
Chapter 4

Chemical Engineering in Transition Heads: Comings and Golding (1951-1966)

In August 1951 R. Norris Shreve was asked to step down as Head of the School, since he had passed the retirement age for Purdue administrators (65 years old). He had divided the School in three divisions which the higher administration had not accepted. In Chemical Engineering there were seven professors: Sherman, Shreve and J.M. Smith as full professors, Doody and Lottes as associate professors, and Bennett and Myers as assistant professors. In Metallurgical Engineering there were five professors: Bray and Enos as full professors, Evers as an associate professor, and Hughel and McCormack as assistant professors. The third section, Engineering Geology, was represented only by Serviss. A large number of instructors (including graduate students) were used to run the laboratories and assist by teaching some of the regular courses.

There was immediate need for more faculty members, and for this purpose Samuel C. Hite in the ChE division and Paul B. Eaton in the METE division were hired as assistant professors. The position of the Head was filled by a nationally known researcher from the University of Illinois, Edward W. Comings.

Edward Walter Comings was the first Head of the School since Peffer that was not previously a Purdue faculty member. He arrived in August 1951 with outstanding recommendations and many research laurels from his years at the University of Illinois, where he had worked on high-pressure technology. Universities are always tempted to hire famous researchers as heads even though they are not always the best leaders or administrators. Comings accepted the three divisions within the School as a *fait accompli*, and they became official in 1953. The active professors in the Chemical Engineering division were Sherman, Shreve, Smith, Doody, Hite, Bennett and Myers. Comings believed he was hired to build a modern department with strong educational and research programs. Fortunately, both Bennett and Myers were interested in modern education and research, and they formed a nucleus to build upon. For a period Comings approach appeared to be working, but then it fell apart. His administration may be divided into two shorter periods. During the first period

(1951-55) he attempted to establish strong research and educational programs in thermodynamics and transfer operations. During the second period (1955-59) significant disagreements between those who were in favor of the older philosophy of ChE education and those who supported the newer ideas developed within the School, and Comings' administration became distracted.

Edward Walter Comings (1908-1989)

The fourth Head of the School of Chemical Engineering, Edward W. Comings, was born in Phillipsburg, New Jersey, on February 24, 1908. He attended the University of Illinois receiving his B.S. in Chemical Engineering in 1930, and he was awarded the Sc.D. degree in 1934 from M.I.T. At M.I.T. he worked under the supervision of T.K. Sherwood. From 1934 to 1935 he worked for Texaco in Beacon, New York. In 1935 he became Assistant Professor at the North Carolina State College. One year later he joined his *alma mater* where he became Assistant (1936-43), Associate (1943-47), and Full Professor (1947-51). At the University of Illinois he started a research program in the area of high pressure fluid dynamics, extraction and drying for which he became internationally known.

During World War II, Comings was Assistant Director of Munitions Development for NDRC and OSRD. For his service he received the Naval Ordnance Development Award in 1945. He came to Purdue in August 1951 as Professor and Head of the School. He left in January 1959 to become Dean of Engineering at the University of Delaware. He retired in 1973. From 1974 to 1978 he was Professor and Chairman of Chemical Engineering at the University of Petroleum and Minerals in Dahrán, Saudi Arabia.

Comings was dedicated to his research, and amidst his various administrative responsibilities found the time to direct many Ph.D. and M.S. students. He wrote more than 80 publications and the book *High Pressure Technology*. For his research he received in 1956 the highest AIChE honor, the William H. Walker Award. His administration was characterized by an emphasis on education and classical chemical engineering research. He was fortunate to direct, a young, energetic and enthusiastic faculty, albeit one with varying goals and directions.

The years 1955 through 1966 are described by many observers as turbulent years in the history of the School. Indicative of this instability is the realization that of 22 faculty members that were added to the ChE faculty from 1951 to 1960—and this number does not include the metallurgical engineers—only three remained here (Woods, Emery, Albright) past 1971.

**Carroll Osborne Bennett
(1921-)**

Carroll O. Bennett, affectionately known as "C.O.", was one of the three members of the young triumvirate of the School (the others were J.M. Smith and J.E. Myers) that attempted to turn around the philosophy of education and research at Purdue in the dramatic years of the 1950's. Born in New Britain, Connecticut, on April 1, 1921, Bennett studied chemical engineering at Worcester Polytechnic Institute (B.S.'43) and at Yale University (Ph.D.'49). From 1943 to 1945 he was with the Army Air Corps. While at Yale he worked with Professor Barnett F. Dodge in the area of high pressure thermodynamics.

Bennett arrived at Purdue in August 1949 and embarked immediately upon a career dedicated to the teaching of transport phenomena and thermodynamics and doing fundamental research. He wrote: "When I was just starting out in the '50's, it became clear that chemical engineers would probably become more interested in fundamental research which would be more similar to research done in physical chemistry than to research done in engineering."

At Purdue, Bennett became instrumental in the revision of the undergraduate and graduate curricula and the establishment of new courses in transport phenomena and mathematics. He helped establish the Ph.D. qualifying examinations and, as Chairman of the Graduate Committee from 1949 to 1959, he fought for the improvement of research conditions in the School. Many of his innovative ideas were resisted by some of the senior faculty. Meanwhile, Bennett was promoted to Associate Professor in 1954 and Professor in 1958. He resigned in May 1959 and left for Lummus Co. in New York, where he became Senior Technical Specialist. With his departure, the School lost one of its greatest faculty members, who would have contributed to strengthening research and education at the School.

In 1964, Bennett left Lummus and joined the University of Connecticut, where he turned his research attention towards catalysis and became a well-known and respected researcher in that field. For his many contributions he received the 1980 Warren K. Lewis Award of AIChE.

His research at Purdue was directed towards high pressure thermodynamics. The proximity of research interests with John E. Myers led to the publication of *Momentum, Heat and Mass Transfer*, which became a successful undergraduate textbook.

John Earle Myers (1923-1995)

John "Jack" Earle Myers was the second "foreign" faculty member to be hired in Chemical Engineering in 1950 (Robert B. Leckie of the 1930's was a Scot). He stayed at Purdue for 16 years. During this period he developed into an excellent researcher and educator, a true pioneer of "modern" chemical engineering, and an influential figure of the School.

Myers was born in Swalwell, Alberta, Canada, on September 14, 1923. He received his B.Sc. from the University of Alberta in 1944 and his M.A.Sc. from the University of Toronto in 1946. He moved to the United States in 1947 and attended the University of Michigan where he received his Ph.D. in 1952. While at Michigan he worked under the direction of the legendary Professor Donald Katz.

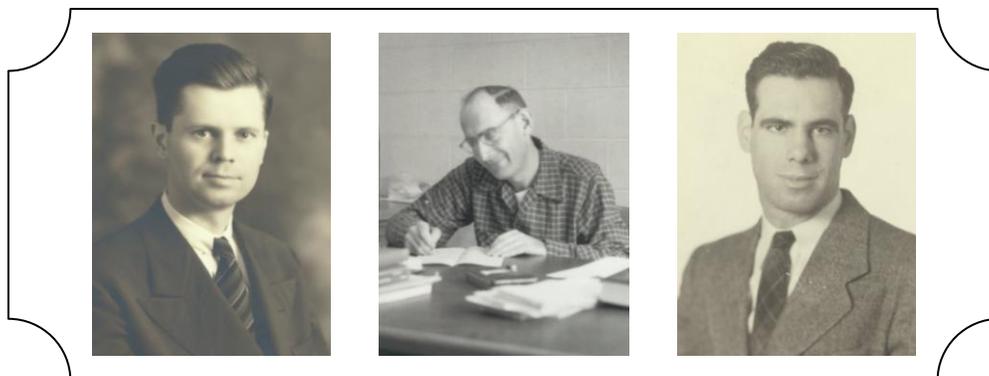
He joined Purdue in September 1950 and stayed here until the end of January 1966, when he moved to the University of California at Santa Barbara as the first chairman of a newly founded ChE Department. In 1976 he became Dean of the College of Engineering¹², a position from which he resigned in 1983 and returned to teaching until he retired in 1988. He died of a heart attack on April 26, 1995.

Myers was extremely active while at Purdue. He developed new courses in transport phenomena and applied mathematics (see Chapter 7) and did significant research in the area of heat transfer. He supervised 29 M.S. and Ph.D. theses. His Ph.D. students include Owen T. Hanna (B.S.'57, Ph.D.'61), formerly professor at the University of California at Santa Barbara, Stanley K. Stynes, Jr. (Ph.D.'63), former Dean at Wayne State University, and Vern W. Weekman, Jr. (B.S.'53, Ph.D.'63), retired manager of the Central Research Laboratory of Mobil. Along with C.O. Bennett he published the book *Momentum, Heat and Mass Transfer*, which became a successful textbook.

Although he intimidated some students by his formal manner, Jack was quite approachable, particularly if he thought the student was motivated to learn. When off duty, Jack also liked to tell stories. One of his favorite stories was how he caught a student who had stolen Jack's solution manual (this was in the days before everything printed was available on the Internet). Jack gave a homework assignment with three of the nastiest problems in his textbook. Only one student came close to getting the correct solutions, and this student had exactly the same solutions as the solution manual. With this evidence the police obtained a search warrant. When they searched the student's room, they found the stolen solution manual. This student did not graduate from Purdue.

John E. Myers was a most influential researcher from 1950 to 1966. He did significant research on heat transfer. As an educator he introduced important graduate courses in applied mathematics and transport phenomena and, with C.O. Bennett, undergraduate courses in the same area.





Left: Edward W. Comings was nationally known for his work on high pressure technology. At Purdue he promoted fluid mechanics. In 1956 he received the W.H. Walker AIChE Award (1941 photograph).

Center: Alexander Sesonske in 1954.

Right: Carroll O. Bennett, shown here in 1948, was one of the main forces behind the revamping of undergraduate and graduate courses in the 1950's. His research was in thermodynamics and transport phenomena.

Of the other 19 professors that left the School or retired, thirteen stayed here fewer than seven years. Among those that left Purdue there were some gifted educators and researchers who became nationally known for their work.

As discussed in the previous Chapter, Carroll O. Bennett and John E. Myers arrived at Purdue in 1949 and 1950, respectively. Samuel C. Hite became officially an Assistant Professor in 1951, but he had been in the School as an Instructor since 1943. His biography can be found in the previous chapter.

In the summer of 1952, soon after his retirement as Head, Shreve embarked upon an ambitious project. At the suggestion of President Hovde he decided to visit Taiwan and examine the possibility of establishing a joint effort between Purdue and a Taiwanese University. The results of this visit are described in the insert on the Purdue-Taiwan project. What is probably forgotten is that in the same trip Shreve spent almost three months visiting Japanese firms and Universities and giving lectures predominantly on the advantages of Purdue's education and research. From July 10 until September 4, 1952 he gave 38 seminars! Shreve was indeed a great ambassador of Purdue University.

