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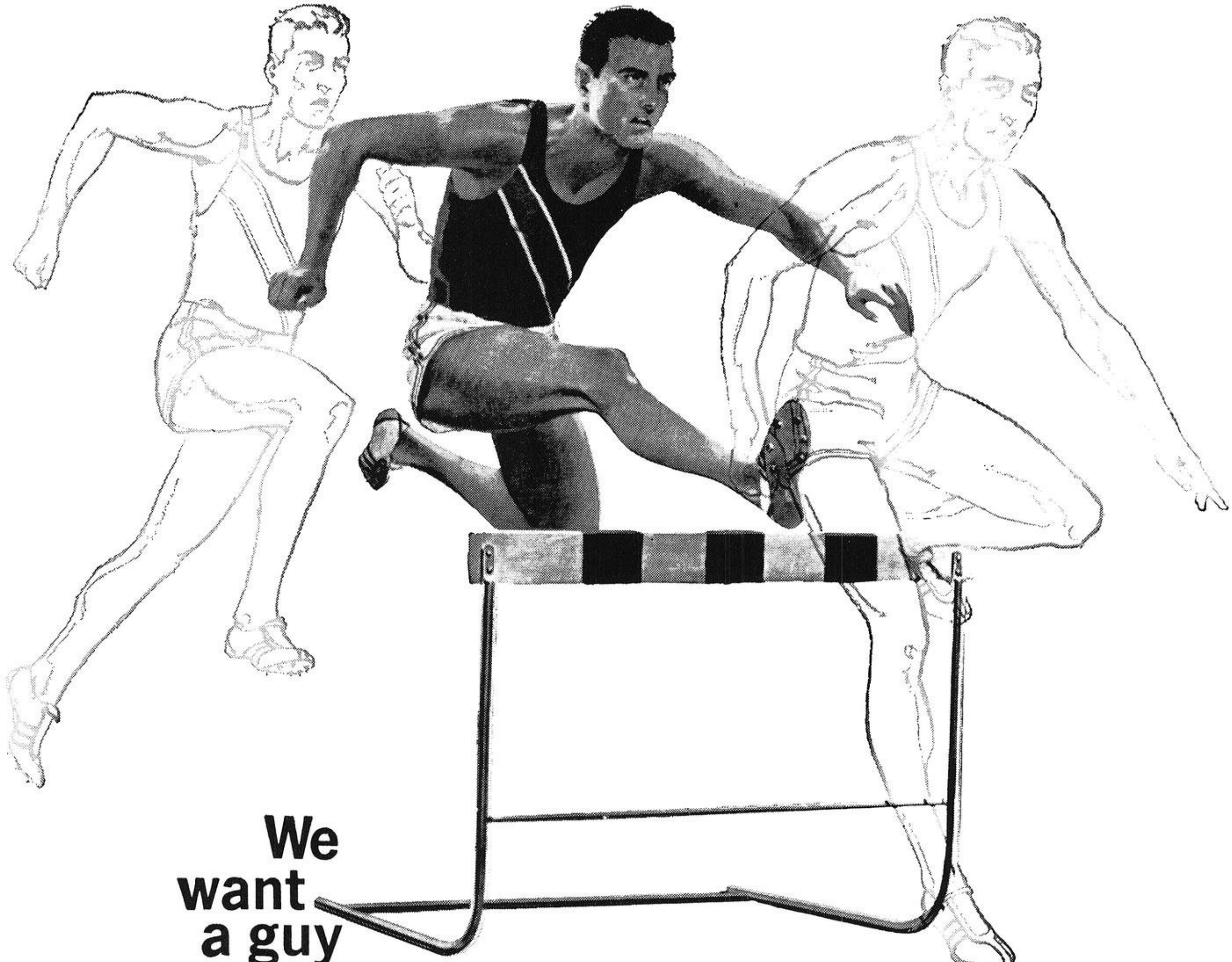
The Wisconsin Engineer

