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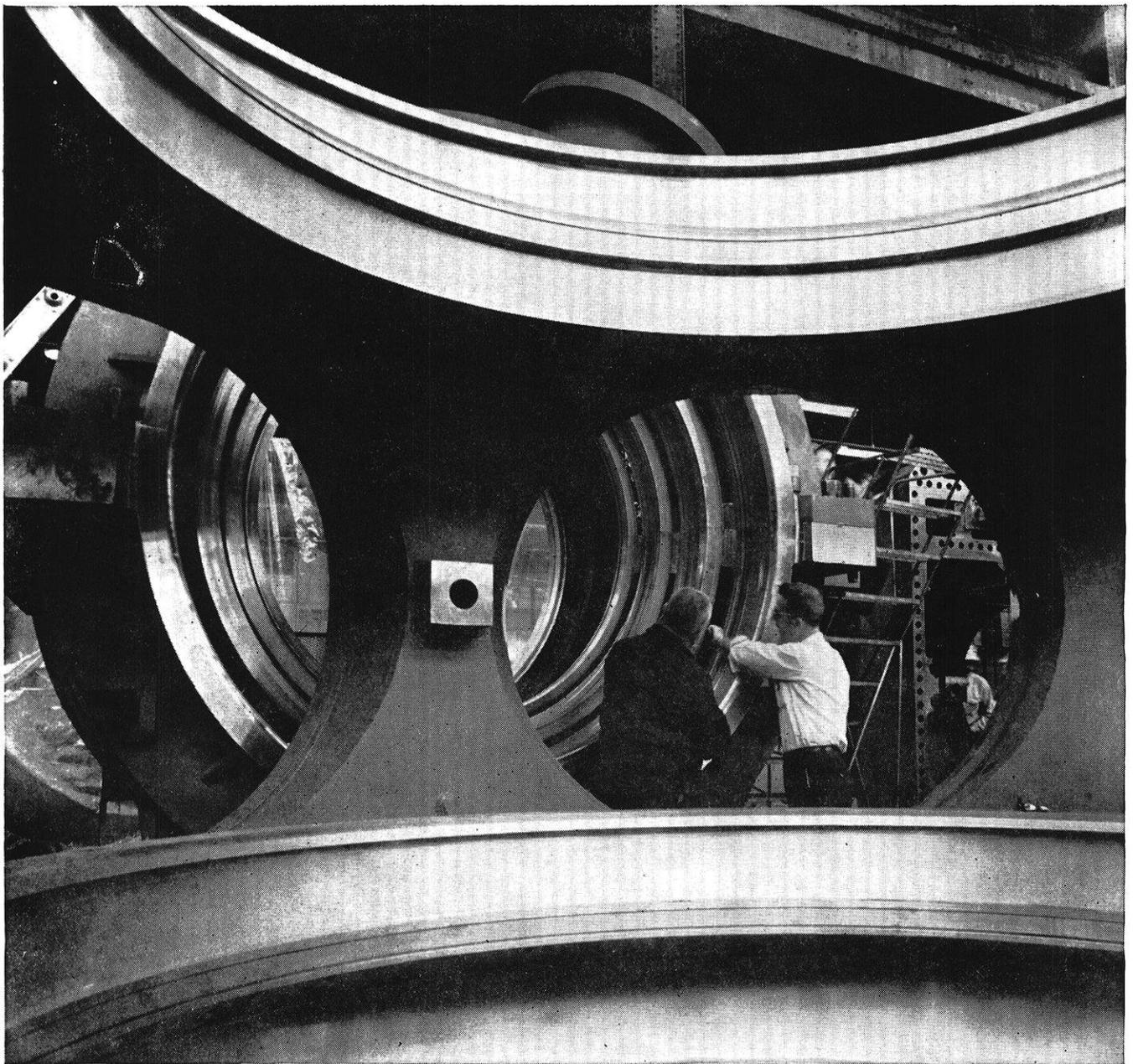
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# wisconsin engineer



## Changes On Our Engineering Campus



## Who needs engineers?

After the statesmen, politicians, lawyers, educators, journalists, clergymen, sociologists, and theorists have finished talking about what should be done, we turn it over to the engineers to do it. Nothing, from the Pyramids to Apollo 16, would have been built without them. Nothing important tomorrow will be built without you. So who needs engineers? We do. Write to George Garvey, Westinghouse Education Center, Pittsburgh, Pennsylvania 15221. An equal opportunity employer

You can be sure...if it's Westinghouse



# The strangler that feeds on sewage won't be eating like it used to.

Give plant life too much food and, before long, it can choke a lake to death.

As the plants multiply, the lake turns into a rotting sump, then a swampy morass, and finally a spongy meadow overgrown with weeds.

Normally, a lake wouldn't age like this for thousands of years. But man can age it in a generation or so. And one of the things he does it with is phosphates from human wastes and detergents.

