



Association of Indiana University Chemists NEWSLETTER

Vol. XVII, No. 2, Fall, 1969

X-Ray diffraction facilities added

The use of X-ray diffraction patterns from powdered samples for purposes of identification is an old and well established means of analysis. In more recent years the detailed study of diffraction patterns from single crystals has become one of the most powerful methods of determining molecular structure.

The LU. Chemistry Department is well equipped for both types of study. The major equipment includes six X-ray generators located in various laboratories in the building. Three of these are small units used almost exclusively in conjunction with goniometers for recording diffraction patterns on film, and two of these are large fully stabilized units used exclusively with automatic single crystal diffractometers. The sixth is a well stabilized and versatile unit located in the instrumentation laboratory. The latter can be used with either of two X-ray tubes. It will accommodate a wide variety of accessory equipment including a counter diffractometer for powder study, and it is used primarily for undergraduate laboratory courses although much of the powder diffraction work for graduate research is performed on it also.

The precession goniometers pictured are typical of the equipment used to record single crystal diffraction patterns on film. Apparatus of this type is used to obtain preliminary information characterizing the crystal, for which photographs are almost indispensable. Once this is completed, the larger job of measuring the intensities of the diffracted X-ray beams, typically a few thousand per structure determination, is normally done on the counter diffractometers.

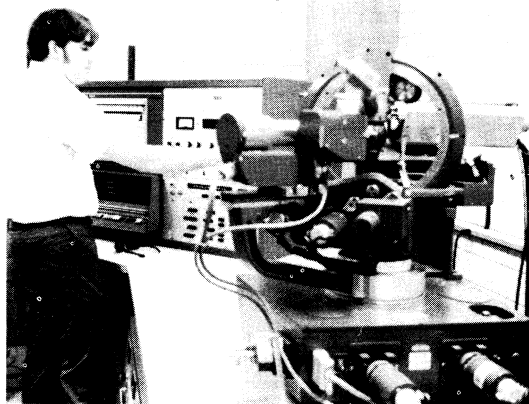
The General Electric diffractometer was photographed as one would normally find it, equipped for low temperature work. Much work is at low temperatures, and this instrument is well suited for it because the design leaves the crystal easily accessible. Low temperatures are attained by boiling liquid nitrogen in a container, seen in the



G.E. Diffractometer



Precession Goniometers



Picker Diffraction Unit

foreground, fitted with a transfer tube which directs the cold nitrogen vapor at the crystal. (Specialized film equipment is under construction for work at liquid helium temperatures.) The G.E. equipment is the older of the two single crystal diffractometers and is automated via instructions which are read in from punched paper tape on a portion of the equipment not shown.

The Picker diffractometer has, as an integral part of the hardware, a small dedicated computer, a portion of which can be seen just below the chart recorder behind William F. Coleman, graduate student, who is standing at the console. Manual modes of operation are available and necessary during the time operating parameters are supplied to the computer. Once data collection is underway, the equipment is fully automatic, and all relevant information is output on the teletype unit seen at the far left in the photograph.

The X-ray equipment is used primarily by the research groups of L.L. Merritt, Jr., R.O. Schaeffer, and W.E. Streib, although an increasing number of graduate students from other research groups are undertaking X-ray studies as a part of their thesis research. Maintenance and instruction in the use of the equipment are largely the responsibility of John C. Huffman, a graduate student and part-time technician for the department.

AIUC NEWSLETTER STAFF

E. GREENE
L. CRUM, D.G. PETERS
HARRY G. DAY

Editor
Contributors
Consultant

Published in co-operation with the Indiana University Alumni Association. Suzann Owen, editorial co-ordinator; Bruce B. Temple, director of alumni publications.

Honors Banquet recognizes 60

More than sixty undergraduate chemistry students were honored at the 1969 Department of Chemistry Honors Banquet.

Each year the top students in the freshman courses C105, C106, and S107 are honored by special prizes. This year they were Stephen Bonsib, Fort Wayne, and Osmund Chan, Hong Kong, for C105; George Arcnoff, Morton, Ill., and Ted Wilson, Elmhurst, Ill., for C106, and Janet Rippey, Tell City, for S107.

The freshman recipient of the four-year Dow Scholarship is Robert Guignon, Webster Groves, Mo.; other Dow scholars are Vaughn Davidson, Valparaiso, sophomore, and Robert Brickman, Glenview, Ill., and Gerald Carlson, Upland, seniors.

Two Courson-Greeves Awards were given this year to juniors Lisa Sanders, Indianapolis, and Lynn Vanatta, Dallas, Tex. The Award has been held this year by M. Amanda McKee Gillum, Rochester, N.Y.

Merck Index Awards were presented to sophomores, Nancy Ellen Bevington, Kokomo, and Mary K. Johnson, Muncie.

The Outstanding Senior Award went to Robert Brickman.

Six senior chemistry majors were named to Phi Beta Kappa; they were Destry W. Lambert, Tipton; James Mier, Anderson; Garold Moneysmith, Louisville, Ky.; M. Amanda McKee Gillum, Richard D. Handley, LaPorte, and Peter L. Scott, LaPorte.

Students who have performed individual research in the NSF Undergraduate Research Participation Program during the last year are Robert Brickman, G. Lynn Brunner, Sunman; Charles Bunnell, Peru; Linda L. Davis, Attica; M. Amanda McKee Gillum, Mark Riddle, Tell City; Daniel Shulruff, Hammond; Gregory Sutton, South Bend; Allan Tereba, Elmhurst, Ill.; and Michael J. Thomas, Chandler.