Four faculty members were hired in 1952 and 1953. John Melville Woods (1922-2004, B.S. '43 University of Kansas, Ph.D. '53 University of Wisconsin) was educated at Wisconsin under C.C. Watson. He joined the School in 1952, after two years as an Assistant Professor at the University of Rhode Island; and embarked upon research in kinetics and reaction engineering. For his research he received the 1962 Shreve Prize. Later he became involved in process design and in the 1970's he collaborated with G.V. Reklaitis in projects on computer-aided design. As an educator, Woods introduced new courses in kinetics and reaction engineering (see Chapter 7) both at the undergraduate and graduate levels. In 1955 he made ChE 529 the required process design course of the School. At Purdue he supervised nine Ph.D. and 24 M.S. students. Woods was brilliant and

energetic, but his procrastination in completing his Ph.D. would prove to be typical of his entire 25 years at Purdue. Unfortunately, his lack of organization and difficulty finishing projects kept him from fulfilling his early promise. In July 1977, Woods left Purdue for M.W. Kellogg Co. in Houston. In 1983 he became the Chairman of the Department of Chemical Engineering of Prairie View A & M University.

Hendrick Charles Van Ness (1924-2008, B.S. '44, M.S. '46, both from the University of Rochester, D. Eng. '53 Yale University) joined the School in the fall of 1952. Between his M.S. and Ph.D. degrees he worked for two years with M.W. Kellogg in Jersey City, N.J. At Yale University he worked with B.F. Dodge, thus becoming the second Purdue faculty member (after Bennett) to work under this pioneer of ChE thermodynamics. During his short stay here, Van Ness supervised six students and made significant research contributions in the area of thermodynamics. He left Purdue in 1956 for Rensselaer Polytechnic Institute where he eventually became Institute Professor of Chemical Engineering¹. While at Purdue, Van Ness started his association with J.M. Smith, which led to the second edition of Smith's thermodynamics textbook. *Smith and Van Ness* is synonymous with thermodynamics and has taught six generations of chemical engineers.

J.M. Smith (left),
R.N. Shreve and a
graduate student
at a ChE picnic
(1954 picture).



Two more faculty members were hired in 1953. William Henry Tucker (1920-, B.S. '42 University of Virginia, M.S. '46, Sc.D. '47, both from MIT) came to Purdue in September 1953 as an Associate Professor. Before that he had been for six years with Whirlpool Co. as a research supervisor of absorption and compression refrigeration. At Purdue he did research in mass transfer. He taught the undergraduate laboratory courses, as well as courses in mass transfer and other areas. In the late 1950's he served the Purdue-Taiwan engineering project. His most important contributions during his 16 years at Purdue were starting the ChE cooperative education program (co-op) in 1959 and hiring Mrs. Katie Eckman as the part-time co-op secretary. Tucker guided the co-op program for the next 10 years. The co-op program proved to be a major force in education because upon returning from work assignments the co-op students helped raise the professionalism of the entire class. Co-op also helped many students pay for a large portion of their education, and in poor economic times

co-op students had a major advantage in obtaining a job after graduation. The program became very popular with the undergraduate students. In the summer of 1969 Tucker became Chairman of the Chemical Engineering Department of Tri-State (now Trine) University in Angola, Indiana, from which he retired in 1985. In 2011 at the age of 90 he lives with his wife Beth in Eugene, Oregon.

Joseph Andrew Brink, Jr. (1925-1981, B.S. '47, M.S. '48, both from the University of Denver, Ph.D. '53 Purdue University) came to Purdue in 1949 as an Instructor. He served in this position while working on his Ph.D. degree under the direction of Shreve. He was appointed Assistant Professor in the summer of 1953 but stayed here only one year. After Purdue he worked at Monsanto Co. (1954-73) where he eventually became Director of Development. In 1973 he joined the Department of Chemical Engineering of Washington State University as Professor and Chairman until his death in 1981. Brink was best known for the development of the *Brink mist eliminator*, which is widely used in sulfuric acid plants and for his coauthorship of Shreve's fourth edition of *Chemical Process Industries*.

A major change in the Engineering administration occurred in 1953. After more than 30 years, Dean Potter, a great contributor to the status of Purdue engineering,² retired. George Andrew Hawkins (1907-1978, B.S. '30, M.S. '32, Ph.D. '35, all from Mechanical Engineering at Purdue University), well-known for his work in high-temperature, high-pressure steam became Dean. Author of numerous publications and four books, he brought to the deanship a forthright manner, along with a dry sense of humor. Hawkins supported graduate work and high standards in research. Although deans often are rather remote and have little impact on the day-by-day business of the engineering schools, Hawkins was to prove an exception. He remained Dean until 1966.

In the spring of 1953, the undergraduate enrollment of the School had decreased to the manageable number of 297 sophomores, juniors and seniors. The graduate student enrollment had stabilized at about 60 and the faculty could embark upon important changes in the curriculum. In the fall of 1953 several new courses were added in fluid dynamics, kinetics, process design, etc. Chemical processes were still a significant research area at Purdue. There were 12 research projects in chemical processes (including five industrial polymer projects for Lilly Varnish Co. under the supervision of Visiting Professor Brage Golding). Transport processes and thermodynamics were the other two strong research areas of the School. Bennett, Myers, Smith, Van Ness and Comings were the motivating forces behind these educational and research changes.

The Purdue-Taiwan Engineering Project

In the early 1950's Purdue University became involved in national foreign policy by undertaking to build the Taiwan Engineering College into an engineering school similar to the engineering schools of the land-grant institutions of the United States. In 1952, President Hovde and Dean Potter selected Professor R. Norris Shreve to make a first-hand inspection. After Shreve's optimistic report, Hovde decided to accept the project, which was sponsored by the Mutual Security Agency (later known as the International Cooperation Administration).

Shreve became the director of the Purdue-Taiwan project. For nine years he made the project his chief interest and activity. He and Professor Wilfred I. Freel of Civil Engineering, along with sixteen Purdue professors, developed new curricula, suggested the purchase of new equipment and the construction of new buildings, and organized an extensive scientific exchange. In the fall of 1961, when Shreve made his last inspection trip to Taiwan, the University had become the National Cheng Kung University, one of the two most respected engineering schools in the Republic of China.

Among the faculty members of the School who went to Taiwan to contribute to this project were Thomas C. Doody (1954-57), W. Henry Tucker (1957-60), and Harold V. Fairbanks (1957-60), who was a member of the Metallurgical Engineering program only for these three years.

Comings was interested in promoting research in the School. He started offering incentives to the faculty including reduced teaching loads and time to write proposals. By 1956 (see Appendix S) the research funds of the School had tripled with respect to 1953, although soon thereafter a major decrease occurred due to the termination of the Lilly Varnish projects.

Four faculty members joined the School in 1954. John William Tierney (1923-, B.S. '47 Purdue University, M.S. '48 University of Michigan, Ph.D. '51 Northwestern University) joined Purdue in January 1954 and did research in the area of packed beds. He stayed at Purdue until 1956, when he joined Sperry Rand Univac. In 1959 he moved to the University of Pittsburgh where he found a permanent home and did important research in the areas of petroleum refining and coal utilization. Ralph Alexander Morgen (1903-1998, B.S. '23, Ph.D. '25, both in Chemistry from the University of California at Berkeley) had worked as a chemist for Pacific Gas and Electricity Co. (1925-26), Western Electric Co. (1926-28), Black, Sivalls and Bryson Mfg. Co. (1928-32), and as an independent consultant (1932-38). In 1938 he joined the Chemical Engineering Department of the University of Florida. In 1952 he became one of the first program directors of the National Science Foundation. He joined Purdue in July 1954 as Professor of Chemical Engineering and Research Director of the Purdue Research Foundation, and did research in the field of pigments and polymer coatings. During his stay at Purdue he was elected Vice-President of ASEE. In 1959 he became President of Rose Polytechnic Institute and in 1961 Dean of Graduate Studies at the Stevens Institute of Technology. He retired in 1968.

The other two faculty members hired in 1954 had a longer tenure at Purdue University. Alexander Sesonske (1921-, B.S. '42 Rensselaer Polytechnic Institute, M.S. '47 University of Rochester, Ph.D. '50 University of Delaware) was the chemical engineer who brought nuclear engineering to the School. After his B.S. degree he worked for the Manhattan Project (1943-45) and for Columbia-South Chemical Corp. (1945-46). After his Ph.D. degree he worked as an engineer for the Los Alamos Scientific Laboratories until he joined Purdue as an associate professor. Here he concentrated his teaching efforts on transport phenomena and the development of new courses in nuclear engineering. He did imaginative research in the areas of liquid metal heat transfer and nuclear reactor engineering, and supervised the work of four Ph.D. and 16 M.S. students. In 1966 he joined the School of Nuclear Engineering as Assistant Chairman, and in 1970 he moved all his research to Nuclear Engineering. Most appropriately, the School of Nuclear Engineering at Purdue states in its Website "The history of the School originates with Alexander Sesonske, who arrived at Purdue University from Los Alamos Scientific Laboratory in September 1954 as an associate professor of chemical engineering. Over the period 1954 to 1957 he brought nuclear engineering from an introductory course for chemical engineers to an interdisciplinary graduate program open to students from various engineering disciplines. In 1955, the first edition of Nuclear Reactor Engineering by Samuel Glasstone and Alexander Sesonske was published. Subsequent editions in two volumes have long been the principal introductory textbooks in reactor engineering." Sesonske wrote more than 80 publications and two books including the classic *Nuclear Reactor Engineering* (by Samuel Glasstone and Sesonske) was first published in 1955 and subsequent editions in two volumes (1963 and later) became a standard textbook. Sesonske also wrote a book on *Nuclear Power Plant Design Analysis* (1973).

Alden Hayes Emery, Jr. (1925-2009, B.S. '47 Pennsylvania State University, M.S. '49 M.I.T., Ph.D. '54 University of Illinois) had an even longer tenure in ChE than Sesonske—in fact Emery's record of 41 years of service was not surpassed until 2004 when Bob Squires retired after 42 years at Purdue. Emery's original area of research was thermal diffusion. After a sabbatical he switched to the then new area of biochemical engineering. He was heavily involved in administration of the School as both Director of the Undergraduate Laboratories and the Graduate program. He was also a long-time advisor for student organizations, especially the Catalyst Club.

Left: Professor and Mrs. George W. Sherman in October 1954.

Right: Two Heads of the School in October 1952. Edward W. Comings (left) and R.N. Shreve.