MEMBER OF ENGINEERING COLLEGE MAGAZINES ASSOCIATED

VOLUME LXXVII NUMBER VI

PUBLISHED BY THE ENGINEERING STUDENTS
of the UNIVERSITY OF WISCONSIN

March, 1973



You can't buy this piece in a steel warehouse

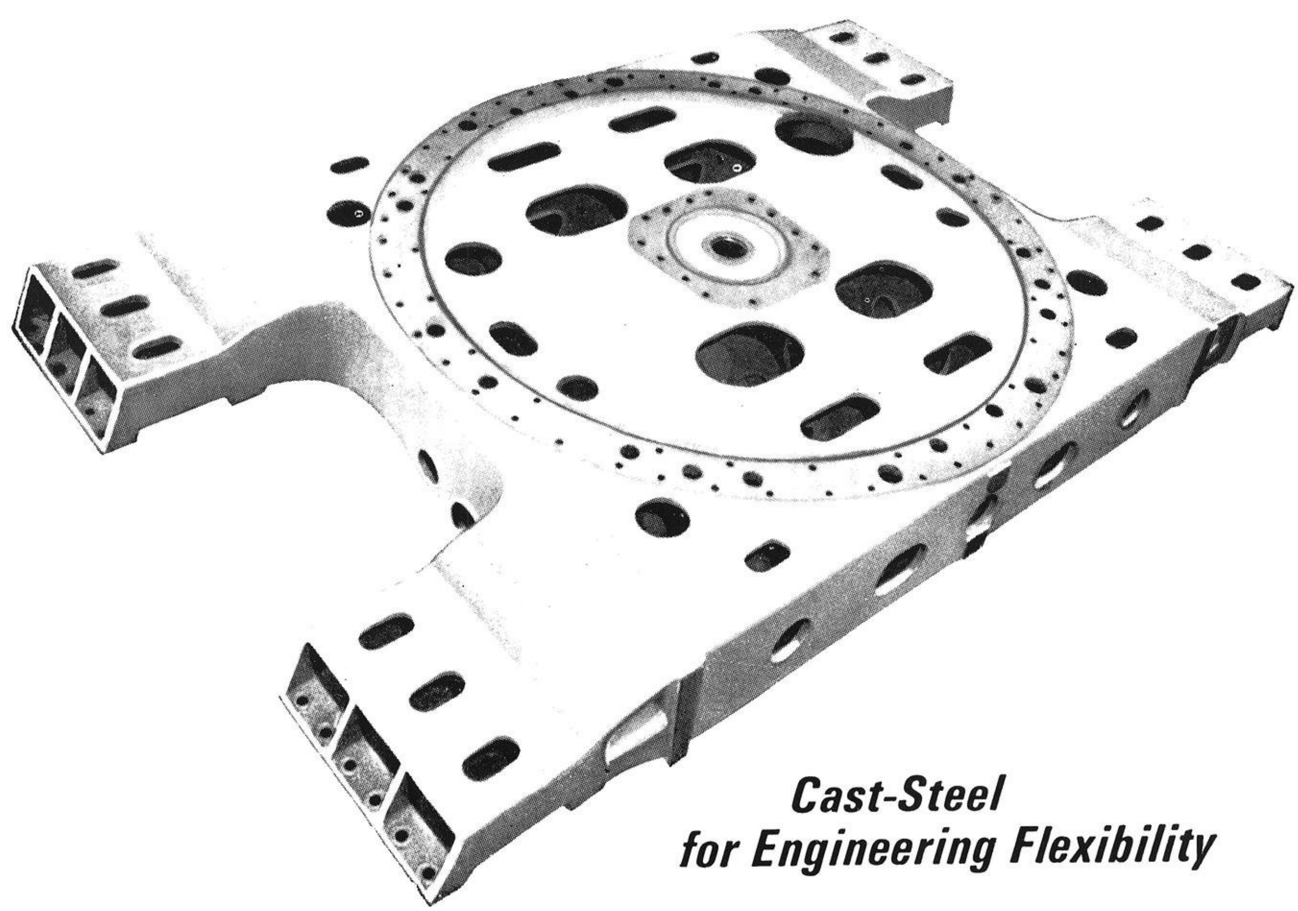
How do you accommodate multiple functions, high non-uniform stresses and complex configuration in a single component made of standard steel shapes? You don't . . . That's why this power shovel body had to be *cast-steel.*

Only with the correct steel composition, and integral one-piece construction, could the designer be sure that the equipment would take the punishing loads and shocks of heavy construction work while maintaining the precise alignment of critical shafts and bearings.

Cast-steel means design flexibility. In addition to offering an unlimited range of shapes, it allows the engineer to put the metal where it's needed for load-carrying ability... Then too, *cast-steel* permits streamlined design —design that minimizes stress-concentration at sharp radii and corners. Can you match such versatility with assembly methods? Don't try.

Want to know more about *cast-steel?* We're offering individual students free subscriptions to our publication "CASTEEL". . . Clubs and other groups can obtain our sound film "Engineering Flexibility." Write: Steel Founders' Society of America, Cast Metals Federation Building, 20611 Center Ridge Road, Rocky River, Ohio 44116.

STEEL FOUNDERS' SOCIETY OF AMERICA



Cast-Steel
for Engineering Flexibility

ENGINEERS—TRANSFORMING THE HOPE OF TODAY INTO THE REALITY OF TOMORROW

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wisconsin engineer

The Cover—
"St. Patrick was an Engineer . . ."
And so goes the song many engineering students have sung in defiance of the law students on Bascom Hill.
In keeping with the spirit of the Patron Saint of the Engineers, we have used a reproduction of a cover first published for the March, 1927 WISCONSIN ENGINEER, and used again in a revised form March, 1929.

MEMBER OF ENGINEERING COLLEGE MAGAZINES ASSOCIATED

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"There's Gotta Be Some Changes Made . . .

Developing an educational system in engineering, as in any profession, is a difficult task. Does one attempt to teach decision-making, require students to memorize basic principles and facts, instill in the students a method of thinking or attacking a problem, or teach design? These are difficult decisions, but ones that must be made. Equally important, however, is the manner in which the material is presented. This can be seen from the fact that most students either like or dislike a course mostly on the basis of the performance of their instructor. Some instructors, professors, and TA's, are not concerned with this. Unfortunately this hurts our College of Engineering because we believe that there is a direct correlation between liking a course and learning the material presented in that course.

Our College of Engineering, which is fortunate to have on its staff many exceptional engineering minds and leaders in their fields, is among the best in the country. How terrible it is to have the educational system fail so often at such a great institution. Is it all that bad? Let's look at an example.

Some students actually refuse to take required courses during semesters when particular professor is the only one teaching the course. Some state that this seeds out the poor students. But why not improve the teaching and then increase the difficulty of the material studied if they wish to do this? Another example of failure is the large number of students per teacher in the lower level courses, while the high level courses have few students per instructor. It seems that this situation should be reversed because the student needs the most help when he is beginning, while in high level courses his study habits are already established when he needs much less assistance.

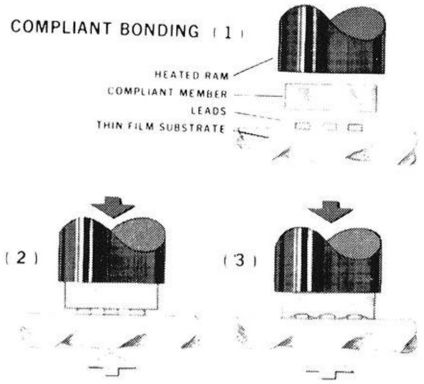
In this issue of the WISCONSIN ENGINEER we have attempted to present some new ideas in engineering education being discussed on the U.W. engineering campus. We feel that the need for improvement in education methods is vital; if the predicted shortage of engineers is realized, demands on the graduating engineering student will be greater than ever.