Four chemistry majors, Robert Brickman, Charles Bunnell, John Chapman, and Allen Terba, presented papers at the Regional Meeting of the ACS Student Affiliates at Ann Arbor, Mich.

The following students have been enrolled in the Chemistry Honors Program, which includes participation in special honors sections of several

chemistry courses, independent research in the junior and/or senior year, and submission of a research report: Robert Brickman, G. Lynn Brunner, Charles Bunnell, Linda L. Davis, M. Amanda McKee Gillum, Mark Riddle, Allan Tereba, and Michael J. Thomas.

The Chemistry Department Honor Roll includes the following students: SOPHOMORES: Richard Alcorn, Washington; Emily Allyn, Mt. Vernon; George Babcock, Warren; Nancy Ellen Bevington, Vaughn Davidson, Douglas Flint, Michigan City; Richard Harruff, Anderson; Kevin Hollis, New Albany; Michael Hostetler, Elkhart; Mary K. Johnson, John Lambertus, Indianapolis; Gregory Larkin, South Bend; Kim E. Marsh, Indianapolis; Kenneth Mickelson, LaPorte; Donald Pelsor, Brookville; Gordon T. Robbins, Anderson; Thomas D. Sills, Evansville; Robert Spillman, Evansville; John S. Stearley, Lima, Ohio; Mark Stevens, North Canton, Ohio; Richard Wampler, Bloomington; Daniel Weaver, Danville; and Leonard Zeabart, Indianapolis.

JUNIORS: Gordon Bokelman, W. Simsburg, Conn.; Victor Contri, Merrillville; Carl Harms, Fort Wayne; Andrew Lowry, Culver; Paul Marciniak, Fort Wayne; Emily J. McDonald, Seymour; Loudon Nalle, Bluffton; Mark Riddle; Lisa Sanders; Gregory Sutton; William Thayer, Plymouth; and Lynn Vanatta.

SENIORS: Paul Argyelan, South Bend; Robert Brickman; G. Lynn Brunner; Charles Bunnell; Peter Dahl, Bloomington; Linda L. Davis; Mary Kemp, Fort Harrison; James Mier, and Allan Tereba.

Industrial Professor lectures on campus

The new industrial professorship program got under way during 1968-69 with three one-week visits from our first industrial professor, Harold H. Zeiss, (B.S. 1938), president of Monsanto Research, S.A., Zurich, Switzerland.

During each of Dr. Zeiss's visits, which were in October, February, and April, he presented lectures to the department on topics in his field of inorganic chemistry and spent much of his time in informal conversation with faculty members and graduate students. In addition, during his first visit he lectured twice to freshman chemistry clas-

ses. When he was here in April he also lectured on "The Development of an Industrial Laboratory."

Under this program the department plans to establish five professorships in the fields of inorganic (Dr. Zeiss), analytical, biological, organic, and physical chemistry. The industrial professors will continue to hold their positions in industry, but will spend at least a week at a time on campus at frequent intervals during a five-year period for the purpose of presenting lectures and offering consulting services to faculty and students on teaching and research problems.

According to Riley Schaeffer, chairman, the industrial professorship program was created because it was recognized that "many college graduates in chemistry have little or no understanding of the nature of chemical industry. In many instances they are totally unaware of the opportunities that industry provides for their scientific careers.

"It is probably fair to state," he said, "that at present most universities fail to convince the student that good science can be carried out in an industrial environment and that the problems met in industry are at least as challenging as those studied in school. Indeed, the challenge added to many industrial problems by economic considerations should and does provide a source of stimulation not found in an academic surrounding."

The program is expected to benefit reciprocally the industries represented by participants, Dr. Schaeffer pointed out. "Many industrial chemists lack appreciation for the problems faced by educational institutions," he said. "All too many of the higher and middle management individuals took their training in the 1935 to 1955 era and tend to view the educational process as it was at the time of their own last exposure to it. Many could well benefit by becoming more aware of present problems and approaches.

"We propose to establish a two-way line of communication between industry and the faculty and students at Indiana University."

After finishing his bachelor's degree work at Indiana, Dr. Zeiss went to Columbia where he earned the MA and PhD. He taught at Yale University and then began his affiliation with the Monsanto Chemical Co. as a research associate in their Dayton, Ohio, plant. During 1960-61 he was a senior fellow of the National Science Foundation and served as guest professor at the Universities of Munich and Heidelberg. He then went to his present position in Zurich.

Lectureship honors Frank C. Mathers

Funds which have been donated to establish a lectureship in honor of Professor Emeritus Frank C. Mathers will be utilized for the first time next fall. Professor John S. Griffith will present the first Mathers Lectures, which will consist of three lectures on topics in biochemistry, the dates and titles of which have not yet been determined.

Professor Mathers, at 88, continues to carry on small-scale research in the Chemistry Department. All of his friends were saddened to learn of his wife's death in May.

Getting to know

William LeSuer of Lubrizol Corp.



One of the first graduate students in chemistry who I remember is William M. LeSuer, whose laboratory was near the Department Office. And the regular letters he received from one Arlene Snow.

He had received an A.B. from Monmouth College in spring 1942 and came to I.U. to work with Dr. Ralph Shriner.

He was born in Pittsburgh in 1920 and has one older brother. His father, a mechanical drawing teacher at Langley High School, died when Bill

was six, and by the time Bill was seven he had already embarked on a business career, delivering the Pittsburgh Press for the next eleven years. After graduation from Crafton High School (Crafton, Penn.) in 1938, he went on to major in chemistry at Monmouth College. It was while there that he met, in chemistry class, Arlene Snow who became Mrs. LeSuer twenty-five years ago last April. (They celebrated this Spring with a Caribbean Cruise!)

