



Badger chemist : a newsletter from the Department of Chemistry--University of Wisconsin--Madison. Newsletter 20 May 1973

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BADGER CHEMIST

A Newsletter from the Department of Chemistry—University of Wisconsin—Madison

Newsletter 20

May 1973



Farrington Daniels
1889-1972

BADGER CHEMIST

Privately published by the Department of Chemistry of the University of Wisconsin, Madison, with the financial assistance of its faculty and alumni.

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The Editor Reports

Response to last year's distress call for financial support was favorable but not overwhelming. Contributions were sufficient to pay the remainder of the printing bill on Number 18, the postage on Number 19, and a large part of the printing bill on No. 19. We embark on this issue with a modest debt and no money in the bank. Like my editorial predecessors, I am prone to live dangerously so here comes another Badger Chemist. I hope you find it a sufficiently attractive link with your past that you will continue to keep the editor out of jail. Remember that even small contributions are welcome. My thanks to all of you who have sent in contributions and encouragement. I do not send receipts in order to save postage and time, assuming that your cancelled checks serve the purpose of a receipt.

News about your activities is also desired. Your classmates like to read about what you are doing. My faculty colleagues have been very helpful in providing information and some of you send in news of your classmates. This is helpful. Many thanks. We could use more of such input.

It is possible that some of you occasionally see names of friends

This 'n' That About Our Alumni

David Amick, Ph.D. '73, is a postdoctoral student with Professor Paul Gassman at Iowa State.

Morris H. Aprison, B.S. '45, (Ph.D., Biochem. '52), is presently chief of the Section of Neurobiology in The Institute of Psychiatric Research and Professor of Biochemistry in the Departments of Biochemistry and Psychiatry at Indiana University Medical School in Indianapolis. Professor Aprison was recently elected to council of the American Society of Neurochemistry and served as chairman of the scientific program committee at their third meeting in Seattle last March (1972). He is also an advisory editor of several journals and presently serves on a NIMH study section in Washington.

Robert Bailey, Ph.D. '65, is Research Specialist in the Environmental Research Lab, Dow Chemical Co., Midland, MI.

Ronald Baney, Ph.D. '60; Group Leader, Sealants Systems Group, Dow Chemical Co., Midland, MI.

Stuart Bennett, Postdoc. '70-71, is Lecturer in Chemistry at The Open University, Bletchley, Bucks, England.

William Benusa, B.S. '57, M.S. '59, is with Gulf Research and Development as Senior Project Chemist. During the last five years he has been working on water quality problems.

Robert G. Bergman, Ph.D. '66, was ACS speaker before the Wisconsin Section on March 7, 1973, when he talked about "Biradicals". After finishing his doctorate Bob was North Atlantic Treaty Organization Postdoctoral Fellow at Ron-

with whom you have lost touch. The Badger Chemist office will be happy to provide most recent addresses on request.

This brings up another point. Approximately 200 Badger Chemists were returned last year because the addressee was no longer at the address used. Since the postal service no longer forwards mail of this sort, we have no alternative but to remove such names from our mailing list. If you know of anyone who is not receiving the Badger Chemist, tell him to send his present address and his mailings will be reinstated.

A.J.I.

ald Breslow's Laboratories at Columbia University. He joined the faculty at Cal Tech the following year. In 1970 he received both an Alfred P. Sloan Foundation Fellowship and a Camille and Henry Dreyfus Foundation Teacher Scholar Award.

Kathy Bjerke, M.S. '65, played a major role in passage of the Michigan Wilderness and Natural Areas Act, a first in the nation. Also very active in Sierra Club.

Philip Boudjouk, Ph.D. 71; Lecturer in Inorganic and Organic Chemistry and Postdoctoral Research Chemist at the University of California, Davis.

Wilbur Bridgeman, Ph.D. '37, and onetime faculty member, wrote in response to the request for textbooks and the Farrington Daniels Memorial. His letterhead indicates that he continues his teaching activities at Worcester Polytechnic Institute.

B. L. Browning, Ph.D. '28, retired in 1967 from the Institute of Paper Chemistry where he had been active for 35 years.

Edward Carberry, Ph.D. '68; Associate Professor, Southwest Minnesota State College, Marshall. He is director of a Minnesota Resources Commission-supported Pesticide Residue Research Group.

F. Stanton Charlton, Ph.D. '48, of 1026 Sande Street, Neenah, Wisconsin has written to provide financial and moral support for the Newsletter but sends no news about himself.

Ruby Wong Chiang, M.S. '49, is serving as research associate to Dr. Barry Commoner at Washington University while bringing up her two daughters. We extend our deepest sympathy to Ruby over the recent death of her husband Robert, Ph.D. '53.

Tek-Ling Chwang, Ph.D. '71, is postdoctoral fellow at McArdle Lab at the University of Wisconsin-Madison.

Robert E. Conary, Ph.D. '38, sent a generous contribution to the Badger Chemist from Belgium but included no news about his activities.

Lloyd M. Cooke, B.S. '37, has been made director of urban affairs for Union Carbide Company. It will be his responsibility to implement corporate policies and programs in urban affairs and assuring such programs are consistent

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A BRILLIANT CAREER ENDS

The long and productive career of Farrington Daniels was brought to a close with his death on June 23, 1972. He had been active in the pursuit of his solar energy research until shortly before his final hospitalization. At the early June meeting of the Board of Regents the recommendation that the new chemistry building be named the Farrington Daniels Chemistry Building was approved. A memorial service was held at the First Congregational Church on June 28 with Memorial Tributes by the Reverend Lawrence L. Gruman, John E. Willard—Chairman of the Chemistry Department and one of Dr. Daniels' Ph.D.'s, and L and S Dean Emeritus Mark Ingraham.

Farrington Daniels was born in Minneapolis on March 8, 1889, the son of Frank Burchard and Florence Louise (Farrington) Daniels. He studied chemistry at the University of Minnesota where he received the B.S. in 1910; the M.S. in 1911. At Harvard he undertook an electrochemical study of thallium amalgams in the laboratory of T. W. Richards who would soon receive the first Nobel Prize in Chemistry awarded to an American. "The Electrochemical Behavior of very concentrated Thallium Amalgams", (with TWR) in *Trans. Am. Electrochem. Soc.*, 32, 343 (1912), was Daniels' first publication. There would be over 300 more. (A bound set of collected reprints has been placed in the Chemistry Library. It constitutes 5 volumes.)

After receiving the Ph.D. in 1914, Daniels joined the faculty of Worcester Polytechnic Institute. He married Olive M. Bell of Minneapolis on September 15, 1917. They and their four children, Farrington, Jr., (M.D. on the faculty of Cornell Medical College), Florence (now Mrs. James W. Drury of Lawrence, Kansas), Miriam (now Mrs. Martin J. Ludwig of Corvallis, Oregon), and Dorin (M.D. of Ontario, Oregon), formed an extraordinarily close-knit family. Dr. Daniels took great pride in the educational development of his children and the artistic activities of his wife. At the time of his death there were 12 grandchildren. The cottage in Door County served as a working retreat and as a focal

point for the gathering of the Daniels' clan for many a summer.

In 1919, Daniels took a position as Electrochemist with the Nitrogen Fixation Laboratory in Washington. His work here would open up a longtime interest in the kinetics of nitrogen oxide reactions and lead to later work toward practical aspects of nitrogen fixation.

His career at Wisconsin began in 1920 when he accepted the offer of an assistant professorship extended by J. H. Mathews, new chairman of the department who was seeking to build up the program in physical chemistry. Promotion to associate professor was made in 1924, to full professor in 1928. Mathews' confidence was well placed, for Daniels went on to develop an impressive teaching program in physical chemistry, to institute a research program which would result in the granting of more than 60 Ph.D.'s plus production of innumerable Masters' and Bachelors' theses, besides contributing heavily to the academic program at Wisconsin, the welfare of the chemical profession, and the well-being of the nation and the world.

Educator

Recognizing the shortcomings of physical chemical instruction, Daniels set to work to remedy the situation. He saw a primary defect in the inability of chemistry students to deal with the mathematics characterizing modern physical chemistry. The result was publication of "Mathematical Preparation for Physical Chemistry" in 1928. In characteristic fashion, he made his own book obsolete by insisting that the chemistry curriculum include a heavier math requirement, including calculus.

Along with Professor Mathews, he placed emphasis on improvements in laboratory instruction. This led to acquisition of new instruments, introduction of new experiments, and joint authorship (Daniels, Mathews, and J. W. Williams) of "Experimental Physical Chemistry" in 1928. A seventh edition was published in 1970 with Daniels, Williams, Paul Bender, R. A. Alberty, C. D. Cornwell, and John E. Harriman as co-authors. The laboratory manual is well known to most Badger Chemists

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Farrington and Olive Daniels with head sculptured by Mrs. Daniels.

Daniels . . .

(Continued from page 3)

and has been widely used around the country.

The textbook problem also attracted Daniels' attention. When he came to Wisconsin Professor Mathews was using the second edition of Frederick H. Getman's "Outlines of Theoretical Chemistry". The third edition came into use soon thereafter. Although it was a popular text, Daniels saw many shortcomings and sent suggestions for improvement to Getman; many of these were incorporated into the fourth edition (1927). When further suggestions kept coming, Getman invited Daniels to become co-author of the fifth edition which was published in 1931. A substantial amount of the writing for this edition was the work of the junior author. Further editions in 1937 and 1943 were entirely reorganized and written by Daniels although both names continued to appear on the title page. With the very thorough revision of 1948, the title was changed to "Outlines of Physical Chemistry" and Farrington Daniels became the sole author. With the preparation of a new edition for publication in 1955, Robert A. Alberty, Ph.D. '47, became co-author and the name changed to "Physical Chemistry". This collaboration continued in subsequent editions published in 1961 and 1966. The book achieved the status of a classic in its day, being used continuously at Wisconsin and in many other schools around the country. It has been translated into several languages including Spanish and Arabic. It was continually updated with new material, reorganized to give it improved coherence, and made more rigorous as the mathematical preparation of students warranted.

Daniels' interest in education was never limited to physical chemistry however. He was always active in the discussion of curricular problems and contributed significantly to the growth and balance of the department's program.

In the winter of 1955 he came to Professor Ihde and volunteered to teach a quiz section in freshman chemistry. Despite the demanding obligations of the chairmanship, he fulfilled his classroom obligations with distinction. He was meticulous in his preparations and attended the weekly staff meetings along with the TA's, missing only

in those cases when travel schedules took him out of town.

In 1939-40 he was chairman of a Letters and Science Committee on curriculum study which had far-reaching effects. Daniels saw science as one part of human activity and saw the importance of balance in undergraduate education; science must be a part of total education, but not to the exclusion of humanities and social studies. The work of the Daniels Committee led directly or indirectly to: revision of B.A. and B.S. degree requirements; the creation of a senior course dealing with science and society; the creation of a "Freshman Forum" course; and the creation of a History of Science Department. All of these innovations would suffer from the country's involvement in World War II but the foundations laid by the Daniels Committee would continue to be felt far into the future, even when Daniels himself would be heavily preoccupied with wartime and post-war problems.

Two innovations, in particular, would have a profound impact. One was the formation of the History of Science Department. Henry Guerlac came to Wisconsin in 1941 as its first chairman. When he took a leave in 1943 to become historian of the Radiation Laboratory at MIT the department remained technically alive but inactive. When Guerlac took a post-war position at Cornell, the College of Letters and Science did not let the program die but sought to strengthen it. Robert Stauffer and Marshall Clagett came to Wisconsin in 1947 and developed the department which would become one of the most active in the country. Farrington Daniels always maintained his interest in the history of science program, using his influence to be sure that it not only remained alive, but that it grew in significance. He took particular interest in encouraging the expansion of the history of chemistry program during his chairmanship, an interest which continued up to the time of his death.

The other curricular innovation of particular importance was "Contemporary Trends", the senior course which had to await the end of the war and Daniels' return to the campus. Its relevance was even more obvious in 1948 than it had been in 1940. In an age of concern for the impact of science on human affairs, Daniels saw the need for a course which would provide an opportunity for students to examine

contemporary problems raised by application of science. He personally recruited the faculty scholars who became involved, and directed the course during its first years. The lectures given during the first term were subsequently edited by Daniels with the collaboration of Thomas M. Smith and published in 1949 under the title, "Challenge of Our Times". After being out of print for a time the book, still timely, was recently reprinted.

Scientist

The scientific career of Farrington Daniels is well known to Badger Chemists. Between 1920 and 1960 there was hardly a graduate student in the Department who failed to feel his presence in one way or another, even when the student's interest was far removed from physical chemistry.

He brought to Wisconsin an interest in nitrogen fixation, developed during his association with the Nitrogen Fixation Laboratory. It would influence a substantial amount of his research during the next three decades and focus his attention on vaguely related problems which would absorb a great deal of his attention at various times during his career. Many of his early papers dealt with studies of the decomposition of oxides of nitrogen, particularly under the influence of radiation.

Such studies led him into studies of kinetics and he became widely known for his expertise in this area. In 1935 he spent a term at Cornell as George Fisher Baker Non-resident Lecturer. The book, "Chemical Kinetics" (1938) was the outgrowth of this lectureship.