Alden H. Emery, Jr.
(1925-2009)

Alden Hayes Emery, Jr. (1925-2009, B.S. '47 Pennsylvania State University, M.S. '49 M.I.T., Ph.D. '54 University of Illinois) was hired in 1954, and he had the distinction at the 75th anniversary of being the faculty with the longest tenure in the history of the School, 32 years in 1986. When he retired in May 1995 he had 41 years of service. This record has now been tied or surpassed by several professors. Between 1949 and 1952 he worked with E.I. duPont de Nemours. He came to Purdue in the fall of 1954 and was initially involved in research on the thermodynamic properties of fluids, mass transfer and fluid mechanics. One of the first professors at Purdue to have his research funded by the National Science Foundation, Emery made significant contributions in the field of thermal diffusion, and after 1960 in non-Newtonian fluid mechanics. After a 1971 sabbatical leave to Israel he changed research directions. He started working on biochemical engineering, a research area that occupied a major portion of his time. In the 1970's and 1980's he formed a powerful biochemical engineering research team with H.C. Lim and G.T. Tsao. He advised 28 and co-advised 11 M.S. and advised 13 and co-advised 2 Ph.D. students. Eight of his advisees went on to academic careers including Charles Wales who taught at Purdue in the 1960's.

Emery was a loyal citizen of the School in the true sense of the word. In addition to his many contributions to almost every course of the ChE curriculum and the number of graduate students he supervised over the years he contributed to all aspects of student-faculty relations. He served as an academic advisor of various student societies such as Omega Chi Epsilon. For more than 30 years he was the Graduate Student Administrator, in charge of all graduate students, and from 1966 to his retirement he was also in charge of the qualifying examinations for the Ph.D. degree. To former undergraduate students he was known as the professor in charge of the second (senior) undergraduate laboratory, the soul of the Catalyst Club - which he advised from 1966 until retirement, and the author of the humorous short plays mocking the habits of the seniors that were performed by the professors at the *Razz-Banquet*. Alden Emery was the (amateur as he said, professional as we believe) photographer of the events of the School for 40 years. His large collection of photographs immortalized in a candid and humorous way the activities and habits of undergraduates, graduates, faculty and staff. A small sample of these photographs can be found in this volume. Finally, long before Starbucks, Alden demanded a good cup of coffee and made his own liquid concentrate by cold leaching coffee beans. The result was a very mild cup of coffee with no bitterness.

Emery became half time in 1990 in Purdue's generous phased-in retirement program. While in this program he continued as Director of the Graduate Program. A banquet in Alden's honor was held on April 29, 1995 at which a memory book was presented, along with a collection of the skits authored by him over the years for the *Razz Banquet*. Along with his jazz band, Alden entertained the assembled friends, colleagues and former students. He retired in May 1995. Alden Emery died on February 7, 2009.



Donald R. Coughanowr, shown here the year he arrived at Purdue (1956), made significant contributions in process control. With L.B. Koppel he coauthored the most successful undergraduate textbook in process control.

Left: R. Norris Shreve, Edward W. Comings and Carroll O. Bennett in September 1956.

Right: Hendrick C. Van Ness was an influential figure in thermodynamics (1955 photograph).



Lyle F. Albright—shown here in a 1962 picture with Ramamurthi Mahalingam (M'.S.63), who became a professor at Washington State University—was an influential researcher and educator. He supervised the theses of more than 100 students in the fields of unit processes and applied chemical kinetics and catalysis, and he taught industrial processes, design and polymers to many alumni.

Meanwhile in May 1955, an era was coming to an end. On May 12, 1955 in a most emotional gathering, the faculty, administrators, staff and students paid tribute to R. Norris Shreve, on the occasion of his retirement. It was hard to believe that "Benny" was 70 years old and even harder to accept that he had been at Purdue for only 25 years. Shreve, however, would continue to work beyond his retirement. He simply transferred his office to the Executive building and continued to contribute to Purdue via the Purdue-Taiwan project and in many other ways. Only after his unfortunate accident on February 4, 1971 would Professor Shreve stop visiting the University.

After his retirement, Shreve became a great benefactor of the School and University. In addition to the Shreve Trust, the Shreve Professorship and the Shreve Prize about which we talk elsewhere, he donated to the Purdue libraries his Chemical Abstracts, all his books, and his gems and gold collection which in 1960 was valued at more than \$75,000. Other personal belongings were donated to Purdue after his death by his gracious second wife and companion, Mrs. Irene S. Shreve. Shreve Hall is named in honor of his first wife Eleanor.

The year 1955 marked the start of an important change in engineering education throughout the United States. In May 1952 S.C. Hollister, the President of the American Society for Engineering Education (ASEE) and an one-time professor of structural engineering at Purdue, appointed a *Committee on Evaluation of Engineering Education* with the goal to evaluate engineering education and suggest new approaches to teaching engineering. Two of the members of this ASEE committee were Dean George A. Hawkins and Prof. J. Henry Rushton who would join Purdue in 1955. When the report of this committee was published on June 15, 1955, a long chapter in the history of engineering education started to fade away.

The report was only 36 pages long. It was polite to the older tradition but firm in its recommendations to the new generation³.

The objective in engineering curricula will not be achieved... by repair of patchwork curricula. It requires complete reconstruction of curricula.

Some attention to engineering art and practice is necessary, but its high purpose is to illuminate the engineering science, analysis or design, rather than to teach the art as engineering methodology.

It is the responsibility of the engineer to recognize those new developments in science and technology that have significant potentialities in engineering. Moreover, the rate at which new scientific knowledge will be translated into engineering practice depends, in a large measure, upon the engineer's capacity to understand the new science as it develops.

Fortunately, some things do not change. Reactions, stresses, and deflections will still occur, and they will have to be calculated. Electrical currents and fields will follow unchanging laws. Energy transformation, thermodynamics, and heat flow will be as important to the next generation of engineers as to the present one. Solids, fluids, and gases will continue to be handled, and their dynamics and chemical behavior will have to be understood. The special properties of materials as dependent upon their internal structure will be even more important to engineers a generation hence than they are today. *These studies encompass the solid, unshifting foundation of engineering science upon which the engineering curriculum can be built with assurance and conviction (author's italics).*

Gradually the committee built the framework of a scientifically oriented curriculum. According to their recommendation the curriculum should consist of humanistic and social studies (one-fifth), mathematics and the basic sciences (one-fourth), engineering sciences (one-fourth), engineering analysis and design (one-fourth), and elective courses (one-tenth).

The recommendations of the Hollister report created much discussion throughout the country. The older generation of instructors opposed them vehemently. The younger generation accepted them. For the first time the word *engineering science* was appearing in an official document on engineering education. At Purdue, Dean Hawkins was quite new when the movement toward scientifically oriented curricula started. He supported it. He formed several committees and sought to adjust the engineering programs to the new ideas. Finally, in 1957 a report prepared by a committee headed by Hawkins was sent to President Hovde. After Hovde approved these recommendations, the implementation of the committee's suggestions started that same year.

In the School of Chemical Engineering the Hollister report arrived only two months after the retirement of Professor Shreve. The first discussions in the faculty meetings showed that some of the chemical engineers were not very happy with the recommendations. However, since the ASEE report was an external report, it could be ignored. When the internal Hawkins report appeared in 1957, a number of ChE professors saw the inevitable change coming and reacted dramatically. Change became necessary when President Hovde decided that the Hawkins report would be implemented. Suddenly, the faculty was divided into at least three factions. First, there were those who believed that engineering and technology were synonymous, that the existing system of education and research in the School was accepted by industry, and, therefore, that there was no need to change anything. Second, there was a strong group of faculty members who were in agreement with the Hollister committee, but believed that their courses were exactly what the committee had recommended. Therefore, they did not see any need for changes. The third group of professors—all active researchers—was a small minority. They believed that the Hollister report had

addressed the weaknesses of the present ChE program and sought to make changes similar to those occurring in all the major ChE Departments in the United States*. This group included, among others, Professors Bennett, Myers, Emery and Coughanowr, who made a serious effort to change the curriculum both at the undergraduate and graduate level. The efforts of the ChE faculty to implement the Hollister recommendations started in 1957. It took seven years, and a number of new faculty members, to change the curriculum. In September 1964 the new undergraduate program (see Appendix H) and a new program for graduate studies were finally activated. The new plan of study was kept until 1981, when a new one (Appendix I) was adopted.

During the last years of Comings' administration and throughout the period of Golding's administration the number of graduating advanced degree students fell to an all-time low (two Ph.D. and 14 M.S. in 1960). That same year there were only 40 enrolled graduate students. And the available research funds plunged to below 2% of the total engineering budget in the mid 1960's (see Appendix S). These events were occurring whilst the US-USSR competition in space had led to the establishment of federal funding agencies and increased availability of funds for research.

The turbulent period of 1955 to 1966 caused significant damage to the School's reputation. Gradually, the School of Chemical Engineering of Purdue University fell in the national rankings of ChE Departments. Whereas in the 1930's and 1940's the School was ranked as one of the best in the country, by the early 1960's it was ranked in the second decade. Although after 1966 there was a revitalization of undergraduate education and graduate research at Purdue, this damaged reputation would follow the School for another 10 years.

The year the Hollister report appeared, two new Professors were added to the faculty, J. Henry Rushton and Lyle F. Albright. Both were active in research and education and offered much to the progress of the School. Rushton came from the Illinois Institute of Technology, where he was Chairman of the Department. He stayed here for 16 years until his retirement in 1971. After his retirement, he administered the AIChE DIPPR program and continued to do research and write publications until he fell ill around 1980. Rushton was a recognized expert in the area of mixing for more than 30 years.

* The reader will find more information on these changes in ChE education in later chapters

Left: The name of J. Henry Rushton is synonymous with mixing research. Rushton came to Purdue relatively late in his career, but continued being active in research. Rushton came to Purdue relatively late in his career, but continued being active in research past his retirement in 1970. His last publication appeared posthumously in October 1985 (1965 photograph).

Right: J. Henry Rushton in 1974.



John Henry Rushton (1905-1985)

John Henry Rushton was one of the most recognized researchers in the history of the School. He was born in New London, Pennsylvania, on November 25, 1905, and attended the University of Pennsylvania (B.S.'26 in Chemical Engineering, Ph.D.'33 in Physical Chemistry). Upon graduation with his B.S. degree he worked as an engineer with Royal Electrotpe Co. in Philadelphia from 1926 to 1928, and with Kieckheffer Container Co. in Delaire, N.J. from 1928 to 1929. In 1929 he became an Assistant Professor at Drexel Institute of Technology. In 1931 he took a leave of absence to finish his Ph.D. He returned to Drexel in 1933 and stayed there until 1936, when he was appointed Assistant Professor at the University of Michigan.

In 1937, Rushton moved to the University of Virginia, where he became Professor and Head of the Chemical Engineering Department. In 1946 he transferred to the Illinois Institute of Technology where he was again Professor and Director of the Department of Chemical Engineering. He joined Purdue in 1955 at the age of 50, and stayed here until 1971, when he became Professor Emeritus.

