Missouri

Shamrock

The UMC College of Engineering Student Magazine

OCTOBER/NOVEMBER 1986

What is an Education?

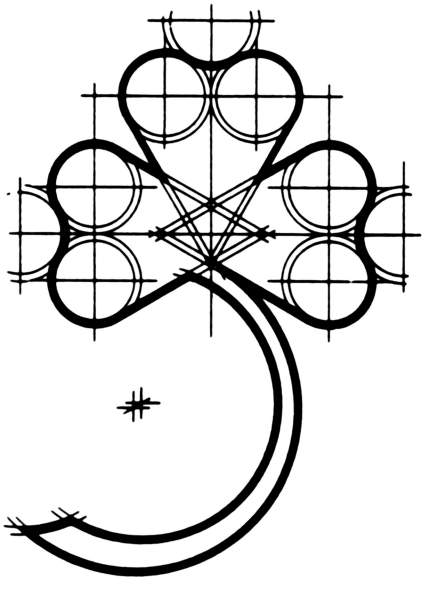
Until recently, I had never really considered just what an education consists of. Sure, going to classes, reading books, studying, and taking exams constitute an education, but are these the only elements to a rounded education? I don't think they are. There is a big difference between the terms "school" and "education". An education includes relating to other people, setting and achieving goals, and learning how and where to find information.

The ability to relate to others is a valuable asset. In college, getting involved in campus activities and social events is a great way to meet all kinds of people and learn how to deal with them. This knowledge of people and communication is an integral part of business. What good is it to develop new ideas if they can't be passed on to others? Just because technical ideas are written down on paper doesn't mean people will readily read and believe them. These ideas usually need to be explained; and, until people trust the writer's ability, they will need to be sold. In the business world, good workers are ones who can relate to their fellow workers as well as their bosses. These are the people who typically move ahead within their companies. In general, the people who can relate well with others are ones who get a great deal of satisfaction out of life.

Another element of an education is learning to set and achieve goals. Goal-setting is a useful way of keeping on the right track. A person's personal opinion on what success is for himself is one definition of a goal. In my opinion, the whole idea of grade point averages is a way of setting goals. Whether they consciously set a specific goal or not, most students have a realistic perception of what GPA they should maintain to consider themselves successful. One purpose of taking classes that may have no use later in life is to prove that the sight of a goal (an overall GPA) will not be lost, even when the immediate circumstances (one specific class) may seem irrelevant to a career.

Another important reason for taking classes that may never be used directly is to learn where and how to find and store information. The primary purpose of many classes is to teach students how to learn on their own. Often, students get so caught up in the specific details that they don't understand, they just give up on the whole concept. In the business world, the boss is not going to say what chapters of a book to read to find necessary information, the workers are expected to find it on their own. Most companies hire workers with different expertises so that they can work together on projects, each adding information relating to his specific expertise. This concept can be useful when studying, also. Within a study group, more information can usually be explained and understood than if one person is studying by himself.

Hopefully, by now the difference between the terms "school" and "education" is clear. Getting a well-rounded education is an important reason we all go to college. Study hard while you are here, but don't let your schooling get in the way of your education.



Janis Ehrhardt

Janis Ehrhardt, Editor
Missouri SHAMROCK

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The UMC College of Engineering Magazine

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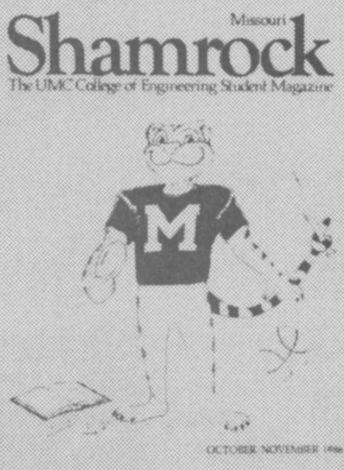
contents

On the Cover



Cover art by Steve Sanvito

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Foremost, the Shamrock acknowledges its advisors, Robert W. Leavene, Jr., Associate Professor of Electrical and Computer Engineering, Annette Sanders, Director of Engineering Communications, UMC College of Engineering.

BRAUN AND BRAINS: ATHLETES IN ENGINEERING

by Janis Ehrhardt

Just as Engineers are often stereotyped as being the typical nerd wearing black-rimmed glasses, high water pants, with a calculator on the belt, athletes are often thought of as "dumb jocks." We all know the engineer's stereotype can be very wrong, but many people don't realize that many athletes are intelligent people. Currently there are 32 engineering students enrolled at UMC who are also members of varsity athletic teams. They represent 5 sports teams: football, gymnastics, swimming, track, and wrestling. In order to earn their degrees, these athletes must show great dedication towards their schoolwork as well as their sport.

These athletes must deal with great mental and physical strain. At Mizzou, most athletes spend between 2 and 6 hours a day at practices, depending on the part of the season. Most practices require a lot of physical exertion.

Professors usually know when athletes are in their classes, but no special treatment is given because of this. One of the few exceptions to this is that athletes are allowed to make up work that is missed when they are competing. Professors' attitudes about these students vary greatly. While some professors feel that sports are merely a waste of time, others admire the diversity of being able to succeed in school and sports. Robert Leavene, Associate Professor of Electrical Engineering and Undergraduate Program Director at UMC, believes that these students possess a "tremendous commitment to succeed." According to him, "They aren't the students who just squeek by. They are the ones who do great because they are committed to their work."

Obviously, these students don't feel they are wasting their time. Actually, sports may be beneficial to some students. With such busy schedules, it is imperative they learn useful time management skills. Most have learned to allot certain time periods for studying, other time periods for working out, and still leave some time for "playing." Tracy Rolf, an industrial engineering major who is on the women's swim team said, "My days are structured; therefore, I have time for it all."

The most important of these skills is learning not to waste time. One of the easiest ways to do this is to keep a list of important things that need to be done. With the list handy, when a few spare minutes come up, time won't be wasted if it is spent doing a small job on the list. This is also an easy way to keep track of assignments that need to be done.

Sports can also teach competitiveness. This quality is useful in all stages of life. Often, athletes can convert the self-confidence acquired through sports to self-confidence in their schoolwork. It is obviously better to take an exam feeling confident than to take it feeling unsure of oneself. This self-confidence may come across well in interviews, also. Doug Slaughter, a chemical engineering major who is on the football team, stated, "I am involved with two completely different sets of people, which gives me a broader perspective in dealing with people." The benefits derived from excelling in sports as well as in school are well deserved.

Janis Ehrhardt is this year's editor of the *Missouri SHAMROCK*. She is a senior majoring in Electrical Engineering, and a member of the Women's Swim Team at Mizzou. She currently holds four Missouri records, and is a three-time Big Eight Champion. She plans to graduate in December, 1987.

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GRADUATE SCHOOL:

THE WHY, WHEN AND HOW OF CONTINUING YOUR EDUCATION

by Tim Popp

What was your answer the last time an interviewer, or a family friend asked you about graduate school? If you are like most engineers you probably answered, "I plan on getting my master's degree . . . someday," and you may not have given the question another thought. Whether or not you were telling the truth, only about 8% of the undergrauate engineers here at the University of Missouri-Columbia (UMC) in 1984-85 planned to go straight into a graduate program, even fewer will ever finish a doctoral degree.

UMC undergraduates are not unique, however. Engineering graduate schools around the country are facing the same dilemma. One report by the Engineering Manpower Commission (EMC) of the American Association of Engineering Societies showed that the number of candidates for master and engineering professional degrees declined in 1984 for the first time since 1978. Nationally, about 12% of new bachelor candidates go on to graduate school.

This trend bothers Assistant Dean of the College of Engineering Paul W. Braisted. "With technology moving as fast as it is, we, as a nation, need to develop *all* of our engineering talent to its fullest potential." Braisted also wonders what effect the shortage of graduate students today will have on the engineering education of the future. He pondered, "Without graduate students today, where will we get tomorrow's engineering faculty?" Both of these issues will remain valid concerns until enrollment increases in engineering graduate programs.

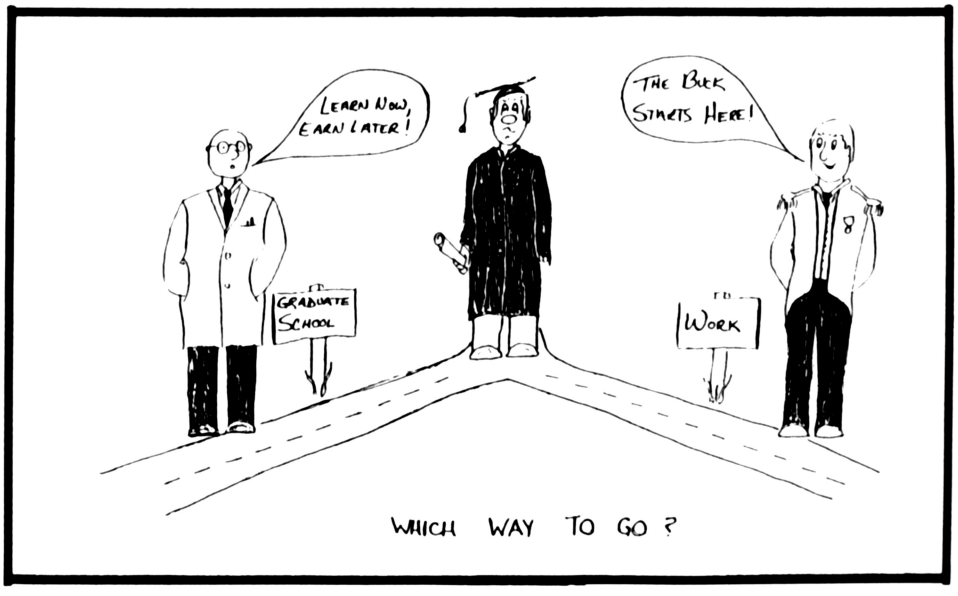
The decision whether or not to pursue an advanced degree is, of course, a personal one. Because of the increased economic and academic demands, graduate school is not for everyone. But given the current situation more engineers may be asking themselves if they should go to graduate school, when they should go and how to get started.

