

NEBRASKA

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THE DEPARTMENT of Chemical Engineering at Nebraska, similar to many departments, grew from the Department of Chemistry. The initial chemical engineering course offerings, two in number, were made in 1920 and the first degrees granted in 1922. The courses were taught by a chemist converted into a chemical engineer. It is hard for us today to appreciate the many problems that confronted our predecessors. The lack of textbooks and laboratory facilities comes first to mind, but the lack of recognition of Chemical Engineering as a separate field of endeavor also plagued them.

Chemical engineering activities grew slowly through the twenties and thirties. In 1938 the Department of Chemistry was renamed the Department of Chemistry and Chemical Engineering in recognition of the increased chemical engineering activities. By this time there were four required ChE courses and optional courses in the present day "in" areas of water supplies and waste disposal. During World War II the potential students were involved in other activities, and universities were not expanding their activities. Consequently, there was an hiatus in the development.

However, wars do end—believe it or not. And, near the end of World War II, the State of Nebraska and the University decided to develop an accredited program in Chemical Engineering. Credit for bringing about this decision and for guiding its implementation goes to Dr. C. S. Hamilton, Chairman of the combined department. I am pleased to have this opportunity to indicate Dr. Hamilton's contribution to the chemical engineering program at Nebraska and to thank him for his help and guidance to me, personally.

To implement the decision required the construction of suitable facilities and the hiring of



individuals who had earned degrees in Chemical Engineering. In the period from 1943 to 1950 both of these tasks were accomplished. \$300,000 were expended to build a wing on the Avery Laboratory of Chemistry to house Chemical Engineering and the staff hired during that time included Merk Hobson, who is now Executive Vice-Chancellor of the University and Jim Weber, who serves as Departmental Chairman. In 1954, Professor John H. Rushton inspected us for AIChE-ECPD accreditation and recommended approval.

Having reached one milestone, the next immediate objective was to institute graduate work leading to the Master of Science degree. This was done and the first MS degrees were granted in 1956.

Naturally, a thought that had been in our minds for a number of years was to set up a separate Department of Chemical Engineering. The fledglings—ready or not—are always eager to leave the nest. While this change was inevitable, the date was advanced by the fact that Merk Hobson was made Dean of Engineering and Architecture. Chemical Engineering closely followed him, and in 1958 a separate department was established in the College of Engineering and Architecture. From that time to the present, the Departmental staff has increased from three to its present size of seven. In 1963 graduate work was extended to the PhD level and the first PhD degree was granted in 1968. Five PhD degrees have been awarded subsequently.

When writing of the growth of the Department of Chemical Engineering, it is appropriate



to say a word about the growth of the entire engineering program at Nebraska. For many years, the sole objective of the College was undergraduate teaching. The research effort was minimal and essentially restricted to the 25th hour of the day, and a few MS degrees were granted annually. Dean Hobson changed this. Graduate education and research were now important objectives, also. The more balanced program continues under our present Dean, John R. Davis. To enhance the research effort, Dean Davis obtained legislative approval for activation and funding of the Engineering Research Center. Now, most engineering departments offer the PhD and the two that do not, will be doing so in the near future.

THE PAST IS but prologue to the future, to borrow a phrase, hence a few words concerning our hopes and aspirations appear fitting. We wish to have a good department. **We want our graduates, whether holders of the BS, MS, or PhD degree, to perform well as chemical engineers and make contributions as citizens.** These are general objectives and every faculty member could subscribe to them. So, what's new?

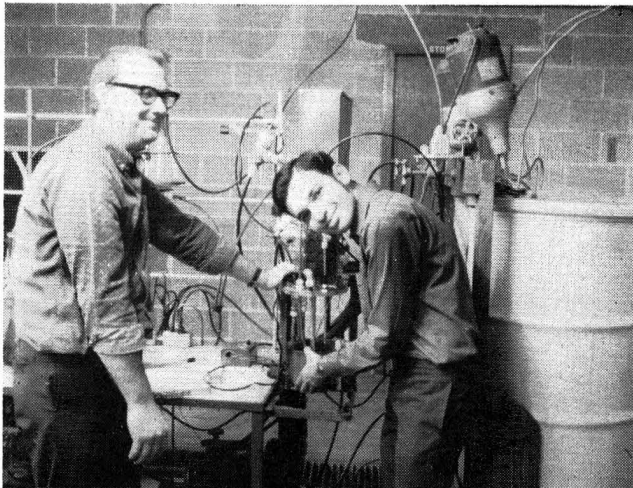
We must think in more definite terms. Given a land grant and state university located in the Great Plains area of the United States, what are logical, specific objectives of its Department of Chemical Engineering? First, we have a definite commitment to undergraduate education. Hence, all staff members have a serious interest in teaching. This means not only exercising care and thought in the preparation of lectures, but in

working on new techniques and utilization of teaching aids, ranging from tape recorders to various visual aids. It is no secret that frequently undergraduate education has been slighted during the recent rapid growth of universities. We say, "It will not happen here."