His interest in photochemistry frequently led to collaborative studies with faculty members in other departments. Following Harry Steenbock's discovery that foods can be fortified with vitamin D by exposure to ultraviolet light, Daniels collaborated with Steenbock in an effort to gain a better understanding of the changes taking place during irradiation of sterols. With Michael Guyer of the Zoology Department he made studies of irradiation of cancer and with Benjamin Duggar and John Stauffer of Botany he made studies of photosynthesis. The interest in photosynthesis would continue and in 1960 he would be coeditor, with L. J. Heidt, Robert Livingston,

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Dr. McElvain Passes On

The hand of death again struck the chemistry department's faculty rolls with the passing of Samuel Marion McElvain on April 11, 1973. He had been hospitalized for an interval about a year ago but had shown good recovery until stricken again only a short time before his death. He joined the chemistry department in 1923 and quickly became one of its stars. His contributions, alongside those of Homer Adkins, gave the Wisconsin department a reputation in organic research which placed it among a small handful of the nation's leaders.

Born on December 9, 1897 in Duquoin, Ill., he attended Washington University (St. Louis) where he received his B.S. in 1920. His undergraduate education was interrupted by service in the U.S. Army during World War I. He became a graduate student of Roger Adams at the University of Illinois where he received the M.S. in 1921, the Ph.D. in 1923. His doctoral dissertation dealt with synthesis of a new bicyclic ring leading to derivatives of isogranatamine. One of the derivatives, ethyl benzoylisogranatamine-carboxylate hydrochloride, was isometric with homocaine hydrochloride and had local anesthetic properties, though more toxic and less anesthetic than cocaine.

Upon joining the department in Madison McElvain immediately developed a vigorous research program to complement that of Homer Adkins who came to Wisconsin in 1919. Richard Fischer was the other member of the organic group at the time.

Professor McElvain married Helen Roth of Madison in 1926. Their daughter Ann is now Mrs. William Frazier of Princeton, N.J. (Frazier is a bacteriologist with Squibb.) Their other daughter Jane is now Mrs. Carl E. Jenkins of Bluefield Hills, Mich. (Jenkins is an engineer with General Tire.) There are six grandchildren.

A significant amount of Dr. McElvain's research was directed toward the synthesis of nitrogen compounds with anesthetic properties. During his early period at Wisconsin he and his students published a long series of papers on piperidine derivatives and other types of compounds with the capacity to induce local anesthesia.

Many of the compounds produced in his laboratory were given extensive pharmacological tests in the laboratories of the UW Department of Pharmacology and of the Eli Lilly Company. McElvain was particularly interested in the relation between structure and pharmacological action. The work on compounds with drug action led to 12 patents.

Despite his interest in anesthetics his overall research program was far-ranging, but always with



S. M. McElvain
1897-1973

the objective of gaining a better understanding of reaction mechanisms. He and his students conducted extensive studies into the acetoacetic ester condensation and a masterful series of investigations into the reactions of ketene acetals. The latter work is summarized in "The Ketene Acetals" published in *Chemical Reviews*, 45, 453-492 (1949) although the studies were continued for another decade.

Another series of researches dealt with the orthoesters, with particular emphasis on their value as local anesthetics and on the nature of their molecular rearrangements. He was also interested in natural products and carried out a careful investigation of the constituents of the volatile oil of catnip. The major components were shown to be β -caryophyllene

(14%), nepetalactone (42%), and nepetalic anhydride (36%). Nepetalactone proved to be substance which makes catnip so attractive to certain species of the cat family.

McElvain was a masterful director of research students and his laboratory was sought out by large numbers. He was major professor to 80 Ph.D. recipients and attracted a large number of postdoctoral students. He was a hard worker who was always fully abreast of his field. He expected hard work of his students and had a reputation of being a hard taskmaster. Combined with this he had a deep understanding of people coupled with a delightful sense of humor. He had the capacity to bring out the best in people. Among his students he was affectionately known as "Uncle Mac." Three of his students went on to receive the ACS Award in Pure Chemistry (C. Fredrick Koelsch '31, now at Minnesota; the late Arthur C. Cope '32, then at MIT; and Gilbert J. Stork '45, now at Columbia).

In the classroom he was businesslike and impressive for his deep understanding of his subject. His interest included the elementary courses as well as the purely graduate classes. He was co-author (with Homer Adkins) of "Elementary Organic Chemistry" (1928) and "Practice of Organic Chemistry" (1928). His greatest forte was in the qualitative analysis of organic compounds and his "Characterizations" course was a classic ordeal for senior thesis students and the new graduate majors. He ultimately became the author of "Characterization of Organic Compounds" (1945).

His devotion to his research and teaching never prevented him from accepting university and professional responsibilities. He served on several important university committees and held the chairmanship of the prestigious University Committee for a term. He was chairman of the Organic Division of the ACS in 1945 and 1946. During the World War II years he was active as a consultant to NDRC. In 1949 he was elected a member of the National Academy of Sciences.

For health reasons he decided to retire in 1961 at age 63. The University Regents voted him Emeritus status in accepting his resignation. He vigorously vetoed the traditional retirement banquet with speeches and adulation but con-

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McElvain . . .

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sented to a small informal dinner with colleagues, friends, and returning students.

His colleagues were successful in staging an Organic Symposium in his honor at the Chemistry Building on July 1, 1961 with papers by his former Ph.D.'s Cope, Koelsch, and Stork, and his former Postdoc., (1943-44) Thomas P. Carney of the Eli Lilly Co. Carney's title was, "Local Anesthetics, Cocaine to McElvain." McElvain's major professor, Roger Adams, was present to deliver concluding remarks. William S. Johnson, a member of the organic faculty from 1940 to 1960 and presently at Stanford, served as discussion leader.

During his retirement years, "Mac" stepped aside from the tensions of organic chemistry to concentrate on the enjoyment of his other interests. He and Helen travelled extensively. Hawaii was a favorite retreat. They also had great pleasure in visits with their children and grandchildren, both in their daughters' homes and in the McElvain home at 2017 Adams Street.

Last year's Badger called attention to the creation of the S. M. McElvain Professorship of Chemistry and the selection of Harlan Goering as its occupant.

This 'n' That . . .

(Continued from page 2)

throughout the firm's areas of operation. Of particular importance will be continuing efforts to solve hard core unemployment. Dr. Cooke joined Union Carbide in 1957 and has held a number of positions in technical and market research. He now works out of the New York City office. He served as the Chicago Section Chairman in 1956 and has held various offices in the ACS. He is currently a member of the Board of Directors and Chairman of the committee on public, professional and member relations.

David Crumrine, Ph.D. '71, is Assistant Professor of Chemistry at Loyola University, Chicago.

Guido H. Daub, Ph.D. '49, recently saw publication of his book entitled "Basic Chemistry", co-authored with William S. Seese. Professor Daub is at the University of New Mexico. His wife is the former Katherine Powell, M.A. '48.

Carl Eggert, B.S. '31, writes from 436 Laurence Avenue, Elgin, Illinois, that he hasn't been back to the campus in many years but enjoys hearing about Wisconsin.

John R. Emery, B.S. '47, returned in autumn 1971 from Europe where he had been managing director of Du Pont's Fiber Business. He is now in Wilmington heading up the Spunbound Products-Nomex® Division.

Paul Entriken, Ph.D. '40, has been with Humble Oil and Refining Company in Baton Rouge, La., ever since finishing his work in physical chemistry and chemical engineering at Wisconsin. For a couple of years he worked as a chemist but has little contact with the subject since having had several staff positions in refinery operations and for the last 15 years with the main computer job. His two children Judy and Paul are married and away from home as is his stepdaughter Connie.

Gary Epling, Ph.D. '72, will be Assistant Professor of Chemistry at Fordham University starting next summer.

John Erikson, Postdoct. '66, has gone into the field of clinical chemistry and as of June 1, 1973 will be Director of Chemistry, Trinity Hospital, Cudahy, Wisconsin.

William J. Evans, B.S. '69, is now a student at the University of California in Los Angeles.

Stephen E. Freeman, Ph.D. '35, reports that their new Laboratory in Fort Washington is now completed. He and Glen Svoboda, B.S. '52, Ph.D. (Pharmacy '58), reports that they will be pleased to welcome visitors to this new facility. They have also completed a resin plant near Chatham, Va.

Thomas Flechtner, Ph.D. '70, is Assistant Professor of Chemistry at Cleveland State University as of last September.

Alvin J. Frisque, Ph.D. '54, is vice-president for research at the Nalco Chemical Company in Chicago.

H. M. Gaarder, B.S. '16, of 1641 Interlachen Road, Seal Beach, California writes "a lot of water has flowed under the bridge in 56 years since I attended the University of Wisconsin. I am at present living in retirement here in California. My working days were spent with the Diamond Match Co. (13 years) and Wilson and Co. (28 years). Please give Dr. Schuette my best regards when you see him. I am sorry to hear of his affliction. I suffered a stroke myself about a year ago, but it was a light one.

I enjoy the Badger Chemist very much and would hate to see it go under".

James M. Gaidis, Ph.D. '67; Group leader, W. R. Grace and Co., Cambridge, Massachusetts.

William H. Glaze, Ph.D. '61, Professor of Chemistry, North Texas State University, Denton, Texas is participating in a team-taught, interdisciplinary science course in a newly formed Honors Program at NTSU.

C. David Gutsche, Ph.D. '47, is busy with one of his colleagues at Washington University in preparing a textbook of chemistry.

Ronald G. Haas, Ph.D. '70, has become a clinical chemist at the Marshfield Clinic. He had previously been at the Kenosha Memorial Hospital.

Kathy Haller, M.S. '73; H.S. Chemistry Teacher, Cottage Grove, Minn. Switching into education from chemistry.

Ralph M. Hill, Ph.D. '38, calls the editor's attention to the misspelling of Professor Adkins' name in the last issue. He also indicates that my item about "Welcome Aboard" sounded a bit ambiguous. The Editor takes this opportunity to make it clear that Welcome Aboard is a travel agency, located at 580 Main St., East Orange, N. J. He guarantees special service to Badger Chemists. It is a pleasure to report that Ralph finds the new work personally satisfying.

Larry A. Holmes, Ph.D. '68, is now technical sales representative of Exxon Company at Des Plaines, Illinois.

Ray C. Houtz, Ph.D. '32, responded to the editor's request for early editions of textbooks by departmental authors with a pre-first edition of Daniels, Mathews and Williams "Experimental Physical Chemistry". This was a paperback manual which was tried out for a year or two before the hard cover version was published in 1929. Dr. Houtz is in the Chemistry Department of Winona State College.

Peggy Hurst, Ph.D. '56, continues in her position at Bowling Green State University in Ohio. She spent last summer helping with a Summer Institute for High School Chemistry Teachers.

Andris Indriksons, Ph.D. '71; Postdoctoral Fellow in Preventive Medicine, University of Wisconsin, Madison. Gained exposure to the diverse areas of medicine, such as cytogenetics, immunology and related physical sciences.

(Continued on page 10, col. 1)



The Happy Chemists at UW-Madison

Picture was taken in May 1972 on south side of the Farrington Daniels Chemistry Building. Identifications are l. to r. Area of chemistry is indicated in () as follows: A. Analytical, G. General (Freshman Chem.), H. History, I. Inorganic, O. Organic, P. Physical, R. Rheology or Colloid, T. Theoretical Chem. Inst.

Back Row: Tom Record (P,G), John Schrag (A,P,R), Larry Haskin (A,G,P), Don Gaines (I,G), Jim Taylor (A,P), Ian Dance (I,G), David Hopgood (A,G), Steve Nelson (O), Hans Reich (O), Tom Whitesides (O), Marion O'Leary (O,G), John Keana (O, Visiting Prof. from Univ. of Oregon, Eugene), Charles Casey (O).

Middle Row: Bassam Shakhashiri (Coordinator of General Chem.), Norb Isenberg (G, Visiting Prof. from UW-Parkside), Bob Lavine (A, Coordinator of Analytical Labs), Ed Larsen (I,G), Dick Bernstein (P,T), Jack Williams (Emeritus, P,R), Paul Treichel (I,G), John Ferry (P,R), Aaron Ihde (H), John Harriman (P,T), Dennis Evans (A), Paul Bender (P, Director of the Departmental Instrumentation Center), Michael Berry (P).

Bottom Row: Dave Crosley (P), Worth Vaughan (P), Larry Dahl (I,P,G), Les Holt (I,G), Chuck Curtiss (P,T, Assoc. Dir. TCI), Joe Hirschfelder (P,T, Dir. Theor. Chem. Inst.), Odell Taliaferro (Demonstrator, G), Dick Fenske (I,G,P, Incoming Chairman), John Willard (P,G, Outgoing Chairman), Alex Kotch (O, Assoc. Chairman), Harold Schimming (Administrative Asst.), Walt Blaedel (A), Bette Germann (Dept. Secretary), Howard Zimmerman (O).

Not on Picture: Emeritus Professors F. Daniels (P), S. M. McElvain (O), V. W. Meloche (A), H. A. Schuette (Food); Professors Phil Certain (P,T), Dan Cornwell (P,T), Harlan Goering (O), Irv. Shain (A,P, Vice-Chancellor), Barry Trost (O), Ed Vedejs (O), John Walters (A,P), Bob West (I,O,G), Howard Whitlock (O), Al Wilds (O), Claude Woods (A), Hyuk Yu (P,G). John Wright (A,P) had not yet joined the department.

Daniels . . .

(Continued from page 4)

and Eugene Rabinowitch, of "Photochemistry in the Solid and Liquid State".