WHY?

The decision to go to graduate school or not is not an easy one. Career goals must be carefully thought out, and used as a basis for this decision. Goals such as job satisfaction and salary or advancement are especially important.

As an undergraduate, how happy you will be with a job or job satisfaction is, at best, an estimate. But after a few years of school you should know if you will be happier in a job involving research and development or if your undergraduate education will carry you through the job you have in mind. If your interests lie in design and theory then you probably owe it to yourself to get the competitive edge that an advanced degree can offer you.

The issues of advancement and salaries are not as well defined. An advanced degree's effect on your salary and career advancement may depend on the company you work for. D.A. Doss, an engineer at General Dynamics in Fort Worth, Texas, said, "There is a definite monetary value to completing a master's or Ph.D. at General Dynamics." Not only are advanced degree recipients offered



Graduates today are faced with a decision that may be more difficult and expensive than ever before.

higher starting salaries, but engineers who complete a degree while at General Dynamics earn an "almost automatic" pay increase and promotion, according to Doss.

On the other side of the coin, Eugene R. Groff, a supervising engineer at Caterpillar in Peoria, Illinois, said, "Although a person with a master's may be offered $100-200 per month more starting salary, advancement is based on performance, not on degree, at Caterpillar." Therefore, a person with a bachelor's could move ahead more rapidly than the person with master's, if his or her performance warranted it.

Career goals are an important factor in the question of graduate school. If you know where you are headed in engineering then you can decide if an advanced degree will help you get there.

WHEN?

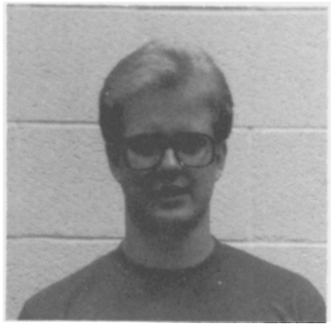
After you have decided to go to graduate school, the question of when to go quickly arises. You will most likely have to decide whether you want to go straight into a graduate program after completing your undergraduate degree, or whether to work first and come back later, either full-time or part-time, to get the degree.

The argument for beginning a graduate program right after an undergraduate degree is one of momentum and economics. Doss from General Dynamics said, "If a person is interested in graduate work, they should finish now, while they are fresh in the academic world." Dean Braisted agrees, "If you are ever gonna do it, do it now while you have the momentum and the continuity of your undergraduate material with you."

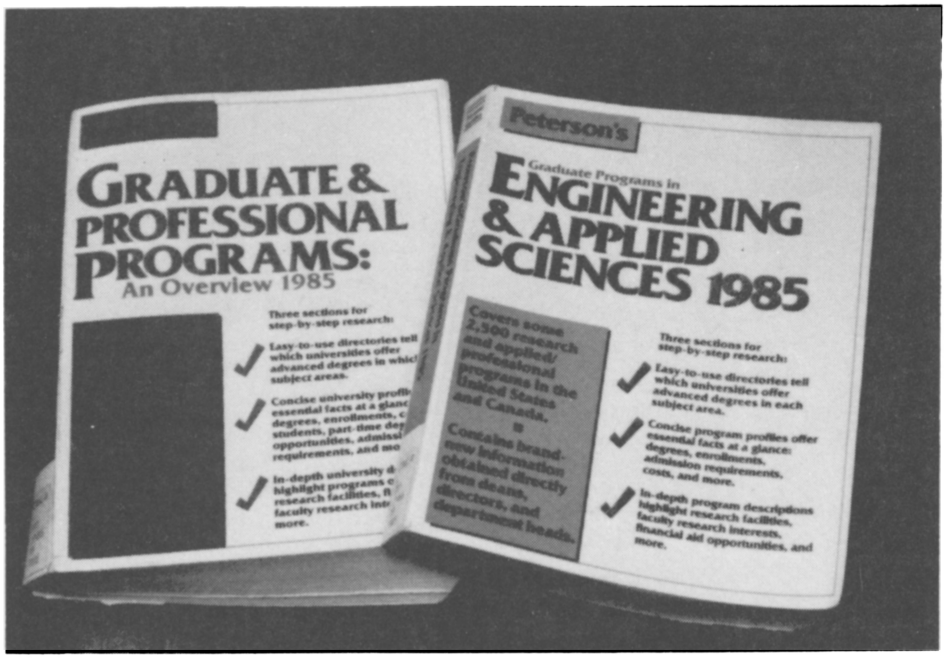
The economic part of this decision involves balancing starting salaries against college costs. The person who stays in school to get a master's degree may be finished in only a year. On the other hand, the person who waits to return to school can take from four to seven years to complete the same degree, said Groff. In addition, he or she has missed the higher starting salary and possibly the quicker advancement for those years of work experience.

But, Dean Braisted feels, this same economic issue is one of the reasons for poor graduate school enrollments. Impressive starting salaries and incentives from industry occuring at the same time as financial aid cuts and a shift to the two-income family are some of the "economic pressures" that Braisted feels are put on students today. These pressures make delaying a graduate school more attractive to many. "Not everyone has the economic means to go to graduate school right away."

Economic pressures are also reponsible for a change in the way some master's degrees are being completed. Although the report by the EMC reported that the overall number of graduate students declined in 1984, the number of part-time students rose. This was due mainly to an increase in the number of programs for practicing engineers. At Caterpillar percentage payback programs and video programs allow some employees to get their master's without ever leaving the company building, Groff said. Of course, part-time graduate work takes longer than full-time, but given the opportunity to "earn while they learn", many students are getting their extra education and making part-time graduate work a viable alternative.



Tim Popp is a senior from St. Charles, Missouri. He will complete degrees in Electrical and Computer Engineering in December, afterwhich he plans on seeking gainful employment. Any such offers are welcome. This is Tim's second year with the SHAMROCK. He is an Assistant Editor.



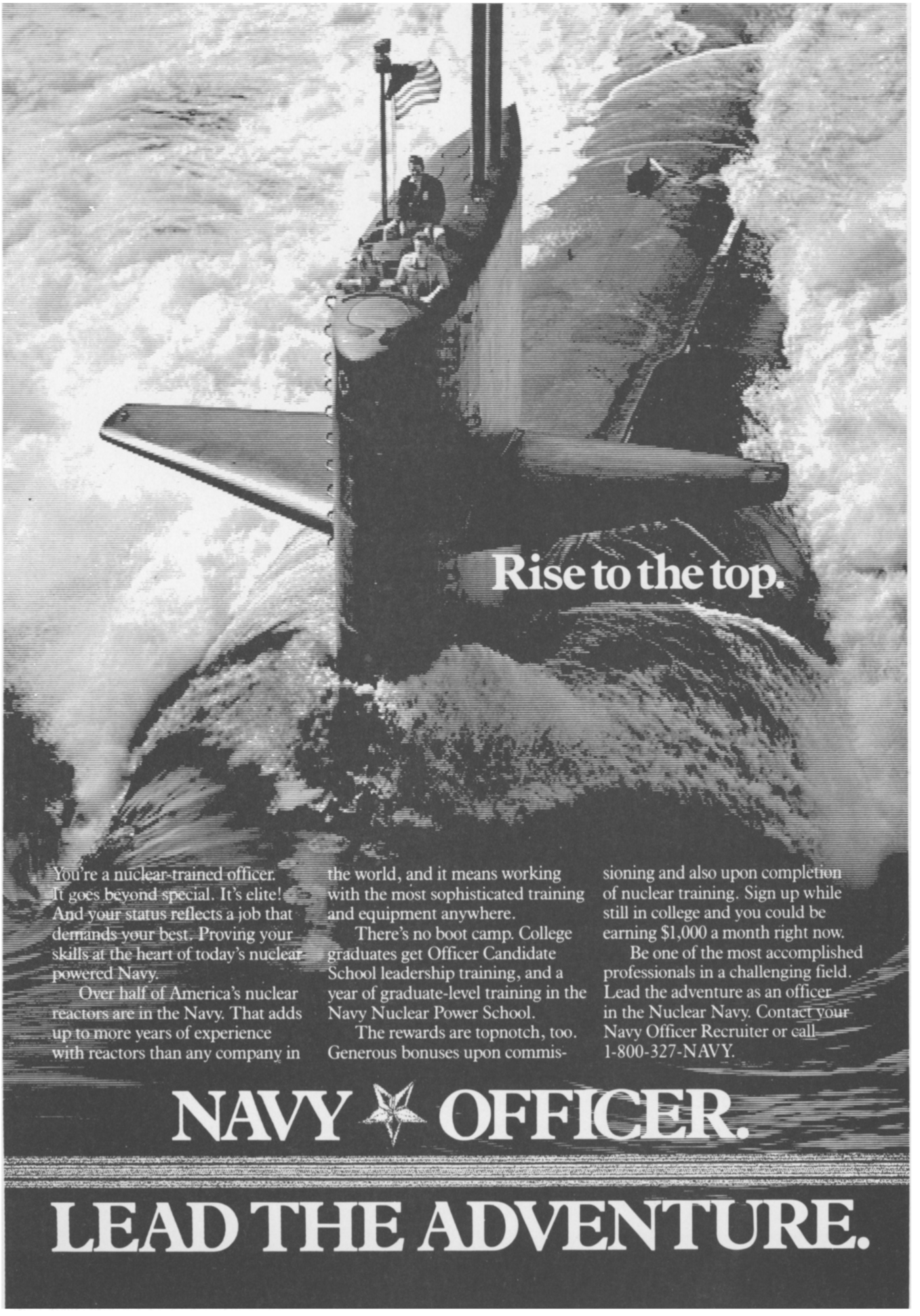
Reference books, such as Peterson's Guide to Graduate and Professional Programs, are available in the library to find information on graduate schools across the nation.