Still not convinced that changes need to made?

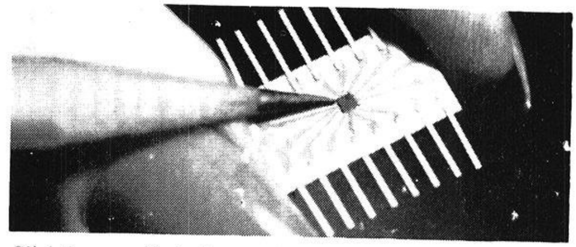
Ask a professional engineer today who works with recent graduates if **he** *feels our education is "good enough."*

Brad Bennett

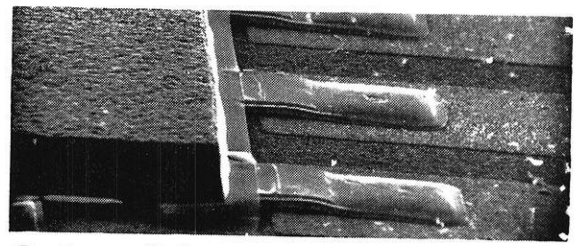
WESTERN ELECTRIC REPORTS



When heat and pressure are applied to the compliant medium, it begins to deform around the gold-plated leads. Deformation of leads is controlled by the flow stress properties of the medium. When the medium bottoms out, it stops the ram and the delicate metal parts are instantaneously and permanently bonded without damage.



Slightly magnified, the pencil points to a beam-leaded circuit chip which has been bonded to 16 gold conductors that converge on it. Within the silicon chip are dozens of microscopic transistors, diodes, resistors.



Greatly magnified, we can see gold beam leads projecting from a chip bonded to thin gold conductors on a thin ceramic substrate.

A new and better way to bond integrated circuits.

Engineers at Western Electric's Engineering Research Center (ERC) and Allentown Works have come up with a revolutionary but simple solution to some very complex circuit bonding problems. It's called compliant bonding.

As in other solid state bonding methods, heat and pressure are used to bond tiny integrated circuits to other components. (Some circuits have fifty or more delicate leads.)

However, our process differs in a very important way. ERC researchers added a compliant or yielding medium between the energy source and leads being joined. On contact, the medium compresses and transmits an equal amount of controlled, predictable bonding pressure to each lead.

There are many advantages to this new technique.

First, it is more reliable. Under heat and pressure, the compliant medium spreads the bonding pressure to all the leads uniformly. It automatically compensates for surface and lead irregularities. Strong, reliable electrical connections are assured for every lead.

It is also more versatile. We can now bond more than one circuit at a time, even with leads of different thicknesses or area widths. The compliant medium perfectly controls lead deformation in even the most complicated multiple bonding. It's no longer necessary to design and test complex bonding tools for each bonding job.

Engineers at Allentown are working to apply the process to large-scale manufacturing. They have developed the first production machines using the process. These machines are now in growing use at Allentown and many other Western Electric plants.

Conclusion: Compliant bonding is technically and economically superior to other solid state bonding techniques. Combined with automated production, compliant bonding promises reliable, high-speed production of circuit packages.

Western Electric

We make things that bring people closer.

EXPO '73: Help make it a Success!

by Bruce Haas

Preparations for Engineering EXPO '73 are becoming increasingly intense as organizers and exhibitors make final arrangements for the approaching exposition. With less than a month to go before the opening of EXPO, student EXPO committee members are scurrying about seeking more exhibitors and manpower to run the show, while other zealous students, inspired with great engineering principles, are donning their long white coats and smudged slide rules to create their own unique exhibits.

EXPO '73 will be held on the University of Wisconsin Engineering Campus for three days, April 6-8. Exhibits will be displayed from 10 a.m. until 9 p.m. on Friday, April 6 and Saturday, April 7, and from 12 noon until 6 p.m. on Sunday, April 8.

The Engineering EXPO is a biennial event on the Engineering Campus. Its main purpose, according to the EXPO committee, is to demonstrate what engineers currently are doing in the field, and to bring engineers and non-engineers together through understanding of engineering concepts. The Exhibition provides an opportunity for the engineering industry to meet with the College of Engineering, and work together in a common symposium.

It also serves as a kind of professional fair where Engineering can display its wares of new developments and unusual phenomena of engineering students with a means of putting into practice the fundamentals learned in the classroom, of testing the student's engineering skill and interests, and displaying his product to the public.

This year's EXPO is the ninth such show at the University of Wisconsin. The first one was held in 1940, and the most recent one was conducted in 1971. EXPO '71 hosted a total of 40 exhibits that were viewed by about 15,000 persons and had profits (which are returned to engineering students) amounting to over $3,000. The show contained some outstanding exhibits such as device for crushing automobiles, a demonstration of Operation Sanguine, and an exhibit showing simulated driving by an Analog computer.

EXPO has always met with a great deal of civic and academic acclaim, and this year's exhibition should prove to be no exception. The theme of this year's show is "Engineers: Transforming the hope of today into the reality of tomorrow." Exhibits will differ in technical complexity and professional adaptability from a nuclear reactor simulator by the American Nuclear Society, to an exhibit demonstrating a computer crap game. Exhibits will represent several different disciplines of engineering, and will be produced by large industrial companies, student engineering societies, and individual students.

While applications for student exhibits are still being received by the committee, many interesting exhibits have already been accepted. Electrical engineers are developing a field ion microscope to put on display. Civil engineers are showing their famous concrete canoe that will brave the bold Wabash River during competition in Indiana. Mechanical engineers have their cryogenic recycling or "tire freezing" which has stirred considerable interest in ecological engineering, as well as a repeat performance of the car crushing exhibit shown in EXPO '71. The American Nuclear Society, sponsoring a number of different exhibits, will have an energy converter on display. Agricultural engineers are producing an exhibit demonstrating the process of extracting protein from plants. In all, almost sixty students-sponsored exhibits are expected to be presented.