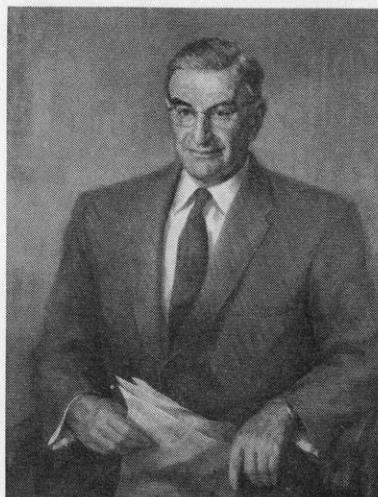
The early studies on oxides of nitrogen would ultimately lead to efforts to develop a method for nitrogen fixation with commercial potential. This utilized the direct combination of nitrogen and oxygen in a gas-fired ceramic furnace so designed as to minimize heat losses through use of the regenerative principle. The equilibrium yield of nitric oxide was sufficiently favorable to justify patents controlled by the Wisconsin Alumni Research Foundation and commercially-financed pilot plant trials. It was Daniels' hope that this might introduce a low-capital alternative to the Haber Process which might be useful in fertilizer production in underdeveloped countries. Although close to being successful, the process was ultimately abandoned as being uncompetitive with existing operations.

During World War II, Daniels was called upon to assist in defense projects, particularly in connection with the atomic energy program. He was associate director of the chemical division, Metallurgical Laboratory, Manhattan District, Chicago in 1944-45 and became Director of the Laboratory in 1945. With the creation of Argonne National Laboratory, he became the first Chairman of the Board of Governors (1946-48). During the latter period he was enthusiastic to start planning a nuclear reactor suitable for commercial power generation. His proposals received support for a time but a change in governmental priorities led to sidetracking the project. He resumed his university activities at Madison where he concentrated on a variety of research interests: a survey of uranium resources; development of a program of isotope enrichment and application; and the study of thermoluminescence of minerals. The latter field would prove of particular significance in the fields of geology and archeology.

In the meantime, he was turning his enthusiasm toward the practical utilization of solar energy. Realizing that readily available power would be a problem of the future, he saw more than two decades ago that scientific input was needed if an energy disaster was to be averted. He became pessimis-

tic about the continued use of fossil fuels since they represented non-renewable resources present in the earth in limited supply. He became equally disenchanted with nuclear power since it too depended on a finite quantity of a limited resource. The breeder reactor might gain time but was not a final solution and fusion energy looked far in the future. The obvious hope lay in the sun's energy and, with his characteristic energy and enthusiasm, he set out to see what could be done to make solar energy more readily utilizable. A further appeal lay in the hope that solar energy might be trapped by simple apparatus suitable for use in underdeveloped cultures. It was characteristic of him to always show compassion for the less fortunate people of the world.

The solar energy studies were



Oil Painting by
Charles W. Thwaites, 1959

pursued during the fifties and with even greater vigor after his retirement. He soon enlisted the aid of Professor John A. Duffie of the Mechanical Engineering Department in connection with design of energy collectors and storage units. Together they edited a volume, "Solar Energy Research," which was published in 1955. Another volume, "Direct Use of the Sun's Energy," would come from Daniels' pen in 1964. His expertise was widely sought and he and Mrs. Daniels made several round the world trips to give lectures and consult with interested scientists and statesmen. Mrs. Daniels kept journals of their trips which were circulated among friends and she took many pictures. Many stu-

dents, colleagues, and friends remember gracious evenings in the Daniels' home when they shared their experiences and slides.

In an attempt to try out simple solar devices among simple cultures, Daniels enlisted the aid of anthropologists. Professor Milton Barnett sent several graduate students to Southwestern U.S. and to Mexico to make ethnographic studies and introduce solar devices into the cultures. Professor and Mrs. Daniels followed up this work by spending the Easter festival period in Oaxaca one year in order to study the problems firsthand. While there, Dr. Daniels worked with native artisans to develop techniques of building solar cookers of inexpensive native materials and designing a large scale solar boiler for preparation of hot water for dye baths. Hal and Gretchen Serrie, on the project in Teotitlan del Valle, allege that Dr. Daniels could work circles around everyone, young and old, native and American.

Administrator

Farrington Daniels was never one to shirk administrative responsibilities, even when he might prefer to pursue his research, teaching, or writing. When Professor Mathews was approaching retirement in 1952 the chemistry faculty turned to Professor Daniels as his obvious successor. In characteristic fashion, he accepted the new duties and led the department during a period of difficult growth. One of his first acts was to inaugurate a colloquium in which members of the faculty discussed their research activities before colleagues and graduate students, thereby making everyone more familiar with the department's total program.

Feeling that the department should have greater liaison with its alumni, he encouraged Professor H. A. Schuette to write up available news about the department and its alumni. Thus, the Badger Chemist was born in the summer of 1953. He did not want it known but it can now be told that Dr. Daniels provided the funds for printing and mailing the first newsletter out of his own pocket. He was an enthusiastic supporter and generous contributor up to the time of his death.

Perhaps his major effort as chairman went into expansion of space. The department was bulg-

(Continued on page 9, col. 1)

Daniels . . .

(Continued from page 8)

ing at the seams in 1952 and plans were instituted for a prospective addition to the east of the existing structure (on the tennis courts). Professor Mathews was taken from retirement to draw plans. Then an alternative was suggested on account of the hazardous condition of the center unit of the old building. It was proposed to tear down the 1905 portion (including the lecture room) and replace it with a high-rise unit. Neither plan materialized.

Finally it was decided by the university administration that such expedients would merely create future problems. Chemistry should start a new building across the street, the first such university building south of University Avenue and an area frowned upon for university expansion by the legislature and many citizens. Daniels not only fought the battle for the move, but for the funding of what became the Research Unit on Johnson Street (now officially renamed the J. Howard Mathews Laboratory). The frustrations of obtaining funding from the legislature, WARF, NSF, and NIH would have broken most administrators. Daniels never sulked after each rebuff but gathered new ammunition and tried again. The building is evidence of his refusal to give up when he knew his case was sound.

Offices and Honors

In 1953 Farrington Daniels was president of the American Chemical Society. Earlier he had been Chairman of the Division of Physical and Inorganic Chemistry and had served as a Director of the Society. He was thrice honored by the Society with the Priestley Medal, the Willard Gibbs Medal, and the Norris Award.

In 1937 and again in 1947 he served as vice-president for chemistry of the AAAS. The National Academy of Sciences made him its vice-president in 1959-61. Other presidencies include Sigma Xi (1965-66), Geochemical Society (1958), and the International Solar Energy Society (1964-67). He was a Fellow of the American Academy of Arts and Sciences and of the American Nuclear Society. The Wisconsin Academy of Sciences, Arts, and Letters made him a life member in 1959 and awarded him

its Distinguished Service Citation in 1967.

The University of Wisconsin awarded him the honorary degree of Doctor of Science in 1966. He also received honorary doctorates from the universities of Minnesota, Rhode Island, Louisville, and Dakar.

Humanitarian

The courage and sense of decency of Farrington Daniels are seen at their best in his support for Allen Astin in the ADX2 battery rejuvenator case which placed the integrity of all government scientific bureaus in jeopardy, in his support for nuclear scientists during the witch-hunting days, and in his support for the Metallurgical Laboratory scientists in 1945 when they realized the awful consequences of the weapon they had created. He would be a staunch supporter of the Federation of Atomic Scientists and his name always appeared on the masthead of the "Bulletin of the Atomic Scientists."

It was undoubtedly as a humane

human that Farrington Daniels had his greatest influence. He entered upon all of his activities with a sincerity and an enthusiasm that was infectious. The influence on his colleagues and his students was enormous. John Willard and those other colleagues who wrote the Faculty Memorial said, "The Nature of Farrington Daniels was further typified by his ability to bring out the best in people by assuming that they would do their best, by his persistence and effectiveness in seeing that jobs that should be done were accomplished, by the unstinting giving of his time to all who asked for his counsel or help, by his staunch support of the integrity of human beings during periods when they were being attacked by public figures, and of the integrity of government scientists during attacks on the National Bureau of Standards, and of his phrasing of the unwritten code of the scientist: 'The unanswering adherence to truth without regard to personal prejudice, professional progress, political pressure, or money.'"



Ground Breaking for Research Unit on Johnson Street—1960

(Now the Mathews Research Laboratory)

l. to r.: F. Daniels (Chairman, Chem. Dept.) at far left, E. M. Larsen (Chem. Building Comm.), Conrad Elvehjem with shovel (President of UW), Fred Risser, Jr. (State Senator, Madison Dist.), unidentified, J. H. Mathews (former Chairman, Chem. Dept., who was involved in early plans for space expansion), Mark Ingraham (partly obscured behind Mathews, Dean of L and S), Carl Steiger (President, UW Board of Regents), next two are unidentified, Alfred W. Peterson (UW Vice-President for Financial Affairs), unidentified. The unidentified persons are representatives of WARF which helped fund the laboratory, the State Bureau of Engineering, and the architectural firm.

NEW BADGER CHEMISTS

BACHELORS DEGREES

January 1972

ANDERSON, Alan B.
BAUMANN, Kathleen A.
EMAMI, Mina
KOENECKE, Roger Allen
LI, Juliana Kam-Wah
LIE, Fie Pin
MUI, Kok-Chee Roger
SPRICE, Patrick D.

June 1972

AMBELANG, Thomas H.
BORCHERT, Steven J.
CEILESH, Jerry
CHECKAI, Ronald T.
DREYER, Mark W.
EGNER, James R.
GARNEAU, Stewart C.
GIRDAUKAS, Gary G.
GUNSEOR, Frank D.
HUE TTL, Peter J.

JACOBS, Alan
JIRSCHELE, John W.
KAEDING, Jeanne
KOERWITZ, Peter Harold
KONS, Hugo L.
KOWLE, Ronald L.
LASKOWSKI, Edward J.
LEE, Gilbert D.
LORENZ, Linda J.
NEUBOLD, Hans B.
OLIVER, George W.
PARRISH, Nancy J.
PHILLIPS, Mary L.
PICARD, David R.
RAWSTHORNE, Larry F.
RYER, Dennis A.
SCHWARTZ, John C.
TOM, Yon Yu
WELLS, John R.
WICKMAN, Don C.
YEUNG, Grace Wing-Wah

MASTERS DEGREES

January 1972

ANDERSON, Michael R.
FISCHER, Joseph B.
FITZPATRICK, James H.
GROW, James M.
LATTIMER, Charles J.
NELSON, Eric A.
SABBAK, El-ssaed Omar
TY, Violeta T.

June 1972

BERNHARDT, John C.
DIXON, Thomas A.
HAILE, Clarence L.
HOSCH, Jimmy W.
JENKINS, Roger A.
JORDAN, Paul N.
KOONTZ, Stephen W.
PENDERGAST, David C.
SEPPANEN, Errol D.
SOLSTAD, Priscilla J.
TRINH, Viet

PH. D. DEGREES

January 1972

BOWMAN, Joseph D.
CAMP, Michael J.
CHIPMAN, Daniel M.
CHWANG, Tek-Ling
EPLING, Gary A.
FUCHS, Philip L.
HENZLER, Thomas E.
HINTZ, Harold J.
HUNTER, Lawrence W.
INDRIKSONS, Andris
JOHNSON, Bruce M.
KOERMER, Gerald S.
LOEWENSTEIN, Michael A.
MASON, Ronald P.
PATTON, Elizabeth Ann
RICKARD, Eugene C.
SALOMON, Mary E.
STUCKI, Heinz
SUKUP, Janice L.

(Hirschfelder)
(Larsen)
(Hirschfelder)
(West)
(Zimmerman)
(Vedejs)
(Larsen)
(Nelsen)
(Curtiss)
(West)
(Taylor)
(Goering)
(Gosting)
(Harriman)
(West)
(Shain)
(Vedejs)
(Whitlock)
(Larsen)

TOAN, Trinh (Dahl)
VERGAMINI, Phillip J. (Dahl)
YEAKEL, Warren C. (Fenske)
ZIMAN, Stephen (Trost)

June 1972

BORS, James J. (Haskin)
BRUBAKER, Kenneth L. (Harriman)
DeKOSKY, Robert K. (Ihde)
DIRREEN, Glen E. (Treichel)
FRISCH, P. Douglas (Dahl)
JONES, Alan A. (Cornwell)
KORDA, Randolph J. (Goering)
MALIK, Joseph M. (O'Leary)
PERCHONOCK, Carl D. (Trost)
RULIS, Alan (Bernstein)
SMITH, David L. (Treichel)
STACH, Robert W. (O'Leary)
STEBBINGS, William L. (Taylor)
WHITMAN, Peter J. (Trost)

This 'n' That . . .

(Continued from page 6)

Elmer Johnson, Ph.D. '40, was in Madison last summer when his wife underwent successful surgery at University Hospitals. Elmer continues his activities at South Dakota State University, Brookings.

George O. Johnson, Ph.D. '31, writes that he has just ended his

ninth year of retirement from the Culver Military Academy. He reports that he is in good health and is enjoying the decreased income tax which comes with retirement.

John Arthur Keenan, B.S. '30, who is now President of Speidel, a Textron Company, has an address at 70 Ship Street, Providence, Rhode Island. He writes that he particularly appreciated the picture and write-up on Dr. Mathews.

William E. Koerner, Ph.D. '49, says that the Badger Chemist is "A very welcome tie back to some good days in my life," but tells us nothing about himself. He is living at 5642 Merdock Avenue, St. Louis.