Rushton was a most active consultant, having worked with Amoco, Commercial Solvents Corp., Swift and Co., Dart Industries, Elliott Co., Arco, Distrigas Corp., Abbott Laboratories, Exxon, Humble Oil, North American Aviation, General Electric Co., Bechtel International and for 40 years (!) with Mixing Equipment Co. He was considered a world expert on design and application of large scale mixing and mass transfer equipment, and on process design. A prolific author (more than 100 publications, the last posthumously in October 1985) he contributed many important papers. One of them on mixing was recognized as a *Citation Classic* in 1980. He also coauthored two books on *Applications of Chemical Engineering* (with H. McCormack, 1938) and on *Process Equipment Design* (with H.C. Hesse, 1946).

Rushton was a serious researcher, a deep thinker and an excellent engineer. His humor and concern for the students were much admired, as were his scientific work and his promotion of the causes of the chemical engineering profession. He chaired a 1954 committee on the future of AIChE^{3a}, and he is the only Purdue faculty member ever elected President of AIChE (1957). He served the Institute in many other positions and committees including the positions of Treasurer (1958-62), and Administrator of the *Design Institute for Multi-phase Processing* (1972-1980).

Despite his illness in the last few years, he attended almost every AIChE meeting. In November 1983, in an emotional presentation at the Washington Diamond Jubilee meeting of AIChE, he accepted the recognition of *Eminent Chemical Engineer*, given to only thirty distinguished chemical engineers. Less than two years later, on June 16, 1985 he passed away in West Lafayette.

Rushton received an impressive number of awards, especially from AIChE, including the highest research honor given by the Institute, the William H. Walker Award (1952), as well as the Founders Award (1962) and the F.J. Van Antwerpen Award (1979). He was the Institute Lecturer of 1970. He also received awards from ACS, where he was Chairman of the Industrial and Engineering Chemistry Division in 1953. He served as a member of the Council of both AIChE and the American Society for Engineering Education.

As a small indication of the recognition by his peers and former students we offer here a statement made by Roger W. Parkhurst (B.S.'65), an Alexandria, Virginia attorney: "J. Henry Rushton brought the real world of ChE, and its business and economics, into the classroom more than anyone I encountered during my days at our fine School."

Lyle F. Albright (1921-2010)

Lyle Frederick Albright (1921-2010, B.S. '43, M.S. '44, Ph.D. '49, all from the University of Michigan) joined Purdue in September 1955, as an Associate Professor of Chemical Engineering, and he became a Professor in 1958. Albright had worked for Dow Chemical Co. (1939-41), E.I. duPont de Nemours and Co. and Colgate-Palmolive Co. (1950-51). His most notable assignment was his contribution to the Manhattan Project for production of plutonium, at Hanford, WA, from 1944 to 1946, while working for E. I. du Pont de Nemours and Co. His experience on that project is recounted in an article published by *TCE Today* in December 2008 and can be read at

https://engineering.purdue.edu/ChE/AboutUs/News/index.html?type=Spotlight&batch_page=6. He joined the University of Oklahoma in 1951 and soon became Associate Professor. In the summer of 1952 he was also a Visiting Professor at the University of Texas.

At Purdue Albright taught numerous courses in process design, kinetics and thermodynamics. Generations of alumni remember him for his two major courses on polymers (ChE 542) and chemical processes (ChE 529). It is estimated that Albright taught polymers to more than 1,300 undergraduate students.

An active researcher, he investigated the kinetics and thermodynamics of chemical processes including pyrolysis, nitration, alkylation, hydrogenation, partial oxidation and combustion, polymerization, chlorination, and molten salt reactions. He also studied fuel cells, electrochemical reactions, coal utilization and pulp and paper production. At Purdue he supervised 122 theses for over 100 different graduate students, and came very close to R. N. Shreve's numbers. Many of his former students became industrial executives or university professors.

Albright kept a strong association with industry and consulted for Commercial Solvents Corp., Abbott Laboratories, Goodyear Tire and Rubber Co., Standard Oil Co., M.W. Kellogg Co., Morton Salt Co., 3M Co., Cities Service Oil Co., UOP, Phillips Petroleum Co., Reilly Tar and Chemical Co., Cobaloy Co., DuPont, Stratco Inc., BP Oil Co., Trinity Manufacturing Co., Rhone Poulenc, and Chevron Oil Co. He served the AIChE in many positions including Director (1982-84), and in 2003 he was awarded the AIChE Van Antwerpen Award. He published 215 papers and book chapters and received four patents. In addition, 22 of his papers were bundled together by *Chemical Engineering* magazine into the booklet, "Modern Chemical Technology" (1968). He also wrote *Processes for Major Addition-Type Plastics and Their Monomers* (1974), and edited a total of nine books. In addition to his scientific accomplishments, Albright was also known to the alumni and the community as a superb magician, often contributing his time for worthy causes in the Lafayette community. He was a member of the International Brotherhood of Magicians since 1937 and entertained audiences as large as 10,000 people. He was an avid swimmer and visited the Purdue Aquatic Center daily for his exercise until a few months before he passed away. Every spring he used to bring a bucket of peonies to Forney Hall and visited all offices to offer flowers to the ladies of the School.

Except for a quirk in the retirement law passed by Congress in the late 1980's that allowed universities to require professors to retire at 70 for a transition period, Professor Albright would have set the record for years of service at Purdue. He became a Professor Emeritus in May 1991 after almost 36 years of service. He remained extremely active in retirement until late in 2010. Probably his greatest achievement, editing the monumental *Albright's Chemical Engineers Handbook* (2009), was done after retirement. Cliff P. Kowall in his review of the *Handbook* [AIChE J., 56, 3025 (2010)] wrote

If the measure of a good novel is how fast you read it because it is so engaging, then the measure of a good technical book is how long it stays on your desk because it is so useful. To the extent that this is a truism, then "Albright's Chemical Engineering Handbook" is a very good technical book. It has hardly left my desk since I received it.

While being treated with oxygen during his last months, he mentioned to one of his visitors, "This is the best oxygen in the world," and then explained to the puzzled collocutor that his former student, Michael Graff, was now CEO of Air Liquide, the company producing the oxygen he was using. This is a typical example of the high regard in which he held his former students and the type of legacy he leaves. He died on December 27, 2010 in West Lafayette.

In the last three years of his tenure at Purdue, Comings hired five professors. Stanford William Briggs (1914-2001, B.S. '37 Cal Tech, M.S. '38, Ph.D. '41, both from the University of Illinois) did his Ph.D. degree under the direction of Comings and was a successful engineer before he came to Purdue. He worked as a development engineer with Gulf Research and Development Co. (1941-42) and Merck Co. (1941-51). In 1951 he became chief engineer of Cutter Laboratories. He came to Purdue in 1958 as an Associate Professor and did research in unit operations and thermodynamics. He took a leave of absence in 1964 and left the University permanently in 1966. He was employed by Whirlpool Corp. (1966-70) and Lear Siegler, Inc. (1970-74). After his retirement he became Professor of Chemical Engineering at Chonnam University in Kwangju, Korea (1978-80). Leslie Catron Case (1930-2010, S.B. '52, S.B. Bus. Adm. '52, S.M. '53, Sc.D. '54, all from MIT) had worked under the direction of Ed Gilliland at MIT. From 1954 to 1956 he worked for DuPont in polymer applications and process development. He came to Purdue in 1956 and established the first program of fundamental polymer research in the history of the School. He taught courses in polymers, chemical processes and other areas. In his six years here he supervised twelve graduate students. In June 1962 Case left Purdue for Tufts University, and then became President of Eltron Inc., a private research company, in Nashua, New Hampshire. In the 1990's he became interested in the cold fusion debate and worked on cold fusion devices. Les Case passed away on July 15, 2010 in Newfields, NH.

Dr. Henry Sampson
First African American to receive Purdue ChE Degree

Henry Sampson was raised in Jackson, Mississippi, where his parents instilled in him the love of learning. He attended Morehouse College in Atlanta, Georgia, before transferring to Purdue University. While a Purdue student, he was a member of Omega Psi Phi fraternity. Sampson earned his bachelor's degree in chemical engineering from Purdue in 1956. He worked as a research chemical engineer at the U.S. Naval Weapons Center in China Lake, California, in the area of high energy solid propellants and case bonding materials for solid rocket motors. He earned his master's degree and Ph.D. at the University of Illinois at Urbana-Champaign, in 1965 and 1967, respectively.

Sampson then moved to the Aerospace Corporation in El Segundo, California, where he served as the director of mission development and operations of the space test program. He led senior engineering staff in the planning, acquisition, development, launching, and space operation of several satellites. He was one of the earliest engineers to examine how to power satellites. Sampson has written a number of papers on rocket propulsion, direct conversion of nuclear energy to electricity, and computer simulation of electrical systems. He pioneered a study of internal ballistics of solid rocket motors using high-speed photography. He has written several technical papers and has been granted patents. In 1971, he coined the gamma-electric cell that made it possible to send and receive audio signals via radio waves without wires.

During the AIChE Centennial Meeting held in Philadelphia in November 2008, Dr. Sampson was honored among the "Twenty Chemical Engineers in Other Pursuits." Sampson is the recipient of a variety of awards including the Purdue Outstanding ChE Alumni Award, Atomic Energy Commission Award (1964-1967), Black Image Award from Aerospace Corporation (1982), Blacks in Engineering, Applied Science and Education Award and Los Angeles Council of Black Professional Engineers (1983), and was named a fellow in the U.S. Navy (1962-1964).

In addition to his work in engineering fields, Sampson is a writer, film historian, and documentary film producer who focuses on the African American presence in the film and entertainment industries. He has written five books about the portrayal of African Americans in movies, cartoons, and on radio. Sampson is married to Laura Howzell Young-Sampson, a professor at California State University-San Bernardino. Together, they are working on a biography of Sampson's mother.



Left: Stanford W. Briggs with graduate students in May 1966
Right: Alden H. Emery at the May 1981 Razz-Banquet

Dr. Henry Sampson (BSCHE '56 Purdue, OChE2009; MS '65 and Ph.D. 67, University of Illinois-Urbana Champaign) the first ChE African-American graduate, overcame challenges and racism to become a noted inventor.



The third addition of 1956 was Donald Ray Coughanowr (1928-2009, B.S. '49 Rose Polytechnic Institute, M.S. '51 University of Pennsylvania, Ph.D. '56 University of Illinois), who would make significant contributions in the area of process control. Coughanowr worked for Standard Oil Company of Indiana (1951-53) before his Ph.D. He joined Purdue in 1956 and his early research was on kinetics. Recognizing the importance of process control and the upcoming retirement of George Sherman, Coughanowr revised Sherman's course (ChE 155) and changed it to *Process Control and Instrumentation* (ChE 456). He started research in process control in 1959, and the first thesis in this field in the School was written by one of his students in 1962. With L. B. Koppel he wrote the classic *Process Systems Analysis and Control* (1965). For his research, Coughanowr received the 1966 Shreve Prize. He left Purdue in June 1967 to become Chairman of the ChE Department at Drexel University. He served as Chair at Drexel until 1988 and retired in 1999. Don Coughanowr passed away in Kennett Square, PA, on September 20, 2009.