Profits obtained throughout the exposition are divided up equally among the exhibitors according to man-hours of exhibition time. Funds will also be given to the Polygon Engineering Council, and the various student engineering societies and fraternities that help manage and present the EXPO activities. Cash prizes will be awarded to the exceptional student exhibits, also.

The EXPO committee, while having prepared for this year's exposition for a year and a half, still desperately needs help in organizing and manning exhibits. The number of industrial exhibitors has greatly declined, due to a lack of funds and the professional personnel necessary to develop these exhibits. Therefore, many more students exhibitors are needed to make EXPO '73 a success. Applications to exhibit are being accepted through March 12; however, assistance in organizing, developing, and presenting exhibits will be welcomed by the EXPO committee at any time.

Those interested in entering an exhibit or in helping in the production of this year's EXPO, are invited to stop in at the EXPO office at 1142 Engineering Building, or call 262-6842.

EXPO '73 should prove to be a very interesting and enlightening display of engineering developments, as well as a very informative production. Plan on attending, and taking in all of the exhibits.

The **Wisconsin Engineer** *offers unusual opportunities to engineering students who may have interests and talents in the communications arts. It provides them with an opportunity to develop writing skills and abilities which will be of great value to them in any endeavor after college. There is no question in my mind but that the person who succeeds today is the one who can express his ideas clearly so that others can understand and accept them — call it selling if you wish.*

Another very important opportunity in working on the **Engineer** *is to develop techniques for presenting to the public an understanding of technlogy. Our society desperately needs the engineer interpreter — the one who interfaces between the hard science of engineering and the soft social sciences. It is also an opportunity to interact with students from other fields, such as journalism and the arts, who hopefully will also serve on the staff of the* **Engineer.**

Finally, I can say positively that the **Wisconsin Engineer** *will always receive strong and enthusiastic support from the Dean's Office because it is my conviction that it is an important College of Engineering activity and a very visible product of our students.*

—W. Robert Marshall
Dean of the College of Engineering

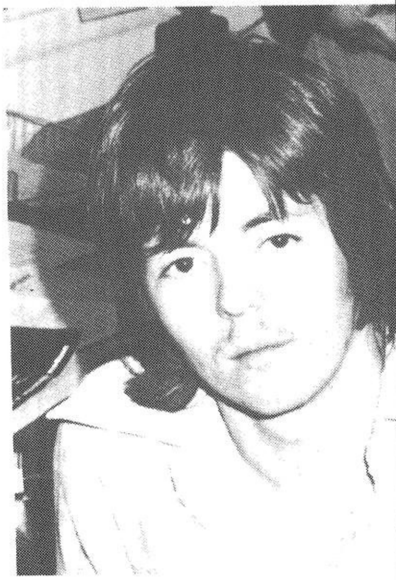
Extra curricular activities (ie. **Wisconsin Engineer)** *are available to students during their stay on campus much as similar activities will be presented to them throughout their lifetime (no matter what the environment — campus, etc.). I have found that, generally speaking, the people I have known who participate in such activities are exceptional. They are normally not satisfied with a mediocre life, but seek that extra depth which comes from participating in a broad range of activities. Interestingly enough, these people generally accomplish more in their lifetime than those "too busy people" who never have time for constructive outside activities. Students who have been able to coordinate their time so as not to feel the disadvantages of extra curricular participation (because, let's face it, it takes time) know the many rewards. What are some of these rewards? Here are a few that I feel are important in respect to student participation in the* **"Wisconsin Engineer:"**

1. *close interaction with faculty*
2. *an outlet for creative contributions*
3. *beefing up your resume*

We are experiencing tremendous technological and societal changes which provide numerous opportunities to perform worthwhile contributions such as discovering some beneficial programs for engineers or, at the very last, reporting and communicating ideas generated elsewhere. What a great opportunity match engineering students and their interests with grad students or organizations outside of engineering. I'm thinking here of the recent "Products Liability and Product Safety" seminar held on campus during engineers week. At that seminar Dean Marshall stood up and encouraged students to help organizations such as the Dane County Consumer Protection League understand more about engineering. Students can get involved in such projects for course credit through the 699 option. The **"Wisconsin Engineer"** *staff could be the matchmaker.*

Finally, there is no doubt that extra curricular activities such as these are well regarded by recruiters, particularly if accompanied by a letter of recommendation by a **"Wisconsin Engineer"** *faculty representative. I have written several and they have been received well by recruiter.*

—Richard A. Moll
Extension Engineering



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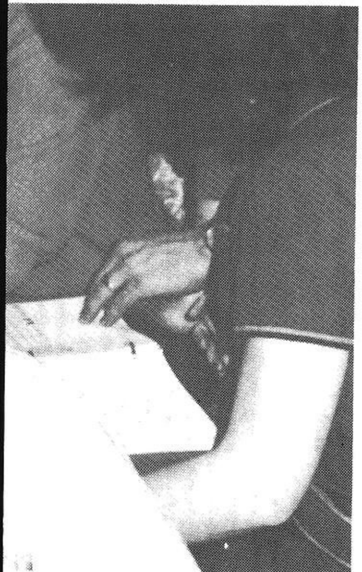

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So you'd rather **do** *it than write about it . . . ?*

It can safely be assumed that curiosity about what makes things work plus some technical skills in how to make things work better are what persuade many young people to take up the study of engineering. Okay . . . so for some perhaps the lure of a well-paying job with responsibility is also a powerful motivator. It may even be that frustration with high school composition and literature convinced some that their future lay with things and not with words about things.