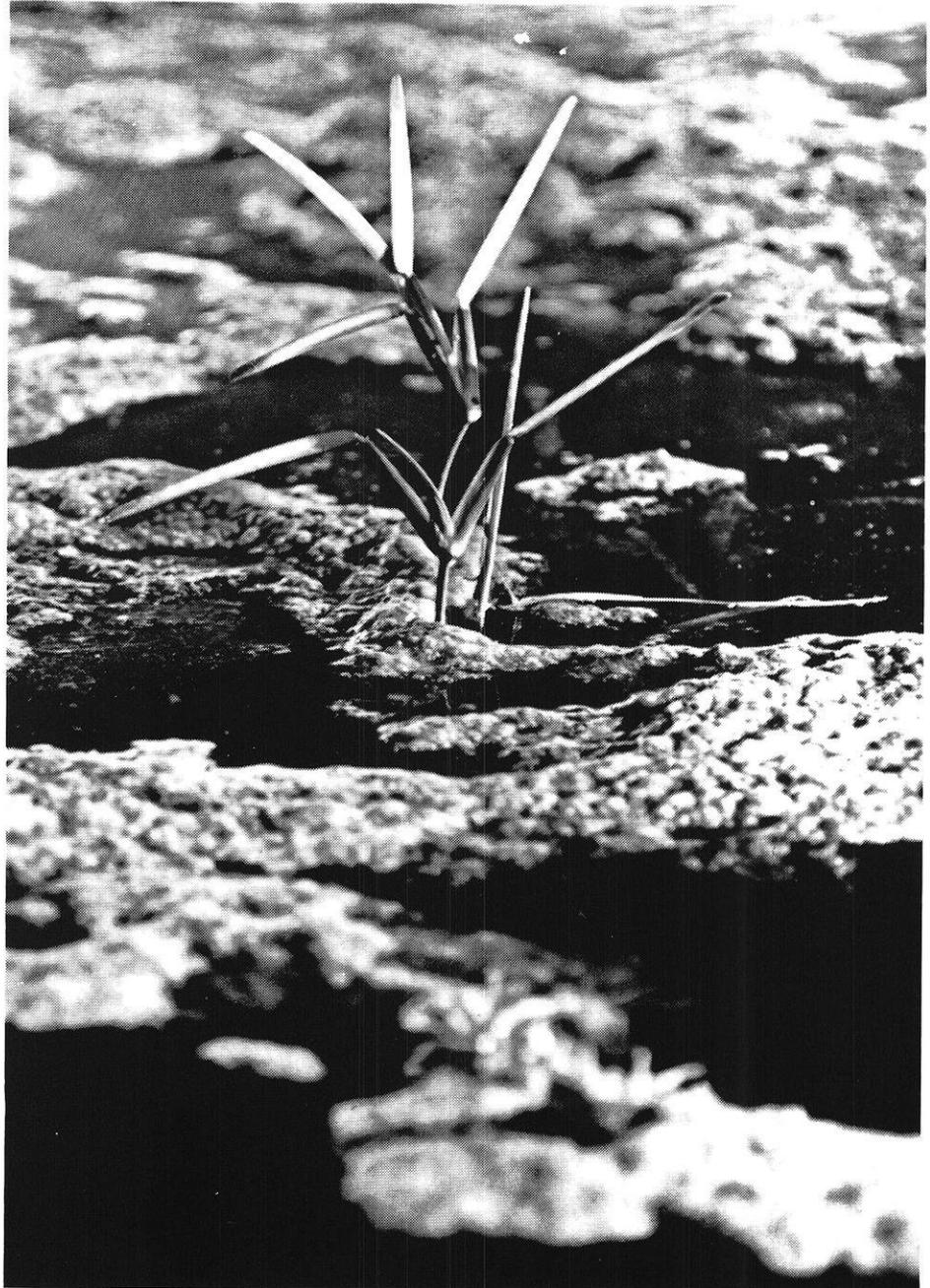
Now, with a new system developed by Dow engineers to remove phosphates from municipal sewage, it appears that the strangler's diet can be drastically reduced.

In pilot studies and field trials in Great Lakes area cities, the system has resulted in phosphate removal as high as 90%. And it's inexpensive, requiring little capital equipment.

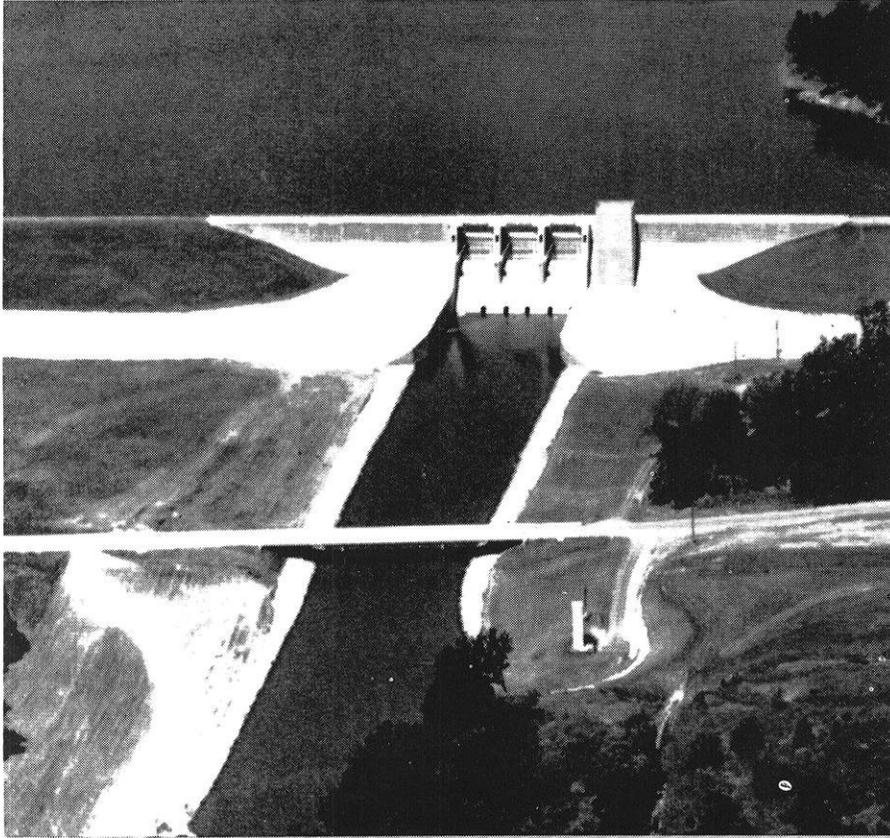
But technology is not enough. If we're to save our lakes and streams, community concern and community action must take us the rest of the way.