Charles L. Krister, M.A. '39, sends his contribution from 1207 Covington Road, Carrcroft, Wilmington, Delaware, with the re-
(Continued on page 11, col. 3)

Stanford Moore Receives Nobel Prize

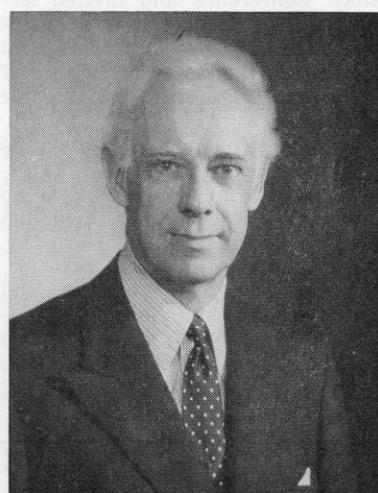
The Nobel Prize in Chemistry for 1972 was shared by Stanford Moore, Ph.D. '38, William Stein, and Christian B. Anfinsen. Moore and Stein are colleagues at Rockefeller University; Anfinsen is with National Institute of Arthritis and Metabolic Disease. All three investigators were recognized for their work on the structure of the enzyme, ribonuclease, from beef pancreas. Drs. Moore and Stein worked in close collaboration on the analysis of the complete sequence of 124 amino acid residues in RNase.

Isolated in crystalline form by M. Kunitz of the Rockefeller Institute in 1941, ribonuclease proved to be a small protein molecule with molecular weight of approximately 14,000. By the end of the 1940's the enzyme became commercially available in kilogram quantities. In the meantime Moore and Stein had made much progress in the development of procedures for separating and quantitatively analyzing protein hydrolysates, using column chromatography, at first with starch, then with ion exchange resins. They developed the fraction collector and went on to create an automatic amino acid analyzer in collaboration with D. H. Spackman. The new methodology was a significant advance over the laborious techniques used by Frederick Sanger in studying the amino acid sequence in insulin.

Using the new techniques, Stein, Moore, and C. H. W. Hirs undertook the study of the sequence in ribonuclease. Their successful undertaking paralleled complementary work by Anfinsen and others, leading to a comprehensive understanding, not only of the amino acid sequence, but of the shape of the molecule and the location of sites of activity. Ribonuclease was the first enzyme to undergo a complete study of this sort.

Stanford Moore was born in Chicago on September 4, 1913. He took his A.B. at Vanderbilt in 1935, then became a WARF fellow at Wisconsin. Although Homer Adkins was technically his major professor, his dissertation research was done with Professor Karl Paul Link of the biochemistry department. In a letter to the Editor, Dr. Moore writes that Link "... started out by teaching me with his own hands the microchemical techniques of Pregl, in whose laboratories in Graz he had

recently been a visitor. That was good training for a chemist who was to study quantitative micro methods for the analysis of proteins in terms of their constituent amino acids." The title of Moore's thesis was, "The Identification of Carbohydrates as Benzimidazole Derivatives." The Ph.D. was granted in 1938. Dr. Moore writes further, "The classes with Adkins, S. M. McElvain, and Farrington Daniels were among the best in



Dr. Moore

the country in the 1930's. I was lucky to be one of Dean Fred's "WARF" boys in those days when the funds from the Steenbock patients were drawing students from all over the United States to the Madison campus."

Dr. Moore became an Assistant at the Rockefeller Institute of Medical Research in 1939, rising to his full professorship of biochemistry in 1952. His early work at the Institute was in association with Max Bergmann and his interests turned toward the chemistry of proteins. Dr. Stein also joined the Rockefeller Institute in 1939 and close collaboration between Moore and Stein began at an early date.

During the war years, 1942 to 1945, Dr. Moore was with the Office of Scientific Research and Development in Washington and since that time he has served several government agencies as consultant and committee member. In 1950-51 he was Franqui Professor at the University of Brussels and in 1951 was visiting investigator at Cam-

bridge University. He was chairman of the Organizing Committee for the Sixth International Congress of Biochemistry, held in New York City in 1964. Between 1953 and 1957 he served as secretary of the Commission on Proteins of the IUPAC. He was President of the American Society of Biological Chemists in 1967, and of the Federation of American Societies for Experimental Biology in 1971. Besides the Nobel Prize he has received many honors, including the degree of *Docteur honoris causa* from the faculty of medicine, Brussels (1954); and from the University of Paris (1964); the Richards Medal of the ACS; the Linderstrom-Lang Medal (Copenhagen); and membership in the National Academy of Sciences.

The staff of Badger Chemist, in behalf of the Chemistry Department and of Badger Chemists everywhere, extends congratulations to Stanford Moore on his distinguished achievements.

This 'n' That . . .

(Continued from page 10)

mark "Enjoyed last issue" but no news about himself.

Edward C. Kwasiewski, B.S. '32, of 33 Fieldcrest Ct., Seneca, N.Y. writes that he has just retired but during the first 20 days has found it difficult to get used to it. Ed also writes that he enjoyed hearing about Dr. McElvain who was responsible for his coming to Buffalo in 1934 to work with National Aniline Chemical Company. He spent 38 years in azo chemistry production and research.

C. Marvin Lang, M.S. '64; Associate Professor, Department of Chemistry, University of Wisconsin-Stevens Point. First Chairman of the newly formed Central Wisconsin ACS Section in 1972, and is National Councilor for 1973-75.

Shortly after publication of Newsletter No. 18, Dr. Schuette received a long letter from Adeline Lofstrom, telling about the Lofstrom family activities. She worked under Dr. Ferry and Ed Fitzgerald on the Transducer while John was getting his Ph.D. under Professor Blaedel. They have three children, the eldest a senior in high school. Daughters Susan and Christine are also in high school. All of them sound like talented youngsters. John is both a musician and

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FACULTY

On July 11, 1972, Lawrence F. Dahl presented a paper on "Synthesis, Structure and Bonding of Organometallic Cluster Systems: A Unified Mo Model Rationalizing the Drastic Effect of Anti-bonding Electrons on Molecular Geometries of Metal Clusters Systems". This was presented at the Gordon Research Conference meeting on Organometallic Chemistry held at Wayland Academy.

Dennis Evans presented seminars at Indiana University, University of Massachusetts, Florida State University, University of South Florida and Southern Illinois during the past term.

John D. Ferry made a quick trip to England in May to receive the Colwyn Medal of the Institution of the Rubber Industry at an international rubber congress at Brighton. He also gave talks at the University of Essex and the National Rubber Producers' Research Association. Professor and Mrs. Ferry returned to Europe in August and, after a week of travel through the chateau country of the Loire valley, attended the 6th International Congress of Rheology at Lyons, France, followed by a conference on polymer mechanics at the Kronberg Castle near Frankfurt, Germany, sponsored by the Battelle Institute.

Alex Kotch made site visits in his role as consultant-examiner for the North Central Association of Colleges and secondary schools at Quincy College in Illinois, University of Missouri-Rolla and Cleveland State University and Colorado School of Mines. He was secretary-treasurer of the Wisconsin Section of the A.C.S. during the past two years, having recently passed on the job to Professor Record. Dr. Kotch and his family have vacationed in the Rocky Mountain region during the past two summers.

Emeritus Professor Harvey Sorum, Ph.D. '27, and his wife Emma-Lou started the new year with a fifty-six hundred mile automobile trip in Mexico. They entered at Nogales on January 4, moved down the West Coast, zig-zagged back and forth from Guadalajara to Yucatan, then back through Eastern Mexico to exit at Brownsville, Texas. Harvey reports that he has been enjoying his first two years of retirement, spending most of his time having

fun. His new laboratory manual "Selected Experiments For Basic Chemistry", came off the press in mid-1972. He recently participated in a conference on the Role of the Lecture in General Chemistry Teaching which was sponsored by colleges in the Detroit area.

Barry Trost spent the spring semester last year as Visiting Professor at Marburg University. While there, he gave lectures at Giessen, Göttingen, Marburg, Heidelberg, and a number of other German Universities. He also gave a plenary lecture at the Burgenstock Conference and invited lectures at the Universities of Paris and Geneva. He recently became a member of the Board of Editors of JACS and Journal of Organic Chemistry.

Howard Zimmerman served as Chairman of the Fourth International IUPAC Symposium on Organic Photochemistry, held last July in Baden-Baden, Germany. While in Europe he also gave lectures in Karlsruhe, Würzburg, and Tübingen and in Sheffield, England. He recently gave a plenary lecture at the Dallas ACS meeting and spoke at a symposium at Texas A and M.

This 'n' That . . .

(Continued from page 11)

a science enthusiast. John Senior, is research chemist for duPont Photoproducts in New Jersey, he is also very busy on ecological projects.

Roger H. Lueck, M.S. '21, supplied us with a copy of the second edition of the Getman textbook. Roger had particular interest in the textbook collection as a former graduate student of Professor Daniels during his first years at Wisconsin.

Robert E. Lyle, Jr., Ph.D. '49, has been serving on the ACS Committee on Nominations and Elections. Bob is a faculty member at University of New Hampshire.

Blair MacQueen, M.A. '23, was in Madison for the 50th class reunion. Other chemists and Chemical Engineers at the reunion were Wilson Trueblood of Tucson, Sydney Drew of Portland, and Honore Hubbard of Rockford, Bud Schneider of Wausau and his wife who was Anne Alexander, B.S. '23, Ralph Spence of Albany, Georgia. Blair is enjoying his retirement in Oconto, Wisconsin. His address is 804 Main Street.

John C. Wright Joins Department

Dr. Wright became Assistant Professor of Chemistry in the Analytical Division last fall. Born in Lubbock, Texas, he received his B.S. in physics from Union College in 1965. The Ph.D. in physics was taken at Johns Hopkins in 1970 under Professor H. Warren Moos, his thesis being titled "Spectroscopic Study of Magnetic Phenomena in D_3PO_4 , D_3AsO_4 , and D_3VO_4 ". During 1970-72 he was a postdoctoral student with Professor F. K. Fong of the Chemistry Department at Purdue where his principal research was concerned with the development of laser-pumped infrared quantum counters.

Dr. Wright's research interests include utilization of the unique properties of coherent sources of radiation to investigate microscopic properties of matter, properties that either could not be previously obtained or were obtained only with greatest difficulty. He is also interested in the static and dynamical processes which are important in quantum electronic materials with a view toward chemically manipulating quantum electronic materials on an atomic level to substantially improve their performance.

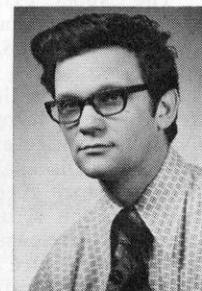
Dr. Wright is married to the former Carol Swanson, who received her M.S. degree from Johns Hopkins. She taught Latin and Greek for two years in Baltimore High School. The Wrights now have two children, a daughter, Dawna Lynn, who is 2 years old and J. David, a recent addition.

Mildred M. Maguire, M.S. '60, received tenure status and is Associate Professor of Chemistry at Waynesburg College, Waynesburg, Pa.

Ronald McKelvey, Ph.D. '72, is with the Paper Chemistry Institute at Appleton, Wisconsin.

Nancy McKenna (m.n. McFadden) M.S. '69; Life Science teacher in Hockessin, Delaware—is teaching 7th grade and loves it. Worked out own course program—contract

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"Mel" Recognized for Hockey Restoration

A column in The Capital Times for February 15, 1973 carried a picture of Emeritus Professor V. W. Meloche together with the following item.



"Chem Mel—one of the men responsible for starting University of Wisconsin hockey in the modern era, has been unable to see the Badgers perform at the Coliseum since Christmas. Professor Villiers "Mel" Meloche has been recuperating from an operation. Meloche was Chairman of the Wisconsin Athletic Board, and one of the prime movers, when hockey was restored on an intercollegiate basis in 1962. A longtime hockey fan, he was a spectator at Wisconsin games, in the frigid weather, on the lower campus in the 20's and early 30's. He has been a longtime member of the Blue Line Club. Retired, after 42 years as a chemistry professor, Mel plans on being at the Blue Line meeting Friday but his Doctor says no to actual

games. He will be leaving shortly for recovery in Tucson."

We are pleased to report that Mel has shown excellent recovery from his surgery.

We are also pleased to report that the Wisconsin hockey season has been a successful one. Although the team was nosed out of first place in the Western Intercollegiate Hockey Association Conference by Denver, they won tough playoff games against Minnesota and Notre Dame to qualify for the finals of the NCAA hockey tournament in Boston in mid-March. In the semifinals against Cornell they gave away four goals during the first two periods and were losing 4-0 when their first goal was scored. Both teams scored one additional goal and Wisconsin was losing 5-2 early in the third period. They were still losing 5-4 with less than two minutes to play when Wisconsin's goalie was removed from the crease and Wisconsin played with six skaters up front and scored the tying goal with about five seconds left in the game. During the "sudden death" ten minute overtime, Wisconsin scored the winning goal with about 30 seconds to go.

This 'n' That . . .

(Continued from page 12)

course—the students decide what they want to do and thus determine their grade. They seem to like it thus far.

Thomas R. Miller, Ph.D. '73, is reported by Professor Dance to be with the Knolls Atomic Power Laboratory in Schenectady.

Nels Minne, Ph.D. '32, President Emeritus of Winona State College, traveled in Greece last year. A souvenir of the trip was a 100 drachma note of the Bank of Greece carrying the engraved head of Democritos, the founder of Atomism, which was sent to the editor. Dr. Minne reports that clerks, waiters, and others failed to identify the portrait on the currency.

Yutaka Mitsuda, Ph.D. '73, is returning to Denki Kagaku Kogyo Company, Niigata, Japan.