However, for many engineers real success at the executive, managerial level will come only if they have learned how to communicate effectively, not only with other engineers but with other professionals (business managers, architects, purchasing agents, and others) as well as with the general public, who will have to live with the projects designed and executed by engineers. Knowing how to write and to speak effectively are crucial to individual progress and to productive teamwork.

Experience on the **Wisconsin Engineer** *while in college can help develop your communication effectiveness. Perhaps even more important, it may provide "another string for your bow." The specialized media, including engineering and other technical and semi-technical publications, constitute a considerable field of employment. Why not give W.E. a try? The change of pace may be just what you need!*

—Jim Fosdick
Professor of Journalism

A student can gain valuable experience by working on the staff of the **Wisconsin Engineer** *magazine. The most immediate benefits are those associated with preparation and reproduction of material to be communicated to fellow students, faculty, and high school students. Since communication will play an ever-increasing role in the student's career, this opportunity is most important.*

Other benefits are: 1) learning to work with others to meet deadlines; 2) learning about the myriad projects that are carried on in the College of Engineering (many unknown to the undergraduate); and 3) becoming acquainted with faculty members involved in research beneficial to mankind—environmental, ecological, and sociological.

—George Sell
Mechanical Engineering

When I joined the staff of the **Wisconsin Engineer** *my motive was to become involved in a worthwhile non-classroom activity. I was never disappointed. The immediate benefits were numerous: Working and having fun with other students with similar interests, the satisfaction of seeing a tangible result from my efforts, and seeing my name in print, for example.*

But the advantages don't disappear when you graduate. An entry of **"Wisconsin Engineer** *Staff" is a significant asset on a resume because it represents a wide range of "Real World" experience, not only in communication skills, but in management and teamwork as well.*

I will always consider my relationship with the **Wisconsin Engineer** *as a profitable one, both in terms of the professional experience and the lasting friendships that I gained.*

If you are looking for responsibility and the corresponding rewards, I urge you to make a commitment to the **Wisconsin Engineer.** *You don't need any special talents — you're an engineer!*

—Robert J. Smith, P.E.
Editor-in-Chief, 1964-66

"FREEDOM IS BEING ABLE TO USE YOUR BRAIN"

by Mary Stein

"The challenge of the new era is simply the total creative process of growing up — and mere teaching and repetition of facts are as irrelevant to this process as a dowser to a nuclear power plant. To expect a 'turned on' child of the electric age to respond to the old educational modes is rather like expecting an eagle to swim."

So says Marshall McCluhan in an article in *Playboy* magazine March 1, 1969. Professor Charles E. Wales, West Virginia University (W.V.U.) chemical engineer agrees with McCluhan.

Wales and his associate, Dr. Robert A. Stager (on a sabbatical leave from the Faculty of Applied Science, University of Windsor, Ontario, Canada), spent three years developing a freshman engineering course at W.V.U. called "Guided Design." Sponsored by a $96,000 grant from the Esso Educational Foundation, the project has evolved into three separate phases, all involving a systems approach to education.

In a recent interview, Wales said, "According to national statistics, over 90 percent of the people coming out of an educational system are followers. Less than 5 percent come out as creative decision-makers. And that's **not** the kind of society I want to live in. To me, freedom is being able to use your brain."

Wales has set up his course so that his students will be able to use their brains and innovate. His first task in designing his course was to develop the freshman engineering course model. "We approached the challenge as an engineer would. Everything kind of fell into place," he said. "No one has taught these students problem solving. The present trend is believing that this should be intuitive but it's not. A guy has to be taught creative decision — making from the time he is a child."

In the course, freshman engineers are divided ito small groups. There are no lectures or texts. All homework is done outside the classroom and class time is devoted to small group discussion of the given problems.

Wales said, "There is group effort motivation here. Students can't always talk to me but they can learn from one another. The present system doesn't have flexibility. No one's taught these kids problem solving. Faculties are too sophisticated. They are poor models for decision-making—they don't realize what steps to take any more. They are too experienced."

Freshmen are taught model thinking in slow motion. It is based on the systems approach to putting the decision-making process to work in teams just like the professionals would.

In the classroom, students go step by step on problems and check themselves. "It's human nature to like to solve problems. Yet this talent must be developed. And it takes a long time," said Wales.

He encourages student leadership by emphasizing discussion, explanation of ideas, and report writing. "It seems that an amazing number of engineers think they cannot or should not be required to communicate in writing, but since this system approach has been in effect, we have been surprised at the quality and clarity these students have achieved," said Wales.

In addition to the live model at West Virginia University, Wales and Stager also travel, putting on two-day workshops. The first day is devoted to an explanation of the systems design for various faculties. A second day is devoted to help each faculty plan and develop their own curriculum.

"We just finished out 30th workshop in three years for the Graduate Education Faculty in Canada and have received a pretty good response," said Wales. "In general, though, the faculty reactions have been mixed.

Some schools have had to cancel their guided design programs because of lack of financial support from the administrations. However, Wales explained that there was not a substantial cost difference between the traditional lecture mode of teaching and the guided design process. "The cost comes from developing the curriculum in terms of faculty time spent. Each college should have some type of fund like corporations do for product development. With this type of set-up, there would be the funds to innovate new teaching methods," Wales said.

If faculties cannot tour the model at West Virginia, and do not have access to a workshop to help them understand the model, they can get a copy of his book, *Educational Systems Design.* The book is unique because, according to Wales, "we've written down the thinking process so that the student and the faculty member can see the thinking model in progress." The book has been revised and the second edition will be available soon.

Wales is very turned on to the systems approach because he feels it offers the student a choice. He cites one example of the kinds of problems they face in their classes. "We take a Peace Corps problem of native housing. Should we build them or would the natives be better off in their worn huts. Where should the village be built, or should it be built at all?" he said.