As time for graduation came closer, Dr. Halde- man, who was Chairman of the Chemistry Department at Monmouth, insisted that Bill should go on to graduate work in chemistry. When Dr. Shriner offered him a fellowship, the road was opened for him to enter I.U. in September 1942. This brought him to I.U. in the days when our faculty included Professors May, Mathers, and Brown. He interrupted his graduate work in April, 1944, to serve in the U.S. Navy for two years (on a sub chaser) and then returned to I.U. (with Arlene) to complete his doctoral work, this time under the direction of Dr. Ernest Campaigne. Bill tells us that Ernie's direction extended far beyond the organic laboratory into athletics. It seems they took time out for handball, etc., many times when Bill thought he should stay in the lab, but Dr. Campaigne wisely felt it would be better for all if they relaxed a bit. Bill says that he and Arlene remain very thankful for all the good counsel and help they received from Jean and Ernie Campaigne and Marie and Harry Day.

When work for the PhD was completed, Bill accepted employment at the Lubrizol Corporation in 1948, going there as research chemist. He has continued to climb in the company, having been group leader, director of organic research, and in 1955 he became director of the research laboratories. After this, he was made assistant division head, research and development, then division head, and in April of this year he was elected Vice President — Research and Development.

Bill and Arlene have four children: Sue Ann, 21; Thomas, 18; Richard, 15; and Jennifer, 12. They are active in the East Shore Methodist Church, and Bill is a member of the Euclid YMCA Board of Managers and Richmond Heights School Board. He continues his interest in Monmouth College, being a member of the Monmouth College Senate.

The LeSuers are quite sports-minded and follow the I.U. teams with considerable interest. The Campaignes and the LeSuers had a great time at the Rose Bowl in January 1968 and are

looking forward to a repeat next January 1. They are also hoping that next season the basketball team starts looking like "Fightin' Hoosiers" once more. Bill gets out with the kids to play ball occasionally, but the family is now looking forward to more fishing this year with the new boat. They were going to Canada fishing the weekend after he wrote to me. Did you catch any?
EMG

Jack Baird retires after 22 years service

Jack Baird, senior laboratory machinist, retired in July after 22 years of service to the department.

Mr. Baird received his training and started doing machine work at the Studebaker Corporation, South Bend, Indiana, about forty-seven years ago, and he has been in this type of work ever since.

In 1947 he joined the staff of the chemistry department as the only machinist, with instructions to develop a machine shop for the department. The department then had one lathe and one drill press. A year later Jack was joined by Maurice Williams, now head of the machine shop; after that it was about seven years before a third machinist was added.

Between 1947 and the present, the personnel in the shop has increased to six regular machinists and one machinist's helper. The major equipment now includes five lathes, six drill presses, and four milling machines. During the same time, the faculty has increased from 17 to 49, and the graduate students from about forty-eight to over two hundred.

Jack remembers being acquainted with all the faculty and graduate students in his early years here, but this is not so any more; he recognizes about half of the faculty now.

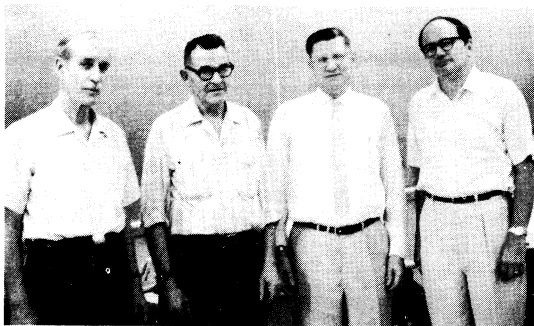
From the beginning the purpose of the machine shop has been to manufacture equipment for use in research. The machinists may be called upon to make either optical, or vacuum, or mechanical instruments. The difference between this shop and most commercial machine shops is that this one is not concerned with production as such. If an instrument can be purchased commercially it will probably be cheaper to do so than for the department's machinists to make it.

Jack explains that the chemistry machine shop exists just because many times the needed instrument cannot be bought commercially; in fact,

much of the equipment made here has never been manufactured before — much less produced in quantity. Rather it is usually made from original drawings done by one of the researchers, in consultation with the machinists. And many students have gotten their PhD's mainly through the use of equipment made in the departmental shop.

The idea of a student machine shop has long been a concern of Jack's. Shortly after he came to the department he set aside a part of the shop he then had for the use of the students, but before long the workload of the main shop had increased so much that there was no longer room enough for a student shop in the same area, and it was discontinued. The idea was revived again when the new wing was being built, and finally during the 1964-65 academic year, with the help of funds granted to the department by the American Chemical Society Petroleum Research Fund, a student shop was set up on the fifth floor of the new wing. (It has recently been moved to the ground floor, near the main shop.) The Student Shop, which any graduate student may gain access to by asking for permission and being trained in the use of whatever instruments he will need, now contains a drill press, a lathe, a milling machine, a bandsaw, a power grinder, a sheet metal brake, a sheet metal shear, and miscellaneous small tools. Maintenance of the Student Shop equipment and the training of students in the use of it has been Jack's responsibility, and he has been pleased to watch his old dream become a reality.

The main value of the Student Shop, as Jack sees it, is that when a student works in it he gains an idea of what the regular machinists are up against in making instruments. This knowledge is helpful when the student subsequently designs work for the machinists to do. In addition, of course, some of the students like to do their



F.T. GUCKER, JACK BAIRD, HARRY DAY,
V.J. SHINER

own metal work as a break from their usual laboratory routine. Jack feels that the Student Shop has been successful in fulfilling its goals; during the four years that it has been in operation he has trained about fifty students to use the Student Shop equipment.