At Dow, we're concerned with more than chemistry. We're concerned with life. And despite our imperfections, we're determined to share its promise. Wisely.

The Dow Chemical Company,  
Midland, Michigan 48640.



# Put Yourself in This



## Picture

In less than thirty years, around the year 2000, our population will grow from 210 million people to over 300 million people. Three people for every two of us now!

It means we must all work doubly hard today to preserve for future generations our many natural resources that we have taken for granted. The Corps of Engineers, for example, is responsible for planning, development and management of our nation's principal water resources.

If you "put yourself in this picture" you can identify with the kinds of things we do. This is Deer Creek Dam and Reservoir in Ohio, part of a coordinated system of flood protection in the Deer Creek and Scioto and Ohio River valleys. Water stored in the lake is used for conservation and released downstream for augmenting low flows. During the first full year of operation almost one million visitors used the recreational facilities which are provided in the reservoir area for boating, water skiing, swimming, fishing, picnicking, camping, hiking, hunting and sightseeing.

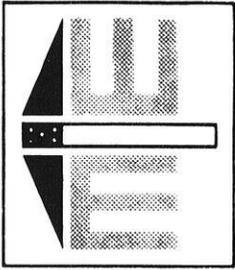
The project is typical of many the Corps of Engineers will design and complete during the next few years.

Want to put yourself in this picture? Career opportunities with the Corps of Engineers go beyond water resources alone. We work in modern construction, engineering design, systems analysis, computer technology & R&D—these are just a few of the other areas where you can build a career of total involvement, achievement and satisfaction with the world's largest engineering/construction organization.

Interested? Write for our new brochure describing the challenges awaiting civilian engineers with the Corps of Engineers. Department of the Army, Washington, D.C. 20314 Equal opportunity employer

**CORPS OF ENGINEERS**

FEBRUARY 1973



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# wisconsin engineer

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Second Class Postage Paid at Madison, Wisconsin, under the Act of March 3, 1879. Acceptance for mailing at a special rate of postage provided for in Section 1103, Act of Oct. 3, 1917, authorized Oct. 21, 1918.

*Published monthly from October to May inclusive by the Wisconsin Engineering Journal Assn.,* Subscriptions: one year—\$2.00; two years—\$3.75; three years—\$5.25; four years—\$6.50. Single copies are 35 cents per copy. 276 Mechanical Engineering Bldg., Madison, Wis. 53706. Office Phone (608) 262-3494.

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# Editorial . . .

## *“Let the Engineer Lead . . .”*

In the past few years, a shakedown has occurred in the College of Engineering. Due mostly to public clamor, the College has instituted changes. Degree requirements were changed in some departments by lowering the number of degree credits necessary for graduation, and in other departments, by changing required courses. New courses were created, while old ones were rejuvenated, by names if nothing else. It was made possible for an engineering student to obtain a minor in environmental engineering. Civil Engineering went as far as to change its name to Civil and Environmental Engineering.

Why did these changes come about so slowly and only after so much damage has been done? Can all the blame be put on administrative red tape? Was the College and its faculty so ignorant or so blind to what was happening in the world around them? Of course, there were numerous reasons for the delays, but let's look at what was happening at that time. Engineers were designing and managing unsafe cars which polluted the air, designing and managing factories that were polluting both our air and water, designing facilities that were inaccessible to the handicapped, and working in plants where the taxpayer's money was being wasted. All these situations still occur to some extent, but at least the engineer has recognized the problems and is attempting to deal with them. The engineering student is taught to recognize and solve these types of problems.

Today one sees that the attitude of engineers had indeed changed. Just the fact that Civil Engineering has changed its title is significant enough to show this. Research on our campus has swung over so that it is oriented towards that research that will help mankind in a direct manner. The feasibility of fusion to help solve the energy crisis is now being studied. In the field of biomedical engineering, work is being done to better treatment and diagnoses of the sick while devices are being developed to aid the handicapped. Solutions to the causes of pollution, such as the Urban Car, are being sought. Engineering techniques are even being applied to socio- and eco-systems to answer some of the puzzling questions in these fields. In this issue, *The Wisconsin Engineer* discusses the projects and more to help make you aware of what is and can be done.

Yet, amidst all that is being done, there appears to be signs of contentment and satisfaction with the way things are now. It appears that all the changes were only made for short-termed reasons. In a year, the job market for students graduating in engineering is supposed to be better than ever. Already the effects of this on engineering can be seen. Reforms are now coming about more slowly. In the new engineering catalog, which came out last summer, industrial engineering was the only department that even mentioned a minor in environmental engineering, although theoretically, it is available in all departments. In fact, some professors are completely unaware of its existence.

Yes, changes have been made but already many are satisfied with the way things are now. Unless something is done now, the changes will be even harder to make. When things are going well, when all the engineering graduates are getting plenty of job offers, even though those engineers over 35 displaced by the economic recession cannot find jobs, everyone assumes that everything must be right. The College of Engineering should not wait for another crisis to make another batch of alterations. Changes should be continuous, hopefully in a positive direction. In the past, engineers have created the mess. In the future, it is the engineers that will have to clean it up. Let the engineer lead, not follow in the trends of society.

**by Brad Bennett**

# Ackerman Contributes

## Letter to the Editor

January 5, 1973

WISCONSIN ENGINEER  
276 Mechanical Engineering Building  
Madison, Wisconsin 53706

Letter to the Editor:

Congratulations on publishing the article in your December issue on "California's Giant Water Hoax How It Was Engineered" by Harlan Trott.