In 1957, after Joe M. Smith left Purdue, two faculty members were hired to replace him in thermodynamics. Buford Donald Smith (1925-, B.S. '50, M.S. '51, both from Oklahoma State University, Ph.D. '54 University of Michigan) came to Purdue in September 1958 as an Associate Professor. He was interested in distillation and thermodynamics and made significant contributions in these fields both in education and research. In 1963 he published the book *Design of Equilibrium Stage Processes*. He left Purdue in 1965 to become a Professor of Chemical Engineering at Washington University in St. Louis where he compiled enormous tables of thermodynamic data, and became professor emeritus. Paul Thomas Shannon (1932-, B.S. '55, PhD. '59 both from Illinois Institute of Technology) joined Purdue also in 1958 as an Assistant Professor. He contributed in the areas of information theory, probability theory, statistical decision theory and thermodynamics. In April 1963 he left Purdue to become Associate Professor of Engineering at Dartmouth College. In 1967 he became President of Digital Systems Corporation. Later he joined B.F. Goodrich Company.

In 1959 Comings, Bennett and Morgen resigned. J.M. Smith and Van Ness had left earlier. A serious situation was developing in the School, and Dean Hawkins oversaw the selection of the new Head, that would direct the School in the critical period of the 1960's. From April 1 to July 1, 1959 Dean Hawkins served as an interim Head. The events in the School from 1955 to 1959 are reflected in the extensive correspondence of Professor R.N. Shreve with President Hovde and Dean Hawkins. Some excerpts are presented here, to show the directions of education and research in the School in those days.

The most important of these letters was written on January 28, 1959 addressed to President Hovde⁴. A few excerpts are presented here. The italics are Shreve's.

As a result of your query to me of some weeks ago, I have given much thought to the situation in the School of Chemical and Metallurgical Engineering as brought to a focus by the resignation of E.W. Comings. (These are the matters requiring attention:

1. At present, in certain of the large courses, there is insufficient correlation in the teaching of different sections of a given course. For instance, the various instructors teach quite different contexts and give different examinations. This has caused very serious confusion on the part of the students...

2. Probably there is *too much changing* from year to year on the part of an instructor giving a certain course... It takes several years to learn to give a course in a skillful manner... Instructors should remain teaching a given course for at least three years.

3. There is much *confusion* among the various instructors and criticism of one by another, even to certain students... Such confusion is recognized more by the experienced teachers. The young fellows like it. This can be corrected by a diplomatic but stronger hand at the helm...

4. Many months ago, several of the professors including Dr. Comings spoke to me about the present neglect in the teaching of *chemical processes*...

5. A new head should certainly be a man who would work out a *proper balance* between (the) so called *fundamental courses and those that equip the graduate for earning his living*...

6. Too few of (the) present teachers have had adequate *industrial experience*.

7. The (teaching) load in the Chemical and Metallurgical Engineering School is very light. Very few instructors carry over about six credit hours.

8. There should be a *close liaison between chemical engineering and chemistry*... This matter, in the writer's opinion, would be corrected if the proper head of chemical engineering is chosen.

...

11. Finally, a more concerted effort should be made to attract graduate students - and not to *exclude* Purdue undergraduates or advise them *to go elsewhere*.

While it may be necessary in the present situation to go out of the School for a head, it would be very much better if the new head could be selected from within the School or from someone who has taught in or been associated with the School.

On March 27, 1959 Shreve wrote⁵ from Taiwan: "When you announced to the Chemical Engineering School that it would be wiser to defer changes in the curriculum

until the new head was appointed and in residence, I thought that this was a very wise move. However, I hear that there is some pressure to precipitate changes. For instance, I have been mailed a copy of a February 16 circularization on (the new) 'Undergraduate Curriculum' sent around by the two newest teachers ... (and) copies (of it) were reaching students." On April 1, 1959 Dean Hawkins replied⁶: "You may rest assured that major changes in the curriculum will not take place until after I have had an opportunity to select and appoint a new head."

On May 7, 1959 Shreve wrote⁷: "I am sure that a few of the teachers there (at Purdue) do not wish to lose their complete autonomy or to be responsible to the Ch.E. staff or even to you. They have been 'spoilt'. Perhaps you can convert them to better teaching practices for the good of the students." To this Hawkins replied⁸: "At times I become very discouraged but every now and then there is a bright spot to cheer me up. The strange thing about the situation is that the ones I expected to cause the most trouble have been very cooperative. Several of the ones I expected to help me have been the main problem children." On June 4, 1969 Shreve noted⁹: "However, I was disturbed by hearing from one of my old students that there was a lot of gossip at the recent American Chemical Society Meeting about troubles in Chemical Engineering at Purdue." Finally, on June 15 Dean Hawkins made his decision concerning the new Head.

The fifth Head of the School was the first and only Purdue ChE graduate to direct the School. When Brage Golding took over the Headship of the School on July 1, 1959 he encountered major problems. A reorganization of the curriculum was going on and significant disagreements existed among faculty members. Research funds had decreased significantly and the graduate body was uneasy. Faculty morale was very low. Every year the faculty had at least one desertion. Unfortunately, Golding could not stop this exodus. Between 1959 and 1967 twelve faculty members left the School.

Brage Golding (1920-)

Brage Golding's successful career took him from Director of Research to School Head and finally to President of three major Universities, an achievement that no other Purdue ChE graduate has achieved. He was born in Chicago on April 28, 1920 and attended Purdue, where he received his B.S. in 1941 and his Ph.D. in 1948 working under R. Norris Shreve. He was Shreve's protégé, and the one that Shreve promoted as Head of the School, especially after Lottes passed away. We know now that Shreve's wish¹⁴ in the latter years of his life was to give Golding the Shreve Professorship in Organic Chemical Technology, but Golding left Purdue early.

After 1948 he was employed by Lilly Varnish Company in Indianapolis where he became first Associate Director and after 1957 Director of Research. This company sponsored a major portion of the School's research in the early 1950's. Between 1948 and 1959 he kept a loose association with the School as a Visiting Professor of Chemical Engineering, and had introduced the first polymer course to the ChE curriculum in 1956 (ChE 542). At Lilly Varnish he developed a strong expertise in paints, coatings, and polymers and started writing the book *Polymers and Resins* which was published in 1959. For a decade this book was a reference of practical polymer knowledge.

Golding became Head of the School in July 1959 and stayed here until October 1966. He directed the School during a very turbulent period when various philosophies of education and research in chemical engineering led to significant discussions and disagreements among faculty members. His influence on the students was such that many graduates of that period were persuaded to follow a career in polymers.

In November 1966 Golding became Vice President of Ohio State University and then Miami University of Ohio. A year later he was elected President of Wright State University in Dayton, Ohio. While president he found the time to continue doing research in the area of polymers, especially adhesion. After six years at Wright State, he was elected President of San Diego State where he served from 1972-1977. That year, he was appointed President of Kent State University in 1977. The campus was still in turmoil following the shootings of four students on May 4, 1970 and the Tent City Gym Annex protests of 1970. Golding remained at Kent State until his retirement in 1982. In the early 1990s he donated numerous articles from his library to the Purdue Libraries. The author of over 50 publications and patents, Golding continued his consulting activities over a period of 25 years. He is now retired and lives in Carlsbad, CA.

Many participants in the events of that period, both faculty members and alumni, have indicated that a major problem was Golding's effort to revive (in a modernized way) the old ideas of unit processes and organic chemical technology. Although this may be one of the reasons for the instability of the School during that period, it appears that professors were unhappy and lacked focus and direction. Evidence for this is found in the Archives of the School, which contains a large number of letters and memoranda addressing at length trivial subjects such as the assignment of departmental committees, or the equipment of the undergraduate laboratories.

The official breakup of Chemical and Metallurgical Engineering in 1959 occurred at an opportune time for Metallurgical Engineering. With his impending departure, Comings was not paying attention during the early negotiations. Because Schulmann's suggestion that ChE and METE split the facilities of the CMET building in half appeared reasonable, it was accepted. At the time the Board of Trustees approved the split on May 1, 1959, no one was in charge in ChE. It took some time for ChE to realize that METE had received a disproportional amount of space. ChE would receive the space back in 1988 when Materials Science (the successor of METE, described in Chapter 3) moved into the new MSEE building. In 1959 the Cooperative Education Program in Chemical Engineering (see box) was started with Henry Tucker as its first Coordinator.

The first faculty member hired by Golding was Robert Donald Vaughn (1930-2010, B.S. '51 Purdue University, M.Ch.E. '53, Ph.D. '56, both from the University of Delaware) who joined Purdue in September of 1960. At Delaware he had worked on non-Newtonian fluid mechanics under the direction of Arthur B. Metzner. He had received the Allan P. Colburn Award of AIChE in 1958. From 1955 to 1960 he worked for Shell Development. A brilliant researcher, Vaughn did significant work in polymer rheology. He was promoted to Associate Professor in 1962 and left Purdue in 1964, disillusioned by the discord. He was subsequently employed by W.R. Grace & Co. (1964-67) and Wyandotte Chemical Co. (1967-79). He then became Manager of Development for Exxon Company and retired in 1985. He passed away on August 4, 2010.

Cooperative Education Program in Chemical Engineering

The Cooperative Education Program in ChE was established in 1959 with W. Henry Tucker as its first coordinator. The purpose of this program is to provide industrial experience for undergraduate students throughout their chemical engineering education. The first co-op class graduated in 1963 and had three students. Over the years the program has waxed and waned in step with the economy. The original co-op program, which still exists as one of the co-op options, was a five year degree program that started alternation of semesters (including summer) on campus with work periods after the student's first year at Purdue. The student then spent their entire senior year on campus. In order to join the program students had to meet GPA requirements, interview for positions, and be offered a co-op position by one of the approved co-op companies. There is no doubt that co-op was immensely beneficial to students. In addition to gaining a much better understanding of why they were learning particular material, most in-state students were able to earn a major fraction of the cost of their education. If they were unlucky enough to graduate in a year when finding a job was difficult, co-op students found that their almost two years of industrial experience was a major advantage in finding a permanent position. Approximately 60% of co-op graduates accept a position with their co-op company.

John M. Woods became coordinator in 1969. That year there were 90 students. From 1973 to 1982 R. Neal Houze was the motive force of this program. When he took over the program there were 70 co-op students and in 1982 there were more than 200 students.

In 1982 Houze became Director of the Cooperative Engineering Education Program for all engineering, and Robert G. Squires became coordinator of the ChE program until December 2004. In 1984, Houze was also appointed Director of Purdue's University-wide Cooperative Education Program. In 2002 Houze stepped down from his Director positions and returned to ChE. He again directed the ChE co-op program from 2005 to 2007 after Bob Squires retired. Mrs. Linda Davis became the Director of the ChE program after Neal. Currently the program has 73 co-op students and 21 active employers.