In retirement Jack will relax part of the time at his home near Ellettsville, spend some time with his family, which includes his wife, three daughters, and eleven grandchildren, and complete a shop which he is building at home. He then expects to continue his favorite activity, working with his hands.

Earl Sexton marks 25 years

Earl Sexton, chemistry glassblower, has now been an I.U. employee for 25 years, and has been working with glass almost that long.

Earl's first I.U. job was as a stockroom clerk in the department of physiology. While working on that job he became acquainted with a graduate student in the department who was doing research with frogs and used various glass equipment in the aquariums. He once showed Earl how to hook up a tank of oxygen and do some elementary glassblowing work so that he could make equipment for use in the aquariums. Earl was immediately fascinated and felt challenged to try new things on his own, so he made quite a lot of aquarium equipment and other things during his spare time.

Eventually Earl's supervisor learned about the skill Earl had gained, and he put him to work on some glassblowing that he needed to have done. After spending a little over two years on this job, Earl went into the Armed Forces, during the Second World War.. He returned in 1946 and, having heard that there was a little glassblowing to be done now and then in the chemistry department, he applied for and got a job as a stockroom clerk-glassblower. He was in charge of the freshmen lab stockroom, and since he had very good hourly helpers who could carry on without much supervision, he was able to spend quite a lot of his time perfecting his skill in the small glass shop which was in a back room of the stockroom area. Finally in about 1950 the glassblowing workload had become heavy enough to justify a separate area and an employee devoted entirely to it, so Earl was allowed to drop his stockroom duties. Meanwhile he had developed sufficient skill through his

constant practice that he could tackle all of the complicated glassware that the faculty member could dream up. As the work increased Earl found that he needed help, and in 1959 Don Fowler joined him as an apprentice. Another man, Tom Lawhead, began training with Earl in 1964, and all three of them are now busy full-time.

The usual way for a glassblower to learn his trade is to work closely with an experienced glassblower for four or five years, as Earl's associates have done. However, Earl, who didn't have the opportunity to do this, has become a self-made expert in the field. He doesn't know of any other professional glassblowers who have not had an apprenticeship. One of the reasons Earl has been able to do this is, no doubt, the sheer enjoyment that he gets from glassblowing. He says that he never seems to get tired from his work. For several years he worked four or five hours a day at novelty glassblowing in addition to his eight hours in the chemistry department, without any particular strain.

Earl especially likes his work here because the new research problems that arise often require new kinds of equipment, and thus there is always a challenge for him. In such cases, it is both the faculty member and Earl who finally work out the design. He remembers one project for Dr. Shiner, the fabrication of conductance cells, which took two years from the beginning until both of them were completely satisfied with the results. In the years since then, however, he has been called upon to make a number of these cells. It seemed that Dr. Shiner's students, who had used the cells here, needed to have their own when they took up research positions elsewhere, and since the job was so difficult in both design and execution, these students couldn't find glassblowers at their new locations who were willing to try it.

Another instrument that was in demand from outside was Earl's quartz balance, which he has now supplied to several laboratories in the Midwest, one in Wales, and one in England, in addition to its original manufacture for use in this department. The balances were difficult enough to work on, since a critical part is the beam, a quartz fiber smaller than the size of a hair. However, once the balances were finished, the problem remained how to ship two of them overseas without damaging them. Earl puzzled over this for a long time, and there seemed to be no way. Then the answer came to him: melt some paraffin, pour it into the shipping container holding the balance, and allow it to harden. This

would keep the quartz beam from being jarred and broken en route, and the recipient could simply dissolve the paraffin — with benzene. It worked, of course.

A glassblower for research could not be very successful if he completely forgot about his work during off hours, Earl believes. He finds that when he is working on a difficult job, it is on his mind almost constantly. Many times the solution to a problem will come to him just as he is going to sleep at night, and then he can hardly wait for the first opportunity to come into the shop and try it.

Earl has a reputation not only for making research instruments but also for the novelty glassware that he makes for the annual I.U. Fun Frolic, a carnival sponsored by the nonacademic staff. His glassblowing booth is always one of the most popular. Interestingly, it was a novelty glassware carnival booth near Smithville, Indiana, that provided his first encounter with glasswork. He remembers clearly watching a man spin glass wool using a bicycle wheel, tie it into bows, and give them to all the little girls around the booth. Earl was about six years old at the time, and this incident has stuck in his mind ever since, possibly influencing him to choose glassblowing as a career.

Seven join faculty

Seven new faculty members have been appointed to start next year; they are:

KENNETH CAULTON, assistant professor, inorganic; BA, Carleton College, 1962; PhD, University of Wisconsin, 1968.

JOHN M. HAYES, assistant professor, analytical; BS, Iowa State University, 1962; PhD, Massachusetts Institute of Technology, 1966.

GARY M. HIEFTJE, assistant professor, analytical; AB, Hope College, 1964; PhD, University of Illinois, 1969.

JAY K. KOCHI, professor, organic, BS, University of California, Los Angeles, 1949; PhD, Iowa State University, 1952.

PETER W. LANGHOFF, assistant professor, physical; BS, Hofstra University, 1958; PhD, State University of New York at Buffalo, 1965.

ROBERT E. ROBERTS, assistant professor, physical; BS, Carnegie Institute of Technology, 1964; PhD, University of Wisconsin, 1968.

ALBERT C. YATES, assistant professor, physical; BS, Memphis State University, 1965; PhD, Indiana University, 1968.