He sums up the purposes of Guided Design as wanting the student to develop "his own value judgements."

"We want a student to be concerned with what happens and when. In the guided design program there is authentic involvement of students. We are hoping to shorten the engineer's education, and to substitute authentic experience in the form of an internship program rather than so much classroom work."

Wales faces criticism from various academic circles but he insists that "teamwork and individualism is one way to bring professionalism to engineering students."

"Previously, learning has been tied to suffering. Students are told that memorization is good self-discipline. Yet recruiters have told me that a company plans on at least one year to train a new engineer to make decisions. My students pass more tests, but according to one of my students, 'it isn't painful anymore.' "

Dr. Charles E. Wales is a specialist in engineering education and is presently teaching at West Virginia University, Morgantown, W. Va. He did undergraduate work at Wayne State, graduate work at Michigan, and received his Ph. D. from Purdue in 1965. Dr. Wales received the "Teacher of the Year Award" at Purdue in 1967. Wales is also past national regent of Theta Tau.

Mary Stein is Associate Editor of the Wisconsin Engineer and is a senior in the School of Journalism. A native of Madison, she works part-time as a senate page at the State Capitol. Her ambition is to become a political journalist.

Lectures Lose Importance

by Carla Sweet

The need for innovation in engineering education has not gone unnoticed at the University of Wisconsin—

Boredom and unreality are the two major problems facing engineering education. Repetitive lectures and the simple memorization of facts make for weary students and weary professors. Weary students may easily become bored engineers and bored engineers are not creative engineers. It is small wonder that students complain that their rote-learning education leaves them ill-prepared for practical work experience.

Professor Glenn Sather of the Chemical Engineering Department has recognized the problems of engineering education.

"I was never pleased with the lecture method of teaching," he said. "I felt the text was quite good but I found I was only repeating it in the lectures. I was bored and so were the students."

Sather feels that repetitive lectures were not the only problem. The fact that students came into his course with different educational backgrounds presented another problem.

"We have many transfer students with different levels of preparation," Sather said. "The lectures could only hit the middle ground." The result was that students plodded through the course unenthusiastically.

Fortunately, Professor Sather responded to the need with a new system of education which he calls "self-paced and self taught." The system is designed to give individual attention and to encourage independent learning. The textbook is used mainly as a reference book and the course material is divided into 15 mimeographed "units". Each unit has two or three main objectives within one area and includes related problems aimed at helping the student master the unit. The student is free to work through each unit at his own pace. When he completes a unit and has successfully solved the study problems, he is tested on the unit. A student may be tested on the material in a unit whenever he wishes as long as he has solved the problems. He must correctly solve all the test problems before going on to another unit. The student's final grade is based on the number of units successfully completed. A student must complete 12 units for a grade of D; 13 units for a C; 14 units for a B; and all 15 units for an A.

Sather rarely lectures. He uses the class time to answer questions, administer tests and give personal attention to individual difficulties. While class attendance is encouraged, it is not mandatory.

"The student is urged to develop the ability to work on his own and to learn self-discipline," Sather said. He feels it is important for each student to develop the independence to study on his own and to develop an independent philosophy toward engineering. It is this independence, he feels, that will help students to be prepared for practical work experience after graduation.

Sather feels that another important advantage of his self-paced method of instruction is the students' attitude toward the method, which he sums up as being "very favorable." And indeed the data he has kept during the two years he has taught with the self-paced method reflects students' enthusiasm.

The form of self-paced instruction he uses is the Personalized System of Instruction (PSI), most extensively used at the University of Texas. Professor Sather uses the PSI method in a sophomore level Material and Energy Balance (MEB) course. The course has a moderately large enrollment, about 80 students a year. It is a multiple-section course with approximately 20 students in each section. The course, Chemical Process Calculations, is in the second semester of the sophomore year and is normally the first chemical engineering course taken by the students.

Professor Sather's decision to use the PSI method of education came about as a result of meetings of the American Society of Engineering and Education at the UW campus three years ago.

He decided to try the PSI method on an experimental basis. During the past four semesters, Sather has taught all the PSI sections of the course plus one lecture section. One lecture section has been taught by another faculty member. He has gathered extensive data, ranging from attitudinal questionnaires filled out by the students' future performance in engineering courses.

The fact that two of the MEB sections were taught by the traditional lecture method afforded Sather the chance to compare the two teaching methods.

In order to appraise the students' attitude toward the two teaching methods, the students were asked to evaluate the course upon completion. The general conclusions are that the students in the PSI sections were enthusiastic over the method of instruction and felt it was a stimulating course; that they got more from the course than they expected and that they put more into the course than they normally do. No evaluating forms were completed by the students taking the MEB course by the lecture method. However, Sather had used evaluating forms when he previously taught by the lecture method. Although students had been generally satisfied with the course there was no great enthusiasm.

Sather also compared the distribution of grades in the PSI and lecture sections during the first three semesters that the PSI method was used. The grade distribution shows the large percentage of "A" grades which is typical of the PSI method. Sather offers an explanation for the high percentage of students withdrawing from the course.

"The students may not have been firmly attached to engineering since this was their first exposure to chemical engineering. For many students, this was also their first exposure to independent work. Furthermore, the PSI method is more time-consuming for both students and faculty and the students, as sophomores, may not have been prepared to work on their own." Sather also noted that many of the students who withdrew took the course the following semester.

Sather has also followed-up on the students who took the course by either method. He found a rather significant effect on the student's future in chemical engineering. After successfully completing the PSI method course, more than 91 percent of the students were still in chemical engineering two years later. However after completing the lecture method course only 71 percent remained in chemical engineering.

Unfortunately not all of the experimental data was as promising. Sather also measured the effect of the two methods on future performance in engineering courses. He used the students' Grade Point Average (GPA) in engineering courses as a criterion. He found no significant difference between the engineering GPAs of PSI and lecture method students.