The publication of this article in an engineering magazine reflects a high standard of journalistic integrity and courage which has all but disappeared from the American scene. I say this advisedly because back in June 1967 the then editor of IEEE SPECTRUM (the official magazine of our national Founder Society in Electrical Engineering) acknowledged publicly "that editorial space for presentation of an unpopular viewpoint is virtually impossible to obtain in a reputable technical journal."

Obviously the story is controversial and highly "unpopular" and discloses a major failure in engineering practice at the very top level of professional responsibility. Since I was directly involved in this experience I have always regarded it as a great tragedy, not only in terms of damage to the public interest, but, more importantly, in terms of seeing how our professional responsibilities can be subordinated and exploited by political pressures.

Since all engineering advancement has grown up out of the lessons learned from failures, there is every reason for publishing this story about this failure in California in the hope that it will persuade engineers to prevent a repetition if they should encounter a similar situation in the future. This is the main reason for having this story appear within the engineering profession and I am more than pleased that Mr. Trott, the author, approved of its appearance in the Wisconsin Engineer. Furthermore, the editorial by Mary Stein carries a special message for all engineers.

As far as reference to my personal action in this matter is concerned, the confirmation of the position I had taken and the vindication are, of course, gratifying. But I attach a great deal more importance to another factor, namely, my faith in the high standard of integrity in my fellow man. I felt confident that sooner or later the truth would prevail, but I had no way of knowing that it would take more than ten years for the facts to emerge as described in the story. Finally, the fact that the story found no outlet in a senior engineering journal and eventually saw the light of day at the student level of a coming generation of engineers is, in itself, a reassuring sign of high standards.

Adolph J. Ackerman  
Consulting Engineer

### EDITOR'S NOTE

The *WISCONSIN ENGINEER* appreciates this comment from the well recognized consulting engineer Adolf Ackerman. We are grateful to Mr. Ackerman for the timely information regarding the California Water Project.

Mr. Ackerman, in some circles is regarded somewhat as a maverick. However, we feel his dedication to his field is a great asset to the profession of engineering.

The *WISCONSIN ENGINEER* believes both sides of an issue must be known if a rational decision is to be made concerning the issue. One can look back now and see that Mr. Ackerman was right. If only he could have had his views publicized before the project was undertaken, it might have made a difference.

# Engineering Profession Undergoing Slow, Painful Evolution

by Don Johnson

Engineering, one of the nation's most conservative professions, is undergoing a slow and painful evolution. Under fire from many sources, engineers have been accused of apathy, misguided values, and snobbery.

A 1971 sociology study by Alvin Rudoff and Dorothy Lucken, appearing in "Science" magazine, charges, "The engineer instigates change yet he abrogates responsibility for its consequences and is reluctant to keep up with it."

Critics argue that engineers must re-assess the role of engineering in today's society. They claim the field has become too far removed from ethical and cultural problems, and look to the words of Albert Einstein for support, "The concern for man and his destiny must always be the chief interest of all technical effort. Never forget it among your diagrams and equations."

Reforms within the profession have failed to change some opinions. Visiting philosophy professor Robert Richardson taught a new course, "Technology and Man," for the first time last semester in the UW College of Engineering. "(Engineers) must consider questions about the nature and scope of science and technology, and what the implications are for society," he said. "Many think this is irrelevant, and my experience makes me less optimistic about changing that attitude." He continued, "I don't see them seriously considering outside criticism. They tend to dismiss critics as uninformed."

More worrisome than criticism is the dramatic decline in student enrollments in engineering colleges across the country. Science and technology have lost their halos. Many students believe technology has fueled wars and fouled the environment, and some are frightened by the recent engineering job shortage. In 1965, 32 per cent of the nation's top high school students, the national merit scholars, chose engineering as their field. In 1970, only 18 per cent did.

Engineering schools are worried, and many are trying to change their image. The UW College of Engineering is making an active effort to recruit black students, reform curriculum, and introduce new programs. The name of the Department of civil engineering has been changed to "Civil and Environmental Engineering." Dean W. Robert Marshall stresses that every field of engineering has potential contributions to make to the environment. A new general engineering department has been created to assimilate new courses with broader orientations.

Courses in "socio-technology", bio-medicine, urban and regional planning, and ocean and environmental engineering are being offered. According to Dean Marshall, new courses are being offered to engineering and non-engineering students to increase interaction between engineering and the social sciences. Proposals regarding such courses are being formulated for presentation to the Sloan Foundation for funding. General engineering Prof. Edward Daub, one of the key figures in planning, refused to make a statement about course goals and what might be offered.

Marshall also points to study-abroad programs as valuable supplements to traditional studies. The college has exchanged programs with Mexico and Germany, and may be able to send students to Japan soon.

Talks with engineering students reflect that the changes taking place are either superficial or are still in the planning stages. One relatively visible change, though, will be an increase in minority group students. Willie Nunnery was recently named head of the college's Affirmative Action Plan as assistant to the dean. The program is an active effort to "make engineering more visible to minority groups," according to Dean Marshall. Out of 40,000 engineering graduates in the nation last year, 400 were black.

Change extends beyond institutional reform. Aloofness is not necessarily virtuous anymore, and engineers are beginning to feel they must take responsibility for some of the changes they bring to the world. Still others are doing more than taking responsibility—they are actively trying to solve social problems with their skills.

Peace Corps campus interviews received such a good response last October, twice as much time was scheduled for interviews this semester. According to Kathy Crow, a recruiter for Action, the influx of engineers into the Peace Corps has been great in the last three years. She points out that foreign countries want more technically trained individuals. Where practical experience was acceptable before, a degree is required now, and countries want volunteers to train their people. "It can be a very creative experience as an engineer. Much of it is a basic grass-roots kind of thing."