Although the educational and economic advantages of co-op are clear, the strict five year plan with five co-op periods was unpopular with some students. Additional options such as co-op with three co-op periods have now been implemented.



Left: W. Henry Tucker, shown here in 1954, was the first Coordinator of the Coop program.

Right: Three important figures of Purdue during the celebration for the 1961 Shreve Prize awarded to Golding. From left: George A. Hawkins, Brage Golding, and R. Norris Shreve.

In December 1960 Golding made a hire that continues to have unexpected positive consequences. Mrs. Mary B. Hutchings was hired to work exclusively with the undergraduates. She set the tone for the ChE tradition of having a mother-in-residence and was well-beloved by the undergraduates during her 21 years. (See text boxes on Very Special Ladies.)

In the early 1960's four professors working in areas peripheral to chemical engineering were given positions in the School. John Pinzelik (1930-2008, B.S.'52 Rutgers, M.S.'58 Purdue University, M.A.'64 Indiana University) became Assistant Professor of ChE and Library Sciences in 1960. He was a member of our faculty until 1967, afterwards he became Professor of Library Sciences and Chief Librarian of the Chemistry Library before he retired in 1993. Another Assistant Professor of Chemical Engineering and Library Sciences from 1957 to 1961 was Dorothy E. Kremen (1924-, S.B.'46 University of Chicago, M.S.'51 University of Illinois), who taught the course on Chemical Literature. She later joined the staff of the American Medical Association. Paul Wesley Case (1907-1988, B.S.T. & I.E. '40, M.S.Ed. '45, both from Purdue University) had been employed at Purdue since 1932 and became Assistant Professor of Manufacturing Processing in 1948. He joined ChE (in addition to the Schools of Technology and Metallurgical Engineering) in 1961 as an Associate Professor. His area of expertise was metal processing. He retired in 1969. Robert Albert Miller (1920-1978, A.B. '44 Washington & Jefferson College, M.A. '47 University of Oklahoma) came to Purdue in 1955 as an Assistant Professor of English. He joined the School for the period of 1963 to 1967.

Very Special Ladies

Helen C. Wilson Giese was born in West Lafayette on April 24, 1910. After a stay of a few years in Nebraska she returned to Indiana in 1931 and was employed by Purdue almost continuously from 1931 to 1970. She was the secretary of Professor J.L. Bray from August 1935 until May 1, 1940 and again from February 1, 1943 until September 1, 1947. She became the Administrative Assistant of Professor R.N. Shreve until 1951 and then of Professors E.W. Comings, B. Golding, R. Schuhmann, Jr. and R. Grace, all Heads (the last two of Metallurgical Engineering and after 1965 Materials Science and Metallurgical Engineering). Thus, Helen worked for four of the first five Heads of the ChE School and knew Professor Peffer before she came to Chemical Engineering. She retired from the School of Materials Science and Metallurgical in 1970 and died in 1999. Starting as a stenographer for J.L. Bray, she developed into an outstanding Administrative Assistant, a true "head's secretary" as the article¹⁶ of *Campus Copy* of November 24, 1970 called her. At one time she was in charge of *everything* going on in the School, the Chemical, Metallurgical and Gas Engineering "options", the library, the building, the counseling of the students and the budget of the School. During the long illness of Bray in the 1940's she became the true arbitrator of the everyday activities of the School. And as *Campus Copy* reveals: "When the CMET Building was being built, John Bray vacationed in Maine for most of the summer. Who do you think made the final decisions on the placement of windows, walls, and laboratories in the building in his absence?" To which I may add that she marked every piece of equipment or furniture when the School moved from Heavilon Hall to the CMET building. As Professor R.W. Vest mentions¹⁶: "Whenever any question involving students arose my stock answer had become; Ask Helen."

Donald P. Heath's (B.S. 1940) memories¹⁷ amplify this general impression: "I clearly remember the old office in Heavilon Hall, where I learned that Helen Wilson, not Professor Bray, ran the School and in particular managed those, students who worked for the Department." And at his retirement, R.N.Shreve wrote¹⁸: "You have in all truth been the Executive Assistant in this School. I feel that you, Elizabeth and the rest of the group here have made it possible for me to administer this School and at the same time carry on research and teaching to a great extent."

The "Elizabeth" of Professor Shreve's letter is **Elizabeth Prentiss**, his executive secretary and "right hand" for many years. She came to Purdue in the early 1940's and stayed until 1980. She worked for Shreve for many years as his personal secretary, preparing his large correspondence, typing his books, etc.

Mary B. Hutchings was born on March 29, 1915 in Saginaw, Michigan. She was educated at the Michigan State University (B.S.'36, M.S.'40) in veterinary pathology and chemistry, and came to Purdue in 1942 where her husband eventually became Dean of Veterinary Medicine. She joined the School in December 1960 and for 21 years she was the true "mother" of all the undergraduate students. She was the first Administrative Assistant to work exclusively on the registration of the undergraduate students and for a long time she counseled the students on the courses they had to take or needed to graduate. Mary retired in 1981 and died on July 14, 1990.

To run well a School needs a strong head secretary or Head's secretary. Some very courageous ladies have filled this position since 1935. After Helen Giese (1935-1958), there were **Lois Christofer** (1959-67) and **C. Suzan O'Dore** (1967-75). More recent very special ladies are discussed in Chapter 6.

Thank you ladies for a job well done!

In 1961 the School celebrated its 50th Anniversary. The festivities were rather limited. Perhaps in the continuing turmoil few wanted to celebrate. Professor Shreve had collected material for the History of the School, but his participation in the Purdue-Taiwan Project had not allowed him to write this book. Thomas C. Doody was in charge of the activities which included a student gathering and a seminar on the history of the School. 1961 also marked a turning point in the turmoil. Many of the professors hired after this stayed at Purdue for long periods. Meanwhile, Golding continued his efforts to replace some of the departing faculty members. In 1961 he hired Lowell B. Koppel from the California Institute of Technology. Koppel's contributions to the School were numerous and will be discussed in greater detail in the next chapter.

Professor Paul W. Case (**left**) in 1962. Mary Hutchings (**center**) and Helen W. Giese (**right**) in 1960.



As a result of the implementation of the Hollister report recommendation, Dean Hawkins issued a memorandum on May 11, 1962 describing the goals and directions of the Schools of Engineering for the future. It is interesting to present here what was planned in 1962 and what had actually happened in 1985 and what has happened in 2010.

It is assumed that enrollment will stabilize at about 30,000 students on the Purdue campus of which about 10,000 will be in engineering. The ratio of B.S. to M.S. to Ph.D. degrees awarded annually will be 100:45:15.

All of the present CMET building should be assigned to Chemical Engineering. A north wing can be added to the building when needed. Space would still remain for the addition of an east wing if it should ever be needed.

The maximum enrollment (in Chemical Engineering) is estimated to be as follows: 183 sophomores, 280 juniors, 266 seniors, 185 M.S. students, and 103 Ph.D. students.

One wonders what kind of a program the Dean had in mind. Obviously his idea was "bigger is better." His prediction of 30,000 students was almost correct in 1985. There were 34,000 students at Purdue in 1985 and 40,000 in 2011. The CMET building was still occupied by both Schools in 1986 and was inadequate for education and research in many respects. No north or east wing had been built in 1986 although the School of Materials Engineering moved to the MSEE building in June 1988 and the new Forney addition came in October 2004. The Dean's ratio B.S.: M.S.: Ph.D. = 100: 25.4: 14.1. The average ratio for the years 1983-85 was B.S.: M.S.: Ph.D. = 100: 8.6: 6.6, and in 2010-11 was 100: 6.7: 15.2. As for the total enrollment in Chemical Engineering, the School temporarily stabilized in 1985 at about 400 undergraduates (versus 730 predicted) and 110 graduate students (versus 288 (!) predicted). The 2010 numbers are 505 undergraduates, and 111 graduate students (77 admitted to Ph.D. status, 32 formally in MS program, but expected to be admitted to Ph.D. status after the qualifier examination, and two terminal M.S.). The big difference between 1985 and 2010 is the significant decrease in numbers of students doing terminal M.S. degrees. For those who know how research and education are done these days, the predictions of the Dean appear to be whimsical, but they show the spirit of an older generation of Purdue administrators.

Mary Hutchings (left) served the School for more than 20 years as the Administrative Assistant to the Head in charge of undergraduate students. She is shown here during the farewell activities of the 1981 *Razz-Banquet* along with Teri L. (Nagel) Carter (B.S.'81, then President of the AIChE Chapter) and the late Jerry D. Stacy (B.S.'81, then Secretary of the AIChE Chapter, and 1981 recipient of the AIChE Award).



The next faculty member came in 1962 to start a new research area for the School. Already in the 1950's a major change in the study of catalytic reactions had occurred both in academia and industry. More emphasis was placed on a thorough analysis of the catalytic surface properties, and the use of sophisticated spectroscopic equipment was becoming important. Robert George Squires (1935-, B.Ch.E. '57 Rensselaer Polytechnic Institute, M.S.E. ChE '58, M.S. Math.'60, PhD. ChE '63, all from the University of Michigan) had studied catalysis at Michigan. Shortly after his arrival, Squires established an ambitious program in catalysis, working initially with IR spectroscopy and then with other spectroscopic techniques. Squires' teaching interests extended to thermodynamics. Generations of alumni know him as the gifted teacher of ChE 311 (now ChE 211) and ChE 439 (now ChE 348). Bob's 42-year career extended across three eras of the School. More details of his story will be told in Chapter 5.

Professor R. Norris Shreve with his former administrative assistant Helen W. Giese (left) and his trusted personal secretary Elizabeth Prentiss (right), in 1970.



Left: John M. Woods (center) - shown here with Shreve and President Hovde - was responsible for the introduction of kinetics, reaction engineering and process design in the curriculum.

Right: Robert G. Squires (left) and Robert D. Vaughn in September 1963.

David P. Kessler coauthored a successful textbook on transport phenomena and contributed to research in fluid mechanics (1976 photograph).



Left: R. Norris Shreve, Brage Golding (center) and Thomas C. Doody (right) in September 1963.

Center: Leslie E. Lahti in 1965.

Right: Ralph A. Morgen in 1956.

Table 4-1. Omega Chi Epsilon

Until 1940 the honorary chemical society Phi Lambda Upsilon was the main society recognizing outstanding ChE students. In the early 1940's a short-lived local ChE honorary society, Chi Eta Epsilon, was formed. In November 1942, its 1942-43 President, Samuel C.Hite, and other members of the senior class started corresponding with the national office of Omega Chi Epsilon in an effort to establish a local chapter of this society at Purdue. Finally, on December 1, 1943, the sixth chapter of Omega Chi Epsilon was established at Purdue with J.L. Bray and C.L. Lovell as its first advisors. The goals of this society, which was originally formed at the University of Illinois in 1931, are to recognize excellence in chemical engineering, to promote original investigation in all branches of chemical engineering, to provide service to the School, to promote comradeship, and to encourage development of honesty, integrity and trustworthiness. As with all student organizations, Omega Chi Epsilon provides officers (listed below) and committee chairs an excellent internship in applied leadership.