Sather admits there may be other disadvantages to the PSI method of instruction.

"The PSI method is more expensive because it requires more staff. Also, I do answer the same questions over and over," he said.

Sather feels it is necessary to weigh the variables involved. He has continued to gather data on the PSI method versus the lecture method and will be presenting "a complete follow-up study" at the 74th national meeting of the American Institute of Chemical Engineers in New Orleans, March 11 to 15.

Several variables weigh heavily in favor of the PSI method. Student attitude, independent thought and a higher caliber of student input are certainly desirable results.

While the PSI method is more time-consuming, slightly more expensive and does not significantly effect the students' future performance in engineering courses, Sather feels it is well worth the extra effort.

"Of course every method has to be satisfactory to the instructor," he said. "This method fits my own personality and I'm convinced it's better than the lecture method."

"I feel it's worth the extra effort due to the superior student attitude alone."

"However," he said, "there are intangibles that can't be measured. For instance, one student who had taken the course with the PSI method came to me and said, 'I've learned that I can study on my own. That will be important to me after I graduate.' "

A native of Stevens Point, Wisconsin, Carla Sweet is a student of Journalism on the University of Wisconsin. She is planning a career in newspaper and magazine writing. She is currently working at the Community Rap Center, a lay-counseling agency in Madison.

"Erin Go Braugh"

The engineer witness was being cross-examined by a lawyer who was determined to discredit him.

"You are an engineer, I believe," said the lawyer.

"Yes," was the reply.

"Is not that rather a low calling?"

"I don't know but what it is, sir," replied the witness, "but it is so much better than my father's that I am rather proud of it."

"What was your father's calling?" asked the lawyer, falling into the trap.

"He was a lawyer," gently answered the witness.

* * * * *

The May, 1926 issue of the *Wisconsin Engineer* contained the above bit of humor, and was quite representative of the main thrust of stories in the *Engineer* about St. Patrick's Day since the start of the Irish mania on campus around 1915.

How the tradition of St. Patrick's Day and the feud with the law school started at Madison is shrouded in the mist of history and folklore. But we can be sure that the engineers — or lawyers — who started the tradition picked the closest targets for their shananigans. In those days, the engineers and the lawyers faced each other, as the engineers were headquartered in what is now known as the Education Building, and Bascom Hill served as a no-man's-land.

Rumor has it that the engineers chose to relocate to their present campus when it was discovered that nothing could be done about changing the prevailing wind direction from the South.

The highlight of the St. Pat's celebrations was not what occurred on the patron saint's day of homage, but what happened during the annual engineers's parade.

A 1928 *Wisconsin Engineer* lists the parade route as "down State St. to the Square; around the square to Wisconsin Ave.; up Wisconsin Ave. to Langdon St.; up Langdon St. to the foot of Bascom Hill; and then to the front of the Engineering Building where a special ceremony will take place."

That March issue went on to report that "even though everyone is watching, only engineers will be able to see" the special ceremony.

A subsequent report said that the 1928 parade was rather dull because Triangle tried all during the parade to get a frog-like lawyer to hop through a hoop but it could not be prevailed upon."

The most famous exchange of engineer/lawyer blows took place on April 6, 1935.

Here is an account of the preliminary events as reported by the *Wisconsin State Journal* on March 19, 1935:

If University of Wisconsin law students are organizing to retaliate against their traditional enemies, the engineers, for a bit of blackguarding discovered at the law building in the early hours Monday, the president of the Law School Assn., "doesn't know anything about it."

Somebody—it may have been fairies or leprechauns—poured oil on the steps of the law

building, locked classroom doors, and pulled lockers over against them . . . and upon it all, somebody hoisted a "Jerry O'Doon" flag to the top of the dignified stronghold of the law.

Perhaps it was all done in honor of the Irish patron saint and perhaps not. And if a committee of lawyers is meeting to plan retaliation upon the suspected engineers when they gather for their annual St. Patrick's Day parade on April 1, as has been said, the president of the laws "doesn't know a thing about it."

"We think too highly of them to believe they would stoop to such low practices," (the president) said. "It must have been a gang of playboys and not really engineers who did it. Anyhow, we are too busy nowadays to go monkeying with any engineers, and anyhow I don't know anything about it."

* * * * *

But little did the engineers realize that the intrepid lawyers were planning a **quid pro quo**— tit for tat in engineering terminology!

The *Daily Cardinal* of April 7, 1935 tells what happened:

Their St. Pat's parade floats spattered by a barrage of rotten eggs and oranges thrown from the roofs of four lower State St. buildings Saturday, several hundred engineers came back to win a sweeping but wet "victory" from their ancient foes, the lawyers, when they successfully drenched about 2,000 curious bystanders on the lower campus with a portable fire pump, threw two freshmen into the lake, and successfully staged that traditional blarney stone kissing.

Starting out mildly enough, the parade of floats satirizing the (U.S.) Senate red probe, Glen Frank, the *Daily Cardinal* Roosevelt, and other well known figures in institutions, met its toughest opposition at the lower end of State St., and finally ended in a near riot as the hydraulic lab's float madly circled the campus at 40 m.p.h. spraying thousands of persons with a high power portable forest fire pump.

The parade itself was quiet enough as it proceeded up Langdon St., circled the square and jogged down State St. Only once was there any difficulty, that when somebody on the hugh ASCE float, which represented the Supreme Court. . . met with legal difficulties when one of the justices hit a passing cop with a ripe egg in front of the Bank of Wisconsin.