Alumnus returns to teach inorganic



Lee J. Todd, who completed his PhD here in 1963, has returned to the department as associate professor in the field of inorganic chemistry. He has done postdoctoral work at M.I.T. and then served on the faculty of the University of Illinois Chemistry Department. He came to I.U. in September 1968.

Dr. Todd is mainly interested in inorganic and organometallic chemistry. His initial studies with his students at the University of Illinois were in the area of carborane chemistry. A new class of one-carbon carborane molecules was uncovered with the discovery that alkyl isocyanides react with decaborane (14) to form $B_{10}H_{12}CNH_2R$ derivatives in which a carbon atom is inserted into the borane cage structure. Since then several other hetero-atom borane systems have been prepared and studied (e.g. $B_{10}H_{10}CHP$, $B_{10}H_{10}CHGeCH_3$ and $B_{10}H_{10}CH^-$).

Carborane-transition metal complexes are also being prepared and studied. Mainly these are analogs of metallocenes in which the metal atom is pi-bonded to the open, five-membered face of an eleven-atom icosahedral fragment (i.e. $(\pi-C_5H_5)Fe(B_9H_9CHPCH_3)$). This fusion of two unrelated subdivisions of inorganic chemistry has resulted in the formulation of molecules with interesting chemical and physical properties.

These unusual cage molecules give the chemist the opportunity to extend the theory of bonding to a large area which might be termed "Unnatural covalent molecules". The carborane derivatives have more valence orbitals than valence electrons and are kinetically but not thermodynamically stable. Dr. Todd and his first year "Indiana" graduate students hope to learn more about the electron distribution in these carborane derivatives with the aid of carbon-13 and boron-11 (70MHz) nmr studies with new equipment which will be in operation very soon.

Dr. Todd has a group of nine students and two postdoctoral associates. Most of the members of the group get a thorough grounding in synthetic techniques (organic and inorganic) but also make extensive use of the nmr, mass spectrometer, and X-ray equipment.

Dr. Todd was born in Denver, Colorado. He came to Indiana for his undergraduate studies at the University of Notre Dame, where he earned the BS. He did his graduate work at Florida State University (MS) and at Indiana University.

Dr. Todd and his wife have three children, ages 8, 7, and 2. His hobbies are handball and stamp-collecting.

Five plan leaves

Five of the faculty will be on sabbatical leave next year. RUSSELL A. BONHAM will be doing research on "The Theory of Electron Scattering from Molecules" at two locations in Japan, the University of Tokyo and Hokkaido University, Sapporo, Japan. One of the persons he will work with at Hokkaido University is Professor Takao Iijima, who was at I.U. from 1962 to 1964 as a research associate with Dr. Bonham.

(GEORGE E. EWING plans to do research with Peter Rentzepis of Bell Telephone Laboratories, Murray Hill, New Jersey, on the subject of vibration relaxation in liquids.

HENRY R. MAHLER will be at the Centre de Genetique Moleculaire du C.N.R.S., Gif-sur-Yvette, France, performing research on the autonomy of mitochondria.

LAWRENCE K. MONTGOMERY also will spend the year in France, as visiting professor at the Pasteur Institute, University of Paris. He plans to complete the revision of a physical organic chemistry textbook while he is on sabbatical leave.

WARD B. SCHAAP has also been granted a sabbatical leave for next year.

Two receive awards

Two members of the department received teaching awards at this year's Founders Day Program. PROFESSOR DENNIS G. PETERS was a recipient of the Ulysses G. Weatherly Memorial Award for Distinguished Teaching, and ROGER HARRIS received the Lieber Teaching Associate Award.

Faculty active in profession

PROFESSOR HARRISON SHULL has just been elected to membership in the National Academy of Sciences.

Two more faculty members have made short trips to Central University in Caracas, Venezuela, to explore possibilities for research collaboration. PROFESSOR HENRY MAHLER went to Venezuela in February, and PROFESSOR DONALD McQUARRIE went in May. Both trips were made possible by the Midwest Universities Consortium for International Activities (MUCIA) grant that the department received last year for this purpose. In addition, one student, Miss Carol Causey, is spending this summer at Central University. A graduate student with Professor Stanley Hagstom, she has gone to Venezuela for the summer to work with CARLOS BUNGE, who was a research associate in the quantum chemistry group before he joined the faculty of Central University.

Seven faculty members attended the Spring ACS Meetings; three of those, ERNEST E. CAMPAIGNE, JOSEPH J. GAJEWSKI, and LEE J. TODD, were co-authors of papers that were presented. The other four who attended are HARRY G. DAY, GEORGE E. HARTWELL, CHRISTIAN E. KASLOW, and WILLIAM H. NEBERGALL.

ADAM ALLERHAND lectured at the University of Louisville and at the Third Great Lakes Regional Meeting of the ACS, Northern Illinois University, on the subject "Applications of Boron Nuclear Quadrupole Effects in Liquids and Solids."

JOHN H. BILLMAN presented lectures about "Cancer Chemotherapy" at the Indianapolis Downtown Campus of I.U., at Quincy College, Quincy, Ill., and at the University of Kentucky, Lexington.

RUSSELL A. BONHAM presented papers on the measurement of electron densities in atoms and molecules at the Frontiers of Chemistry meeting,

Wayne State University, Detroit, Mich., and at Indiana State University, Terre Haute.

ERNEST E. CAMPAIGNE spoke on "Drugs and the Mind" in the 1969 Science Lecture and Discussion Series, Ball State University, Muncie.

