Nineteenth Annual Report
To The Chemical Engineering Alumni
The Ohio State University

PROCESS DYNAMICS AT

CHEMICAL ENGINEERING DEPARTMENT
THE OHIO STATE UNIVERSITY
March 20, 1967

NINETEENTH ANNUAL REPORT TO THE ALUMNI OF THE
CHEMICAL ENGINEERING DEPARTMENT AND PETROLEUM ENGINEERING

Dear Jewels:

Tomorrow is Spring and the best time of the year is starting as every day becomes better and better. This is my nineteenth letter to the alumni and is just a step from my second decade of letters. I will begin my twentieth year as department chairman next Fall - God be willing. It is a wonderful feeling to hear of the progress made by all of you. This is especially true of those who have hit "tough sledding" and then the breaks, after which there was only one way to go and that was up. I have often said at technical meetings that I will match our alumni with those from any other school. I have the advantage over other department chairmen in that I know over 95% of our alumni personally - everyone who has graduated during my thirty-eight years in the department and practically all of those who graduated before.

ACE DAY - FRIDAY, MAY 12, 1967

The Annual Conference for Engineers is a week later than in previous years. The reason for this is that the preceding week will be May Week on campus which will tie up President Fawcett and others. The ACE Day program will be a very interesting one indeed. It will consist of the dedication of Hitchcock Hall which now houses the office of the College of Engineering and the Engineering Experiment Station, Engineering Drawing, classrooms and auditoriums. After the dedication program, there will be an address by Professor Robert C. McMaster on "Sonic Power - University Research with Industrial Payoff." Dr. McMaster is a forceful speaker. I am sure that all of you will get much out of his talk. In the afternoon session, Dr. Aldrich Syverson will give his paper on "An Experimental Course in Process Design." This paper was presented at the annual meeting of the American Institute of Chemical Engineers at Detroit last December. It was one of the best received papers at that meeting. It will show what we are now doing in process design. Dr. Syverson will be available after his presentation to give more details to those interested. It would be worthwhile for any company to send one of our alumni to this meeting to hear both Dr. McMaster and Dr. Syverson. The complete program for ACE Day is given on pages 8, 9, and 10.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

We are very proud that, once again, 100% of our graduating students have joined the American Institute of Chemical Engineers. I wish that the spirit of professionalism was stressed more vigorously before I became department chairman in 1948.

We are very proud that we placed two winners in the National Student Contest Problem for 1966 sponsored by the American Institute of Chemical Engineers. Glenn McKee, who is now with the Monsanto Company, won second place. Tom Fitz, now with Procter and Gamble, placed third. This is very unusual for a school to have two winners in one year. We have had winners in other years, but never two at the same time. Each of the 102 schools in Chemical Engineering is permitted to submit two solutions. We, therefore, hit the jackpot.

-1-
The subject of the 1966 problem was "The Preliminary Economic Process Design of a Plant to Manufacture a Monomeric Chemical - t-Butyl Methacrylate." At Ohio State this contest problem is given under the course Chemical Engineering 720 - 2 credit hours - Special Problem. A suitable solution must be submitted to meet the requirements of this course and graduation. Thirty days are allowed for the solution of the problem. The students were not permitted to discuss this work with anyone until June 15, 1966. The solution of the problem required at least 100 hours of intensive work by the students and the junior staff, under the supervision of Dr. Syverson, put in over 200 hours on the grading of the solutions.

The Central Ohio Section, American Institute of Chemical Engineers, awarded $25.00 to each student whose solution was submitted. Photographs of Herbert Barneby, President of the Central Ohio Section, making these presentations are given in this report. After Glenn McKee and Tom Fitz received their awards, they were asked what the problem was about and in keeping with the June 15 date, Fitz and McKee mumbled and said they could not pronounce the organic chemical. This brought the house down. We did announce to the Central Ohio Section, in a meeting held in September, the subject of the problem.

Glenn McKee's scholastic record for five years was 3.92 out of 4.0. The scholastic record of Tom Fitz was 3.4. He won his letters in football and during his fifth year was one of Woody Hayes' assistants.

COVER PAGE

The photographs on the cover page show the progress we are making in process dynamics and control. This is taught under Chemical Engineering 740 - Chemical Engineering Measurements and Control, and a graduate course Chemical Engineering 815L - Advanced Instrumentation and Process Control of Chemical Plants.

Using funds received from a National Science Foundation grant, the Ohio State University, chemical engineering alumni, and chemical companies matching grants, modern equipment has been added to the process dynamics and control laboratory. Such equipment includes electronic/pneumatic recorder controllers, analog ratio control computers for distillation column control. An Electronics Associates, Inc. solid state analog computer facility is now in operation containing 40 amplifiers, 24 integrators, 6 multipliers and associated digital logic components. The facility can be divided into three separate units with problem boards for undergraduate simulation experiments or these can be slaved together as one master computer to work complex mathematical problems associated with the advanced graduate course in process dynamics and control as well as fulfilling the department's need for solving other types of mathematical problems.

The B. F. Goodrich Chemical Company donated to the department a Thompson-Ramo-Woolridge 300 digital computer which served as a process control computer in one of their plants since 1959. This was the first application of digital computer control in the United States' chemical industry. This modern transistorized computer will be used in two general areas to more intimately acquaint students with the impact of computers in engineering:

(1) data logging, correlation and control of large scale chemical equipment such as evaporators and distillation columns,

(2) hybrid computation by integration with analog computer facility to solve problems not feasible by digital or analog computation alone.

A new room is being constructed in the Unit Operations Laboratory to house all of this computing equipment.
This process dynamics and computer control system is one of the finest in the country. There are relatively few schools in the country who are fortunate enough to be able to combine all of this computing equipment in one location for optimum teaching and research. The effect of this program will be academic excellence in this important field of chemical engineering. Such a program will elevate the image of the department in the eyes of industry and other universities.

**FELLOWSHIPS, SCHOLARSHIPS, GRANTS-IN-AID AND OTHER CONTRIBUTIONS TO THE CHEMICAL ENGINEERING DEPARTMENT**

Once again, we are very thankful for the generosity of the many companies and agencies listed below. Without their help it would be impossible to have a graduate program. The laboratory costs for the undergraduate program would be prohibitive, if it was not due to the generous donations of chemicals and, in many cases, laboratory equipment. The undergraduate scholarships have helped many worthy and scholarly students, especially those on the five-year combined program in which an outstanding student can obtain a Master's degree with an additional quarter and a half of work.

The grants-in-aid have done much for the department. In some cases, it has enabled us to send our faculty members to national meetings to present papers and to keep up with the technical explosion in chemical engineering and to participate in national meetings, presiding at meetings at which they are officers. In some instances, the grants-in-aid are used for graduate fellowships. This is indicated in the table below:

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<tr>
<th><strong>FELLOWSHIPS</strong></th>
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<td>1. American Oil Foundation</td>
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<td>9. Ohio State University</td>
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<td>10. National Science Foundation</td>
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<td>11. Louis A. and Lucille Roberts Memorial Fellowship Fund</td>
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**GRANTS-IN-AID AND OTHER CONTRIBUTIONS**

| 1. American Cyanamid Company * | 9. Harshaw Chemical Company, Division of Kewanee Oil Company |
| 4. Dow Chemical Company * | 12. Mead Corporation |
| 5. Dow Corning Corporation | 13. Monsanto Company |
| 7. Esso Education Foundation * | 15. Universal Oil Products Company |
| 8. B. F. Goodrich Chemical Company | 16. Mobil Foundation Incorporated |

*Money may also be used for a pre-doctoral fellowship.*
THE ALCOA PROFESSORSHIP

The Aluminum Company of America (ALCOA) made a contribution of $60,000 for an ALCOA professorship in Chemical Engineering. This amount will cover a three-year period. We are setting up a program in polymer engineering. We are looking for a top man in this field to head up this program.