HOW?

Once you have decided when to go to graduate school you will probably wonder how to get started. It is important to start the process early. If you intend to go straight from your bachelor's degree into a school with a strong research record, your junior year is not too early to begin the search for the best school for you. Getting your admission materials together for a graduate school may take more time than it took for undergraduate school. There may be entrance tests, such as the Graduate Record Examination (GRE), grade point average requirements, or professor recommendations that are required by different schools. This takes time, so get the ball rolling as soon as you have made the decision to go.

It is important to find a graduate program that is going to provide the best educational situation for you in the area of your interest. The best way to find these programs is to talk to professors whose opinion you value and who are involved in your field of interest. The more feedback you receive the better. Research materials, such as the *Directory of Engineering College Research and Graduate Study* and *Peterson's Annual Guide to Graduate Study*, provide detailed information on programs offered nationwide and are available in most libraries.

As technology plays an ever increasing role in everyday life, so grows the need for technically competent engineerings. Graduate school is a way for engineers to become specifically qualified to work in the technical field of their choice. A shortage of graduate students and industry's willingness to provide incentives has created many new situations, such as part-time programs, in which students can do graduate work. As a result, graduate school may be easier and more profitable than ever before, for the qualified and interested engineer.



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COMPUTERS PROMOTE EFFICIENCY IN ENGINEERING

by Lisa Hemming

Today's engineering student must be familiar with terms like CADD (computer-aided design-drafting) and CAD/CAM (computer-aided design/ computer-aided manufacturing). Future engineers will find themselves at workstations instead of the traditional drafting table. This should not imply that drafting skills are becoming obsolete, because such skills will always be a vital function of engineering work. High-technology enables draftsmen to display their drawings on computer terminals, doing away with much of the need for manual drawings. Companies large and small alike are slowly integrating computer-aided design - drafting systems into their engineering departments, increasing accuracy and efficiency.

The computer increases efficiency and thus makes for more accurate work.

The first time computers and the engineering field were linked together was in the 1950's, when computers were employed to aid engineers in the design of turbomachinery. Before the computer came along, disc stresses, frequencies, and temperatures had to figured out on desk calculators. This complicated work took days to calculate and errors were bound to creep in. The computer drastically reduces the chance of such errors by relieving the engineer from tedious long-hand calculations.

Late in the 1950's sophisticated computer methods took on calculations so complicated that doing them by hand was virtually impossible. Other tasks taken over by the computer were: streamline-curvature techniques for aerodynamic performance, solutions of simultaneous linear differential equations to determine shell stress and blade frequencies, algebraic equations calculating the end conditions on shells and beams, temperature calculations and many more.

General purpose programs began appearing in the late 1960's and early 70's. These programs were written in Fortran code by computer specialists. Previously, engineering design groups wrote the computer programs for the specific needs of their company. Today computers are aiding engineers in design and drafting.

Computer-aided design (CAD) is a tool which brings multidisciplinary design work together in a single database enabling designers to assemble a composite 3-D model of an entire project. This will allow the designer to visualize his work—inspect it for potential flaws, and consistency—before it is built.

CAD is widely employed by design and production engineers, as well as drafting technicians and architects. CAD can be used for nearly all phases of the design process. An engineer can store ideas for a design in the preliminary stages of development and modify the design with ease when necessary. Brainstorming thoughts can be recorded, then recalled at a later date to stimulate new ideas or the reevaluation of past thoughts. The computer is a valuable tool for making calculations relating to design specifications and again when selecting the optimum concept giving maximum performance at minimum cost. Numerous designs can be tested without the expense of constructing models. The computer brings a design to life graphically by representing a two or three-dimensional likeness.

CAD can be used for nearly all phases of the design process.

Computers optimize shape, eliminate the need for wire-frame models, and give an object depth and color. The engineer can also rotate an object on the screen to inspect all facets of the design. This would be impossible on paper without many drawings.

Numerous designs can be tested without the expense of constructing models.

During the final experimental phases where durability, workability, and operational characteristics are tested with costly scale models and working prototypes, the computer eliminates the need for expensive physical models and testing facilities. Computer-aided design/computer-aided manufacturing (CAD/CAM) programs simulate such models under operating conditions. Programs simulating the effects of structural, thermal, and kinetic conditions are available. Even electrical properties of a circuit can be accessed quickly and easily with the aid of a computer.

Drafting represents the challenge of describing a physcial entity. Computer-aided drafting creates a dramatic reduction in the time required to complete a set of drawings. CAD/CAM systems are used in manufacturing firms to construct and refine geometric models, like an electronic schematic, a mechanical part, or an architectural layout.

arrangement from design to fabrication drawings that can be run on a CADD system, freeing the draftperson from tedious and time-consuming hand-drawing work at the drafting board.

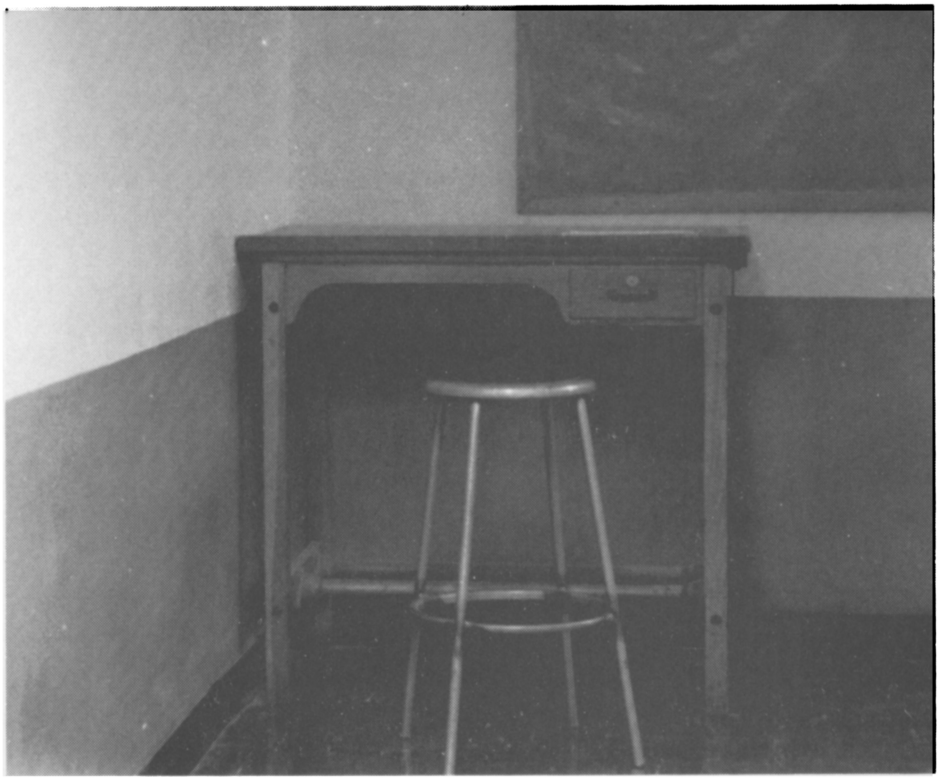
A large part of drafting work involves modification of an existing design. Should this be the case, graphical data for the original design can be stored in the computer and the design modified at will. By using computer-aided drafting the new drawings can be produced without the draftsman having to manually alter the drawing.

The dangers of CADD stem from organizations which try replacing manual skills with computer-aided design and drafting. CADD should not be used as a substitute for design experience or ability. While it may enhance the process it will not take its place. A novice CADD operator or draftsperson must learn his craft in architectural or engineering design and must have a good working knowledge of the language of the CADD system. Manual drafting skills can prove to be an invaluable and necessary tool. Some engineers feel CADD systems were designed for computer programmers rather than designers and draftsmen.

Computers have immensely improved the quality of engineering.

Computers have immensely improved the quality of engineering. Hard-copy drawings are no longer necessary for the fabrication of parts. A true CAD/CAM system is evidenced by a pass through

Five years ago the typical engineering and design firm did not have a computer-aided design system. The cost of workstation and PC-based CADD systems, as well as hundreds of software packages have fallen drastically. Firms can now buy systems with 3-D capabilities for under $20,000.