Forest S. (Jack) Mortimer, Ph.D. '43, reports that he is still with Shell Development as a research supervisor. He is currently involved in various spectroscopic developments.

Charles Muckenfuss, Ph.D. '57, accompanied his contribution last July with a note "Don't fire the editor! The alternative is a lot more freshman advising for him!!"

Joseph Niu, Ph.D. '62, is Senior Research Chemist, BASF Wyandotte Corp., Wyandotte, MI. Visited Hong Kong and Taiwan January 1973. Obtained a Master of Business Administration degree December 1972.

Michael O'Connor, M.S. '60; Director, Clinical Laboratories, University of Iowa Hospital.

John L. Oncley, Ph.D. '33, was designated as one of four scientists to receive the 1972 Stouffer Prize for pioneering research on cholesterol. The prize is sponsored by the Vernon Stouffer Foundation.

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ORGANOSILICON MEETING

More than 240 chemists from 13 countries attended the Third International Symposium on Organosilicon Chemistry, held in Madison August 20-24, 1972. This was the first time this meeting has been held in the United States—the two previous symposia were in Czechoslovakia in 1966 and in France in 1969. Professor Robert West was Chairman of the Organizing Committee, and Dr. Ray Parnell, a Postdoctoral Fellow in Chemistry, served as General Secretary.

The opening session was held in the large auditorium in the Chemistry Building on August 21, where the participants were welcomed by Chancellor Edwin Young. Later sessions were held at the Wisconsin Center. During the four-day meeting 114 papers were presented. Two notable developments reported at the Symposium were the increasing evidence for multiply-bonded Si compounds as re-

action intermediates, and the surprising finding that numerous organosilicon compounds have high biological activity. Rather simple organosilicon structures show high activity as sex hormones, for instance. And Professor M. Voronkov from Irkutsk, USSR, reported marked reduction in tumor size through the use of organosilicon-based anticancer drugs.

Many former UW students were in Madison for the Symposium. Papers were presented by Ronald Baney, Ph.D. '60; Joyce Corey, Ph.D. '63; Gene Corey, Ph.D. '19; Mitsuo Ishikawa, Postdoc, 1965-67; Paul Jones, Postdoc, 1966-68; Alan MacDiarmid, Ph.D. '53; John Margrave, UW Chemistry Faculty 1952-; Terry Selin, Ph.D. '61; Jack Thayer, Ph.D. '64; as well as by Dr. West and his students. Other ex-Wisconsin students attending included Edward Carberry, Ph.D. '68; Keith Fisher, Postdoc 1968-70;

Gerald Gornowicz, Ph.D. '70; Ronald Husk, Postdoc 1965-66; Anthony Matuszko, Postdoc 1967-68; Rudy Salinger, M.S. '60; Herbert Sipe, Jr., Ph.D. '69; Frank Stewart, Ph.D. '69; Verne Quass, Ph.D. '69 and Gary Wulfsberg, Ph.D. '71.

The meeting ended Friday morning with excursions to Wisconsin Dells and the House on the Rock. Plans were made in Madison for the next Organosilicon Symposium, scheduled for Leningrad, USSR in 1976.

This 'n' That . . .

(Continued from page 13)

tion and includes a substantial cash award. Dr. Oncley was honored for his pioneering work on lipoproteins. The award ceremonies were held in Cleveland on October 20, 1972. Dr. Oncley was a graduate student of Professor J. W. Williams while he was at Wisconsin. He was associated with the Harvard University Medical School for many years and is now at the University of Michigan.

Elizabeth Patton, Ph.D. '71, is working as a postdoc in the Biochemistry Department, University of Rochester. First child, Rob was born June 1972.

Fredus N. Peters, Ph.D. '25, of 400 Golden Gate Points, Sarasota, Florida, has been retired from Quaker Oats for several years and is enjoying the birdwatching opportunities in Florida. He recently sent a delightful letter reporting on activities in the Chemistry Department at the time he was a student in the 20's, working for his doctorate under Professor Richard Fischer.

Nancy G. Potts, B.S. '15, of 730 S. Spring Avenue, LaGrange, Ill. supplied us with 3 textbooks having their origins in the Wisconsin Department.

David L. Powell, Ph.D. '63; Associate Professor, College of Wooster, Wooster, Ohio. Took research leave and worked with Peter Klaebe at the University of Oslo, Norway, last year.

Albert F. Preuss, Ph.D. '53, is Vice-President for Research and Development at the Ionac Chemical Company in Birmingham, New Jersey.

Allen K. Prince, Ph.D. '56, presented an informal seminar to the department last September on the subject, "Industrial Research." Al is director of Functional Products Research and Development at Dow.

Peter C. Pritzl, M.S. '30, wrote Dr. Schuette that, having spent 10 years in Montana, he has had an opportunity to check his statement that "Montana produces the purest honey!" The Reverend Pritzl has served two large churches in Montana and has now retired to a small mission parish near the Canadian border. He loves the "Big Sky" country. His chemical interests have remained alive through his efforts to help the farmers with water sources and irrigation developments.

LaVerne C. Quass, Ph.D. '69, is Assistant Professor of Chemistry, University of Wisconsin-Parkside.

Wilkins Reeve, Ph.D. '40, writes, "Keep up the good work." His letterhead indicates that he is Professor of Chemistry at the University of Maryland.

Robert W. Rosenthal, Ph.D. '59, has a son who recently finished his first year at the University of Wisconsin. Bob is with Gulf Research and Development in Pittsburgh.

Eunice McGilvra Rusch, B.S. '46, is chemist in the Southern Regional Research Laboratory of the U.S.D.A. in New Orleans. The eldest of her four children is studying Chemical Engineering at Louisiana State University.

Harold P. Rusch, B.S. '31, (M.D. Wisconsin) was presented with an American Cancer Society National Award at the Society's annual dinner in New York City last November. Dr. Rusch is director of the McArdle Laboratory for Cancer Research in connection with University Hospitals. He has been a director of the American Cancer Society since 1935, and was recently president of the Wisconsin Division.

Leo Safranski, B.S. '37, of 405 Covington Road, Carrcroft, Wilmington, Delaware writes "Just can't let the Badger Chemist die". He sends no other news about himself.

Rudolf Salinger, M.S. '60, is Group Leader, Basic Intermediate Research, Dow Corning Corporation, Midland.

Clair N. Sawyer, B.S. '30, writes that he and Mrs. Sawyer are enjoying life in Sun City, Arizona on a semi-retired status. He lives at 10216 Kingswood Circle and his letterhead indicates that he is keeping himself involved in consulting activities.

Dalton L. Shinn, Ph.D. '35, is now retired from his research position at Crown Zellerbach Corporation in Camas, Washington after 35 years. He is now engaged in several hobbies including amateur radio, flying, electronics, and still does some consulting work on pulp and paper while his wife, former Wisconsin student Winnefred Enos, is society editor of the Camas Post-Record. They have a son and daughter and five grandchildren.

Henry J. Small, Ph.D. '71, was overlooked in the listing of degrees for 1971. His degree was done jointly in chemistry (Gaines) and history of science (Hiebert, Ph.D.

'53), his thesis title being, "The Helium Atom in the Old Quantum Theory." He is associated with the Center for History and Philosophy of Physics, American Institute of Physics in New York City.

R. Martin Smith, Ph.D. '70; Chemical Consultant, Wisconsin State Crime Laboratory, Madison, Wisconsin.

Lynn Sousa, Ph.D. '71, is becoming Assistant Professor of Chemistry at Michigan State University next July.

Willard F. Sprengeman, B.S. '30, Ph.D. '35, has retired from his position as laboratory director, Pigments Department of Du Pont. After receiving his B.S. at Wisconsin, he took his M.S. under H. B. Hass at Purdue, then returned to Wisconsin to work under the late Professor N. F. Hall. He was at Kimberly Clark for two years and then began his long career at Du Pont.

C. K. Steinhardt, B.S. '72, has taken a position as chemist with Napko Corporation in Houston, Texas.

Jane Ehr Pinger Taylor, B.A. '31, writes from Tucson, Arizona reporting a change of address but does not supply information regarding her activities.

Howard Tennent, Ph.D. '42, of Kennett Square, Pennsylvania writes "Fire everybody, but carry on! Scream again when necessary".

John Thayer, Ph.D. '64, is Associate Professor, University of Cincinnati. He is writing a book in the area of biological organometals.

Stephen W. Tobey, Ph.D. '65; Director, Eastern Research Laboratory, Dow Chemical, Wayland, Massachusetts.

Roland Trytten, Ph.D. '41, was honored in Stevens Point last October on the occasion of the formation of the Central Wisconsin Section of ACS. Roland had been a former Chairman of the Central Wisconsin Subsection at the time that the group was still connected with the Wisconsin Section centered in Madison.

Robert H. Valentine, Ph.D. '67, is now at 3M Company, St. Paul.

Marion H. Veazey, Ph.D. '26, responded from Hagerstown, Maryland with help for the editor but supplied no news about himself.

Vanderveer Voorhees, Ph.D. '24, who is a consulting chemical engineer and patent attorney in Los Altos, California, had a long European trip last summer. He and his

(Continued on page 15, col. 2)

In Memoriam

William D. Burdick, M.A. '26, died on March 21, 1971. He had been retired from the Milton College faculty since 1963, having served 44 years with the college. For 34 years he was head of the Chemistry Department and 10 were served as business manager.

William E. Caldwell, Ph.D. '30, died of a heart attack in his home in Corvallis, Oregon on December 26, 1972. After receiving his Ph.D. with Professor Walton he returned to his undergraduate Alma Mater Oregon State University where he spent his entire career until his retirement two years ago. With G. Brooks King, Ph.D. '31, he was author of the widely used general chemistry text, "The Fundamentals of College Chemistry", first published in 1948 and carried through four editions.

Robert Chiang, Ph.D. '53, died on July 3, 1970. He had been with Monsanto in St. Louis. His widow is the former Ruby Wong who took her M.S. with Professor Schuette in 1949.

Theron G. Finzel, Ph.D. '28, died on October 3, 1972 of a heart attack at Monroe, Wisconsin. He became associated with the Du Pont Rayon and Cellophane Company in 1928. In 1943, he was transferred to the University of Chicago and later to Oak Ridge, Tennessee where he worked on the Atomic Bomb project. When the war ended, he returned to synthetic fiber research. He became research manager for Midland-Rosse Incorporated of Cleveland, carrying out studies on Polyesters until his retirement in 1965.

George W. Heise, B.S. '09, M.S. '12, died in autumn of 1972. He was director of the Laboratories of National Carbon Company for many years before his retirement. During retirement he continued active in the authorship of a work on primary batteries. Shortly before his death he sent, for the Historical Collection, some historical material on this subject. In Badger Chemist No. 7 (1959) Professor Schuette published a lengthy profile on his career up to that time.

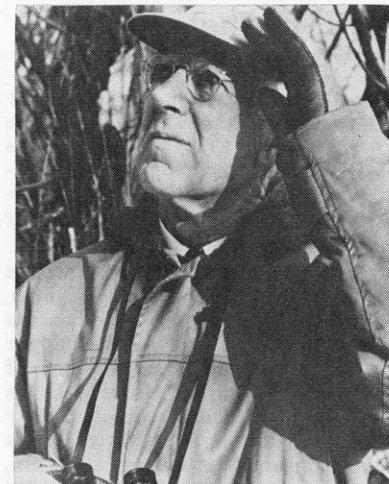
Mrs. Ester F. Klein, the widow of the late professor Michael Klein,

died on June 11, 1971 in a Madison hospital. She and Dr. Klein were fellow students at Lawrence College and were married in 1921. She is survived by their daughter Elizabeth who lives in Madison.

Arlie W. (Bill) Schorger, Ph.D. '16, died on May 26, 1972 in Madison. During his early professional career he was with the U.S. Bureau of Standards, the Bureau of Internal Revenue, and the Forest Products Laboratory. In 1917 he joined the C. F. Burgess Laboratories, later the Burgess Cellulose Co., becoming president of the latter company in 1931. He was active in the development of cellulose products, for example, the cellulose sponge. Author of "The Chemistry of Cellulose and Wood," he held 34 patents dealing with plant products.

At the same time he was a talented naturalist with a particular interest in ornithology. Upon retirement from his business activities in 1949 he gave full time to his former avocation and in 1951 the University Regents made him Professor of Wildlife Management in the department founded by Aldo Leopold. He was an active member of the department until his retirement as Emeritus Professor in 1955. Over the years he was an ardent student of the public records and published many papers on the wildlife of Wisconsin and two books, "The Passenger Pigeon, Its History and Extinction," and "The Wild Turkey, Its History and Domestication." The UW Press will posthumously publish, "Prairie, Marsh and Grove—The Natural History of a Midwestern County." (The county is Dane.)

He was a former president of the Wisconsin Academy of Sci-



ences, Arts, and Letters. Honorary Sc.D. degrees were conferred on him by Lawrence College (1955) and the University of Wisconsin (1961).

His outstanding library on natural history was given to the Department of Wildlife Ecology with a handsome endowment for its maintenance. His library dealing with wood chemistry was given to the Chemistry Department's Historical Collection.

Albert W. Stout, Ph.D. '34, died on August 6, 1972. He was presently a research chemist with the Western Pine Association Laboratory.

William E. Uebersetzig, known to generations of freshman chemistry students and TA's as "Bill", died on November 26, 1972 in a Madison nursing home at age 95. He served as a stockman in the Chemistry Department for 30 years before his retirement in 1947.

This 'n' That . . .