THE OHIO STATE UNIVERSITY CHEMICAL ENGINEERING EQUIPMENT DEVELOPMENT FUND

Contributions for this worthy cause are still coming in. Many of our alumni are ear-marking their contributions to the Development Fund for the Chemical Engineering Project #525659. The University administration, including our Dean of Engineering, have done much in the past decade in the uplifting of our department in the areas of salaries, building, research equipment, personnel, and travel. Their cooperation with us has been positive and not negative. However, it is impossible for the University to support all of our needs from the budget. The contributions from our alumni and the grants-in-aid from many chemical companies help us materially.

DECEASED, LOST, STRAYED, OR STOLEN ALUMNI

It is with a heavy heart that I receive notices of so many of our alumni dying. The list is given in this report and we believe it to be correct as far as we know.

We still have some mavericks - better known as lost, strayed or stolen alumni. If you know of the address of anyone appearing on this list, we would appreciate it if you would call it to our attention. Many alumni have helped us with this information. When we lose an alumnus, I have quite an empty feeling as once an Ohio State Chemical Engineer always an Ohio State Jewel.

We are sorry to report that on November 11, 1966, Professor Emeritus (Petroleum Engineering) Edward V. O'Rourke died of a heart attack. He had come to the office to get his mail and as he was walking out of the departmental office door, he was stricken with the attack and died about two minutes later.

Professor O'Rourke was born in Columbus on December 5, 1895. He received the degree of Bachelor of Mining Engineering in 1919. After six years experience in Chili, South America; Ruth, Nevada; Maracaibo, Venezuela; and with Gulf Oil in Venezuela, he joined the Ohio State University staff in 1925 in the Mining Engineering Department. He was chairman of that department for several years and in the Fall of 1956 he became professor of Petroleum Engineering in the Chemical Engineering Department. He retired in 1960 and was given the title of Professor Emeritus - Petroleum Engineering.

Professor O'Rourke was an engineer first and a scientist second. He had no use for scientific data which had no practical or economic value. His most significant contribution to his students was probably instilling in them the economic impact of the engineering methods taught. The value of this economic emphasis is attested to by the large number of former students who are now presidents, vice presidents, and managers of oil producing companies. Professor O'Rourke enjoyed a close personal relationship with his students both during their college days and later during their professional life.

A resolution in memoriam of Edward V. O'Rourke was prepared by Professor H. C. Slider and the undersigned. We will be happy to send copies of it to any of his former students and colleagues.
It is with deep regret that we report the loss of DR. ALBERT HENNE, Professor of Chemistry, who died in a Philadelphia hospital about March 12, 1967. He had charge of organic chemistry for our chemical engineers and was one of the most respected professors of our students. His first degree was in chemical engineering which he received from the University of Brussels in Belgium. With his wide industrial experience, he made his courses in organic chemistry one of the best. The students and our faculty in chemical engineering will remember him for many years.

CHANGES IN DEPARTMENTAL FACULTY MEMBERS

THOMAS E. CORRIGAN, Associate Professor of Chemical Engineering, resigned at the end of the Summer Quarter, 1966, to accept a position with the Mobil Chemical Company.

We were fortunate to have DR. HARRY C. HERSHEY accept the position of Assistant Professor in our department. Dr. HERSHEY attended the Cornell University for one year and then transferred to the University of Missouri at Rolla where he received three degrees in Chemical Engineering, namely, B.Ch.E., M.Sc., and Ph.D. He was an Assistant Professor of Chemical Engineering at the University of Missouri for one year. He worked for two years as an Associate Engineer for Union Carbide Corporation's Nuclear Division at Paducah, Kentucky. In 1962 he returned to the University of Missouri for graduate work. He has several publications, is aggressive in his research work, and will be an outstanding addition to our staff.

THOMAS ALVIN BOYD LECTURE SERIES IN CHEMICAL ENGINEERING

The College of Engineering of The Ohio State University is proud to present a series of lectures on "Intermolecular Forces and Thermodynamic Properties of Mixtures." These lectures will be given on the afternoon and evening of Thursday, April 20, 1967, and the morning and afternoon of Friday, April 21, 1967. The times, titles of lectures, and speakers are given below. If you are interested and wish more information, kindly contact Dr. Webster B. Kay, Chemical Engineering Department, The Ohio State University, 140 West 19th Avenue, Columbus, Ohio 43210 - or call Dr. Kay at 614-293-2727. He will be happy to answer your questions or forward to you a brochure of these meetings.

THURSDAY - APRIL 20, 1967

Afternoon  
2:00 - 4:00 P.M. Meet the Lecturers  
This will be an informal meeting and discussion for those interested in the measurement of the physical properties of mixtures.

Evening  
6:00 P.M. - Joint dinner meeting with the Central Ohio Section of the American Institute of Chemical Engineers.

8:15 P.M. - Panel Discussion - "Estimation of Thermodynamic Properties of Mixtures, Old and New Methods". Panelists: Professors Kreglewski, Rowlinson and Van Ness. Moderator: Professor Kay

The dinner will be held at Presutti's Villa Restaurant, 1692 West 5th Avenue.

FRIDAY - APRIL 21, 1967

Morning  
9:00 A.M. Introductory remarks
9:05 A.M. Professor Rowlinson - On the nature of intermolecular forces in fluid mixtures
10:30 A.M. Professor Kreglewski - A semi-empirical treatment of properties of fluid mixtures
12:00 Noon Lunch

Afternoon  
1:30 P.M. Professor Van Ness - Vapor-liquid equilibria
2:45 P.M. Professor Rowlinson - The limitations of the rigorous methods of statistical thermodynamics and kinetic theory in the calculation of thermodynamic properties. Future development of this subject.
4:00 P.M. End of Meeting

These lectures will be held in the Hitchcock Hall Auditorium - 2070 Neil Avenue.
Professor Alexander Kreglewski is Head of the Phase Laboratory at the Institute of Physical Chemistry, Polish Academy of Science in Warsaw, Poland. At the present time he is Visiting Professor, 1967-1968, at the Thermodynamics Research Center, Texas A and M University.

Dr. J. S. Rowlinson is Professor of Chemical Technology at the Imperial College of Science and Technology, University of London, London, England.

Dr. H. C. Van Ness is Professor of Chemical Engineering at Rensselaer Polytechnic Institute.

Dr. Thomas Alvin Boyd, B.Ch.E. '18, is an internationally known authority on combustion and fuel chemistry. He was an early co-worker with Dr. Charles F. Kettering in the original General Motors Research Laboratories in Dayton and is credited with being one of the early pioneers in the development of tetraethyl lead. As a life-time associate and close friend of Dr. Charles F. Kettering, he authored "Professional Amateur," a biography of Charles Franklin Kettering, and "Prophet of Progress," selections from the speeches of Charles F. Kettering. Dr. Boyd has thoughtfully made available to the University the income from his book, "Professional Amateur," to be used in sponsoring lectures which will bring together persons with a variety of backgrounds but mutual interests.