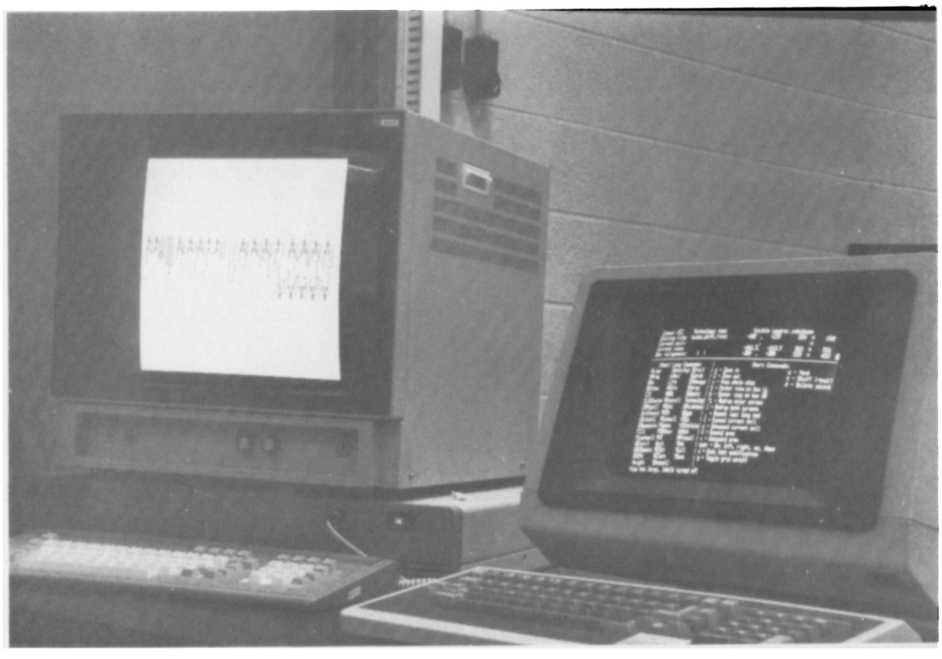


Due to micro computers like the IBM PC, the path to computerizing drafting departments is becoming clearer.

If a firm wishes to get maximum return on their investments in automation, a CADD operation must be able to facilitate this process; systems and software must be able to exchange data. Realization of this fact is the basis for a major new trend in automation and project integration.

the financial recourses to invest in CADD or the time needed to integrate the system into their work routine. The time lost implementing such a system can be devastating to a small company. A company must also take the time and expense to train its personnel to operate a CADD system.

Project integration represents the centralization and standardization of all project information.



Project integration represents the centralization and standardization of all project information. This visual appeal is its promise: better engineered designs, improved project coordination, tighter project control and fewer costly construction errors. Automation must be integrated with compatible software. An integrated system must be easy to operate and maintain to be successful.

Some companies are lagging behind in the implementation of CADD. Small manufacturing firms usually do not have

When choosing a CADD system a company should consult the members of the engineering department and select a system based on the needs of the company, keeping within cost constraints. An "intelligent" CADD system can store and retrieve multitudinous information, including part numbers, prices, manufacturer's names, etc. as part of the drawing process. CADD vendors are reducing their products to fit desktop machines, or offering desktop stations as cost effective ways to add more drafting terminals to their larger computers. Due to micro computers like the IBM PC, the path to computerizing drafting departments is becoming clearer. This is an important consideration for many firms.

The computer has been criticized by some engineering managers who complain that designers rely on solutions derived solely from prior experience with numerical outputs from the computer instead of trying to find new ways to solve design problems. The most common worry is that a programming error may escape notice. With the sophisticated software packages available today there is little need to worry about any incorrect modeling of physical phenomena in computer solutions. Another misconception about the implementation of CADD is that workers whose jobs have become automated tend to lose their skills. It is important to remember that the computer is merely an extension of the engineering tools available for drafting and design. The computer increases efficiency and thus makes for more accurate work. The engineer must possess manual drafting skills in order to understand the CADD system and be able to integrate it into specific drafting and design problems.

CADD has become an integral part of engineering. Initially the computer relieved the engineer from hours of tedious calculations. The speed at which the computer can access information frees the engineer to go on to other work. However, traditional drafting and design still holds its own in the world of graphics. Drafting and design dictate the development of computer graphics and not the reverse. Although CADD is no substitute for design experience, computers do enhance the ability of engineers and represent an extension of their skills.

Lisa Hemming is a junior from Quincy, Ill. majoring in mechanical engineering. Lisa is a member of the Engineer's Club and chairman of publicity for S.W.E. She enjoys cooking, swimming, and skydiving.

CO-OPS:
The Link Between School and Career

by Thomas Luebbering

One of the first questions an employer asks during an interview is, "What kind of experience do you have?" One of the best ways to gain this needed experience is through a cooperative education program.

So, what exactly is a co-op program? There's not a single definition for co-oping, but generally it can be described as a program that combines real work experience with college studies on an alternating basis. The work experience teaches skills that can't be learned while in school, and also gives a chance to translate an education into real world practice.

Most college students begin co-oping after their sophomore year. Some begin as early as their freshman year, while still others wait until as long as their junior year. Employers realize that a co-op doesn't have the experience of a graduate, so they plan work loads to match the co-op's education level. A co-op will often spend a good deal of his time in company training programs so that he can learn specific skills to advance to more difficult jobs.

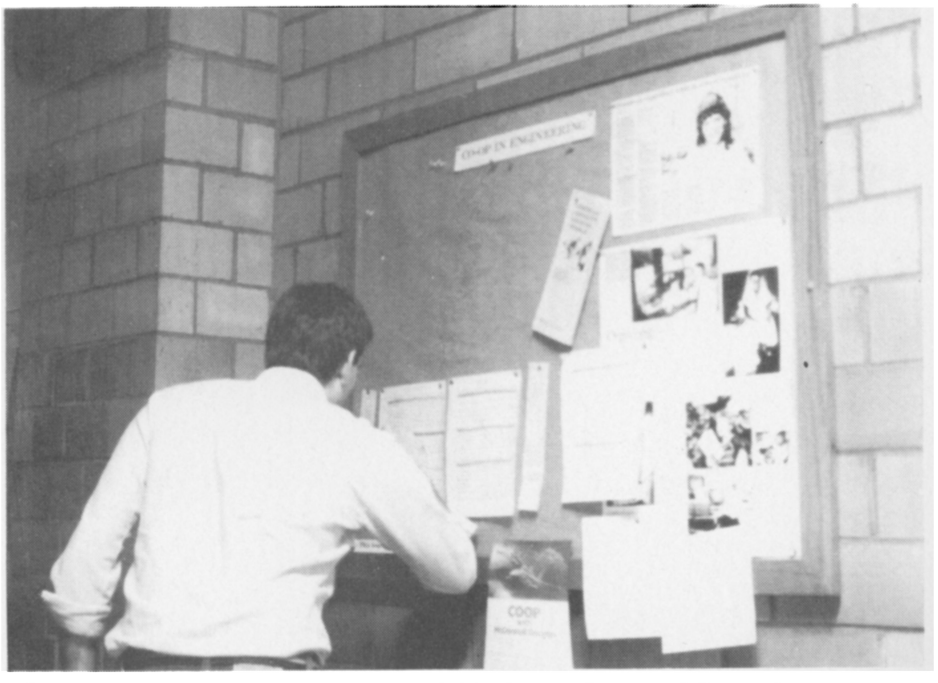
Co-oping can supplement an education in many ways; the most obvious benefit is the work experience. Since co-op's are expected to work hard at their jobs, they will be subjected to real business problems and projects. Joe Zehnle, a co-op at McDonnell Douglas in St. Louis, had this to say about his work experience, "Co-oping has been the most valuable experience I've ever had because it was hands on. This summer, I worked with an Intel 8085 microprocessor. I learned about its I/O, assembly language, and the programming of its EPROM. I was also able to learn quite a lot about the corporate organization of McDonnell Douglas."

The average co-op probably isn't expected to handle a great deal of responsibility, but will be expected to make decisions that require intelligence, common sense, and a certain amount of learned information. These decisions will draw on formal education and will provide insight to the engineering profession. As well as working with trained engineers, co-ops will also have the opportunity to observe them and learn from their experiences. Most of the full time employees are eager to assist and pass their knowledge on to co-ops.

An increased knowledge of the business world may also be obtained by co-oping. By working alongside other engineers, one can view first-hand the communication patterns, lines of authority, and personalities of fellow workers. Co-oping can produce an increased understanding of how a company is run and how things actually get done. The best way to learn about a company is to become a part of it and share the responsibilities of making the company perform.

"As a co-op, I learned about the administrative process of my company and I was allowed to share in some of the decision making," states Mark Schifferdecker, a summer employee of Bendix in Kansas City.

Valuable lessons about career goals may also be learned. By progressing through his station, a co-op will be sub-



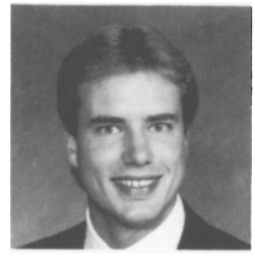
Information on co-ops is readily available for students at Missouri.

jected to various aspects of engineering. Certain engineering jobs may be interesting and enjoyable, while others may not. This experience is a great asset in planning career goals. In extreme cases, engineering may prove to be different than expected, and a complete change of major is required. A career change such as this is always difficult, but there is no better time to change than while still in school.