(Continued from page 14)

wife visited Yugoslavia, Greece and Germany.

Shirley L. Fitzsimmonds Wakefield, B.S. '57, completed her Ph.D. in Physical Chemistry at University of Cincinnati in 1969 and is associated with research and development in the solid state device laboratory of Avco Electronics Division, Avco Corporation, Cincinnati, Ohio. Her work with scientific instrumentation occasionally brings her back to the chemistry department at Wisconsin.

Guy Alexander, Ph.D. '47, is with the Wesson Division of Fansteel

Corp. Fansteel is building a research laboratory in the University of Utah Research Park at Salt Lake City. Guy will be director of the laboratory and Adjunct Professor of Metallurgy at University of Utah. His graduate students will be employees of the Fansteel Corp.

Carol Herman Wallace, Ph.D. '49, and her husband spent six weeks in Europe last summer where her husband, a psychiatrist, attended a conference on alcoholism and drug addiction in Amsterdam.

Thomas C. Wallace, Ph.D. '70; (Continued on page 16, col. 1)

This 'n' That . . .

(Continued from page 15)

Elected chairman of Chemistry Department, University of Los Andes, April 1972, for six months term. Served as Professor Contratado de Quimica Analitica, University of Los Andes, Venezuela for last 2 years.

Earl Whitford, Ph.D. '24, writes from 1275 Gulf Shore Blvd. North, Naples, Florida, that he hastens with a check lest the Badger Chemist fall into the clutches of Mafia loan sharks. He writes "In the current issue, I was pleasantly surprised to find a bit of news about friends as hoary as I am, including 'Skipper' Witherow and Sam McElvain who were charter members in the Sip and Stagger Club once housed on the fourth floor of the then new wing of the University Club." He invites Badger Chemists young or old to please stop by if they are ever in Naples. He reports that there are snakes in the boondocks but never fear, he always has a few cases of appropriate recovery medicine just in case.

Ronald Wingender, Ph.D. '69, is with the BioTest Company in the Chicago area.

Marvin O. Winkler, Ph.B. '29, writes from Cupertino, California wishing "the perpetuation of news from the Wisconsin Chemistry Department".

Earl H. Winslow, Ph.D. '29, writes that the last Badger Chemist recalled many pleasant memories.

Warren W. Woessner, Jr., Ph.D. '71, is now with the Miles Laboratories in Madison. His father was Ph.D. '40 with Professor H. A. Schuette.



Ivan A. Wolff, Ph.D. '40, is director of the U.S. Department of Agriculture's Eastern Regional Research Laboratory in the Philadelphia suburb of Windmoor. He became director 3 years ago after serving for 28 years as research scientist at the Northern Regional Research Laboratory in Peoria. The Windmoor Laboratory, which is doing research on a wide variety of animal and plant products, has been des-

ignated as a Research Area in the new organizational structure of the Agricultural Research Service. Ivan attended an 8-week intensive training program last fall at the Federal Executive Institute in Charlottesville, Virginia.

Rosalie Savet Wolff, B.S. '49, writes that she is in graduate school at Brandeis University as a doctoral candidate in the Florence Heller School for the Social Sciences. After graduation she started graduate work in biochemistry at Harvard but left to be married in March 1950. She kept her hand in chemistry as research chemist for the next three years at Worcester Foundation for Experimental Ecology. She writes that it is interesting to hear about what is happening on the Madison scene even though her professional interests have changed direction.

Gary Wulfsberg, Ph.D. '71, Assistant Professor of Chemistry, Northland College, Ashland, Wisconsin.

Y. Stephen Yamamoto, B.S. '65, received his Ph.D. in Chemistry from Pennsylvania State University in June 1971. He has taken a position as senior chemist in the emulsion research laboratories of Eastman Kodak Company, in Rochester, New York. Stephen's father is State Architect in Wisconsin. His younger sister Diane is working for her Ph.D. in Chemistry at the University of California—Berkeley.

John B. Youmans, B.A. '15, who went on to a medical career from his chemistry major, is now retired from his professorship of medicine at Vanderbilt University.

Frank Chandler Young, Jr., B.S. '66, has completed his service with the Navy and is with Container Corporation in San Francisco where he is associated with the sales program. Frank is the grand-

son of Emeritus Professor H. A. Schuette and the son of Associate Dean F. Chandler Young.

Mary Zosel, M.S. '70, is teaching chemistry and physical science in the Wauwatosa, Wisconsin High School.

Textbooks, Continued

The textbook acquisition project of Professors Livingston and Ihde has been strikingly successful. Professor Livingston reports from Purdue that he now possesses all editions of Getman and of Getman and Daniels, except for the second. The response to Professor Ihde's request has produced a complete set of all of the books of which Professor Daniels was author, both Laboratory manuals and P. Chem. textbooks. The Historical Collection still lacks a copy of the first edition of Getman.

The appeal also brought copies of Adkins and McElvain, Kahlenberg, and Walton and Krauskopf, besides additional books which are valuable additions to the Department's Historical Collection. Our thanks go to Nels Minne, Ph.D. '32, Nancy Gray Potts, B.S. '15, Leo Safranski, B.S. '37, Ray C. Houtz, Ph.D. '32, and Leslie E. Downs, M.S. '32.

Promotions

The following promotions were made in summer of 1972.

John P. Walters associate to full professor.

Edwin Vedejs assistant to associate professor.

Charlene Steinberg, M.S. '48, was recently promoted from assistant to associate professor at the UW-Sheboygan Center where she doubles as tennis coach.

Badger Chemist is still in financial distress (see "The Editor Reports," page 2). Besides inflationary price increases for printing, this issue is larger than the last on account of important additions after typesetting had begun. Send appropriate disaster relief to:

The Editor
Badger Chemist
Department of Chemistry
1101 University Avenue
Madison, Wis. 53706

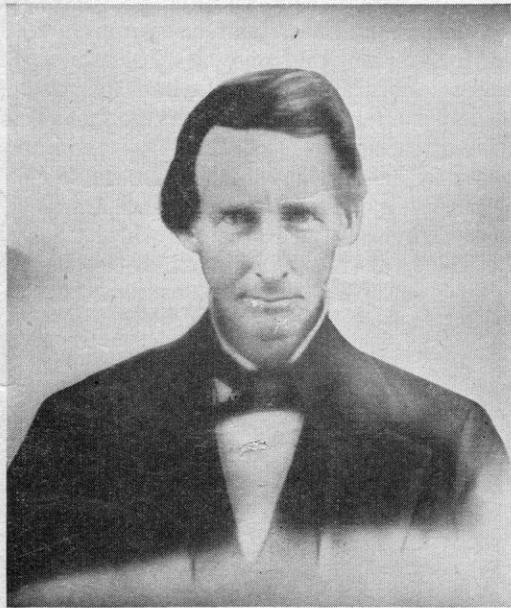
years ago after serving for 28 years as research scientist at the Northern Regional Research Laboratory in Peoria. The Windmoor Laboratory, which is doing research on a wide variety of animal and plant products, has been des-

THE EARLY DAYS OF CHEMISTRY AT THE UNIVERSITY OF WISCONSIN

AARON J. IHDE and H. A. SCHUETTE
University of Wisconsin, Madison, Wisconsin

THE first chair devoted exclusively to chemistry was created in the University of Wisconsin in 1880 when the institution was in its 32nd year. This does not mean, however, that the subject had finally received a belated recognition. W. W. Daniells, the first incumbent of the chair, had been with the University since 1868 as its first professor of agriculture and had been offering most of his instruction in chemistry. Even before the coming of Daniells, courses in chemistry had been offered by S. P. Lathrop and Ezra S. Carr.

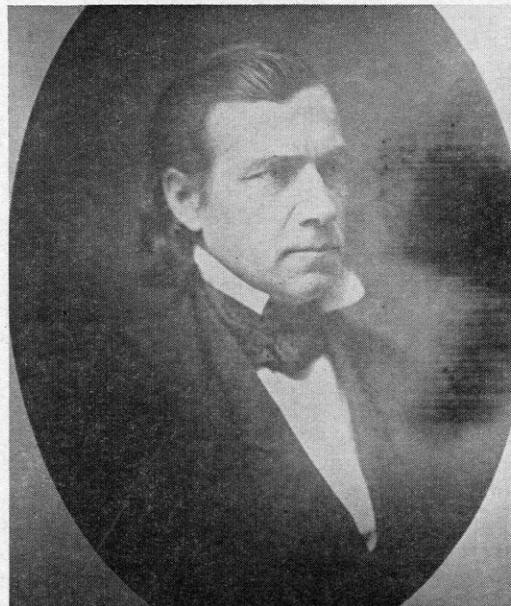
Samuel Pearl Lathrop (1816-54), who had received his M.D. from Middlebury (Vt.) College in 1843, was appointed in 1854 to fill the chair of chemistry and natural history. This was the last of seven chairs to be filled in the institution which had been founded in 1848, the year that Wisconsin achieved statehood.



S. P. Lathrop about 1850

Lathrop, no kin to the University's first president, John H. Lathrop, had held a similar post since 1849 at Beloit College. Instruction in science was begun at the state university with the assistance of apparatus borrowed from the older college on the state border. Professor Lathrop, however, died before he had completed his first year.¹

¹ BOUTWELL, P. L., *Trans. Wisconsin Acad. Sci.*, 41, in press (1952).



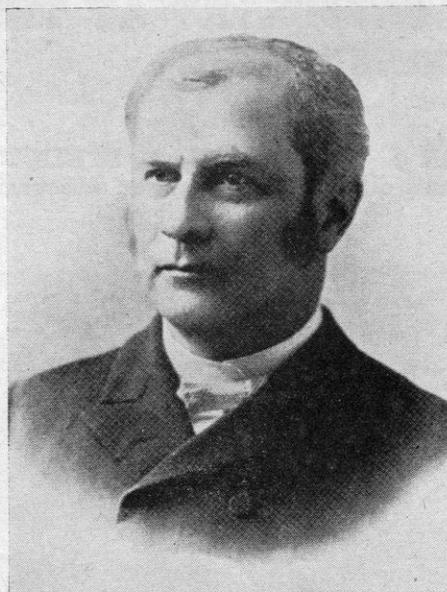
Ezra S. Carr about 1865

Ezra Slocum Carr (1819-94), a graduate of Rensselaer Polytechnic Institute and Castleton (Vt.) Medical School, was successor to Professor Lathrop. Carr, a member of the faculty of Albany Medical College, was induced to come west not only by salary considerations but also by the fact that the Board of Regents strained the finances of the struggling University in order to purchase Carr's mineral collection for \$1400.

Carr was favorably remembered by the naturalist, John Muir, as "The Doctor, who first laid before me the great book of Nature, and though I have taken so little from his hand, he has at least shown me where those mines of priceless knowledge lie and how to reach them."² In his teaching Carr called upon the students to repeat his lectures and demonstrations before the class. This method reflected the teaching procedure of Amos Eaton and his pupil James Hall, under whom Carr studied at Rensselaer. Though Carr referred often to laboratory work, these lecture demonstrations were the only opportunities offered to the students for experimental work. No systematic pattern of laboratory work was offered until Daniells appeared upon the scene.

Carr also busied himself with University politics, becoming a member of the Board of Regents in 1857.

² BADE, W. F., "The Life and Letters of John Muir," Houghton Mifflin Co., New York, 1924, Vol I, p. 143.



John E. Davies about 1895

Though he vacated the position a year later as a result of faculty opposition, he was a factor in the resignation of Chancellor Lathrop and an unsuccessful candidate for the vacant position. His tactless aggressiveness in promoting his department and deriding others made him unpopular with faculty colleagues, regents, and politicians. Nevertheless, he retained his professorship of chemistry and natural history for 12 years.

This period was a precarious one for the University and all those connected with it. Financial resources were never adequate. The second chancellor, Henry Barnard, was in such poor health during his two-year tenure that administrative matters fell largely on the shoulders of John Sterling, professor of mathematics, natural philosophy, and astronomy. With the chancellor's resignation in 1860 a reorganization was inaugurated. All professorships were declared vacant and provision was made for the restoration of only five. Immediately thereafter the Civil War depleted the student body to negligible proportions. Sterling and the small faculty struggled along as best they could.

The University received a new lease on life with the onset of postwar days. Congress had passed the Morrill Act in 1862, setting aside forest lands to provide income for colleges of agriculture and mechanical arts. At first there was a serious consideration to the setting up at Ripon of a separate state college along the lines followed by Michigan, Ohio, Indiana, Iowa, and certain other states. In 1866, however, the state legislature passed enabling legislation for the incorporation of agriculture and engineering into the university.

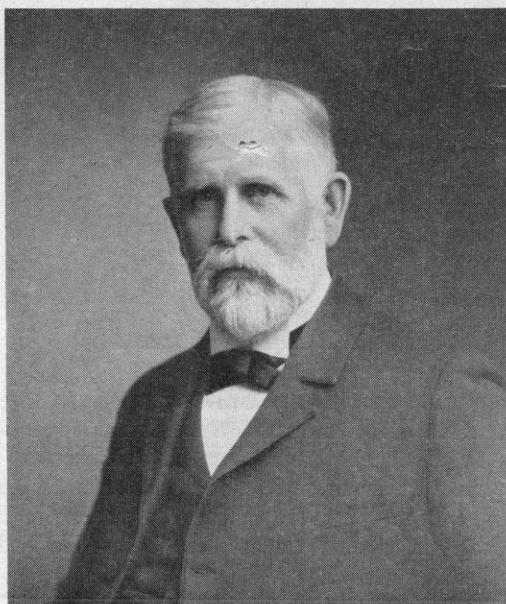
Paul A. Chadbourne of Williams College assumed the presidency in 1867. He was responsible for adding John E. Davies and W. W. Daniells to the faculty in order to strengthen the sciences in accord with the new policy of emphasis on the practical arts. Carr

was dropped from the faculty at this time. He was professor of agriculture at the newly founded University of California for several years before becoming Superintendent of Public Instruction in that state.