SALARIES AND ENROLLMENT

The salary offers again are listed in this report. These are incomplete as some of our men are still taking plant trips. However, it does indicate that there is still a shortage of chemical engineers.

Enrollment data are also given. We are very much concerned with the drop in enrollment before the third year and the beginning of our curriculum. In some cases this drop is attributed to the student choosing a course of study which is not so demanding and difficult as chemical engineering. We are now investigating the possibility of there being other reasons and, if so, what they are. Each member of our staff has been assigned to act as an adviser to about ten students in the first and second year who have indicated their intention of taking chemical engineering. In this manner, we hope that we can find a correlation. The following table is indicative of this enrollment problem.

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*Increase due to transfer students from other universities.

BATTELLE MEMORIAL INSTITUTE

We are very grateful and appreciative of Battelle's contribution to chemical engineering education in our department this past year. With the resignation of Dr. Corrigan and the illness of Dr. Dryden we were confronted with a shortage of faculty members. Battelle permitted Mr. Alex Lemmon, Jr. and Dr. Palmer Stickney to give courses in our department. We would have been in a difficult position without this help. We thank the administrative officers at Battelle for their whole-hearted contribution.
We are very happy to report that Dr. Charles E. Dryden, one of the giants of our department, has returned to the University after a long illness.

THE MUCH ADO ABOUT NOTHING DEPARTMENT

Parker S. Dunn gave to me the following clipping from the WALL STREET JOURNAL, June, 1966. I thought this would be appropo to give in light of the so-called scientific method of research.

"NOTABLE AND QUOTABLE"

'Charles Brower, chairman, Batten, Barton, Durstine and Osborn, writing in Sales Management magazine:

If Christopher Columbus had applied modern research methods to his proposed voyage, a consumer jury test would have told him in advance that the world was flat; depth interviews with expert seamen would have revealed the impressive monsters that awaited him hungrily at the end of the sea; motivational studies among his crew would have shown that they were only interested in money; Ferdinand and Isabella would have cancelled their appropriation; America would never have been discovered; and you would all be Indians."

I thought all of you would enjoy the following. As Kettering once said according to T. A. Boyd, "I believe in luck and plenty of it. The harder you work the more luck you have."

TAKE TIME-----------------------------------------------

to work --it is the price of success.
to think --it is the source of power.
to play --it is the secret of youth.
to read --it is the foundation of wisdom.
to laugh --it is the music of the soul.
to be friendly --it is the road to happiness.
to dream --it is the highway to the stars.
to look around --it is a shortcut to unselfishness.
to pray --it is the way to heaven.

We are looking forward to seeing many of you on Friday, May 12, 1967. With kindest and warmest regards.

Sincerely yours,

[Signature]

Joseph H. Koffolt
Chairman
Chemical Engineering Dept.

JHK:mut
ACE DAY
Friday, May 12, 1967

MORNING SESSION
9:00 a.m. Registration and tours of the building - Hitchcock Hall Lobby, 2070 Neil Avenue (at Woodruff Avenue)

10:00 a.m. Building Dedication Ceremony - Hitchcock Hall Auditorium
Dr. Harold A. Bolz, Dean, College of Engineering - Presiding
Participants: Dr. Novice G. Fawcett, President, The Ohio State University
Dr. Bertram D. Thomas, Member, Board of Trustees and
President, Battelle Memorial Institute
The Honorable James A. Rhodes, Governor, State of Ohio
Dr. John D. Millett, Chancellor, Ohio Board of Regents
Address: "Sonic Power: University Research with Industrial Payoff", by Dr. Robert C. McMaster, Professor, Welding and Electrical Engineering Departments

LUNCHEON SESSION - Ohio Union Ballrooms
12:00 Noon Presiding: Marion L. Smith, Associate Dean
Recognition of Engineering Honor Students
Presentation of Distinguished Alumnus Awards
Presentation of Teknikoi Outstanding Alumnus Award
Address: "Turmoil In Technology", Dr. Gordon B. Carson, Vice President, Business and Finance and Treasure, Ohio State University

AFTERNOON SESSION - Department of Chemical Engineering, Chemical Engineering Building, Room 207
Presiding: Joseph H. Koffolt, Chairman, Chemical Engineering Department
Presentation of student awards in Chemical Engineering:
American Institute of Chemical Engineers - Annual Scholarship Award
M. W. Kellogg Company Design Award
Central Ohio Section, American Institute of Chemical Engineers - Student Contest Problem Award
American Institute of Chemists Professional Award
Introducing the Golden Anniversary Class of 1917:

Living:
Samuel Irvine Anderson
Arthur Marshall Brant
Francis J. Cloran
Edward Henry Deibel
James Wallace Kennedy
William Fredrick Meyer
Henry Ellsworth Outcault
Earl Rogers Schafer
James Paul Emmett George

Deceased:
Don Fisk Alexander
Carl Everett Aungst
Charles Russell Bennett
William Irving Burt
Homer D. Holler
Walter Leonard Kreuger
Fred Neddemeyer Schaaf
Frank Lee Sinks
Henry Howard Thompson
William Albert Wirth
2:30  
An Experimental Course in Process Design - An Approach to Gaining 
Breadth and Depth in Chemical Engineering, by Dr. Aldrich Syverson, 
Professor, Chemical Engineering - Room 207, Chemical Engineering 
Building

or

Inspection of research work and facilities of the department; 
Properties of Azeotropes - Dr. W. B. Kay - Room 436 
Surface Transport and Transient Adsorption - Reaction Research - 
Chemical Kinetics of Flow Reactor - Dr. Syverson - Room 414 
Mass Transport Phenomena of Fluids in Heterogeneous Media - 
Dr. C. J. Gankoplis - Room 332 
Air Pollution as Applied to Environmental Control - Dr. T. L. 
Sweeney - Room 435A 
Phase Behavior of the Trempeleau Reservoir, Morrow County, Ohio - 
Miscible Displacement Studies of Clinton Sand - Professor H. 
C. Slider - Room 425 
Problems of Fluid Dynamics in Chemical Engineering, Mixing, 
Turbulence, etc. - Dr. R. S. Brodky - Room 306 
Liquid Fuels, Petroleum, Coal and Oil Shale - Dr. E. E. Smith - 
Room 103 and 407

4:00  
Social Hour - Unit Operations Laboratory - Room 117

6:00  
Dinner for Anniversary Classes - arranged previously or in afternoon

BIOGRAPHICAL SKETCH OF THE SPEAKERS

Dr. Robert C. McMaster, professor of welding engineering and electrical engineering 
at The Ohio State University, is recognized internationally for his creative work in non-
destructive testing, X-ray and radioisotope techniques, ultrasonics and many other fields. 
Among his numerous inventions is the development of a high-sensitivity, high-detail resolu-
tion X-ray television inspection system, which has contributed markedly to research in 
resistance welding and process and quality control. He has received national acclaim for 
this work which led to precision quality control of brazed honeycomb structures and other 
complex shapes essential to national defense production. More recently, he has devoted 
his attention toward the development of ultrasonic devices for industrial power applica-
tions.