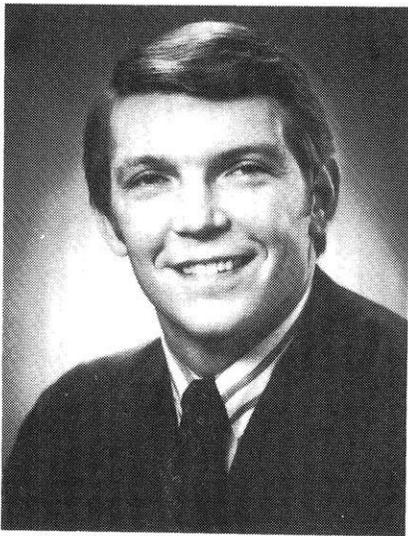
Marshall said bio-medical problems, is a major channel for socially relevant work. A similar example of this social consciousness is the work of electrical engineers Greg Vanderheiden and Dave Lamers. Concerned about the crippling effects of cerebral palsy, they devote much time to the development of mechanical aids for children with the disability. With

Profs. C. Daniel Geisler and Leo Jedynak as advisors, the team has developed communications devices for cerebral palsy victims and others with severe handicaps.

Concentrating their efforts in helping a 13-year-old Madison boy who cannot speak, walk, or write, the research team has developed a new communications aid called the Auto-com. The machine allows patients to use a printing unit such as a typewriter, but without levers and buttons. The machine has a smooth surface with painted letters. The user points to a letter or word, the system records the letters, and sends out a code to a printing unit that gives a written message.

Vanderheiden reports that current research is trying to make the machine more portable and marketable. He suggests that the next project of the team will be development of environmental control systems for those with extreme disabilities. Such systems might allow control of lighting, heat, and perhaps the telephone at the movement of a finger.

Prof. James Marks, director of placement services for the College of Engineering, likes this kind of practical approach—"Social theory won't clean up sewage. Employers are still looking for basic engineering in solving these problems."



**Mr. Pat Richter is a native of Madison and graduated from the University of Wisconsin in 1964. During his athletic career at Wisconsin he participated in basketball, football, and baseball and is one of only five athletes in the history of the school to have won nine letters. After receiving All-American honors in football at UW, he played professional football with the Washington Redskins for eight years.**

"You have a tendency to look for people that mirror yourself." This is Pat Richter's summation of how corporate recruiters judge applicants. Richter, coordinator of professional, technical and college recruiting for Oscar Mayer & Co. in Madison, told a group of UW engineering students recently that "As soon as you sit down with someone you know whether (the company) wants them."

The criteria vary according to the individual recruiter, he said, but in engineering grade point averages are the first on the list. Richter pointed out, however, that he looked for other qualities besides academic success. Involvement in campus activities and whether someone financed their own education are other indicators of an individual's capabilities.

Richter warns, though, that a person's appearance can automatically exclude someone from consideration for a job. A recruiter must consider a particular department's image and whether the prospective employee will be compatible, he added.

He said the basis of judgment is highly subjective, and gave the following random list of points most recruiters look for.

- Well-groomed personal appearance.
- First impressions.
- Direct answers and candidness.
- Applicant's interest in the company and desire to stay with that company.
- Personal preparation for the interview.
- Background.
- Grades and other activities in college.

# Societies Plan Spring Activities

## AMERICAN NUCLEAR SOCIETY

The primary activity of the ANS this semester has a big part in the organizations of Expo as both the General Chairman, Jack Van Derhei, and Vice-Chairman, Fred Beranek, of Expo are members of the ANS. One member is building an MHD energy converter that will hopefully be operable by April 6 and will make an excellent exhibit. The ANS will also be giving a slide show pointing out the difference between fission, fusion, and breeder reactors. In addition, the ANS will be giving tours of the UW reactor, having a reactor simulator for the public to operate, having a demonstration of equipment used to detect radiation, and moves about various aspects of nuclear engineering.

Much of the last meeting of the student chapter of ANS featured the Executive Secretary of the American Nuclear Society, Octave DuTemple, who gave a speech on the nuclear power situation in Europe. At the present time, ANS has 40 members and just about all showed up for an excellent meeting. Plans are underway for the annual ANS spring picnic. Our president is Fred Beranek and our advisor is Dr. Gerald Kulcinski.

**The Very Tentative Schedule** for American Society of Civil Engineers (ASCE) Student Chapter

Wednesday, February 14 — open

Wednesday, February 28 — open

Wednesday, March 28 — "Careers Night" Local engineers representing industry and government illustrate to the student chapter what their jobs entail. A atmosphere prevails

Wednesday, April 25 — open

Saturday, April 28, — The Third Annual Concrete Canoe Race, Lafayette, Indiana. Approximately twenty student chapters from throughout the midwest congregate at the Lafayette reservoir, and with a recalcitrant attitude toward the laws of bouyance, ease their respective canoes which are made of concrete.

NOTE: The open dates on the schedule are nights when we would like to have meeting but have yet to secure speakers for them.

## AIIE

The American Institute of Industrial Engineers, Student Branch recently held election. The new officers for 1973 are Dan Traxler, President, Brian Durtschi, Vice-President, Terry Kluge, Secretary, Leonard Betley, Treasurer, and Leon Eschenbach, Professional Development Director.

AIIE is presently planning on active professional Development Program. Included will be various outside speakers relating to the future and experiences of Industrial Engineers and their profession. Plant trips are also being proposed.

In addition, AIIE will be having an intramural basketball team and is planning on sponsoring an Industrial Engineering Department tennis or pingpong tournament.

