gave us two heifers the next time. I even painted a picture of finding our beloved cow with little Ferdinand. (See photo on page 9)

I took up painting several years ago and had a showing at the Amherst Museum. I am very busy getting ready for the new art show of my work in the Old Colony Museum. The show opens when I become 100 years old on January 7. That is why I cannot leave home right now to accept your kind invitation.

SCS Alumni Newsletter
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Dr. Gregory Girolami

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