The career of Dr. McMaster includes extensive varied teaching experience at Carnegie, 
Case and California Institutes of Technology. Before joining The Ohio State faculty in 
1955, he was for nine years a member of Battelle Memorial Institute, Columbus, serving 
successively as research engineer, assistant supervisor of Industrial Physics Division, 
supervisor of Electrical Engineering Division, and Assistant Coordination Director. At 
Battelle his research include fatigue studies of aircraft, weldment structures, and oil 
well drilling materials; development of permanent magnet materials; radiation steriliza-
tion of microorganisms; xeroradiography; ultrasonic and computer circuitry.

Dr. McMaster is the editor of a two-volume, 1900-page Nondestructive Testing Handbook, 
and has served as president of the Society for Nondestructive Testing. He is the author 
of more than 100 technical papers and publications.

His many honors, including the 1963 Alumni Award for Distinguished Teaching, 1959 
DeForest Award, 1957 Coolidge Honor Award and ASM Marburg Lecturer, attest to the high 
recognition enjoyed by this master teacher, inventive genius, and creative professional 
engineer.
Dr. Gordon B. Carson, Vice President for Business and Finance, and Treasurer of The Ohio State University, has enjoyed a varied career as an engineer, corporate executive, research director, teacher, and dean of engineering.

Dr. Carson received his B.S.M.E. from Case Institute of Technology in 1931 and his M.S.M.E. and M.E. degrees from Yale University. In 1957 Case Awarded him an honorary Doctor of Engineering degree.

While teaching at Case, he was in charge of the industrial division of mechanical engineering and developed the graduate program in industrial engineering. At this time he also served part time as a research engineer, and later as director of research, for the Cleveland Automatic Machine Company. In 1948 Dr. Carson became assistant to the general manager of the Selby Shoe Company in Portsmouth, Ohio, advancing later to manager of engineering and secretary of the corporation. He holds patents pertaining to automatic machinery and automation for the consumer goods industry. His latest invention is a digital control for processing machines.

A member of many professional societies, Dr. Carson served as national president of the American Institute of Industrial Engineers in 1957-58 and edited the PRODUCTION HANDBOOK. His many honors include election as Fellow of the American Association for the Advancement of Science. Dr. Carson is currently chairman of the Ohio State Selective Service Advisory Board for Scientific, Technical and Specialized Personnel; a director of the Industrial Nucleonics Corporation; a director and vice president of Goodwill Industries; a trustee of the Riverside Methodist Hospital; and a trustee of the Engineering Index Service. He is past president of the Columbus Society of Financial Analysts.

It was during his years of leadership as dean of the College of Engineering, 1953-58, that the building program being recognized here today was conceived and initiated.

INTERESTED HIGH SCHOOL STUDENTS WISHING TO STUDY CHEMICAL ENGINEERING

During the past year we have prepared a four-page brochure on chemical engineering at the Ohio State University. This brochure was prepared for distribution to students in high school. It covers the following:

a. What is chemical engineering?
b. What does a chemical engineer do?
c. What is the difference between the profession of chemistry and the profession of chemical engineering?
d. What does a chemical engineer study?
e. What about the future of chemical engineering?

If any of you, as many of our men do, are going to talk to high school students, we will be happy to send to you a supply of these brochures. Let us know how many copies you will need by letter or phone.

We also have a film prepared by the American Institute of Chemical Engineers on the profession of chemical engineering. It is in color, with sound, is 16 mm, and has a running time of about 20 minutes. We would be happy to loan our copy to you. We have done this several times this past year.

In view of the critical demand for chemical engineers, we would appreciate any help you can give to interest students in chemical engineering.
ENGINEERING IN THE NEW CONCEPT
OF HIGHER EDUCATION

An Address to the
American Institute of Chemical Engineers
May 16, 1966

by
John D. Millett
Chancellor, Ohio Board of Regents

It may seem inappropriate and even presumptuous for a social scientist by profession to comment about engineering education. Even as an administrator in higher education, my credentials for useful observation or comment may seem somewhat limited.

There is one place, however, where professional skill based upon education and experience often breaks down. This failure in effective action frequently occurs not within the specialized area of professional practice itself, but on the borderline where professional practice meets the interests and concerns of many other groups of people in our society. No profession in our country ever operates in a vacuum. Every profession operates rather in a social environment which is our nation, and every profession must give careful thought at all times to the relevance and the contribution of its own efforts to the larger context of which it is a part.

My role here today accordingly is not to provide any new or startling insights into engineering education as such. I lack the professional know-how which is indispensable to adequate consideration of the details of engineering education. My concern is with the larger context within which both engineering education and engineering practice must necessarily take place. More specifically, my concern is with certain general developments which are having and will continue to have a major impact upon engineering education and engineering practice.

At the outset, we need to ask in what respect is there a new concept of higher education in this country. An adequate answer to this question would require considerable discussion of the history and the purposes of higher education in the United States. Without providing the background for these generalizations, let me make certain observations. Research has become a major function of higher education in the past 25 years. In particular, this research growth has taken place in the physical sciences, the biological sciences, engineering, and mathematics. Moreover, this research activity has been closely geared to the needs of defense procurement, atomic energy development and space exploration. Furthermore, higher education has become increasingly important in meeting the manpower requirements of our society. And both research and an educated manpower have become essential ingredients of economic growth, the number one domestic problem of our society. The new concept of higher education in our country is that of an enterprise embracing the exploration of new knowledge which affords the background for technological development as well as providing as educated personnel to staff the extensive professional demands of our society. These two activities of higher education, research and instruction have become related to the economic well-being of our society as never before in our history.

It may be well at this point to remind ourselves about the fundamental characteristics of a profession in our society. A profession involves knowledge and skill in rendering essential service to our fellow men. But a profession also requires that this service, based upon knowledge and skill, be performed in accordance with a definite code of ethics.
The knowledge essential to the practice of a profession is imparted primarily through a formal instructional program of higher education. This instructional program also seeks to begin the development of the individual skill which a professional practitioner requires; this may be achieved through observation, cooperative activity, internship, and a period of professional development on the job.

In the field of engineering education, substantial changes have taken place or are under discussion. I am sure you are as familiar with these as I. Different ideas and different procedures are being tried by different colleges of engineering and by the different programs within engineering. All of these experiments have in common the effort to re-define the role of the engineer in professional practice and to reconstruct the educational program so that it may more nearly meet the current needs of professional practice.

As I have inquired about both the engineering profession and engineering education, three basic matters have continually been brought to my attention. Many different individuals have suggested that the professional engineer in his professional practice fulfills three roles. In turn, the education of an engineer must provide the background of knowledge needed in the performance of these roles.

The first role of the engineer today is that of scientist. There was a time, so I am told, when engineering and science were clearly distinguishable, one from the other. It was not unusual to say that the engineer was a practical man and the scientist a theorist. I suspect actually what may have been the case was that for many years the practice of engineering based upon experience outran our store of scientific knowledge based upon experimentation and inference. In the past 25 years in the United States, this situation has greatly changed. We have made enormous strides in our accumulation of scientific knowledge.

As a result, the engineer can no longer afford to work from empirical data alone. He must understand the theory of thermodynamics, of energy conversion, of mechanics, of molecular structure, of the atomic nucleus, of genetics, of cellular differentiation, of gravitation, and of radiation. More than this, he must be as familiar as the scientist with the mathematical expression of force and of relationships.