During the past semester, the regular meetings of the Student Section featured several speakers from off campus as well as some of our own professors from Mechanical Engineering.

This past semester all members received invitations to the monthly meetings of the Rock River Valley Section of ASME, our parent chapter. These meetings were highlighted by speakers and plant tours.

The Student Chapter also had an opportunity to tour the Gisholt Foundry division of Giddings and Lewis in Madison.

Officers this past semester were: Chairman, John Hertel, Vice-Chairman, James Rennes, Secretary-Treasurer, David Ulmen. Officers for the coming year will be elected at the next meeting, being planned for the first week of February. Our Faculty Advisor is Professor W.J. Feiereisen of Mechanical Engineering. Our President is John Hertel.

## AICHE

The AICHE hopes to tour one of the major breweries in Milwaukee this semester. In addition, plans are being made to tour Johnson's Wax Company in Racine, Wisconsin. Elected officers for this year are Darwin Demery, president—treasurer; John Karrow, secretary; and Cheryl Brandt and Ron Holton, Polygon representatives. With 48 members, our advisor is Prof.G.H. Sather.

# Societies (continued)

## SAE

The new officers of SAE are Dan Kapellen, President; Carl Kishline, Vice President; Gerard Schommer, Secretary; and Carl Gilmore, Treasurer. Head advisor is Prof. Gary Borman with co-advisors being Profs. A.H. Easton, Andrew Frank, and Norman Beachley. Professor Borman became head advisor replacing Professor Easton who had served for 15 years.

Coming events include plans for the February and March meetings. SAE's spring "Gymkhana" will be held Saturday, May 5. The rain date is May 6. The "gymkhana" test of driving skill in which the driver maneuvers his car through a course of pylms for time. A trophy is awarded got fastest time of the day, and for the fastest time in each of the six vehicle classes.

1973 Engineering Expositions Projects include SAE's demonstration and explanation of how an electric brake and an air brake work. A demonstration of the electric hybrid powerplant from the urban car is also being planned. The engine will be mounted on a dynamometer and the engines various modes of operation will be demonstrated and explained.

SAE's major exhibit will start with a demonstration showing what effect different masses have on the force of impact at the same velocity. This will be done by running a light car and a heavy cart into a movable wall which is hooked up to a scale to record the force impact.

The use of energy absorbing devices will be demonstrated by mounting foam-filled soda cans on the front of the car again recording the impact and comparing with previous force of impact recorded by the same cart without the energy absorbing device.

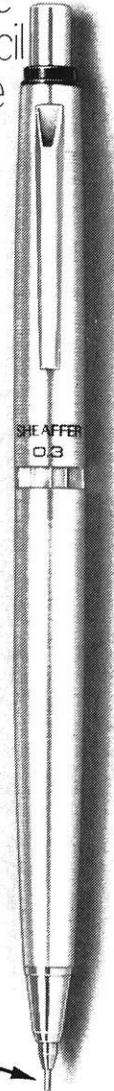
On display will be one or two modern automobile bumpers from 1973 cars and their energy absorption process for absorbing five miles per hour-crashes will be explained.

Also in the exhibit will be a demonstration of a safe child safety harness. A cart with a bucket seat in it and a child dummy strapped in a safety harness will be run into a wall at five to ten miles per hour to demonstrate that the child is protected in a collision. A film loop will be shown continuously showing the effects of safe and unsafe safety harnesses in collisions in slow motion.

IEEE, with approximately 350 members, has probably the largest membership of the engineering societies on campus. Most of the efforts this semester are making Expo 73 a success. Members of the IEEE are currently sponsoring three projects among them, a new and improved model of the Drivocator or auto-simulator which was present at the Expo 71. The control system has been changed over from analog to digital control. Our president is Aleks Layarevich.

WISCONSIN ENGINEER

The new  
super thin line  
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"floating lead  
protector"!



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# Employment Outlook Skyrockets

by Don Johnson

The overall demand for engineers is expected to skyrocket between now and 1980, according to reports of the President's Manpower Commission and the Engineers Joint Council. They predict an average of 48,000 openings each year. The Occupational Outlook Quarterly claims average annual openings may reach 58,000.