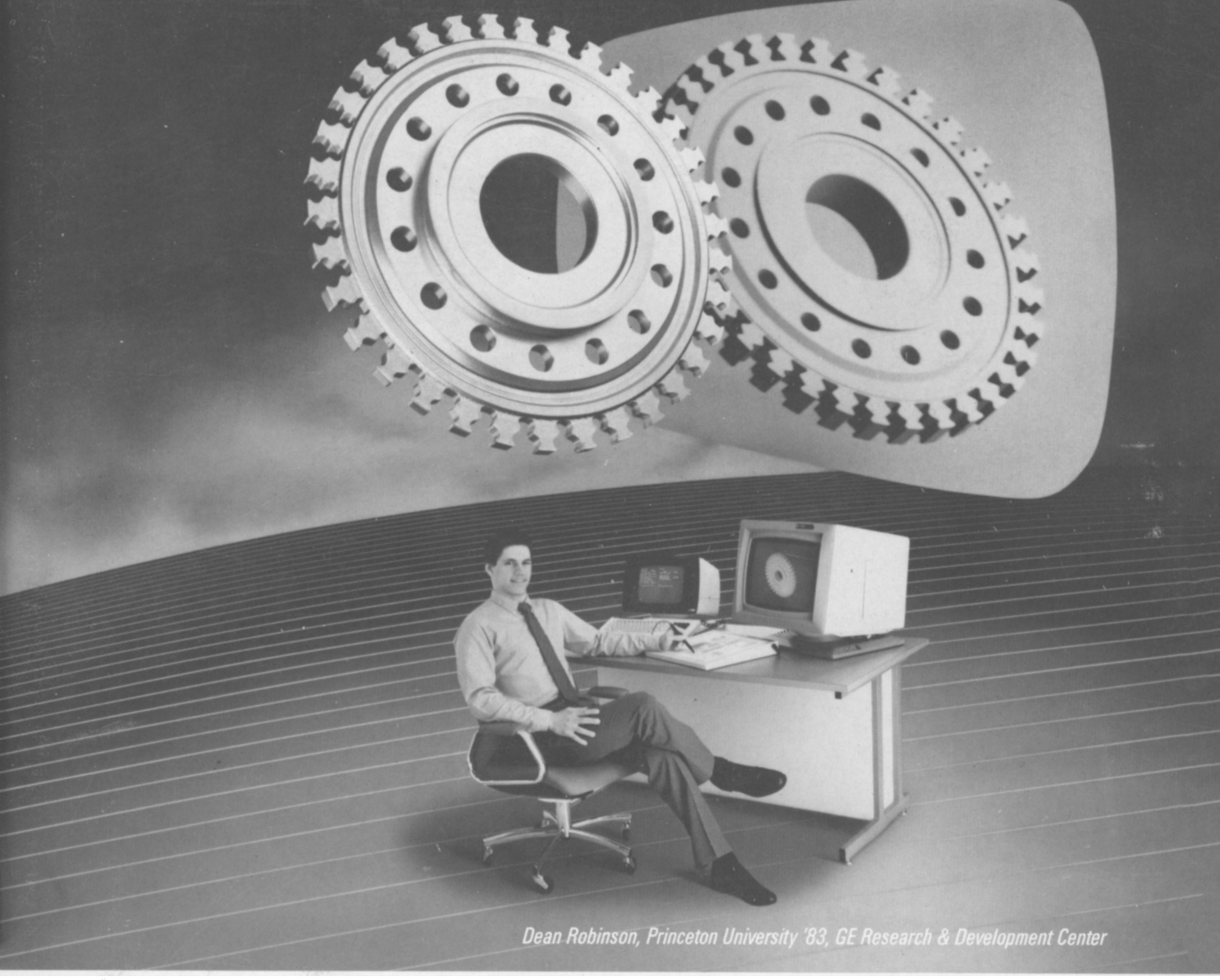
One of the most noticeable benefits of co-oping is the financial assistance. Co-ops are paid, and often paid well! The average co-op earns between $7-$11 per hour, depending on the employer and the co-op's education. Many students need this money to help pay for the rising costs of college. Although the pay shouldn't be the only consideration for employment, it is often a major factor.

Is co-oping for everyone? The answer to that question is a definite NO. Although co-oping can be a good experience, it has its drawbacks. Joining a co-op program can increase the time spent in school by at least a semester or two. Although most companies pay graduates with co-op experience more, this increase in pay is often offset by the raises that non co-op graduates receive while the co-op is still in school. The work experience received may prove to be of little value. One UMC co-op, who wishes to remain anonymous, recalls sitting at his desk for weeks with absolutely nothing to do. Most companies who have co-op programs provide meaningful work, but some do not.

The final decision of whether or not to co-op is a personal one. A good co-op experience can enhance education while providing needed financial assistance; a bad experience can act as a guide to prevent further mistakes in a career. If the experience sounds appealing, and the challenge sounds exciting, many benefits may be obtained from a co-op program. The opportunity is there for the taking.



Thomas Luebbering is a senior majoring in Electrical Engineering. He is originally from Jefferson City and this is his first year writing for the *Missouri SHAMROCK*. Thomas is a member of I.E.E.E. and Delta Tau Delta social fraternity. He plans to pursue a law degree after graduation.



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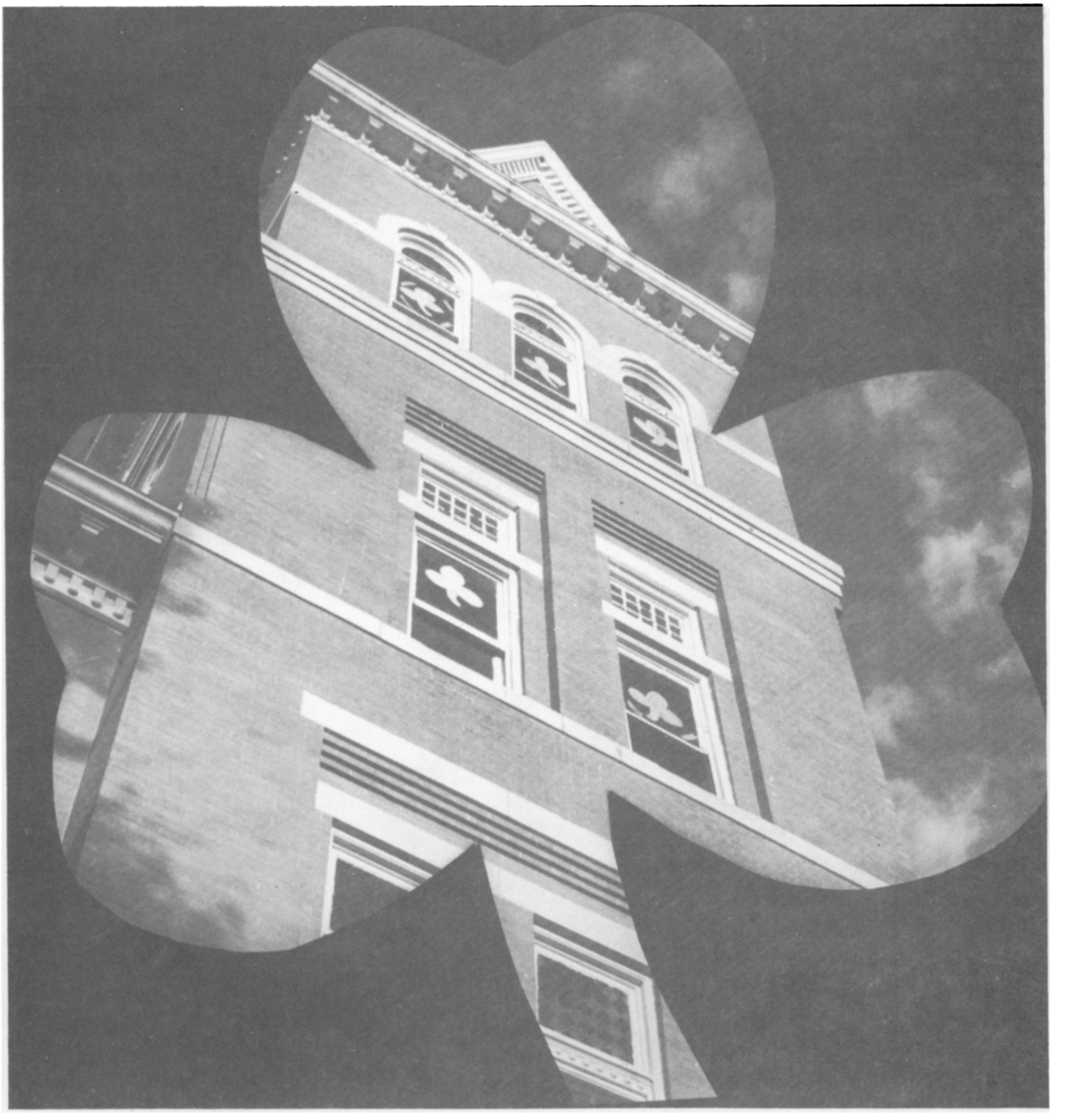
The UMC College of Engineering Student Magazine



from the editor's desk

TRADITION

Along with the winter semester come severe cases of senioritis, and spring fever in general. As thoughts of graduation and the "real world" come along, one must also reflect back on the past four years (or more) spent here at Ol' Mizzou. These years really haven't been all that bad; actually, I have a lot of great memories of college life. I wonder if I will remember my friends, acquaintances, and professors in ten or twenty years. I guess these memories and friends are all a part of tradition.

According to *Webster's New World Dictionary of the American Language*, tradition is "a long-established custom or practice that has the effect of an unwritten law; specifically, any of the usages of a school of art or literature handed down through the generations, and generally observed." The University of Missouri has a special pride that I consider to be part of its tradition. This pride and the feelings that go along with it are what I want to remember ten years from now when I reflect on my college experiences.

What do you think of when you think of Mizzou? The Journalism school? The columns? The football or another sports team? These, among whatever else come to mind are all a part of Mizzou's tradition. The first three words in the definition above say a lot. Our Journalism school didn't earn its reputation in a few short years. If six new columns were built outside the library, or any other building, they wouldn't have the meaning or history of the columns found outside of Jesse Hall. Even though our football team isn't what it once was, it is on its way up. Student and alumni support is one way to help it back up. Being an athlete myself, I have seen first-hand how funds from alumni support can help out.