I am not suggesting that the engineer and the scientist are now the same. There appears to be general agreement that the two roles are still different, and that in shorthand we may define this difference as that between the advancement of knowledge, which is the role of the scientist, and the application of knowledge, which is the role of the engineer. What present circumstances mean is that the scientist and the engineer are involved in a fruitful partnership.

In educational terms, the role of the engineer as scientist presents two substantial needs. On the one hand, the scientific content of engineering education is being strengthened. This requires more laboratories and more equipment; this requires more engineering instructor; with a background in basic science or more science instructors with an appreciation for the application of science; and this requires curriculum adjustments which broaden the scientific and mathematical foundations of engineering education. On the other hand, the requirements for continuing education are now much greater than ever before.

Not long ago the director of marketing for Chemical Abstracts Service located here in Columbus made the statement that they saw man's present knowledge of chemistry doubling in the next 11 or 12 years. The chief engineering officer of a large manufacturing company
told me recently that in his experience an engineer today must be re-educated every ten years, or at least three times in his engineering career.

The scientist in a university laboratory is usually able to keep abreast of the developments of new knowledge in his specialized field of interest. The engineer in industry or in private practice does not always have the same opportunity, partly because he must keep acquainted with a broader range of scientific knowledge. Today, thanks in part to the provisions of a new piece of federal legislation, the State Technical Services Act of 1965, education administrators are seeking improved means to provide for the continuing education of engineers and for a better flow of scientific information between universities and industries.

The second role of the engineer is that of economist. A number of years ago I asked one of the leading engineers of American business how he would define the difference between a scientist and an engineer. Without hesitation, he responded that the engineer was an economist and the scientist was not. This statement has always intrigued me as a remarkably succinct definition of an engineer. Yet, this definition may also be misleading if it is not carefully considered.

I am sure my friend was not implying that an engineer must necessarily be an expert in national income analysis, for example. Rather, he was saying that an engineer's task is to evaluate various possible alternatives for the development of structures, equipment, end products, and production processes in terms of cost effectiveness. The scientist again is not concerned as a scientist with the economics of production. The engineer in his application of knowledge must continually be alert to alternative cost factors in every structure, in every piece of equipment, in every process. Public policy may at times dictate a disregard for cost, as when circumstances of time, of national prestige, or even of national security are involved. But under ordinary conditions cost can never be absent from the calculations and plans of the engineer.

My impression is that we in higher education still have a great deal to do in order to provide the engineering student with the background of economic knowledge essential to his profession. I have no doubt that this knowledge should begin with national income accounts and perhaps include input-output analysis. But beyond this beginning, there is a need for an understanding of the expense of materials and of production in terms of a standard cost effectiveness. This understanding needs careful cultivation in our professional education.

In the third place, the engineer today has an important role in society as an innovator. The whole subject of technological change in the United States is much in our minds today. There are some who are especially worried about the impact of technological change upon employment, especially upon employment of unskilled labor. This subject was carefully considered by a National Commission of Technology, Automation, and Economic Progress which was created by an act of Congress in 1964 and which reported its findings and conclusions in February of this year. There are some who are especially concerned about the impact of technological change upon our educational system, upon our labor market demand for educated talent. It seems clear that a greater investment must be made in educated manpower if we are to meet the employment needs of our economy in the decade of the 1970's. There are some who are especially concerned about the influence of technological change in promoting economic growth and material well-being for the American people. I have just been reading an article in Scientific American about the economics of technological change, and I have been much impressed by the data on growth between 1947 and 1958 in the electronic components industry, the plastics and synthetic materials
industry, the business equipment industry, the communications industry, the chemical products industry, and the electric power industry. All of these industries have experienced substantial technological improvements in the past 20 years. And there are some who are especially concerned about the relationship of technological change in our country to the rate of such change in other countries. A recent conference of NATO nations reported considerable alarm in many European countries about the gap between themselves and our nation in the rate of technological change, and it is this gap in turn which is creating much of the demand for American capital investment overseas and so placing strain upon our own foreign economic balance of payments.

Thus, no matter in which direction you turn, technological change is very much a major national concern of this country today. Yet, most persons who know anything about the subject are agreed that the rate of technological change in the United States should not be curtailed. On the contrary, there are many reasons why such change should be continued and even accelerated. But if technological change is to continue, it will be the engineer in his role as innovator who must play a major part.

And our educational system, especially our system of higher education and of engineering education, will have to contribute substantially to the preparation of educated talent ready and able to participate effectively in technological change. It is not at all certain that our colleges and universities, and our colleges of engineering in particular, are prepared to provide education in innovation.

There are some persons in recent years who have questioned whether American society was continuing to be innovative in its basic drive. There has been much talk about the organization man and the emphasis upon conformity in our social activity. There has been a good deal of discussion about how to promote creativity, about how to realize, in Secretary John Gardner's vivid phrase, a "self-renewing society." These doubts have had some basis in fact.

Undoubtedly, the capacity for innovation is a precious gift. At the same time, it is a capacity which requires a combination of creative imagination and of practical application. It is not difficult for some persons to live in a dream world and to believe that they are cultivating their creative capacities. Such dreaming is not innovation. Innovation implies action, and action must be accomplished in a practical world of people and things. The engineer above all others in our society should understand and appreciate the peculiar requirements of innovation. And it is to be hoped that the professional education of the engineer will stimulate this understanding and appreciation.

If there is a new concept of higher education in our country -- and I suspect that a changing emphasis is involved more than a new concept -- then engineering education along with other professional fields of education faces new requirements. The role of the engineer as scientist, as economist, and as innovator may not be satisfied with an undergraduate education alone. Graduate education both at the master's degree and doctoral degree level may increasingly be needed in order to permit the engineer properly to fulfill his multiple role. Similarly, the requirement for the continuing education of the engineer must be met in a variety of ways, including formal provision of courses and seminars by our colleges of engineering.

And certainly the new concept of engineering education, or the new importance of engineering education, requires an appropriate response by every institution of higher education offering such education. Needless to say, this "appropriate response" can be realized only through educational improvements in instructional personnel, in instructional facilities, and in instructional practices. These improvements will cost money.
Higher education in our country is not a luxury but an essential investment in the stock of productive resources which make possible a prosperous society. Apart from land and natural resources, we have long recognized the importance of productive plant and equipment, along with an available source of energy, as the necessary ingredients of material output. Today, increasingly we recognize "know-how" in the organization and management of productive resources as indispensable elements of material output. Tomorrow, we shall recognize that investment in education -- in higher education in particular -- has become the new, additional input of material output. The engineers of today well be in the forefront of those who demand that this investment be made in order to maintain our economic growth, our national security, and our freedom.
"I AM GOING TO QUIT!"

Many times our alumni write, call, or even come to Columbus complaining about the unfairness of his boss or superior. In attempting to get down the facts, I find in many cases all the complaining is in his mind and he has been stewing over alleged abuses for days or months. This prompted me to purchase 500 reprints of the J. P. McEvoy article published in READER'S DIGEST - "Wanta To Borrow A Jack?". In nine cases out of ten the individual looks at his job and his superior in a new light. One man was promoted to Vice President of his company two months later, and his complaint had been that he was being by-passed in promotions.

"WANTA TO BORROW A JACK?"

by

J. P. McEvoy


"One day I went to a lawyer friend for advice.