JACK K. CRANDALL is spending four months, April through July, at Monsanto Research S.A., Zurich, Switzerland, doing research with Harold H. Zeiss, president of Monsanto in Switzerland and our industrial professor of inorganic chemistry. While in Europe, Dr. Crandall has attended the Burgenstock Conference on Stereochemistry, Burgenstock, Switzerland and he plans to attend the International Heterocyclic Conference, Montpellier, France, and the Fourth International Conference on Organometallic Chemistry at the University of Bristol, Bristol, England.

HARRY G. DAY attended the meeting of the Federation of American Societies for Experimental Biology in Atlantic City, N.J. In February, under the sponsorship of the Division of Chemical Education, he gave several lectures and counseled students and faculty at Southern Missionary College in Tennessee. In March this was repeated at Nazareth College in Michigan.

JOSEPH J. GAJEWSKI attended the 21st National Organic Chemistry Symposium on the ACS in Salt Lake City, Utah. He also gave a lecture at the University of Wisconsin, Madison.

FELIX HAUROWITZ delivered one of the Francis Delafield Lectures at Columbia University, on the subject, "The Molecular Basis of Immunity." He spoke on the same topic at the University of Western Ontario. Dr. Haurowitz also presented a paper at the meeting of the Federation of American Biological Societies, and attended the meeting of the American Association of Immunologists at Pasadena, Calif.

HENRY R. MAHLER gave two seminars at Harvard University on the subjects, "Biosynthesis of Mitochondria and Their Proteins" and "Biogenetic Autonomy of Mitochondria." He also presented lectures on one or the other of these subjects at the St. Jude Children's Hospital, Memphis, Tenn., at the University of Pittsburgh Medical School, and at the University of Notre Dame. He lectured on "Structural Control of Reactivity in Proteins and Membranes" at the University of Pennsylvania Medical School and gave other seminars at the Illinois Institute of Technology, Northwestern University, Stanford University, and University of California, Davis.

LAWRENCE K. MONTGOMERY spoke at the 1969 Great Lakes Midwest Regional Meeting of the ACS, on "The Application of Deuteron Magnetic Resonance to Organic Chemistry."

WALTER J. MOORE presented lectures at the University of Kentucky and at Miami University. He went on an ACS lecture tour of the Southwestern Region and spoke at Arizona State University, the University of Arizona, the University of Hawaii, Fresno State College, California State Technical College, and the University of Nevada.

DENNIS G. PETERS lectured at Ball State University on "Chemical and Electro-Chemical Studies of Platinum Coordination Compounds" and at Cornell College, Mt. Vernon, Iowa, on the subject, "Ignobility of Noble Metal Electrodes." He lectured on "Electrochemical Oxidation of Borohydride and Trihydrohydroxyborate" at the Third Great Lakes Regional ACS Meeting. A student of his, James C. Shaeffer, also presented a paper at this meeting.

WARD B. SCHAAP gave a lecture at the Third Great Lakes Regional Meeting of the ACS on the subject, "Applications of Radioisotopes in Polarography."

V.J. SHINER, JR. visited the National Agricultural University of Peru in Lima for a week and a half to counsel on undergraduate education in chemistry. The trip was in relation to a MUCIA-operated Ford Foundation Grant to help improve instruction in basic science at the Agricultural University. Two graduate students, Jose Canchucaya and Paco Paratore, are at I.U. on fellowships through this grant and plan to teach at the Agricultural University after receiving their advanced degrees.

RUPERT A.D. WENTWORTH presented lectures at Rose Polytechnic Institute, Terre Haute; Iowa State University, and Polytechnic Institute of Brooklyn.

Graduate Adviser reports activities

At the Chemistry Honors Banquet, April 30, a number of chemistry graduate students were recognized as winners of special fellowships and for outstanding performances in teaching and research.

Named as the four outstanding teaching assistants for the 1968-69 academic year were Margaret COX, Stephen KAHL, Steven NORTON, and Robert SCHMIDGALL. In addition, at the University Founder's Day ceremonies on May 7, Roger HARRIS (who received a departmental teaching award for 1967-68) won a University-wide Lieber Teaching Associate prize. Also, for con-

tinued excellence in teaching he was given a departmental cash award this year.

For excellence in his first-year (Chemistry C500) research, Peter CLARK received the Robert Chernin Memorial Award for the academic year 1968-69.

In recent months, graduate students in the department have been recipients of a number of special fellowships. Lawrence COX and William DOWD have recently been awarded ACS-PRF Graduate Research Fellowships for 1969-70, joining Arnold CRELIER, Leonard NEUBERT, and Richard WATKINS, who have been ACS-PRF Fellows during the current academic year. Three graduate students, William COLEMAN, Hugh GARDNER, and Richard LEESE, won National Science Foundation Fellowships for next year.

National Institutes of Health (Public Health Service) Fellowships have recently been awarded to Alan CLARK, Steadman HARRISON, R. Burton LEWIS, Mitchell SMAS, and Glenn TINDELL. Several more students have submitted applications.

During the period July 1, 1968 to June 30, 1969, 29 graduate students were awarded PhD degrees and 11 MS degrees were issued. The following includes information about the plans or activities of degree recipients since the last newsletter:

Peter BAKUZIS, who completed his doctoral work with Dr. Wenkert is now doing postdoctoral research at Case-Western Reserve University.

Charles MAYER has gone to the University of Oregon for postdoctoral study after receiving his PhD degree with Dr. Crandall.

Leonard NEUBERT is fulfilling a military obligation as first lieutenant in the Air Force; he received his PhD under the direction of Dr. Carmack last April.

Helen POLAND, who received her PhD in June with Dr. Parmenter, has accepted a postdoctoral appointment at the University of Colorado.