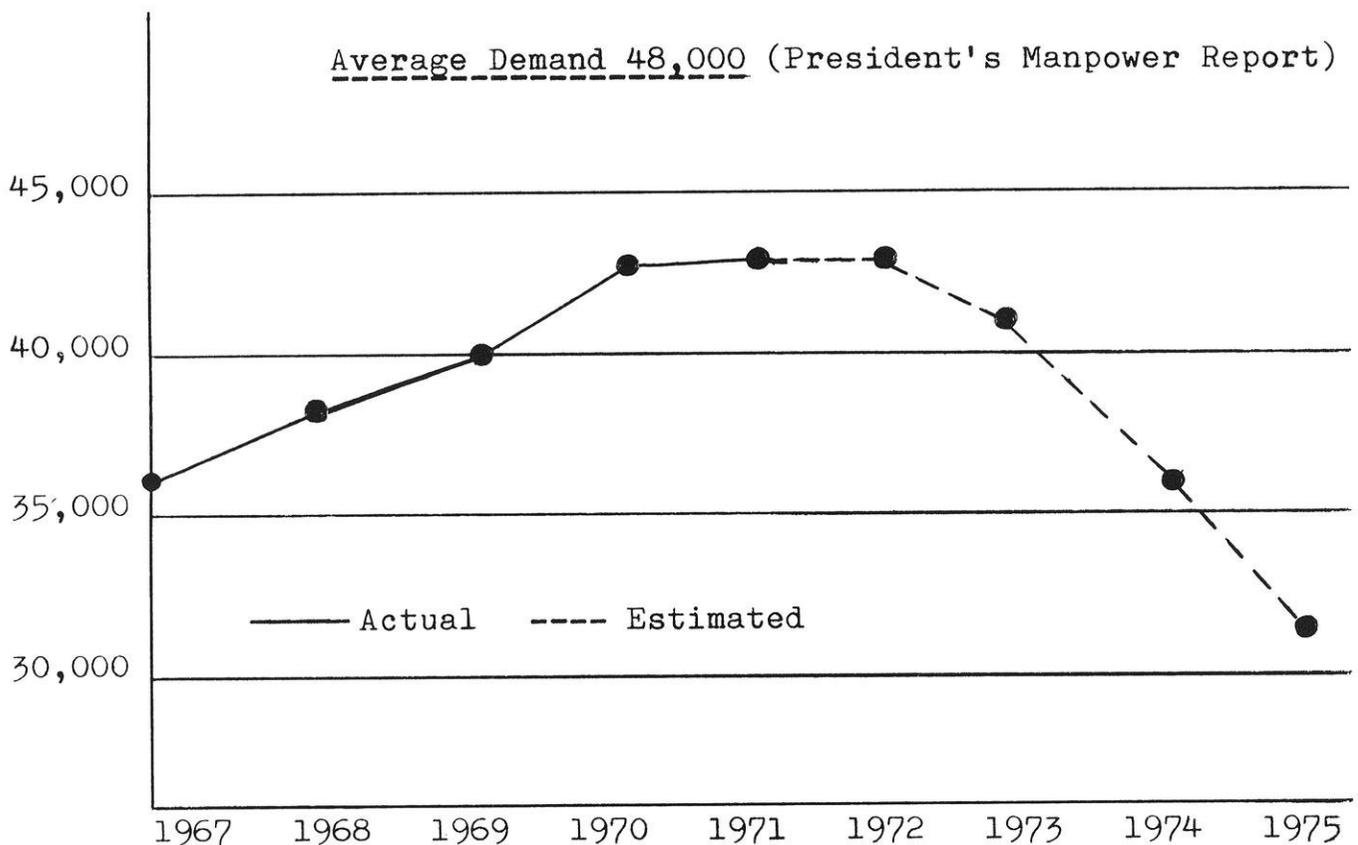
Prof. James Marks, director of placement services for the UW College of Engineering, explains that the average demand for 48,000 engineers each year will not be met by the nation's engineering colleges, who are suffering severe enrollment drops. Forty three

jobs. Rapid growth, however, is seen in agricultural, electrical, industrial, mechanical, and metallurgical engineering. "Good prospects" are given to biomedical, chemical, civil, and mining engineers.

The reports also indicate that engineers are sought after in related occupations as industrial designers, programers, systems analysts, technical writers, and urban planners.

The College Placement Council reports that engineering graduates in 1972 received the highest starting salaries of all groups studied. At the bachelor's degree level chemical engineers averaged

Bachelor's Degrees in Engineering—All U.S. Schools



thousands bachelor's degrees in engineering were earned in 1971 and 1972. The prospective gap between supply and demand is illustrated below. Current employment prospects indicate that engineers have seen the last of the recession of 1971 and may expect a healthy job market in the future with some variations in specific fields.

Although long-run outlooks are considered favorable for all fields of engineering, aerospace engineering does not have enough openings for those seeking

\$928 per month; mechanical engineers, \$894; and electrical engineers, \$888. Women averaged \$893 for all fields. At the master's level, salaries averaging \$1,129 were offered to MBA's with a technical undergraduate degree. Electrical and chemical engineers led the doctoral graduates with averages of \$1,439 and \$1,405.

Prof. Marks points out that it is a very good time to enter the study of engineering. Predicted job prospects have never been better.

# Interview Dates

## MONDAY, FEBRUARY 26

American Can (1 of 2)  
Amoco Chemicals  
Consolidation Coal Co.  
A.B. Dick Co.  
General Telephone  
Illinois Dept. of Personnel  
Pratt & Whitney (1 of 2)  
Raytheon Co. (1 of 2)  
Wisconsin Industrial Trucks  
Naval Ordnance Labs

## TUESDAY, FEBRUARY 27

Allen Bradley (1 of 2)  
Beloit Corp.  
Eastman Kodak Co. (2 of 2)  
Exxon (Esso/Humble/Enjay) (1 of 2)  
Goodyear Tire  
3M Co. (1 of 3)  
Pratt & Whitney (2 of 2)  
Procter & Gamble (1 of 2)  
Raytheon Co. (2 of 2)  
Shell Companies (1 of 4)

## WEDNESDAY, FEBRUARY 28

Allen Bradley (2 of 2)  
Arthur Andersen & Co.  
Exxon (2 of 2)  
Koehring Co. (2 of 2)  
3M Co. (2 of 3)  
Outboard Marine  
Procter & Gamble (2 of 2)  
Shell Companies (2 of 4)  
Westenhoff & Novick

## THURSDAY, MARCH 1

General Dynamics (1 of 2)  
Honeywell (1 of 2)  
3M Co. (3 of 3)  
Milwaukee R.R.  
Mobil Oil Corp. (1 of 2)  
Northern Illinois Gas Co.  
Republic Steel (1 of 2)  
Union Carbide Chemicals (4-6 divisions) (1 of 2)

## FRIDAY, MARCH 2

Brunswick Corp. (2 of 2)  
General Dynamics (2 of 2)  
Honeywell (2 of 2)  
Indiana Dept. Natural Resources  
Kohler Co. (2 of 2)  
Mobil Oil Corp. (2 of 2)  
Union Carbide Chemicals (2 of 2)  
U.S. Army Medical