Dr. John Eugene Davies (1839-1900), a graduate of Lawrence University and Chicago Medical College, assumed the professorship of chemistry and natural history vacated by Dr. Carr. Davies' interests, however, lay more in the direction of physics and mathematics than in chemistry. His chemical responsibilities were terminated in 1874 when he became professor of physics and astronomy. A few years later, with the completion of Washburn Observatory, James C. Watson, the famous University of Michigan astronomer, was brought to the University. Davies spent the remainder of his life at the University as professor of physics, except for a short leave for study under Lord Kelvin. His published work was largely the result of his activities in charge of the Geodetic Survey in Wisconsin.

William Willard Daniells (1840-1911), a graduate of Michigan Agricultural College with an M.S. degree, came to Wisconsin in February of 1868 as the first professor of agriculture. Within the year, "and analytical chemistry" was added to his title. When Davies severed his connection with chemistry, Daniells' title was changed to Professor of Agriculture and Chemistry.

Laboratory instruction was inaugurated in the fall of 1868 after a summer spent in equipping a room in the south basement of University Hall (now Bascom, Hall) as a laboratory. Daniells had spent some time as a student at Harvard just before coming to Wisconsin and brought with him a realization of the importance of laboratory instruction which had been so effectively demonstrated by Wolcott Gibbs and Josiah Parsons Cooke of Harvard, and by the youthful Charles Eliot at the newly founded Massachusetts Institute of



W. W. Daniells about 1900

Technology. As early as the spring of 1868 Daniells had one student carrying on laboratory work on a carpenter's bench in the basement of University Hall. By 1875 laboratory instruction was being offered in qualitative, blowpipe, and quantitative analysis. There were also courses in organic and agricultural chemistry.

At the start of the fall term in 1880 Daniells severed his connection with the agricultural department and became the University's first professor of chemistry. Expansion began almost as soon as the department was created. At the time of his retirement in 1907 his department included three professors, eight instructors, and four assistants. In addition to expansion of personnel the physical plant had likewise expanded. The new department of 1880 shared a portion of the three-year-old Science Hall. When this building burned in 1884 it was replaced by the present Science Hall. The Regents decided, however, that such a noxious and dangerous subject as chemistry should not be taught in a fine building like Science Hall, so the chemistry department moved, in 1885, into its own Chemical Laboratory, the cream-colored brick building beside Lake Mendota which today houses the chemical engineers. The final move of the chemistry department was made late in the fall of 1905 when the central portion of the present Chemistry Building was completed.

Professor Daniells did not receive help in his teaching duties until 1879 when Charles Richard Van Hise (1857-1918) was added to the staff as assistant in metallurgy and chemistry. This young man was elevated to instructor a year later and became assistant professor of metallurgy and chemistry in 1883. He was not to remain long in the field of chemistry, however. In 1886 he became professor of metallurgy. Under the influence of President Thomas C. Chamberlin, he turned his attention more and more toward geological fields. He became, successively, professor of mineralogy and petrography, professor of Archean and applied geology, and in 1892, after he had won the first Ph.D. granted by the University, professor of geology. Only 11 years later he became president of his alma mater, the only graduate of the institution to achieve that distinction.

Organic chemistry was singled out for special recognition in 1885 when Homer Winthrop Hillyer (1859-1949) was made instructor in that subject. A native of Wisconsin, he had received a B.S. at the University in 1882 and then earned a Ph.D. at Johns Hopkins where Ira Remsen had built up the foremost research laboratory of organic chemistry in this country. Hillyer remained at Wisconsin for 20 years. When he left the academic world to become research chemist for General Chemical Company he was succeeded by William Frederick Koelker (1880-1911). The latter had just received his doctorate at the University of Berlin where he had been a student of Emil Fischer. Koelker's promising career was cut short by his untimely death in 1911.

At the onset of Koelker's final illness, Richard Fischer (b. 1869) was added to the staff as professor of chemistry. Fischer arrived in chemistry by way of pharmacy. Following graduation from the pharmacy course at Michigan, where he had been a student of Albert B. Prescott, he had served as instructor in pharmacy at Wisconsin between 1894 and 1898. Taking two years for study abroad, he spent a semester with Emil Fischer at Berlin and then completed his doctorate in pharmaceutical chemistry under Ernst Schmidt, authority on alkaloids, at Marburg. He returned to Wisconsin as assistant professor of pharmacy, a position he held until he joined the chemistry department in 1909. During the years between 1903 and 1909 he also served as State Chemist, a position which had been held by Professor Daniells between 1879 and 1883.

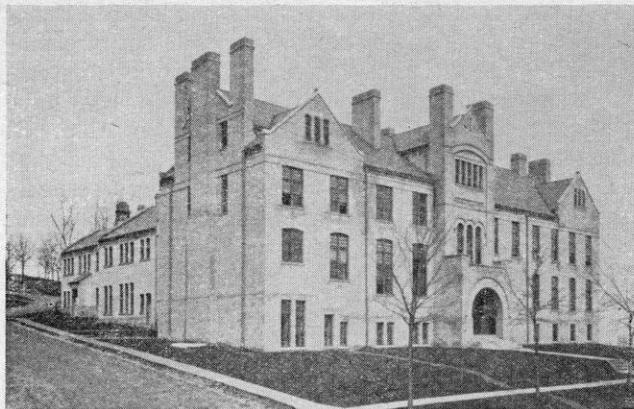
Pharmacy also contributed to the inauguration of physical chemistry at Wisconsin by providing a place for Louis Kahlenberg (1870-1941) when he returned



Louis Kahlenberg about 1898

from Leipzig with his doctorate. Kahlenberg had shown such promise as an undergraduate at Wisconsin that he was made an instructor upon graduation in 1892. He earned his M.S. during the following year. His bachelor's and master's theses, carried out under the direction of Professor Hillyer, each resulted in a publication. He then felt the need for European study and gave up his instructorship. At the end of two years at Leipzig, where he studied physical chemistry with Ostwald, organic chemistry with Wislicenus, physics with Wiedemann, and botany with Pfeffer, he received the Ph.D. *summa cum laude*. His dissertation, done in Ostwald's laboratory, was an extension of his earlier studies on tartrate complexes with Hillyer.

Upon returning to Wisconsin, Kahlenberg was told



Chemical Laboratory. Home of the Chemistry Department 1885-1905. Headquarters of Chemical Engineering Department since 1905. Also Housed Physiology, Physiological Chemistry, and Pharmacology, 1907-17.

that the departmental budget did not permit his reappointment. A Canadian, Arthur P. Saunders, with a Ph.D. from Remsen's laboratory, had been engaged as instructor when he left. However, Professor Kremers, Director of the School of Pharmacy, was able to find funds to appoint Kahlenberg instructor in pharmaceutical technique and physical chemistry. The next year Saunders left the University to undertake further study in Europe and Kahlenberg became instructor in physical chemistry. Within two years he became an assistant professor and the year 1900 saw his promotion to a full professorship. Upon the retirement of Professor Daniells in 1907 he became head of the department.

The coming of Kahlenberg may be considered a milestone in the growth of the department. Being a man of strong character, he never hesitated to voice his beliefs, even when they were unorthodox. Though he left Ostwald's laboratory enthusiastic for the Arrhenius theory of electrolytic dissociation, he soon became critical of the whole concept. He inaugurated research in his own laboratory on the properties of solutions, particularly nonaqueous solutions. Students began graduate work at Wisconsin. Azariah T. Lincoln, who became professor of chemistry at Rensselaer Polytechnic Institute and later at Carleton College, received the first Wisconsin Ph.D. in chemistry in 1899. Herman Schlundt, who later became head of the department at the University of Missouri, received the second in 1901. Others followed and the reputation of Wisconsin as an institution for graduate study in chemistry began to grow. At the same time teaching was never slighted. Kahlenberg's self-confidence, his tricks of emphasis, and his showmanship caused his lectures to remain alive in the minds of students long after the courses and even the names of other professors were forgotten.³

New men were added to the staff. Victor Lenher (1873-1927), who had received his Ph.D. under Edgar

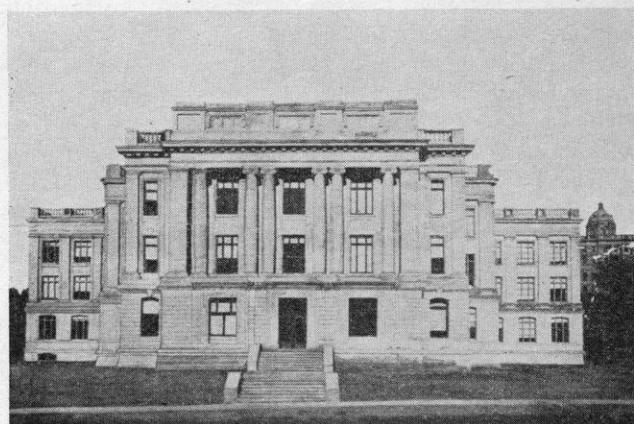
Fahs Smith at Pennsylvania, became assistant professor of general and theoretical chemistry in 1900. Francis Craig Krauskopf (1877-1947) was brought in as an instructor in February of 1906 on the recommendation of Wilder Bancroft of Cornell, under whom he was doing graduate work. Krauskopf mixed instruction with graduate work, earning his doctorate under Kahlenberg in 1909. James Henri Walton (1878-1947) was added to the general chemistry staff in 1907. He left a similar position at the University of Illinois which he had held since receiving his doctorate at Heidelberg under Georg Bredig in 1903. Joseph Howard Mathews (b. 1881), a graduate of Wisconsin who had served as an assistant in physical chemistry in 1904-05, was added to the staff upon completion of his Ph.D. under T. W. Richards at Harvard.

PHARMACEUTICAL CHEMISTRY

The growth of pharmacy paralleled the growth of chemistry and showed at all times a strong emphasis on the chemical aspects of the subject. The College of Pharmacy was founded by action of the Board of Regents in 1883.

President John Bascom, after consultation with his friend Ira Remsen, brought Frederick Belding Power (1853-1927) to Madison as professor of pharmacy and *materia medica* to head the department. Power had received a Ph.D. in 1880 at Strassburg where he had studied chemistry with Fittig and pharmacognosy with Flückiger. He had been teaching for three years at his undergraduate alma mater, the Philadelphia College of Pharmacy, before coming to Wisconsin.

Power was intensely interested in research and immediately inaugurated a program of student investigation. He himself was an active investigator of the essential oils and alkaloids although his greatest fame rests with his later studies on the constituents of chaulmoogra oil. After nine years he left the University to become Scientific Director of Fritzche Brothers. In 1896 he became Director of the Wellcome Research Laboratory in London. He returned to his homeland



Chemistry Building in 1905. Home of Chemistry and Pharmacy Departments. Extensive Additions made in 1913, 1928, and 1939.

³ HALL, N. F., *Trans. Wisconsin Acad. Sci.*, 39, 83-96 (1949); 40, Part 1, 173-83 (1950).

in 1916 to take charge of phytochemical research in the U. S. Department of Agriculture.

When Power left the University in 1892 to enter pharmaceutical industry, Edward Kremers (1865-1941) was made director of the school of pharmacy. Kremers had come to the University soon after the course in pharmacy was inaugurated and received his diploma of Graduate in Pharmacy in 1886. Feeling that the Ph.G. represented vocational training only, he remained at the University two years more in order to qualify for the more academic B.S. degree. There followed two years in Germany where he received the Ph.D. in 1890 at Göttingen. His graduate work was done under Otto Wallach, the outstanding terpene authority of the time. Upon returning to Wisconsin, Kremers spent a year as assistant in pharmacy and another as instructor before being elevated to a full professorship upon taking over Power's duties. What Kahlenberg did for chemistry, Kremers did for pharmacy. A four-year course leading to the B.S. degree was inaugurated. Graduate students began doing work in plant chemistry and the first Ph.D. was granted to Oswald Schreiner in 1902.⁴

AGRICULTURAL CHEMISTRY

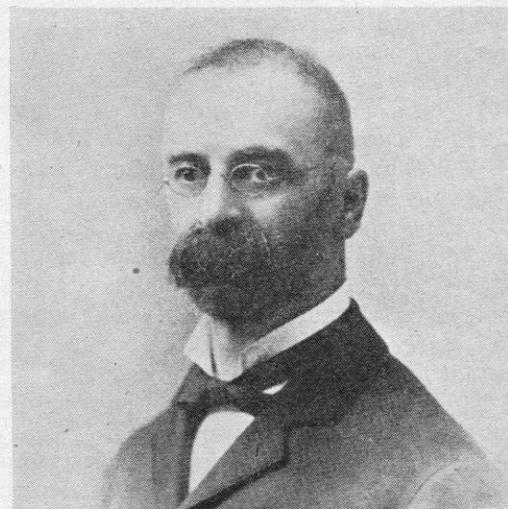
Agricultural chemistry acquired the importance of departmental status in 1883 with the coming of Henry Prentiss Armsby. Agricultural aspects of chemistry had received recognition from the beginning of the University, however. Lathrop had acquired a loyal following among Wisconsin farmers during his professorship of chemistry and natural science at Beloit College. He had been a popular lecturer on scientific agriculture, a contributor to the *Wisconsin and Iowa Farmer*, and an officer of the Rock County Agricultural Society and Mechanics Institute. In addition to his college duties and his medical practice he found time for the cultivation of a small tract of land and exhibited prize-winning poultry and garden produce at the Rock County Fair. His interest in scientific agriculture was a factor in his call to the state university (ref. 1).