Roger SAILLANT is now a postdoctoral fellow at UCLA, after earning his PhD with Dr. Wentworth.

Alumni gather at ACS

The latest get-together of the AIUC was a Social Hour at the ACS meeting in Minneapolis, April 15. The attendance was good and the talk among the groups was even better. Among those who attended were: Richard BAYER (PhD '59) from Carroll College, Eli ARONOFF (PhD '54) from ITT, Al BORDERS (PhD '37) from 3M, John BORNMAN (PhD '56) from Lindenwood College (Mo.), Warren

BUDDENBAUM (PhD '64) from Oregon Graduate Center, Archie CLARK (AB '54) from Winston-Salem State College, Ron COLLINS (PhD '62) from Eastern Michigan University, Don Jack COOK (PhD '44) from DePauw University, Melvin DRUELINGER (BS '62) from Indiana State (Terre Haute), and David DUNHAM (Post-PhD '67-68) from Monmouth College.

Also, Phil FERGUSON (AB '47) from Florida Presbyterian College, Curtis FRANZ (MS '65) from Iowa City, Norma Johnson from The Pillsbury Company, Donald GAINES (PhD '63) from the University of Wisconsin, Duane LEHMAN (PhD '59) from Dow, Angelo LOBO (PhD '66) from Rensselaer Polytech, Marshall MEAD from ACS, Richard NEITHAMER (PhD '57) from Florida Presbyterian College, Mrs. Deanna (Nelson) KEYTON (PhD '68) from LSU at New Orleans, John PERA (PhD '60) from Buckman Laboratories, Inc., Norman SWEENEY (MA '51) from 3M Company, Phelps TRIX (MA '44), from Wyandotte Chemical Corp., Chris VOGEL (PhD '67), Kenneth WEST (PhD '68), from St. Lawrence University, J. Edmund WHITE (PhD '58) from Southern Illinois University, Ralph WHITE (PhD '67) from University of North Carolina, and O.E. Yokley (PhD '53) from Cincinnati.

From the I.U. faculty and current students, Harry Day, Dr. and Mrs. Kaslow, Dr. and Mrs. Nebergall, Gary Eubanks, Stanley Prince, and David Garrett and his wife, were there. Dr. Robert Fischer, formerly a member of the faculty and now at California State College, attended.

The next Social Hour is planned for the August Meeting in New York. Alumni planning to attend the meeting in New York, should drop by the get-together to renew old acquaintances.

Treasurer's report

Balance, 31 January 1969	69.27
Receipts (contributions from alumni since January 1969)	
since January 1969)	81.50
Total	146.77
Expenditures	
Social Hour at Minneapolis	12.50
Service Charges at Bank	1.84
	14.34
Balance, 30 June 1969	\$132.43
The Spring Newsletter bill has not been received.	

News of alumni

The Newsletter editors need help. Please send news of yourself or any other alumni about whom you can give information. Below is a form to make it easier to send news:

Name

Address

Date of degrees from I.U. AB BS MS PhD

News

Return to:

Miss Elizabeth Greene, Department of Chemistry, Indiana University, Bloomington, Indiana 47401.

Albert AIKEN (AB '39) retired from the U.S. Army (Chemical Corp) in January, 1968 with the rank Lt. Col. and is now working as an operations research analyst for the U.S. Army Combat Developments Command Armor Agency at Fort Monmouth, N.J.

Darwin APPLETON (MA'31) who retired in 1967 after 35 years as chemistry teacher, varsity baseball coach, and science department chairman at the Proviso High Schools (suburban Chicago), is now a director of curriculum for the Polk-Lincoln-Johnson School Corporation at Walkerton.

Douglas ARMSTRONG (BS '63) has recently accepted a position as assistant professor of chemistry at Massachusetts College of Pharmacy and will begin a program of teaching and research in September '69.

Morris BADER (PhD '61) has been promoted to associate professor of chemistry and acting director of the computer center for academic use at Moravian College, Bethlehem, Pa.

Kandiah BALASUBRAMANIAN (PhD '65) is lecturer grade II in the biochemistry department, University of Colombo and is teaching medical students and conducting his own research on isoenzymes and carcinogenicity of aflatoxins.

David BERGES (PhD '67) has joined Smith, Kline and French Laboratories as senior medi-

cal chemist in research and development. He recently returned from France where he worked for more than a year doing research in organic chemistry as a postdoctoral fellow under a grant from the French government.

Dr. Robert BOTTLE (Post-PhD '54-'55) who has been visiting lecturer at the Syracuse University School of Library Science this past year, gave a Chemistry Colloquium address at I.U. on May 9 on "Users Assessment of Alerting Services in Chemistry and Allied Sciences." Dr. Bottle also was Director of a five-day institute on "Effective Use of Chemical and Biological Literature" at Syracuse University June 9-13.

Ralph BRUNER, Jr. (AB '45) is president and general manager of Sidney Aluminum Products, Inc., in Sidney, Ohio. After leaving I.U., he completed a degree in 1946 from the University of Arizona with a major in metallurgical engineering.

Jayr de Paiva CAMPELLO (MS '66) received a PhD from Universidade do Parana, Brasil last year and has been vice chairman and associate professor at the Universidade De Campinas since January, 1969.

R.V. CASH (PhD '52) has been named chairman of the newly-created Department of Chemistry at Central Connecticut State College.

Dr. Cedric L. CHERNICK (Post-PhD '57-'59) was appointed assistant vice-president for programs and projects, The University of Chicago, beginning May, 1969.