The engineering school also possesses some long-established customs. Engineer's Week, St. Pat's Day, the *Missouri Shamrock*, and even the image of a typical engineer are some of these customs. The activities associated with Engineer's Week have changed a bit since the first one, but they are always fun and shouldn't be missed. St. Pat's Day is a special one for engineers because we all know that St. Pat was the first and foremost engineer, right? The *Missouri Shamrock* has been around since 1906, a fact that definitely makes it long-established. Even though it isn't necessarily accurate, the image of a typical engineer wearing thick-lensed glasses, having greased-back hair, and carrying his calculater hooked to his belt loop has also been around for a long time. Although this "image" is an old one, it is changing. More and more people are realizing that engineers are regular people, and are no different from anyone else.

Although the traditions of a school are not essential for a graduate's success, they are an integral part of that school. They add to the fun and memories of college, and give alumni pride in their alma mater. In a way, traditions are like people; some will always remain exactly the same, while others will allow certain characteristics to change.

Janis Ehrhardt

Janis Ehrhardt, Editor
Missouri SHAMROCK

Missouri
SHAMROCK

The UMC College of Engineering Magazine

Jan./Feb., 1987 Vol. 80 No. 2

Editor's Note: *Any engineering society who wants material published on the "Organizations page" should submit articles to the Shamrock mailbox—Room 203 Electrical Engineering building. Feel free to contact the editor for information concerning deadlines, publishing dates and story content. The Shamrock reserves the right to edit all submitted material.*

contents

The Missouri Shamrock is published three times annually (Oct/Nov, Jan/Feb, Mar/Apr) by the engineering students of the UMC College of Engineering. Opinions stated herein do not necessarily reflect the views of the College of Engineering.

Subscription rate is $5.00 per year. Inquiries concerning subscriptions or advertising should be directed to Missouri Shamrock, College of Engineering, 1020 Engineering, University of Missouri-Columbia, Columbia, Missouri 65211.

Foremost, the Shamrock acknowledges its advisors, Robert W. Leavene, Jr., Associate Professor of Electrical and Computer Engineering, Annette Sanders, Director of Engineering Communications, UMC College of Engineering.

1986-87 SHAMROCK STAFF

letters to the editor

Thank you so much for your timely and informative article by Tim Popp. We agree it is important that students be made aware of the opportunities in graduate studies.

We would like to point out an additional economic consideration not discussed by Mr. Popp. Potential graduate students may find it interesting that, instead of paying to go to school, as they have done for the undergraduate years, many qualified students are in the unique position of being able to attend graduate school with an income, in the form of a teaching or research assistantship or a fellowship. Although the dollar amounts do not compete with salaries in industry, they do provide an opportunity for students to continue their education through the Master's degree without additional loans and with living expenses covered.

The Engineering Dean's Council of the American Society for Engineering Education has made avilable "Advancing By Degrees", a booklet with an objective persentation of pros and cons of graduate study for engineers. Results of the Engineering Manpower Commission of the American Association of Engineering Societies salary surveys (for those with and without graduate degrees) are included. These booklets are available at no cost to our prospective graduate students when they visit our office. We have a number of other resources for those interested in a closer examination of the statistics of graduate education in engineering.

We would like to also take this opportunity to inform students that additional information and application procedures are available in the MAE Graduate Office (2005 Engineering Complex) and in each of the other departments in the College of Engineering. We have information on our own programs and on those of other institutions. We inform students of the relative ease in making application for our graduate programs. In MAE, for example, our own undergraduates need only submit a brief statement of objective in pursuing graduate studies, three letters of recommendation and a transcript(s) for all college coursework completed.

Information on fellowship and assistantship opportunities is available and we are willing to assist students in making application. Forms for University of Missouri Fellowships in amounts ranging from $3,000 to $8,000 per year for entering graduate students are currently available. We had National Science Foundation applications one month in advance of the November 14 deadline for their $10,000 fellowships, available to highly qualified students entering graduate programs in engineering. Office of Naval Research (ONR) Fellowship applications should arrive soon. A number of fellowships are specified for women and minorities. A bulletin board near the MAE Graduate Office provides current information.

Faculty and administration are anxious to provide prospective students with information on graduate school. It is our desire that when our undergraduates decide to go either to graduate school or to industry, the decision is an informed one.

From:
Linda Hudson, MAE Graduate Administrator
Fred Ahrens, MAE Assistant Chairman - Graduate Program

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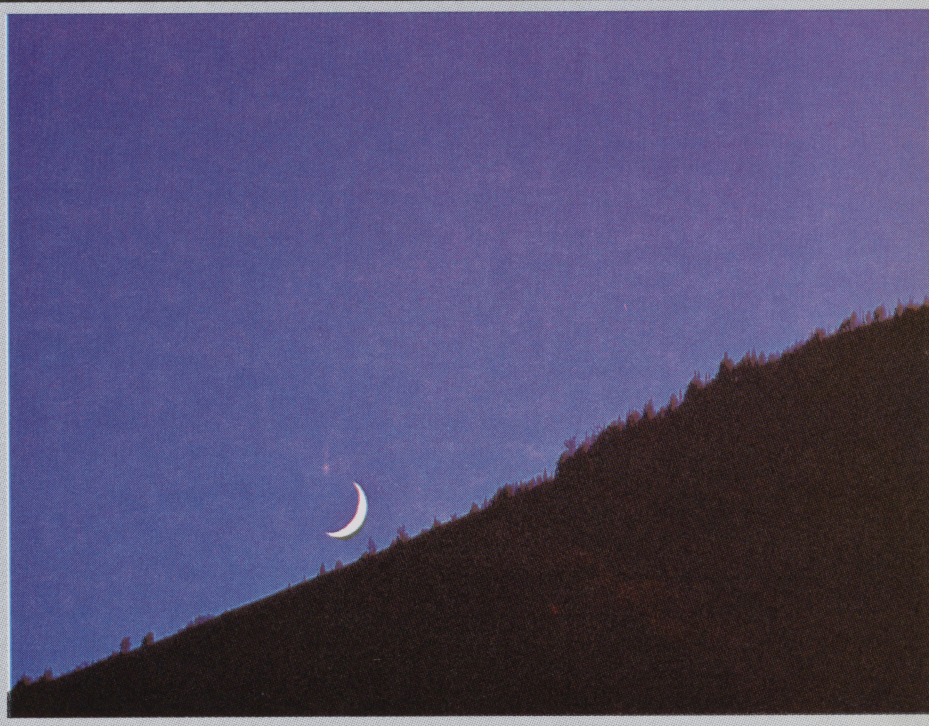


ANHEUSER-BUSCH COMPANIES

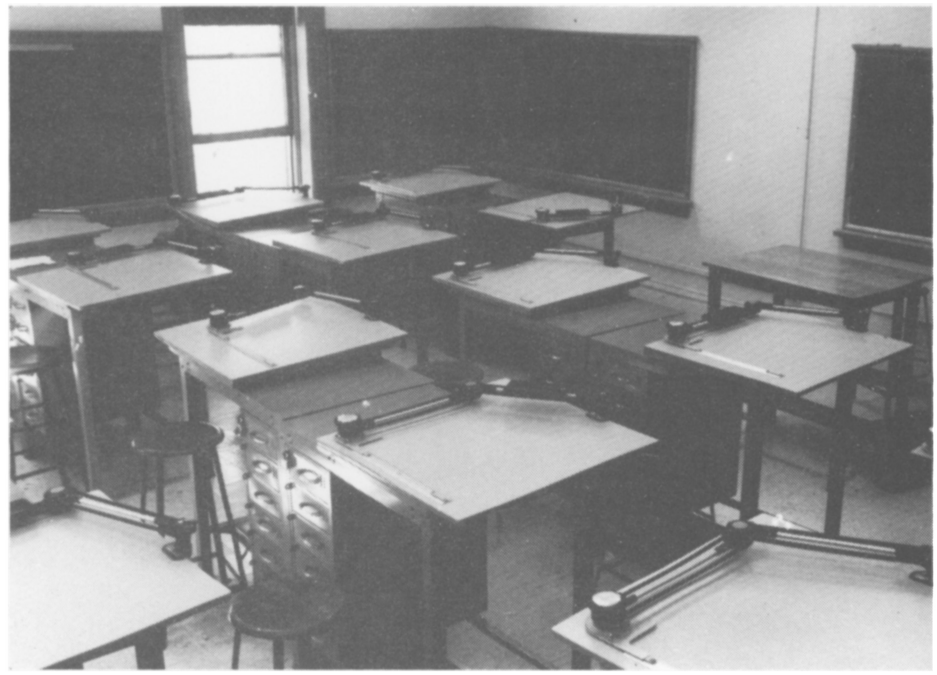
A STEP AHEAD

by Shelly Moats

As many computers edge their way into many fields of technology and business today, a challenge is presented to institutions of higher learning. How does a school keep its students updated and train them to use these wonder-machines, for the time they go out into the "real world"? The answer is that the school provides hands-on training in computer use. It is a discerning faculty that foresees a trend in computer aided techniques and works to prepare its students beforehand. Such is the case in the drafting-design courses in the UMC College of Engineering.

The engineering curriculum is slowly being changed to incorporate the use of computers into drafting techniques. The process of incorporation started in 1984 when a graphics lab was requested but turned down. Since then a committee consisting of six representatives from different engineering departments has obtained partial success in its efforts to develop a computer lab. After submitting a report showing the need for a computer lab of 93 terminals, they were rewarded with a lab of 18 terminals. Each consists of an IBM AT computer with monitor, keyboard, software manual, disk drive, and mouse. In addition, each terminal has access to one of the five printers or the four plotters which are also located in the lab. Room 2011 in the engineering building, which was formerly used by courses such as Engineering 30, is the site for the new computer lab.