A second specific objective concerns the effort in the graduate and research area. The chief resource of the area is food. Hence, we should look there for uniqueness. It is not hard to find. Food must be processed, and chemical engineers can assist and apply their special knowledge to many processing steps. However, the chemical engineer cannot operate alone in this area. The processing of food from producer to consumer involves many others including the food scientist and technologist, the agriculture engineer, and the microbiologist. **So, while maintaining a good, basic chemical engineering program which will enable our graduates to enter any number of industries, we wish to help develop and contribute to a multi-discipline program in the area of food processing.**

NOW A FEW WORDS about the staff, the individuals charged with the immediate responsibility of achieving both the general and specific goals. In a relatively small department, as in a small industrial concern, the staff member must be a versatile individual. We cannot afford an individual who will teach only at a single level, be it graduate or undergraduate. Further, he should develop a research program and supervise the research work of MS and PhD students. Also, a staff member is expected to carry his share of the departmental, college, and universities chores. Along the line of this last item, we are particularly proud of the contribution the members of our department have made on Faculty Senate Committees, Graduate College Committees, etc. This contribution has been made in spite of the fact that we are one of the smaller departments in the University.

The staff consists of seven members and each is the holder of the PhD degree. They represent quite a cross-section: J. M. Eakman (Minnesota '66), R. E. Gilbert (Princeton '59), P. J. Reilly (Pennsylvania '64), W. A. Scheller (Northwestern '55) [who is now enjoying a years leave of absence at the University of Erlangen in West Germany], L. C. Tao (Wisconsin '52), D. C. Timm (Iowa State '67), and J. H. Weber (Pittsburg '48). All have had some industrial experience



Professor Delmar C. Timm and student Rajul Desai work on experimental crystallizer.

and a good majority, a considerable amount. There is not a department in the country less in-bred than ours. No member has received a degree from the University of Nebraska.

Given the seven staff members, what sort of programs, undergraduate and graduate, have been developed? Our undergraduate program, as those in all accredited departments, is pretty well fixed by the accreditation requirements. This does not preclude lively discussions within the Department and within the College for that matter on the subject of curriculum. While accreditation requirements establish some principles, guidelines and objectives, there are many possible variations on any given theme. Each department must determine which set of variations best suits its staff, students, and local situation.

A review of our curriculum would be of little interest, but mention of a few items which entered into our thinking might have some appeal. First, only full time staff members have responsibility for classes and laboratories. Graduate assistants function as paper graders and lab assistants. Second, the preparation of students coming to the University and, in turn, the Department varies widely. Third, the interests of students differ markedly; i.e., some are thinking of industrial employment or seeking MBA's after earning the BS degree, while others are thinking in terms of graduate work. Fourth, we can expect a specific level of financial support. Fifth, staff members should be available to students. Sixth, the time of our staff members is a precious

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resource, so we must use it wisely. Seventh, the student's program should be flexible and include a number of technical electives.

Some, or all, of the factors must be considered when we are trying to decide, for example, whether our junior level courses should be "Bird" or unit operations oriented, or when we are considering a freshman or senior level special problems course. In the final analysis, a number of value judgments are made.

AS INDICATED EARLIER, the development of the graduate program started immediately after the undergraduate program was accredited. We have been quite successful in arousing in our students an interest for advanced work and are proud to point to the fact that between the time the Department was established in 1958 and the recent change in the draft status of graduate students, a period of ten years, better than 50% of our graduates went on for advanced work. While a good share stayed at Nebraska, a number went to Kansas, Oklahoma State, Iowa State, Illinois, Minnesota, Michigan, Purdue, Rice as well as other institutions.

With seven staff members we can offer a reasonably large number of graduate courses, particularly when some are offered on an "every other year basis". Also, to date we have required all of our MS students to write a thesis. By this means we could get more research projects started in the Department, so our motives were not entirely altruistic, but still this type of experience can be of considerable benefit even for those students who intend to work for the PhD. Also, in most cases, and this applies more strongly at the PhD than at the MS level, research projects involve experimental work.

A number of interesting research projects are under way, but rather than mention them I shall indicate the general areas of research. These would include biochemical engineering, bio-engineering, kinetics and catalysis, crystallization, ion-exchange, digital computer applications, polymerization, process dynamics and control, transport phenomena, thermodynamics, desalination, and tray efficiencies. We feel the student has ample choice in the selection of a research topic.