The Omega Chi Epsilon chapter of Purdue is the third longest in continuous existence. From the early days of its history several of its members became involved in the national organization. Thus, J.C. Lottes was its national Secretary in the late 1940's and W.H. Tucker its Vice President in the late 1960's.

After Bray, J.C. Lottes, W.H. Tucker and A.H. Emery served as its advisors, Robert G. Squires (1969-74), R. Neal Houze (1974-81), Roger Eckert (1981-87), Linda Wang (1988-90), Linda Wang and Joe Pekny (1991-96), Joe Pekny and Venkat Venkatasubramanian (1996-98), Jochen Lauterbach and Eva Sevick-Muraca (1998-99), Jochen Lauterbach and Jennifer Sinclair (1999-2000), Jochen Lauterbach (2000-02), Ken Thomson (2002-03), Chelsey Baertsch (2003-2010), and Elias Franses (2010-present). In 2008 the chapter won the PESC Merit Fund Award. Among other activities, the society sponsors the Omega Chi Epsilon Outstanding Senior Award which was established in 1961 to recognize outstanding scholarship and leadership by a senior student. In 1963 the award was dedicated to the memory of Bruce A. Wilson (B.S.'63). Its recipients since 1961 have been the following students:

1961	William Murray	1987	Lyn Eshelman
1962	David R. Rea	1988	Christopher N. Bowman
1963	Thomas Roberts,	1989	Eric C. Johannsen
1964	Roger E. Tower	1990	Christopher L. Fieber
1965	David A. Snyder	1991	Kendall Justiniano
1966	James T. Murphy	1992	James Buerle
1967	Gary W. Probst	1993	Becky Ficek
1968	Robert N. Davis	1994	Brian Eastin
1969	Frank C. Coe	1995	Michele Bland
1970	David W. Pershing	1996	Craig Beasley
1971	Steven J. Swanson	1997	Jeffrey Lin
1972	Steven Augsburg	1998	Bryan Comstock
1973	Edward A. Turek	1999	Kevein L. Dolan
1974	William C. Nelson	2000	Diane M. Whirledge
1975	Stephen S. Grubbs	2001	Stefanie Bendiburg
1976	Carl R.F. Lund	2002	Margaret Rittorton
1977	Deborah L. Grubbe	2003	Donald E. Owens
1978	Walter Schumacher	2004	Brian C. Ward
1979	Rohit Khanna	2005	Patrick R. Ford
1980	Paul W. Sibal	2006	Ardimus E. Litzenburg
1981	Julia C. Lester	2007	Lee Swanson
1982	Demetrio A. Ruiz	2008	Russell Nix
1983	Cheryl A. Perkowski	2009	Laura Quock
1984	Thomas J. Balsano	2010	Brian Lowry
1985	Valerie A. Valesano	2011	Ashley Vacchiano
1986	Michael T. Jones		



Left: The plaque of the Omega Chi Epsilon Award in 1985.

Right: Alden H. Emery's contributions to education, research, administration and the School's Spirit were numerous. He is shown here in a 1965 picture.

Table 4-2. Omega Chi Epsilon Student Chapter Officers

Year	President	Vice President	Treasurer	Secretary
1982	Linda Pfaff	Dave Heintz	Roxane Doering	Roxane Doering
1983	Kathy Quinlan	Kevin Klotte	Doug Robinson	Greg Ames
1984	Doug Robinson	Kipp Coddington	Jane Atwood	Nikola Juhasz
1985	Kipp Coddington	Rick Knauer	Mike Jones	Daena Nelson
1999	Jennifer Ralston	Eric Hubert	Kelli Bousum	Shawn Kaleta
2000	Stefanie Bendiburg	Adriah Hardesty	Erin Moulesong	Christopher Caledron
2001	Sean Rochford	Keith Melchiors	Jeff Miller	Gwen Hallberg
2002	Don Owens	Shawn Toloday	Pat Stenger	Sarah Snyder
2003	Brian Ward	Ben Rosenbaum	Mohammad Behbahani	Brian McGrath
2004	Patrick Ford	Elizabeth Tocce	Rebecca Reid	Amanda Acosta
2005	Joan Porsche	Eric Borne	Mark Tucker	Ardimus Litzenberg
2006	Lee Swanson	Danny Robbins	Kim Gaafar	Jason Peckenpaugh
2007	Sarah Absher	Alan Beecher	Ajlan Al Zaki	Robert Purcell
2008	Laura Quock	Phil Schoch	Mandy Knust	Charlie Rutter
2009	Elise Branstrator	Theodore Birky	Brian Lowry	Ben Wilson
2010	Steven Warren	William Borror	Lynne Alexander	David Lyons

Leslie Erwin Lahti (1932-, B.S.'54 Tri-State College, M.S.'58 Michigan State University, Ph.D.'64 Carnegie Mellon University) joined the School in 1963. Before his Ph.D. he had worked with Corning Glass and Ren Plastics. His research at Purdue was in thermodynamics and polymers. He received the 1967 Shreve Prize. The same year he became Professor of Chemical Engineering at the University of Toledo. In 1972 he became Chairman of the Department and in 1982 Dean of Engineering at Toledo. He was elected a Fellow of AIChE and is now retired.

Some short-lived debates surfaced in the faculty in the early 1960's concerning the relative importance of teaching and research in a major university. Golding had recognized that the research activities of the faculty were not as intensive as he thought they should have been and he suggested ways of increasing the number of graduate students and the research funds of the School, which by that time were approaching an all-time low (Appendix S). The debate ended relatively soon with the understanding that good researchers were expected to do a good teaching job as well, and that the School could not further afford faculty who were inactive in research.

To further strengthen the areas of transport phenomena and control Golding hired D.P. Kessler and R.E. Eckert in 1964, R.A. Greenkorn, C.E. Wales and T.J. Williams in 1965, and R.G. Barile and H.C. Lim in 1966. These were the last actions of his administration. On November 30, 1966, Brage Golding left Purdue to become Vice-President of Ohio State University in Dayton, Ohio.



Roger E. Eckert in 1975

Mrs. Irene S. Shreve with the first Shreve Distinguished Industrial Fellow of the School, Dr. Fredrick Lloyd (B.S.'44, Ph.D.'49), former graduate student of R.N. Shreve, in 1984.



Lowell B. Koppel (left) in 1964.



The Shreve Endowment and Distinguished Professorship

The R. Norris and Eleanor B. Shreve Trust was created on October 11, 1957 through the generosity of Professor Shreve and his wife. As a result of this trust, the Shreve Distinguished Professorship was established by action of the Board of Trustees of Purdue University in June 1967. Although the intention of the donors was that this Chair be in the School of Chemical Engineering, the first recipient was Professor Earl T. McBee of the Chemistry Department. After Shreve's death in 1975, complications arose because of the misunderstanding of Purdue officials as to Shreve's wishes with respect to this professorship. Finally, L.B. Koppel succeeded in convincing the administration in 1976 that Shreve's intent was to have this professorship in Chemical Engineering.

Unfortunately the efforts of the faculty to award this Professorship to an important researcher in chemical engineering were initially unsuccessful, mainly because of the conditions placed by Shreve¹⁹.

The main limitation we are placing on this fund is that it be confined to some phase of organic technology. We are doing this not only because it has become Norris Shreve's main interest in the last quarter of a century but because we believe that by some concentration that more continuing results will be obtained... Hence, our intent is that this fund be devoted to instruction, research, and development in the field of organic technology by chemical engineers.

Organic chemical technology is no longer an active research field of modern chemical engineering. Thus, the professorship was left unfilled until 1984, when, upon agreement by Mrs. I. Shreve, the funds were used for the establishment of the *Shreve Distinguished Visiting Industrial Fellowship*. This program allowed outstanding industrial researchers to spend some time in the School, interacting with one or more research groups.

The first recipient of the Shreve Fellowship (1984-85) was Fredrick R. Lloyd (1921-, B.S.'44, Ph.D.'49, both from Purdue ChE), a former student of Shreve, and Vice-President of Eli Lilly & Co. He spent a year at Purdue teaching a dual-level course

(ChE 597B) and offering valuable industrial insight to the biochemical engineering research groups of the School. Two recipients were selected for the 1984-85 academic year. Joseph T. Kummer (1919- , B.E.'41, Ph.D.'45, both from the Johns Hopkins University) was a retired senior staff scientist of Ford Motor Co. who had made outstanding research contributions in catalysis. Ping I. Lee (1948-, B.S.Ch.E.'69 National Taiwan University, Ph.D.Chem. '75 Michigan State University) was the Associate Director of Advanced Drug Delivery Systems, Pharmaceutical Research and Technologies for Smith, Kline and French Laboratories. He had made significant research contributions in the field of diffusion in polymers. They each spent a week in the School interacting with the faculty and students. In 1987 Dr. V. J. Stokes from General Electric was the Shreve Distinguished Visiting Professor. He presented two seminars while at Purdue. In February 1989 Prof. M. M. Sharma visited the School for two weeks as the Shreve Distinguished Visiting Professor.

Currently, the Shreve endowment funds are used to support the instructional and educational mission (not research) of the School. This includes expenses for the graduate seminar, the recently initiated graduate student travel program, safety expenses, graduation receptions, AIChE receptions, and Academic Advisory Board visits.



Former Dean Andrey A. Potter (left) and Dean John C. Hancock in 1976.

David Phillip Kessler (1934-2003, B.S.'56 Purdue University, M.S.'59, Ph.D.'62, both from the University of Michigan) worked for Dow Chemical Co. (1956-58) and Procter and Gamble Co. (1962-64) before joining Purdue University in 1984. He was to spend the next 37 years at Purdue (see textbox).

**David Phillip Kessler
(1934-2003)**

David Phillip Kessler (BSChE '56 Purdue University, M.S. ChE '59, Ph.D. ChE '62, both from the University of Michigan) worked for Dow Chemical Co. (1956-58) and Procter and Gamble Co. (1962-64) before joining Purdue University as an assistant professor in 1984. His extensive industrial experience (partly after his BS and partly after his Ph.D.) helped him provide relevant examples in both undergraduate and graduate classes and to serve as an excellent career adviser for undergraduates. He concentrated his efforts on teaching and research in transport phenomena, statistics, numerical analysis, applied mathematics and biomedical engineering. He also had several patents covering dialysis incorporating a portable hemodialyzer for use as an artificial kidney. He advised 14 and co-advised 11 MS and advised three and co-advised three Ph.D. students and wrote two books with R.A. Greenkorn: *Transfer Operations* in 1972, and *Modeling and Data Analysis for Engineers and Scientists* in 1980. The two of them also developed a TV course in 1976 on Data Analysis (43 video sessions). Affectionately known as the "Bob & Dave Show," ChE 525 was taught in this format on local television for five years as well as in the classroom, with the former proving to be every bit as effective as the traditional approach.