Students who enroll in Engineering 30 and MAE 20 are the primary users of the lab. Other courses that may utilize the lab include those in Housing and Interior Design. In addition, the lab has been designated as a public access lab. This allows university students and faculty to come in and learn how to use the new software on their own.



In the old Engineering 30 classroom, all of the work had to be hand-drawn by students.

The new computer lab, located in room 2011 of the Engineering Building, adds to the quality of the Engr. 30 classes.

The lab was opened for use at the beginning of winter semester 1987, and its use has been incorporated into the curriculum of the Engineering 30 course. Right now, its use only constitutes 25 percent of the course work, but it could eventually go to 100 percent. Changes in the course include a decrease in the amount of hand drawing required, the teaching of students in how to use the software, computer tests, and the possibilty of an end-semester project. Dr. Whelove, professor for Engineering 30, predicts that the impact of the new curriculum and lab will be positive and modernizing, and he believes that it will increase interest in the courses which use the lab.

The success in getting this new computer lab is only one of the first steps in a series of many to update the engineering curriculum and to keep graduating students abreast with the latest technology. Improvements such as these continue to promise a better education for students in the UMC College of Engineering.

Shelly Moats is a sophomore from Kansas City, Mo. majoring in Electrical Engineering. This is her first year as News Editor for the *Missouri Shamrock*. She is a member of IEEE and Zeta Tau Alpha social sorority. Shelly enjoys playing volleyball, scoping out the guys in her engineering classes, and visiting her family in Madrid, Spain.

TEXAS BOUND

by Steve Sanvito

Arlington, Texas may be a long way from the Indianapolis 500 Speedway, but that won't diminish the enthusiasm of a group of UMC engineering students this summer.

In May of this year, the UMC student branch of the Society of Automotive Engineers (SAE) will participate in the Formula SAE race car competition to be held at the University of Texas at Arlington. The competition requires students to design and build a mini-formula type race car. The students will then compete against cars built by students from other universities in a series of events. These events include acceleration, skid pad, maneuverability, and fuel economy tests. In addition, students must present and discuss their cars before a panel of judges.

This will be the second time that UMC's SAE branch has entered the Formula competition. SAE previously entered a car in the 1985 competition. Despite the fact that this car was overweight and was built on a budget of only $800, SAE managed to win the fuel economy event.

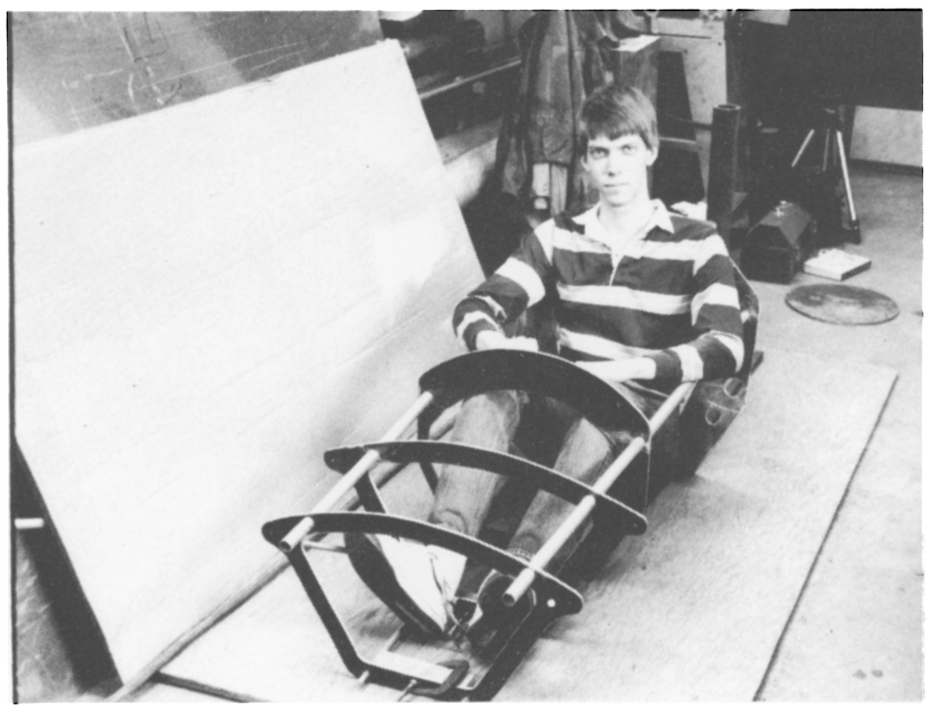
This year, however, Mizzou's SAE will be hoping to win much more than just the fuel economy event. Alan Bindemann, who is heading the project, said that the new car should be much more competitive than the previous car.

Part of the reason for this is that every possible step is being taken to make the new car as lightweight as possible. "Our previous entry was very heavy, weighing in at about 630 pounds without the driver," Alan said. "This year we hope to cut the weight to around 450 pounds by making the car smaller, and by using aluminium, rather than steel, for the frame.

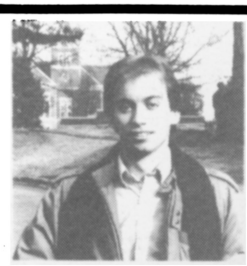
In addition to reducing the car's weight, SAE hopes to increase its power by obtaining a new engine. In particular, SAE is seeking a 4 cylinder, 500cc engine from Honda. Alan noted that this is the same engine found on the Honda Interceptor motorcycle. "We also want a liquid cooled engine since we overheated our air cooled engine at the 1985 competition."

Computers have helped to test some aspects of the car. "We developed a program to simulate the suspension's motion during body roll," said Alan. "The program plots the motion of the suspension and chassis, and was quite useful in analyzing our suspension designs by evaluating factors such as camber angle (tire inclination) roll center movement due to body roll."

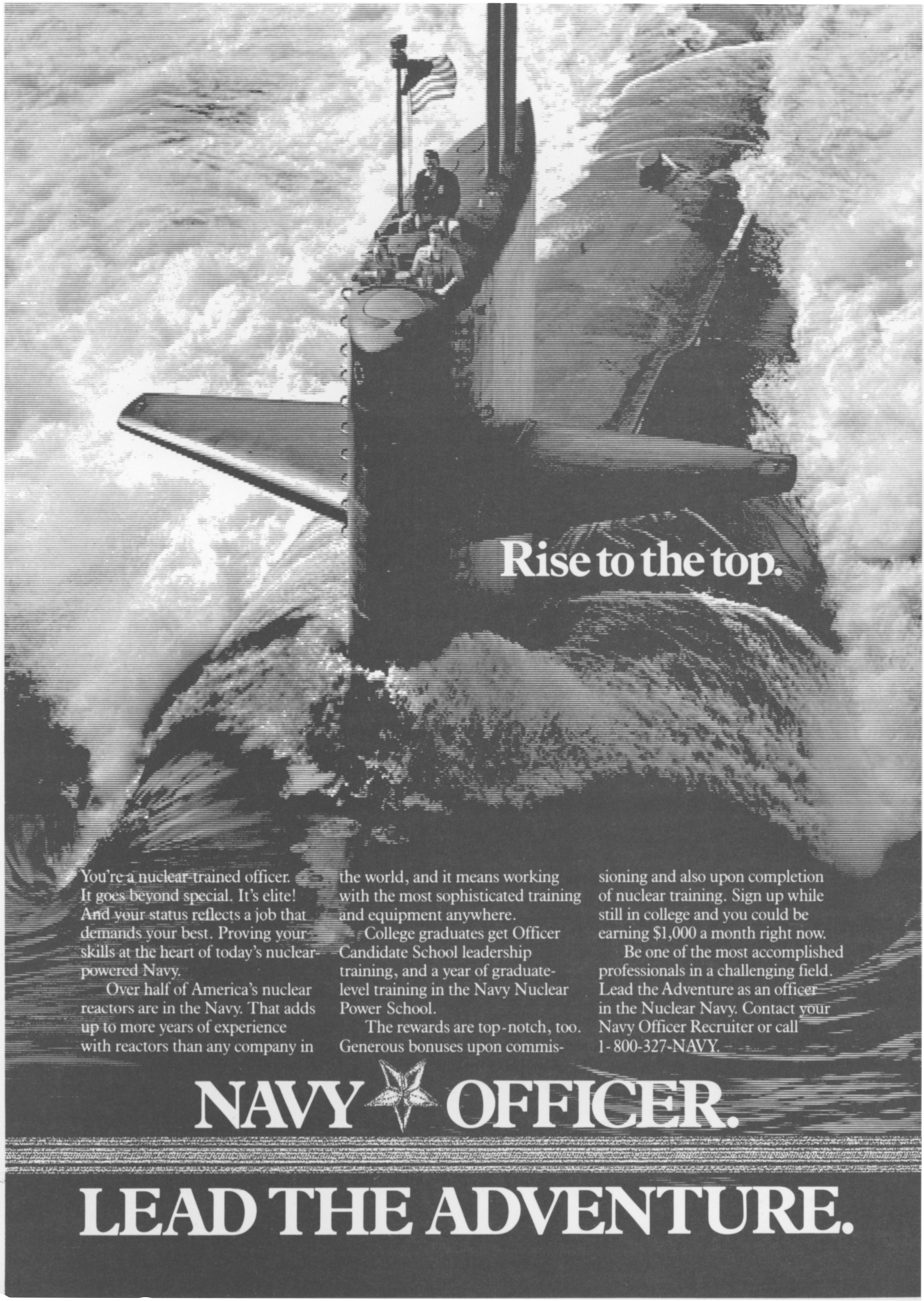
Overall, Alan is confident of UMC's chances of winning this year. "Even though the competition gets stronger every year, I feel that UMC can make a strong showing."