## MONDAY, MARCH 5

Addressograph Multigraph  
Burroughs Corp.  
Caterpillar (1 of 2)  
R.R. Donnelley & Sons (1 of 3)  
Johnson Wax  
McQuay-Perfex Corp.  
Rex Chainbelt

Texas Instruments (1 of 2)  
Westinghouse Electric (1 of 2)  
Naval Civil Engineering Labs

## TUESDAY, MARCH 6

Allis Chalmers Mfg. (1 of 2)  
American Appraisal (1 of 2)  
Baxter Labs  
General Dynamics—Electric Boat Division  
McDonnell Aircraft (1 of 2)  
Union Oil Co. (1 of 2)  
Westinghouse Electric (2 of 2)  
Wisconsin Public Service

## WEDNESDAY, MARCH 7

Aerojet Nuclear (1 of 2)  
Allis Chalmers Mfg. (2 of 2)  
Applied Physics (1 of 2)  
Collins Radio Co.  
Commercial Union Companies  
Continental Can Co.  
Heil Co. (1 of 2)  
Hewlett Packard (1 of 2)  
Illinois Dept. of Public Works  
McDonnell Aircraft (2 of 2)  
Univac — Data Processing (1 of 2)  
Univac — Defense (1 of 2)

## THURSDAY, MARCH 8

Aerojet Nuclear (2 of 2)  
Louis Allis Co.  
City of Chicago  
Gleason Works  
Globe Union Inc.  
Hewlett Packard (2 of 2)  
Northern States Power  
Ohio Brass Co.  
Ryerson Steel (1 of 2)  
University of Illinois—Graduate School  
Warner & Swasey  
Waukesha Motor  
Federal Highway—U.S. Department of Transportation

## FRIDAY, MARCH 9

Celanese (3 of 3)  
Combustion Engineering  
Commonwealth Edison  
Inland Steel  
Eli Lilly (2 of 2)  
M.I.T. Lincoln Labs  
Mirro Aluminum Co.  
Underwriters Labs  
Whirlpool Corp. (2 of 2)  
Wisconsin Power & Light (1 of 2)  
Wisconsin State Bureau of Personnel

## MONDAY, MARCH 12

Boeing Co. (1 of 2)  
Clark Dietz & Associates  
Wisconsin Power & Light (2 of 2)

## TUESDAY, MARCH 13

Boeing Co. (2 of 2)  
Institute of Paper Chemistry

# Trends:

## UW Leads in Biomedical Engineering

by Brad Bennett and Bruce Haas

The **Wisconsin Engineer**, by devoting an entire issue to trends in engineering and job opportunities, attempting to provide engineering students with information of projects taking place on the Madison campus which are broadening the scope of the engineering profession.

### ECO-SYSTEM MODELING

Civil Engineering Professor Mitchell is leading a project in modeling an environment. By setting up a model desert environment with controlled air and soil temperature, he hopes to be able to predict plant and animal life. Once this data is obtained, the project will attempt to determine the effect that man-made changes have on the environment.

### BIOMEDICAL

The UW is considered a world leader in Bioengineering. A new field for engineers, the world of anatomy and hospitals is of vital concern to technical experts. Since 1963, many new breakthroughs have been made by engineers for the medical profession. A new technique for radiation measurement called Thermoluminescent dosimetry has been developed by Profs. Farrington Daniels and John R. Cameron. There has been an effort to study the standardization of hospital planning. Bioengineering at Madison can be divided into five main areas: artificial organ development, computer application to medical problems, development of new diagnostic devices, investigation of new surgical techniques involving engineering principles, and engineering studies of how humans function. Professor Sereig has developed a computerized body frame which allows paraplegics to walk. Electrical engineer C. Daniel Geisler is studying a racoon's nose. He is building a mechanical ear and hopes to find out through his experiment how the senses can change sound, light, pressure and heat into electrical impulses used by the brain.

### FUSION

Nuclear engineering is presently studying the feasibility of fusion reactors to satisfy future energy demands. At the UW now, another group is seeking funds to purchase an experimental Adiabatic Toroidal Compressor (ATC) tokamak. This device is being tested in connection with the heating and containing of nuclear plasma.

### SOCIETAL SYSTEM MODELING

Professor Harrison in Civil Engineering told the **Wisconsin Engineer** about his project using knowledge of dynamic systems and systems control to create a model, giving insights into the behavior of society. Society is considered a dynamic system and by obtaining this information, scientists will be able to forecast trends in society, this will hopefully be able to channel this change in a positive direction.

### ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL

The pressure is now on engineers to save our environment. No longer can systems be designed solely to solve an engineering problem. Instead, engineers are directing their efforts towards designing systems either to correct previous environmental disasters, or to solve problems in a way least harmful to the environment.

Examples of this approach are UW projects in the repair of lakes, recycling, energy conservation, modeling eco-systems, and remote sensing of pollution. In addition, engineers are trying to alleviate noise, air, water, chemical, thermal, and electromagnetic pollution.

### FIREFIGHTING

Firefighting is a senior design project involving scientific studies of smoke detection, high rise building rescue instruments for quantification of fire, fire clothing for firemen, fire extinguisher design, fire truck design, and fire fighting robots.

### MINERALS AND MINING

Materials processing in space has been the subject of experimentation here at the UW. By taking a laboratory into space, performing tests, and bringing it back, engineers hope to determine whether man will be able to build with metal in outer space.

Minerals engineers have also been designing nuclear fuels, and recycling metals. Mining engineers are concerning themselves with "benign and benevolent" mining operations. Rather than strip mining, engineers will take immediate steps to restore the environment around the mining site. Undersea mining is also being explored to see if resources can be tapped under the sea without destroying the ecological balance of the sea.

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