Kessler was very service-oriented. He served as the Chairman of the University Senate during the academic year 1972-73. From 1978-80 he was Director of Academic Information Systems and from 1976-80, assistant provost. From 1982 to 2000 he was the Head of the Division of Interdisciplinary Engineering Studies in addition to being an active faculty member in ChE and chair of the undergraduate committee while the curriculum was restructured. As a favor to the author (PCW) he served as acting Head of Freshman Engineering from January to June 1992 so that Wankat could take a sabbatical. After the author returned from sabbatical, the professors and staff of Freshman Engineering wondered why Dave Kessler wasn't the Head of Freshman Engineering! In addition to teaching, research and consulting, Kessler was active as a mediator in fact-finding cases and as a member of accreditation committees. His professional societies included the American Society of Engineering Education, the American Institute of Chemical Engineers, the American Association of University Professors, Sigma Xi, and the Society of Professionals in Dispute Resolution.

Outside the classroom, Dave revealed a side of himself that extended from a love of music to "hustling a mean game of pool," especially at student-faculty gatherings. His lifelong passions were tennis and fly fishing. Dave was a pleasant companion—he rarely complained even after he self-diagnosed his brain tumor. He always had an appropriate quip ready at the tip of his tongue, but he also knew instinctively when not to say it. He retired in 2001 after 37 years of service to Purdue and died on October 22, 2003.

Roger Earl Eckert (B.S.E. '48 Princeton University, M.S. '49, Ph.D. '51, both from the University of Illinois-Urbana Champaign) came to Purdue in 1964 after 13 years experience with E.I duPont de Nemours. He was extremely student oriented and from 1987 to 1975 he was Director of the School's undergraduate program with responsibility for advising, registration and undergraduate course matters. He provided almost 39 years of service to the School (see textbox).

**Roger Earl Eckert
(1926-2003)**

Roger Earl Eckert (B.S.E. ChE '48 Princeton University, M.S. ChE '49, Ph.D. ChE '51, both from the University of Illinois-Urbana Champaign) did his doctorate under the direction of the internationally known chemical physicist and chemical engineer Harry G. Drickamer. After receiving his Ph.D., he was employed by E.I duPont de Nemours as an engineer, then senior engineer from 1951 until 1964, when he came to Purdue University as an associate professor. His extensive industrial experience gave him a firm belief in the power of statistical analysis.

At Purdue he developed an active research program in the fields of fluid mechanics, polymer rheology, methods of design of experiments, and mass transfer. He advised 20 and co-advised three MS and advised three and co-advised eight Ph.D. students and was the recipient of the 1965 Shreve Prize for Chemical Processing. Dr. Michael Ramage (BSChE '66, Ph.D. Purdue '71), a distinguished graduate of the School, did his thesis research with Eckert. Mike stated "Roger was a tremendous major professor. He was an advisor, mentor, and lifetime friend. Roger enhanced my career and life."

From 1970 to 1975 Eckert was the Assistant Head of the School. From 1975 to 1987 he was Director of the School's undergraduate program and was responsible for advising, registration and undergraduate course matters. This was the area where Eckert excelled—working with undergraduate students. He contributed extensively to undergraduate and graduate teaching, especially in the fields of statistics, polymers and in the undergraduate laboratories by teaching ChE 205 (mass & energy balances), ChE 306 (separations), ChE 320/244/525 (statistics), ChE 434 and 435 (laboratory), and ChE 542/442 (polymers).

Eckert's paternal concern for the students' problems was unsurpassed, and he served as advisor not only of ChE societies, but also campus residence halls. Eckert taught until his final illness forced him away from his beloved classroom. He died April 26, 2003 after almost 39 years of service to the School.

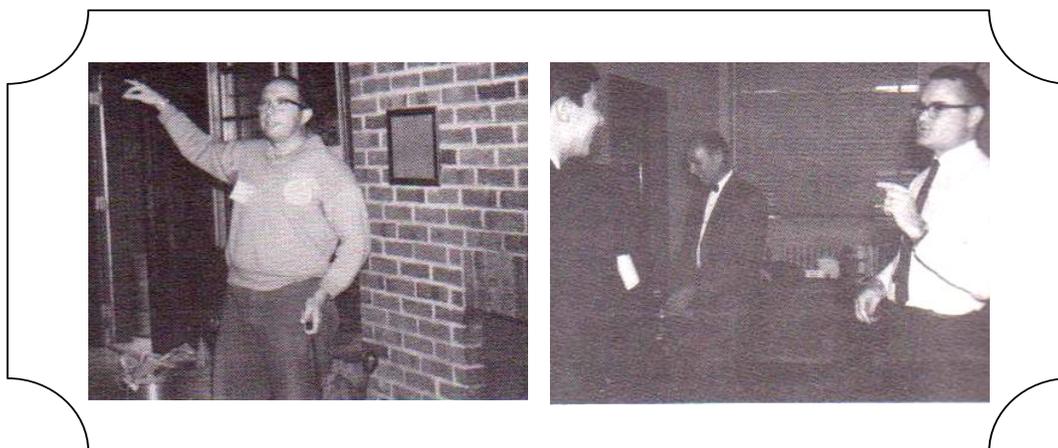
Charles E. Wales (1931-1999, B.S. '53 Wayne State University, M.S. '54 University of Michigan, Ph.D. '65 Purdue University) started at Purdue in 1965 soon after he finished his Ph.D. under the direction of Alden Emery. Before that he was Instructor (1954-56), Assistant (1956-60) and Associate Professor (1960-63) at Wayne State University. He stayed at Purdue for two years. As the Chairman of the Freshman Engineering Department at West Virginia University he became well known in engineering education for developing the guided design teaching method. He was a Professor Emeritus at West Virginia and died on May 16, 1999.

Finally, Theodore Joseph Williams (1923-, B.S. '49, M.S. '50, both from the Pennsylvania State University, M.S.E.E. '55 Ohio State University, Ph.D. '56 Pennsylvania State University) was an internationally recognized researcher in process control, who joined Purdue after

several years of industrial experience. He was an Assistant Professor at the Air Force Institute of Technology from 1953 to 1956, when he joined the Monsanto Co. in St. Louis. He was associated with the School from 1965 until 1970. In 1966 he formed the Laboratory for Applied Industrial Control which he directed until he retired.

The biographies and contributions of Robert A. Greenkorn who started in 1965 and of the last two professors hired during Golding's administration (R.G. Barile and H.C. Lim) will be presented in the next Chapter.

With the departure of Brage Golding in October 1966, an era had come to an end. Some major decisions about the future of the School would be made during the academic year 1966-67. The man who would make them was, surprisingly enough, a mechanical engineer.



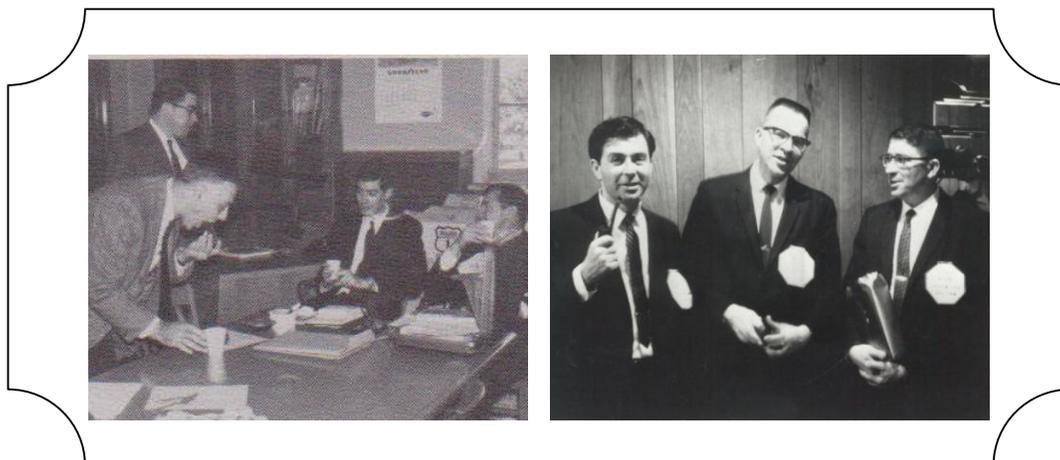
Left: David P. Kessler in October 1966.

Right: Lowell B. Koppel, (left), Lyle F. Albright (center) and Robert G. Squires in November 1966.



Left: John E. Myers and Brage Golding at Myers' farewell dinner in January 1966.

Right: Theodore J. Williams made significant contributions to control and distillation.



Left: Brage Golding's farewell get-together in November 1966. From left to right: B. Golding, D.R. Coughanowr, L.B. Koppel and R.A. Greenkorn.

Right: Charles E. Wales, Leslie E. Lahti and Donald R. Coughanowr (from left to right) at their joint farewell banquet in May 1967

References and Bibliography

1. M.M. Abbott, *Chem. Eng. Educ.*, 18, 50 (1984).
2. H.B. Knoll, *The Story of Purdue Engineering*, Purdue University Studies, West Lafayette, IN, 1963.
3. Report of Committee on Evaluation of Engineering Education, ASEE, 1955.
- 3a. T. S. Reynolds, *75 Years of Progress – a History of the American Institute of Chemical Engineers 1908-1983*, AIChE, New York, 1983.
4. Letter of R.N. Shreve to F.L. Hovde, January 28, 1959.
5. Letter of R.N. Shreve to G.A. Hawkins, March 27, 1959.
6. Letter of G.A. Hawkins to R.N. Shreve, April 1, 1959.
7. Letter of R.N. Shreve to G.A. Hawkins, May 7, 1959.
8. Letter of G.A. Hawkins to R.N. Shreve, May 18, 1959.
9. Letter of R.N. Shreve to G.A. Hawkins, June 4, 1959.
10. Memorandum of G.A. Hawkins to the Head of the Schools of Engineering, May 11, 1962.
11. S.M. Case and R.W. Coughlin, "C. O. Bennett of Connecticut," *Chem. Eng. Educ.*, 16, 98 (Summer, 1982).
12. D.G. Seaborg, "UC Santa Barbara," *Chem. Eng. Educ.*, 15, 106 (Summer, 1981).
13. Letter of R.W. Parkhurst to N.A. Peppas, January 25, 1984.
14. Interview of R.N. Shreve with R.E. Eckles, five parts, 151 pages, in R.N. Shreve's file, bound volume of letters and other items kept in the office of the Dean of Engineering, July 23-31, 1969.
15. Anonymous, Campus Copy, November 24, 1970.
16. Letter of R.W. Vest to H.W. Giese, December 1, 1970.
17. Letter of D.P. Heath to H.W. Giese, October 27, 1970.
18. Letter of R.N. Shreve to H.W. Giese, August 27, 1951.
19. R.N. Shreve, letter of intent to Purdue University regarding the N. and E. Shreve Fund, February 4, 1964.