"I'm in real trouble," I said. "My neighbors across the road are going on vacation for a month and instead of boarding their two dogs they are going to keep them locked up and a woman is coming to feed them - if she doesn't forget it - and meanwhile they'll be lonely and bark all day and howl all night and I won't be able to sleep and I'll be a nervous wreck and I'll either have to call the SPCA to haul them away or I'll go berserk and go over there and shoot them and then when my neighbors return they'll go berserk and come over and shoot me. . . ."

"My lawyer patted back a delicate yawn. "Let me tell you a story," he said. "And don't stop if you've heard it - because it will do you good to hear it again."

"A fellow was speeding down a country road late at night and Bang! goes a tire. He got out and looked and, drat it! - he had no jack. Then he said to himself, 'Well, I'll just walk to the nearest farmhouse and borrow a jack!' He saw a light in the distance and said, 'Well, I'm in luck; the farmer's up. I'll just knock on the door and say I'm in trouble, would you please lend me a jack?' and he'll say, 'Why sure, neighbor, help yourself - but bring it back.'

"He walked on a little farther and the light went out so he said to himself, 'Now he's gone to bed and he'll be annoyed because I'm bothering him - so he'll probably want some money for his jack. And I'll say all right, it isn't very neighborly - but I'll give you a quarter. And he'll say, do you think you can get me out of bed in the middle of the night and then offer me a quarter? Give me a dollar or get yourself a jack somewhere else.'

"By this time the fellow had worked himself up to a lather. He turned into the gate and muttered, 'A dollar! All right, I'll give you a dollar. But not a cent more! . . . A poor devil has an accident in the middle of the night and all he needs is a jack. You probably won't let me have one no matter what I give you. That's the kind of a guy you are.'

"Which brought him up to the door and he knocked - loudly, angrily. The farmer stuck his head out the window above the door and hollered down, 'Who's there? What do you want?' The fellow stopped pounding on the door and yelled up: 'You and your damn jack! You know what you can do with it!'"

"When I stopped laughing, I started thinking, and I said, 'Is that what I've been doing?'

"Right," he said, "and you'd be surprised how many people come to a lawyer for advice.
and, instead of calmly stating the facts, start building up a big imaginary fight - what he'll say to his partner, what she'll say to her husband, or how they'll tell the Old Man off about his will. So I tell them the story about the jack and they cool off.

"The next time I hear from them, one tells me that the partner was glad to meet him halfway; the gal says she can't understand it - her husband was so reasonable she thought she must have gotten somebody else on the phone; the relative found out that the Old man had already been asking a lawyer how he could give everything to them before he died to save them inheritance tax."

"I thought, "How true! Most of us go through life bumping into obstacles we could easily bypass; spoiling for a fight and lashing out in blind rages at fancied wrongs and imaginary foes. And we don't even realize what we are doing until someone startles us one day with a vivid word like a lightning flash on a dark night."

"Well, the other night I was driving home from the city. I was late for dinner and I hadn't phoned my wife. As I crawled along in a line of cars I became more and more frustrated and angry. "I'll tell her I was caught in the heavy week-end traffic and she'll say, 'Why didn't you phone me before you left town?' Then I'll say, 'What difference does it make anyway - I'm here!' And she'll say, 'Yes and I'm here, too, and I've been here all day waiting to hear from you!' And I'll say 'I suppose I haven't anything else to do but call you up every hour on the hour and make like a lovebird!' And she'll say: 'You mean like a wolf, but you wouldn't be calling me.' " By this time I am turning into the drive and I am plenty steamed up.

"As I jumped out and slammed the car door, my wife flung open the window upstairs. "All right!" I shouted up to her. "Say it."

"I will," she cooed softly. "Wanta borrow a jack?" "

-17-
THE OHIO STATE UNIVERSITY
DEPARTMENT OF CHEMICAL ENGINEERING

1966-1967 LIST OF STAFF MEMBERS, FELLOWS, SCHOLARS, RESEARCH ASSISTANTS

PROFESSORS
Joseph H. Koffelt
Robert S. Brodkey
Charles E. Dryden
Christie J. Geankoplis
Webster B. Kay
Aldrich Syverson

ASSOCIATE PROFESSORS
Waldron D. Sheets
Hartzel C. Slider
Edwin E. Smith

ADJUNCT ASSOCIATE PROFESSORS
Alexis W. Lemmon, Jr.
Palmer Stickney
Robert L. Bates
John S. Eckert
John B. Martin

ASSISTANT PROFESSORS
Edwin R. Haering
Harry C. Hershey
Karlis Svanks
Thomas L. Sweeney

TEACHING ASSOCIATE-A
Jerome L. Bauer
P. Dean Culnan

TEACHING ASSISTANT-C
Charles E. Baumann
Robert C. Chase
Hugh J. Zeller

TEACHING ASSISTANT-E
P. Dean Culnan

TEACHING ASSISTANT-G
Mazen Y. Anastas
Gerald A. Bullano
Kiu H. Lee
Dean H. Reber
William B. Woods, Jr.

TEACHING ASSISTANT-P-T
Thomas W. Doub, Jr.

STUDENT ASSISTANT
William Deerhake
Jerry R. Morton
Dennis Hurley
Keith Robinson

SECRETARY
Marjean U. Trau

STENOGRAPHERS
Suzanne Phillips
Sharon Sims
Shirley Turner
Beverly Trau
Cathy Nieman

TECHNICIAN
Michael B. Kukla

MECHANIC
Keldon Latham

FELLOWSHIPS
1. American Cyanamid - Arthur W. Thornton
2. American Oil - W. Ernest Lewis
3. Camille and Henry Dreyfus Foundation
4. Dow Chemical
5. Esso Research and Engr. - Terry A. Coleman
6. Koppers Teaching Fellow
7. Lubrizol - Hugh J. Zeller
8. National Science Foundation - Thomas W. Doub, Jr.
9. Procter and Gamble - Michael Rominger
10. Shell Companies - Robert Schaefer
12. AID - S. K. Bhalla
14. Louis and Lucille Roberts Memorial Fellowship

SCHOLARSHIPS (contd.)
6. Union Carbide Corp. - W. P. Burgess
7. Union Carbide Corp. - C. A. Klingensmith
8. Universal Oil Products - P. Wendschuh
9. W. P. Burgess
10. J. B. Wood

RESEARCH ASSISTANTS - Eng.
Exp. Station
Emil Mednis
Stavros Rychas
Paul Smith

RESEARCH ASSISTANT-Research Foundation
A. M. Rao
Richard Linak

RESEARCH FELLOW - Research Foundation
Jerry R. Barber
Miss Mamata Dutta
Douglas Hissong
James E. Williamson

SCHOLARSHIPS
1. General Motors - J. M. Salladay
2. Goodyear Foundation - J. Yacher
3. Monsanto - J. W. Bradshaw
4. Rohm and Haas - A. D. Bares, C. P. Dunlap
5. Standard Oil of Calif.-D. W. Hurley

-18-
DECEASED CHEMICAL ENGINEERING ALUMNI
(Number in Parenthesis Indicates Number of Graduates that Year.)