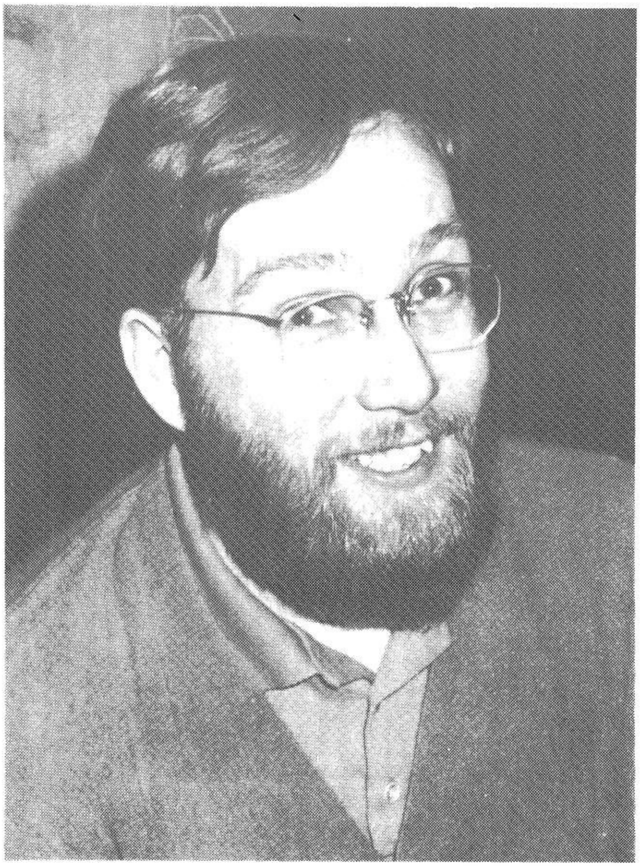
The cop forced the driver of the three-ton truck pulling the float to drive to the police station. Here Chief McCormick came out, searched the float for more eggs," he asserted.

"Yes, but how about the lawyers?" somebody asked.

"You worry about them," replied the chief.

The truck rejoined the parade.

After the parade reached the lower campus, the long green "snake", a long piece of green cloth over several hundred dirty street urchins, melted into a bundle, and . . . (engineers) pulled off the blarney kissing tradition.



Peter Fox is the Wisconsin Engineer's leprechaun-in-residence and an assistant editor. He is from Wisconsin Dells, served four years in the Army as a Russian linguist, and is a senior in the University of Wisconsin School of Journalism. Peter's intended field is media management.

CREATIVITY CHALLENGES TRADITION

by Don Johnson

Educators in all fields are taking the initiative to assure greater student comprehension of material. Less stress is being placed on formal education in favor of more emphasis on practical experience. If engineers are to learn about digital computers, why not construct one?

This is one of the innovations in the department of electrical engineering (EE) here at the University of Wisconsin-Madison campus. The first facility of its kind in the country, EE 307 has been offered in the College of Engineering for the last seven years. It was designed by EE Profs. Donald Dietmeyer, Allan Scidmore and Charles Kime to offer students an opportunity to gain realistic experience in the engineering of digital computers.

"We are talking about the real thing," remarked Prof. Kime. He explains the course is divided into two halves. The first seven experiments are intended to give broad practical design experience. Emphasis is placed on finding creative solutions to new problems.

The last part of the course is an independent project, where groups of eight design, build, and test their own digital computers. Prof. Kime stresses two features of the course: the lab is essentially available to the students at any time, and specially designed equipment facilitates course work.

Including innovations within itself, the course offers a minimum of structure and audio tape instruction. There are only two required lecture periods — the first for orientation and the last for a final exam. Lectures and lab instructions are received on audio tapes, but instructors are present for consultation. Supplementary tapes for those with a heterogeneous background are available. A non-tape option is also offered. Prof Kime said the use of tapes is still being evaluated, but indicated that students are not using them to their full potential.

He summarized the following list of course features for potential students:

- Flexibility of scheduling work.
- Reduction in size of lab groups without increasing work load.
- Elimination of lab lectures.
- Additional information for students with heterogeneous backgrounds in prerequisite material.
- "Presence" of a professor, even though the course is taught by a TA.
- More thorough feed-back on work.

Electrical engineers may also be watching more movies during a linear system analysis course. First used on the UW campus last year, computer animated movies have been popular in this country for the last three years. EE Prof. Ferrel Stremler explains that the computer is more practical in demonstrating graphical solutions to abstract equations. "It's a nice tool to use for a graphical solution."

Five sequences of graphs about the convolution integral are four minutes long. Drawing the same sequence of graphs on a blackboard would take 20 minutes to one half hour. In a paper about computer animated graphics, Prof. Stremler wrote, "It presents an intuitively appealing approach." Several other sequences are being planned.

Other innovations within the department can be seen in course organization changes. With an enrollment of 90 students, EE 230, a prerequisite for 63 out of 67 engineering courses, offers re-tests, immediate grading, and student proctors. Instructors report that student response to changes in the course was very positive. In the original proposal for "teaching improvement" by EE Profs. Donald Novotny, Vincent Rideout and John Asmuth the following advantages were cited:

- Every student will have successfully demonstrated mastery of each major concept at least once.
- Slower students will receive more supplementary material and more drill.
- Faster students can work ahead or work in more challenging aspects of course.
- Independent study (even on other campuses) will be possible with assurance of proper topical coverage.
- Upper division students (proctors) can take a meaningful part in the educational process.

Three upper level students are currently employed as proctors in the course. Prof. Novotny said that proctors grade re-test exams immediately, in order to evaluate the results with the student.

EE Prof. James Beyer indicates that labs have not been excluded from curriculum changes either. He explains that two required sophomore labs have been reorganized to allow the student greater flexibility in scheduling. Students may take the labs during the first half of the semester, the second half, or every other week, depending on which is convenient. There are eight lab sections to choose from.

These labs were first introduced last year. Previously, labs were coordinated around lectures, but encountered too many difficulties in pacing work loads and jumping from subject to subject. Now the labs concentrate on one subject area in each of three, one credit mini-labs.

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