His successor, Carr, is known to have offered courses in agricultural chemistry. With the coming of Daniells there was a serious attempt to develop the agricultural offerings of the University. Organic chemistry, as offered in 1875, included the chemistry of germination, nutrition, vegetable growth, decomposition, fermentation, and saponification. Agricultural chemistry covered the composition of soils, manures, and crops, and the chemistry of the dairy. During this time Daniells also had charge of the University Farm.

The first serious agricultural research was inaugurated in 1880 when agriculture and chemistry were severed. A Norwegian immigrant who had just graduated from the course in mining and metallurgy, Magnus Swenson (1854-1936), was appointed instructor in chemistry. Although he may have assisted in the analytical laboratory his main role was that of research assistant to Daniells and the professor of

agriculture, W. A. Henry. As a senior, Swenson had upset the residents of Madison with his thesis, "The chemical analysis of Madison well waters," revealing cesspool pollution of the drinking water used in 96 per cent of the homes. His research project with the agriculture department involved the extraction of sugar from sorghum cane. His extensive and systematic study received a \$2500 award from the U. S. Department of Agriculture as the best thesis on sugar chemistry. At this same time he became *persona non grata* in Madison when a highly publicized demonstration of the centrifugal separation of sugar crystals failed of its purpose and sprayed dark sorghum molasses over legislators, regents, faculty, farmers, and other invited dignitaries. Swenson accepted a position with a Texas sugar refiner. During the next 20 years he attained a notable reputation for his development of sugar processing machinery as well as other chemical engineering achievements.⁵

Henry Prentiss Armsby (1853-1921), who came from the Connecticut Agricultural Experiment Station as professor of agricultural chemistry in 1883, had received his Ph.D. at Yale and followed this with study at Leipzig. He was at Wisconsin only four years when he was made director of the newly founded Pennsylvania Agricultural Experiment Station where he carried out his extensive experiments on the respiration of large farm animals. Stephen Moulton Babcock (1843-1931) filled the vacant position.



Stephen M. Babcock about 1897

Babcock had been an instructor in agricultural chemistry at Cornell for a year and chemist with the New York Agricultural Experiment Station at Geneva for six years before coming to Wisconsin. His doctorate had been earned under Hans Hübner at Göttingen in 1879 in the laboratory of the then aged Friedrich Wöhler. In addition to his professorship of agricultural chemistry, Babcock also doubled as chief chemist

⁴ HOUDANG, G., *Trans. Wisconsin Acad. Sci.*, 37, 111-35 (1945).

⁵ HOUGEN, O., *Norwegian-American Studies and Records*, 10, 152-75 (1938).

of the Wisconsin Agricultural Experiment Station and, after 1899, as assistant director of the station.

While Babcock is probably best known for his invention of the test for fat in milk, his ideas on animal feeding were of major importance. He doubted that energy and protein values were adequate in planning animal diets. When he put some of his ideas to test on two heifers loaned by Professor W. L. Carlyle of the animal husbandry department the experiment was terminated prematurely when one of the animals died and the other was hastily recalled by the badly disturbed Carlyle. Babcock's younger colleagues in agricultural chemistry were to bring such experiments to completion at a later time.

Babcock's only associate in the early days was Fritz Wilhelm Woll (1865-1922), a Norwegian who came to Wisconsin after receiving his B.S. at Royal Fredericks University at Christiania. He received an M.S. at Wisconsin in 1886 and was made assistant chemist of the experiment station when Babcock came to Wisconsin. Woll was made assistant professor of agricultural chemistry in 1893 and, after receipt of his Ph.D. in 1904, became associate and finally full professor before he left the department in 1913 to become professor of animal nutrition at the University of California.

Edwin Bret Hart (b. 1874) was brought to the department in 1906 when Babcock wished relief from some of his duties. Hart had been chemist at the experiment station at Geneva, New York, and had had graduate training at Marburg and Heidelberg under Kassel. William Edward Tottingham (1881-1944), whose specialty was plant chemistry, was brought from Geneva at the same time. Elmer Verner McCollum (b. 1879) took a Yale Ph.D. under Treat B. Johnson in 1906. After a year's further study under Lafayette B. Mendel, McCollum became an instructor at Wisconsin. Before leaving in 1917 to become head of the biochemistry department at the Johns Hopkins School of Hygiene and Public Health, McCollum had arrived at his concepts of fat- and water-soluble vitamins and had undertaken vitamin studies on small laboratory animals. Harry Steenbock (b. 1886) became a graduate assistant upon receiving his B.S. in 1908. William Harold Peterson (b. 1880) was made an assistant the following year when he came to Wisconsin with an A.M. from Columbia. Both men were made instructors in 1910 while they were still doing graduate work under Professor Hart. Both remained with the department after receiving their doctorate, Peterson specializing in fermentation biochemistry, Steenbock in fat-soluble vitamins.

In 1911 Hart, McCollum, and Steenbock, with George C. Humphrey of the animal husbandry department, published their classic study of the nutrition of cattle fed on rations consisting exclusively of parts of a single plant, a study which revealed that the suspicions of Babcock were indeed justified.

Babcock retired in 1913, but this did not mean that

he ceased working or being an influence. Almost up to the time of his death in 1931 he was a regular visitor to his laboratory. His jovial nature was phenomenal and his friendly interest, coupled with helpful suggestions, was continued inspiration to his younger colleagues.

SOILS CHEMISTRY

The chemistry of soils received its start when President Thomas C. Chamberlin brought Franklin Hiram King (1848-1911) to the University as professor of agricultural physics in 1888. King had been a student of Chamberlin some years earlier at the state normal school at Whitewater. After additional study at Cornell, King had served as professor of natural science at the state normal school at River Falls before coming to the University. During his 13 years at the University he prosecuted a vigorous program of investigation into the application of science to farm problems. While much of his work was physical rather than chemical he published "The Soil" in 1895 and was developing the interest in soil fertility which was to receive recognition in later years. After he left the University he spent a turbulent three years with the Bureau of Soils in the U. S. Department of Agriculture, where he found himself in disagreement with the chemists and their theories on availability of fertilizer potassium. His connection with the Bureau was severed on account of publication difficulties. The travels in China which followed resulted in the well-received "Farmers of Forty Centuries," an account of Oriental methods of maintaining soil fertility.

Andrew Robinson Whitson (1870-1945) entered the department in 1899. As a Wisconsin undergraduate he had become interested in geology, and he followed Chamberlin to Chicago when that scientist resigned the University presidency to devote his whole time to geological teaching and research. At Chicago Whitson studied chemistry under Stieglitz, Alexander Smith, and Nef.

At Wisconsin, Whitson became full professor and chairman of the department in 1901 when King left. The designation "agricultural physics" was dropped in 1906 and the department of soils created to indicate the emphasis on soil science. Charles William Stoddart (b. 1877) was made instructor in 1904 and assistant professor two years later but left in 1910, a year after receiving his Ph.D., to become professor of agricultural chemistry and later dean at Penn State College. Emil Truog (b. 1884) became a graduate assistant after receiving his B.S. in 1909 and rose through the ranks to become head of the department upon the retirement of Whitson.

Whitson quickly inaugurated a program of studies on soil fertility. With the assistance of Alfred Vivian, a chemist with the Agricultural Experiment Station, he proceeded with an extensive soil survey. Vivian soon went to Ohio State University as professor of

agricultural chemistry and later dean of the college of agriculture, but the studies on the chemistry of soils continued.

PHYSIOLOGICAL CHEMISTRY

The University gave early thought to the development of a program in the field of medicine. In 1856 a department of medicine was created and staffed, Ezra Carr being named to the chair of chemistry and pharmacy. On account of finances and other difficulties the department failed to become operative. When Henry Barnard became chancellor in 1858 there was much discussion of the importance of instruction in the application of science to public health. David Boswell Reid (1805-63), a graduate of the University of Edinburgh, was appointed professor of physiology and hygiene and was also made director of a museum of practical science. Dr. Reid had come from the British Isles in 1855 with a reputation as a teacher of practical chemistry and author of several textbooks. He was also an expert on ventilation and had been active in the installation of an air-conditioning system in the houses of Parliament. In America he gave lectures on the progress of architecture in relation to ventilation and the preservation of health, under the sponsorship of the Smithsonian Institution and the Lowell Institute, before coming to the University in 1859.

Reid's tenure at the University was terminated with the reorganization which followed Barnard's resignation from the chancellorship. With the onset of the Civil War, Reid became an army surgeon with the Union forces. He lost his life in 1863 as a result of illness contracted in line of duty.

The scientific aspects of medicine received formal recognition during the next four decades only to the extent of setting up a premedical course. At the turn of the century the state began to recognize the need for increased facilities for medical training and a pre-clinical program was set up in the University. Complete training through the clinical years was not made available until after the completion of the Wisconsin General Hospital in 1924.

With the inauguration of preclinical work in 1906, a department of physiology and physiological chemistry was formed. Joseph Erlanger was brought from Johns Hopkins to head the department. He remained only until 1910 when he took a similar position at Washington University, St. Louis. Harold Cornelius Bradley (b. 1878) came to the campus in 1906 to take charge of instruction in physiological chemistry. Bradley had just received his Ph.D. at Yale under Lafayette Mendel. Along related lines was the work of Arthur Solomon Loevenhart (1878-1929), a Johns Hopkins M.D., who became professor of pharmacology and toxicology in 1908.

These departments were housed in the upper floors of the Chemical Engineering Building until 1917,

when they were given space in Science Hall. Physiological chemistry was separated from the physiology department in 1921.⁶

CHEMICAL ENGINEERING

Chemical engineering started as a branch of electrical engineering. The head of that department, Professor Dugald Caleb Jackson, (1865-1951), was interested in developing the electrochemical phases of electrical engineering since electrochemical industries were undergoing rapid growth toward the end of the nineteenth century. Charles Frederick Burgess (1873-1945) was made instructor in electrical engineering upon graduating from the course in 1895 and entrusted with the development of applied electrochemistry.

By 1898 a four-year course in applied electrochemistry was offered, under the direction of Burgess in the department of electrical engineering. During the subsequent years the need for greater emphasis on applied chemistry began to be recognized. Magnus Swenson, now a prominent chemical engineer and industrialist, who served as a regent of the University 1905 to 1911, was foremost in encouraging the expansion of the offerings of the University in this field (ref. 5). In 1905 the regents authorized the inauguration of a course in chemical engineering. Burgess was promoted to a full professorship of applied electrochemistry and placed in charge of the courses in chemical engineering and applied electrochemistry which were now severed completely from the department of electrical engineering. In 1909 Burgess' title was changed to professor of chemical engineering. He severed his connection with the University in 1913, when his industrial activities were requiring too much of his time.

He had incorporated the Northern Chemical Engineering Laboratories in 1910 as a center for his consulting activities. The name was changed in 1915 to C. F. Burgess Laboratories. His work soon brought him into the dry cell business and he ultimately set up the Burgess Battery Company.⁷

The faculty of chemical engineering in 1905 consisted of Burgess, Assistant Professor Judson Dickerman, who handled the work in fuel technology and chemical manufacture, and Oliver W. Brown, who was instructor in applied electrical engineering and taught a course in illumination and photometry. The latter three men left the department before 1910.

Oliver Patterson Watts (b. 1865), who completed his Ph.D. in 1905, was made an instructor in chemical engineering the following year. He has remained with the department up to the present time and even

⁶ OATWAY, W. H., JR., "Progress of the University of Wisconsin Medical School. The Years Before 1923," manuscript in the University of Wisconsin Medical School Library, undated.

⁷ MCQUEEN, A., "A Romance of Research. The Life of Charles F. Burgess," The Instruments Publishing House, Pittsburgh, 1951.

after 14 years of retirement from teaching duties continues to carry on research in the electroplating of metals. Otto Louis Kowlake (b. 1878) became an assistant in the department in 1906 upon receiving his B.S. in applied electrochemistry. He became chairman of the department when Burgess left the University and left a long record of progress in the development of the department at the time of his retirement in 1948.

GENERAL TRENDS

This survey of chemistry at the University of Wisconsin, covering slightly more than a half century, marks the metamorphosis of a university. The original faculty, devoted to the broad cultural aspects of classical education, was somewhat oblivious to the wants of a vigorously growing state. Five years elapsed before the chair of natural science was filled. The first occupants were M.D.'s who offered not only chemistry but a spectrum of science offerings.

By the time of World War I the faculty was, in contrast, a body of specialists offering a wide assortment of courses to satisfy the apparent needs of an economy utilizing the findings of science. Men holding the Ph.D. degree were now commonplace and graduate instruction was developing vigorously. A university offering no instruction in chemistry during the first years of its existence had grown into one offering not only a complete listing of fundamental courses but

having, in addition, five independent departments dealing with applied chemistry.

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In addition to the references cited in the text, valuable material was obtained from biographical reference books such as "American Men of Science," University catalogues and other University publications, and the histories of the University by C. W. Butterfield (1879), R. G. Thwaites (1900), J. F. A. Pyre (1920), and M. Curti and V. Carstensen (1949).