1902
1. Harvey Keating

1904
1. John Hoffhine

1906 (3)
1. Thomas Beer
2. Arno C. Fieldner
3. B. T. Brooks, Chemist

1907 (6)
1. Harry R. Drackett
2. Harry E. Surface
3. Dana J. Demorest
5. Harry M. Williams

1909 (6)
1. Erwin Sohn
2. O. R. Sweeney
3. Sydney H. Katz
4. H. H. Watt

1910 (7)
1. Ernest H. Grant
2. William D. Lareaux
3. W. A. Richey
4. Lear H. Van Bushkirk
5. P. S. Beebe

1911 (11)
1. Harry V. Atkinson
2. Sumner B. Frank
3. Roscoe C. Jones
4. Clarence B. King
5. C. J. Burkley
6. Albert W. Davison
7. Howard Dock
8. Ralph E. Hall

1912 (11)
1. P. M. Giese
2. E. S. Boerstler
3. F. J. Montgomery
4. C. E. Veit
5. Walter O. Augustine
6. W. A. Richey
7. B. S. Eberstler
8. H. H. Thompson
9. Fred N. Schaad
10. H. D. Holler (Ph.D.)
11. W. I. Burt
12. Chase R. Bennett
13. E. J. Witzemann

1914 (19)
1. Emil H. Balz
2. W. T. Burgoon
3. Paul Cottringer
4. A. A. Chambers
5. Roy B. Fritz
6. L. A. Gregg
7. Edward G. Hines
8. Brice Stewart Hall
9. Leasley S. Jenkins
10. P. R. Morris
11. A. A. Kohr
12. R. W. Shafor
13. A. R. Willis
14. Claud R. McNeil
15. Howard F. Anderson
16. J. G. Ralston
17. H. W. Seyler
18. E. V. O’Rourke (Pet. Eng.)
19. Harold R. Nicklaus
20. Erwin C. Howell
22. Roy Paster
23. Victor J. Roehm
24. Harold T. Reiner-Ruff
25. Carroll L. Strait
26. Joseph M. Volzer
27. Russell F. Hamilton
28. R. R. Kennedy
29. Fred V. Doutt
30. W. K. Gilkey
31. William Green
32. C. M. Evans
33. John E. Wiss
34. Donald Brooks
35. R. B. Hollenback
36. Henry F. Palmer
37. Paul R. Hines
38. Walter L. Klaiber
39. Roland M. Kohr
40. R. E. Wolfe
41. R. E. Whinnery

-19-
6. Wallace Wing
7. Ben Blumenthal
8. Carl J. Beckert
9. C. A. Ritchie
10. Andrew Karsten
11. Marion Reed

1923 (60)
1. R. T. Donham
2. Albert G. Corwin
3. James T. Goff
4. William J. Harrison
5. G. R. Lyon
6. J. L. Roberts
7. J. L. Ware
8. E. N. Prinz
9. Stanley Newbrander
10. C. R. Blanchard
11. Y. L. Pun

1924 (28)
1. Carroll M. Allen
2. Raymond S. Carter
3. C. Weis
4. George W. Ruhl
5. Virgil Hutton
6. H. T. Ruff (Ph.D.)
7. Frank J. Koehne

1925 (35)
1. Curtis Balding
2. Lorin E. Lutz
3. Frederick H. MacLaren
4. Adolph Valley
5. John Bowers
6. Chennan Shen
7. Henry F. Palmer
8. S. M. Sun
9. Arthur E. Juve
10. Alfred M. Eyerman
11. R. E. Prior
12. George W. Ruhl
13. R. H. Bancroft

1926 (14)
1. J. Gavin Cullinan
2. J. L. Thoma
3. Mao Han Tuan

1927 (19)
1. Charles E. Hammett
2. Dwight S. Masters
3. Edwin F. Mussdorfer
4. Charles R. Owens
5. L. E. Meng
6. Dwight S. Masters
7. Thomas C. Chadwick
8. E. E. Martin
9. Wilson F. Brown

1929 (24)
1. James Pace Alton
2. Ming Tan Haich
3. W. J. Michel
4. E. B. Carr

1930 (34)
1. G. B. Malvea
2. K. M. Sprinkel
3. J. L. Arns

1931 (43)
1. T. W. Elslager
2. Adolph Wasserteurer
3. C. J. Black

1932 (40)
1. Conrad F. Daum
2. David M. Goodfriend
3. Alfred E. Galloway
4. E. C. Plotter
5. William M. Davis

1933 (42)
1. Francis E. Pickering
2. Carl H. Albrecht
3. H. L. Sittler
4. Thomas C. Chadwick (Ph.D.)

1934 (39)
1. George K. Dumbaull
2. Lawrence Stout

1935 (66)
1. Harvey C. Gillogly
2. William Swisher
3. Lee Kleinmaier
4. William T. Walton

1936 (42)
1. Robert L. Scroggs

1937 (53)
1. Richard M. Abbott
2. Clare O. Ewing, Jr.
3. Leon W. Omwake
4. William C. Shank
5. E. H. Osborne
6. James Braden
7. J. P. Mitchellson
8. Frank A. Vinci
9. D. J. Gaston
10. Howard J. Orloskwi
11. Alexander Newhouse
12. Henry F. Palmer
13. Richard D. Schafer

1939 (69)
1. Robert E. Scheiber
2. Ralph Edwin Hall

1940 (73)
1. Carmen Adovasio
2. F. Wayne Beall
3. John R. Linn
4. Robert Mills
5. Dana J. Demorest

1941 (71)
1. John W. Russell

1942 (67)
1. Vaughn E. Kelly
2. Julian Adam Yocom

1943 (90)
1. M. F. Dick
2. Willis T. Harberson

1944 (28)
1. K. E. Kress

1945 (14)
1. Roland L. Allen
2. Charles J. Speitz, Jr.
3. Howard Wilkinson

1947 (103)
1. Sidney Miller

1948 (147)
1. H. C. Clafin
2. Donald Dewey
3. David Farrar Pickard
4. D. L. Wiggins
5. Robert J. Wygal

1949 (132)
1. Thomas O. Feasel
2. John W. Shook, Jr.

1950 (87)
1. Robert C. Johnston
2. David Pickard
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<td>E. W. Gorman</td>
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<td>F. C. Smith</td>
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<td>H. Mitzen</td>
<td>K. Kersey</td>
<td>T. W. Kraner</td>
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<td>W. J. King</td>
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<td>H. F. Shattuck</td>
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<td>C. C. Keckler</td>
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<td>Yu Seng Tseng</td>
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<td>H. W. Hess</td>
<td>R. D. Kumaon</td>
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<td>Marion C. Reed</td>
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<td>O. Thompson</td>
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<td>J. A. Thompson</td>
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<td>1931</td>
<td>Mrs. Hao Feng Yun Hsiang</td>
<td>M. M. Lee</td>
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<td>1933</td>
<td>N. R. Price</td>
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<td>E. A. Bowman</td>
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<td>E. C. Painter</td>
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<td>Turney Fergusson</td>
<td>John R. Seferian</td>
<td>Donald C. Dewey</td>
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<td>1953</td>
<td>Al-Kazimi, Abd Ali M.</td>
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<tr>
<td>1955</td>
<td>Fred C. Ohmeiss</td>
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<tr>
<td>1960</td>
<td>Holland E. Blosser</td>
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</tbody>
</table>

LOST, STRAYED OR STOLEN ALUMNI IN CHEMICAL ENGINEERING

IF YOU KNOW THE ADDRESS OF ANY OF THESE, WE WOULD APPRECIATE IT VERY MUCH IF YOU WOULD INFORM US.
### Placement of Chemical Engineering Graduates