John CHRISTENS (PhD '56) writes that he is process superintendent for DuPont de Nemours (Deutschland) and tells us that Jim ROOLEY (PhD '51) is his boss as assistant plant manager of the plant in Westfalia.

Bernard D. COLEMAN (BS '51) is senior fellow of the Mellon Institute and professor of mathematics at Carnegie-Mellon University. He, with Markovitz and Noll, wrote a book, "Viscometric Flows of Non-Newtonian Fluids," which was published by Springer-Verlag in 1966. At present, Professor Coleman is serving as editor-in-chief of the Springer Tracts in Natural Philosophy.

William E. COUNDIFF (AM '66) has been listed in Volume VIII of Leaders in American Science which was recently published by Who's Who in American Education, Inc.

Standiford COX (AB '57) has been promoted by Eli Lilly and Company in Indianapolis to project coordinator for new products for human use.

Howard DESS (BS '51) has been named director of research at the Central Corporate Laboratory of the National Lead Company, in Hightstown, N.J.

Melvin L. DRUELINGER (BS '62) after completing a year of postdoctoral work at Iowa State University under Dr. O.C. Chapman will join the staff of Indiana State University as assistant professor of chemistry. His research is in organic photochemistry.

Samuel P. GASKINS (AB '67) is working as associate engineer in the semi-conductor division of RCA in Indianapolis.

Steven B. GIVENS (AB '63) is now deputy commissioner, Public Service Commission of Indiana, living in Indianapolis.

Frank A. GUTHRIE (PhD '62), currently professor of chemistry at Rose Poly, served on the review panel for the National Science Foundation's Undergraduate Instructional Scientific Equipment Program this spring.

Jane HEARD (MS '68) is now Mrs. Gerald K. Wichman. (He received BS in Chemistry in '66.) They are living at 60 East 32nd, Apt. 612, Chicago, Ill.

Ross M. HEDRICK (PhD '47) was promoted to advanced scientist at Monsanto Chemical Company's New Enterprise Division at St. Louis.

Richard HOBSON (PhD '41) retired from Goodyear Tire and Rubber Company in 1968 and is now relaxing at 721 Seminole Blvd., Casselberry, Fla.

Bernard HOLMAN (AB '51) tells us he is now an independent operator in oil and gas exploration and development with an office in Jackson, Miss.

Michael JUNKER (AB '64) is teaching at Newberry College. They have just moved into a new \$1½ million science and mathematics building. After spending last summer ('68) here on an NSF research grant, he is working toward his PhD at the University of South Carolina. The Junkers have 2 children, Penelope, 2, and Mark, 6 mos.

Gary KOZAK (BS '60), PhD Programs Coordinator for IBM, is responsible for PhD relations activity between IBM and about 10 universities in Northeastern U.S. He also functions as IBM's corporate associate to the ACS.

Although Mary Imel Linvolle (MA '26) is retired as soil analyst, Agronomy Department at Purdue, she still participates in many of the University activities.

Dana MAYO (PhD '59), now on the staff at Bowdoin, will be spending the 1969-70 academic year (on sabbatical leave) at the University of Maryland in the Laboratory of Ellis Lippincott.

Herman OPITZ (PhD '56) is manager, Glass Research at Kerr Glass Manufacturing Corp., Lancaster, Pa.

Donald PARSONS (AB '63, MD '67) is now resident in pathology at Fitzsimons General Hospital, Denver.

Stephen F. PETERSON (BS '64) received his PhD from Cornell University this year with his research under the direction of Professor C. Morrison. He is now working as research chemist with the Savannah River Laboratory of the DuPont Company.

Delbert PHILPOTT (MA '49) is research chemist in charge of the Ultrastructure Laboratory for NASA at Moffett Field, Calif.

J.L. POPE (AM '52) is now on a post-doctoral traineeship at the University Hospital in Seattle. After completing a PhD at Southwestern Medical School in 1965 under Dr. H.C. Tidwell, he worked as Research Associate with Dr. J.A. Olson at the University of Florida (Gainesville). In 1966 when Dr. Olson, under a Rockefeller Grant, went to Bangkok to develop the Biochemistry Department of a new medical school, Lon went along working there from 1966 to 1968, when he returned to the U.S. and began the work at Seattle.

Thomas E. RAGLAND (BS '58) is currently assistant professor of botany at the University of California at Davis. He is also co-ordinator of project involvement, a project to provide channels for educational reform and innovation with minimum of red tape and-or bureaucracy.

Charles SHORT (AB '28) is the manager of Nehil Lumber Company in Midland, Mich.

Nolan SOMMER (PhD '44) has been named executive vice president of American Cyanamid Company.

James E. VINT (AB '64) is currently a captain in the U.S. Air Force, working for an MS in research and development systems management; the University of Southern California.

Edward Yokley (son of O.E. YOKLEY, PhD '53) was one of three Xavier University (Cincinnati) students awarded a Woodrow Wilson Fellowship for 1969.

Jay YOUNG (BS '39) of King's College, Wilkes-Barre, Pa., tells us he will be visiting professor of chemistry at Carleton University in Ottawa, Canada for 1969-70.

CORRECTION

Rodney D. MOSS (PhD '51) is director of Chemical Research and Development, Agricultural Products, of the Dow Chemical Company at Midland. (I am sorry Rod that I abbreviated too much in my notes and made the incorrect report. EMG)

NECROLOGY

Adolph FISCHBACK (PhD '42), retired supervisory chemical engineer at Ft. Monmouth Army Electronics Command (New Jersey) died December 19, 1968.

Robert L. SHELLEY (PhD '29), Professor of Chemistry at Ball State University, died January 26, 1969.