**June, 1966 - March, 1967**

#### Bachelor of Chemical Engineering

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Company and Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>James Gilbert Arnold</td>
<td>B. F. Goodrich Chemical Company, Avon Lake, Ohio</td>
</tr>
<tr>
<td>2.</td>
<td>Jerome E. Balkenhol</td>
<td>Procter and Gamble Company, Cincinnati, Ohio</td>
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<td>3.</td>
<td>H. Carter Castillow</td>
<td>Chemical Engineering Dept., Ohio State University*</td>
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<td>William F. Dehake</td>
<td>Chemical Engineering Dept., Ohio State University*</td>
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<td>5.</td>
<td>Thomas E. Fitz</td>
<td>Chemical Engineering Dept., Ohio State University*</td>
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<td>Richard H. Furlow</td>
<td>Dow Chemical Company, Midland, Michigan</td>
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<td>Jeffrey E. Haas</td>
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<td>8.</td>
<td>Edward F. Jefferis</td>
<td>Chemical Engineering Dept., Ohio State University*</td>
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<td>9.</td>
<td>Michael G. Konicek</td>
<td>Chemical Engineering Dept., Ohio State University*</td>
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<td>11.</td>
<td>Glenn L. McKee</td>
<td>Chemical Engineering Dept., Ohio State University*</td>
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<td>12.</td>
<td>John W. Mitchell</td>
<td>Procter and Gamble Company, Cincinnati, Ohio</td>
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<td>13.</td>
<td>Donald J. Modell</td>
<td>Diamond Alkali Company, Cleveland, Ohio</td>
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<td>14.</td>
<td>Jerry R. Morton</td>
<td>Chemical Engineering Dept., Ohio State University*</td>
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<td>Gary W. Moye</td>
<td>Chemical Engineering Dept., Ohio State University*</td>
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<tr>
<td>16.</td>
<td>David W. Walter</td>
<td>Monsanto Company, Texas City, Texas</td>
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<tr>
<td>17.</td>
<td>Hugh J. Zeller</td>
<td>Chemical Engineering Dept., Ohio State University*</td>
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**June, 1966**
- Universal Oil Products, Des Plaines, Illinois
- Ohio State University, Chemical Engineering Dept.*
- Eastman Kodak Company, Rochester, New York

**December, 1966**
- Esso Research and Engineering Co., Florham Park, New Jersey
- Owens-Corning Fiberglas Co., Granville, Ohio
- The United States Air Force
- Standard Oil Company of Ohio, Lima, Ohio

#### March, 1967
- None

#### Master of Science

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<tr>
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<td>Edmund J. Rolinski</td>
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*Working for M.Sc. degree.*
### MASTER OF SCIENCE (continued)

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<td>James O. Nye</td>
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<td>Albert R. Shuki Jr.</td>
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<td>1.</td>
<td>Charles E. Baumann</td>
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<td>Robert R. Sheefer</td>
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### DOCTOR OF PHILOSOPHY

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THE OHIO STATE UNIVERSITY  
DEPARTMENT OF CHEMICAL ENGINEERING  

March 15, 1967

**SALARY OFFERS FOR 1966-1967**

Underlined salary offer accepted.  
λ Going on for graduate work - either Ph.D. or M.Sc.  
Δ Has already accepted a position. Received offers during 1965-1966.  
* Indicates industrial experience.  
** Took very few interviews. Interested in a particular company, going into the service, 
or will graduate in December, 1967.  
I International student. Will return to home country.

**BACHELOR OF CHEMICAL ENGINEERING (5 years)**

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<td>8. **</td>
<td></td>
<td>Will not graduate until December, 1967.</td>
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<td>13. **</td>
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<td>Plans a career in the U.S. Army.</td>
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**COMBINED BACHELOR OF CHEMICAL ENGINEERING AND MASTER OF SCIENCE**

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COMBINED BACHELOR OF CHEMICAL ENGINEERING AND MASTER OF SCIENCE (continued)

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<td>Δ 19</td>
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MASTER OF SCIENCE

1. Δ 6 850, 867, 850, 840
2. λ 6 Going on for Ph.D.
3. * 6 1000, 1000, 1040, 920, 1000
4. λ 6 Going on for Ph.D.
5. Δ Has position at Battelle Memorial Institute.
6. Δ 885
7. Δ 8 885, 850, 880, 860, 885, 835, 875, 875
8. Δ 8 885, 920, 920, 925

MASTER OF BUSINESS ADMINISTRATION (Already has M.Sc. degree in Chemical Engineering)

1. Δ 16 845, 830, 833, 790
2. Δ 1

DOCTOR OF PHILOSOPHY

1. Δ 9 1050, 1100, 1130, 1130, 1130
2. Δ 10 1100, 1175, 1150, 1195
3. Δ Accepted Asst. Professorship in Chem. Eng. - OSU
4. Δ Has a position with Mobil Oil Corporation.
5. Δ 13 1100, 1125, 1100, 1092, 1100, 1100, 1125, 1050, 1125, 1100
6. Δ At Wright-Patterson Air Force Base
7. Δ 11 1150, 1150, 1200, 1150, 1200, 1150, 1100, 1200, 1185, 1200, 1200, 1200, 980, 980
8. Δ 2 Returning to home country.
9. I

SUMMER SALARY OFFERS FOR 1967

GRADUATE STUDENTS - M.Sc. Degree

1. 660
2. 660, 685, 625, 625, 647, 680, 680
3. 685

FIFTH YEAR STUDENTS

1. 575, 600, 630, 635
SUMMER SALARY OFFERS FOR 1967

FOURTH YEAR STUDENTS

1. 575, 652, 540
2. 590, 600
3. 563, 600
4. Dropped out of school.
5. 625, 675
6. 625, 635
7. 575
8. Dropped out of school.
9. 600
10. 625, 620
11. 580, 615, 600, 600
12. 609, 700, 620
13. 675
14. 650, 630, 600, 652
15. 660

THIRD YEAR STUDENTS

1. 550, 560, 565, 610, 580
2. 600, 630
3. 526
4. 600, 560, 490, 625
5. 535
6. 500
7. 500
8. 575
9. 685
10. 500
11. 500
12. 500
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### School of Architecture and Landscape Architecture

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### Grand Total

3249

Included in above totals: Lima = 45, Mansfield = 73, Marion = 25, Newark = 44, Wright-Patterson Air Force Base - 103
1926 - V. A. Lauderman, C. G. Landes

1931 - J. H. Koffolt ('24, '29, '31), M. Conn


1951 - D. Vorum
Return of A.I.Ch.E. Scholarship Award to Gary Moye, 5th Year, winner in 1966.

Mrs. Charles E. Dryden pinchhitting for Prof. Dryden on "Chemical Engineering Education in India".

Presentation of American Institute of Chemists Award to Jerome Balkenhol by Dr. Webster B. Kay.

The Group at the Departmental Program
Central Ohio Section, American Institute of Chemical Engineers Student Contest Problem Award presented by Section President, H. L. Barnebey, to Glenn L. McKee.

M. W. Kellogg Company, Division of Pullman Inc., Design Award presented by Dr. A. Syverson to Hugh J. Zeller.

Central Ohio Section, American Institute of Chemical Engineers Student Contest Problem Award presented by Section President, H. L. Barnebey, to Thomas Fitz.

American Institute of Chemical Engineers Scholarship Award presented to James W. Sebert by H. L. Barnebey, President, Central Ohio Section. A.I.Ch.E.