Alan Bindemann, head of the SAE race car project, shows the more competitive car .



Steve Sanvito is this year's Production Editor of the *Missouri Shamrock*. He is a senior majoring in Mechanical Engineering and plans to graduate this December. A native of St. Louis, Steve enjoys raquetball and playing the guitar in his spare time.



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MBA: ANOTHER OPTION

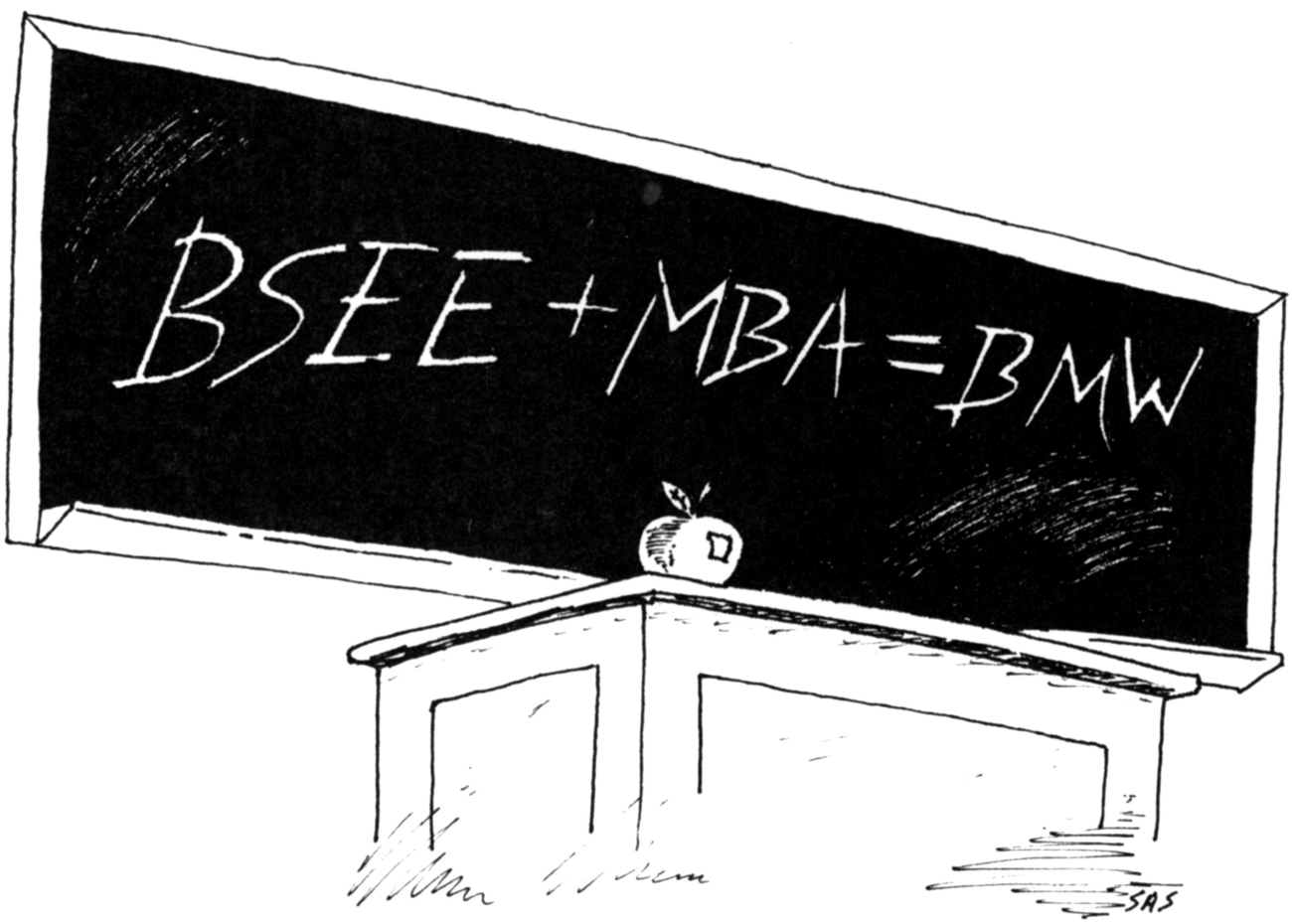
by Tom Luebbering

In the last issue of the *Missouri Shamrock*, Tim Popp wrote an article concerning engineering graduate programs. Although the engineering graduate degree is still the most common path for technical students wishing to further their education, alternative graduate programs have become increasingly popular in recent years.

By far the most sought after non-technical degree for engineers is the master of business administration degree. One report by the College Placement Council showed that nearly 25 percent of all engineers who pursued a graduate degree in 1985 studied towards an MBA. The student with a combination of a BS in engineering and an MBA has become more appealing to today's more technical companies. Many areas of business call for technical expertise that goes beyond the reach of the average undergraduate business student. With a combined engineering-business degree, one could have a distinct advantage over those with a background in either engineering or business alone.

Many of the top graduate business schools realize this fact and actively recruit engineering students. According to a study published in *Barron's Guide to Graduate Business Schools*, 24 percent of Harvard and 58 percent of Stanford MBA students, respectively, have an engineering degree. The same study revealed that graduates of MBA programs with engineering undergraduate degrees were offered starting salaries that averaged 15 percent higher than those offered to students with non-technical degrees. Engineers are often recruited more vigorously than business students, and they are more likely to adapt to the difficult course work because of their previous experience with intensive studies.

Many undergraduates, especially engineers, have questions about what MBA programs consist of. Basically, most MBA programs are two-year courses of study that give students a



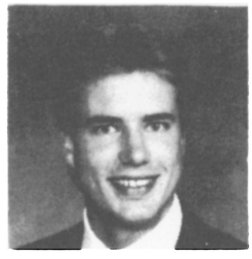
broad background in a wide range of business subjects. The MBA also provides some technical training while emphasizing practical solutions to business problems.

Once a student decides to attend a graduate business school, an important factor to be considered is choice of school. There are over 700 MBA schools across the country and they vary greatly in terms of quality of education and market power. A degree from a prestigious school may have enormous market value while one from a lesser known school may have little if any. The graduation certificate reads "MBA—University of_____". The name of the school which follows that hyphen can make all the difference in the world to job applicants.

If the opportunities that an MBA degree offer sound interesting, you owe it to yourself to seek further information. Several good sources, including *Peterson's Guide to Graduate Schools* and *Barron's Guide to Graduate Business Schools* are available in the library or the Career Placement Office.

If you decide that you would like to pursue an MBA degree, begin preparing as early as possible. Most schools require that you take the GMAT before admission and many have prerequisites that must be met. Several of the more prestigious schools also encourage applicants to enter the work force for a few years prior to undertaking an MBA program to gain valuable first-hand business experience.

It may seem that career plans for engineers have become more confusing however, with the confusion comes increased opportunities. More engineers are performing jobs that were previously limited to business students. And don't expect the confusion to subside any time soon. Forecasters predict that with the widespread use of computers and specialized equipment, the future will hold even more new opportunites for technical students.



Thomas Luebbering is a junior majoring in Electrical Engineering. He is originally from Jefferson City and this is his second semester with the *Missouri Shamrock*. Tom is the president of Delta Tau Delta fraternity, a member of IEEE, and he plans to pursue a degree in patent law after graduation.

WHO IS THAT MAN?

by Maureen Steineger

The title of Assistant Dean is one that many people in engineering are not quite clear on. Some correlate the title with the idea of "the Dean's helper"; some conjure the image of an academic surveyor; and some do not even distinguish between the two deans' positions. A discussion with Paul Braisted, current Interim Assistant Dean, has led the author to the realization that the job of Assistant Dean is a diverse and complicated one. The assistant dean is, quite figuratively, the "wearer of many hats".

RECRUITING

As one who is concerned about encouraging bright, outstanding students to attend the UMC College of Engineering, the assistant dean spends much time interacting with high school students throughout Missouri. He participates in many of the formal programs organized by UMC Admissions for counselors and interested students, so that they can become more familiar with the University and what the College of Engineering has to offer. Dean Braisted has scheduled time for several such programs this year, including joining the Admissions team at the Parkway School District Guidance Counselors Program, a similar one for the Hazelwood School District, and a "Meet Your University" Program in St. Louis. During the Summer Welcome program, Dean Braisted speaks to incoming UMC students about the College of Engineering. He tried to give a realistic scenario to the students, describing the extensive advising available, exams that must be taken, extracurricular opportunities in engineering, and the difficulty of engineering studies in general.

Besides participation in high school introductory programs, the Assistant Dean interacts with community colleges and feeder schools. For example, he visits such institutions as Meramec, Florissant Valley, and Forest Park Community Colleges, as well as feeder schools like Northeast Missouri State University. Students at these locations are invited to write or call with questions, and transfer brochures are made available at their schools.

PUBLIC RELATIONS

Along with the interest in recruiting, the assistant dean cooperates with Engineering Communications in helping prepare brochures and other information items on the College of Engineering. Much of the material is disseminated through the assistant dean's office in response to various inquiries.

JOB PLACEMENT

A vital function that the assistant dean provides is that of Director of the Engineering Placement Service. Along with Lou Baur, Placement Secretary, Dean Braisted helps inform seniors of placement procedures and job opportunities. Engineering Placement is also promoting CO-OP opportunities. During interviewing seasons, the Engineering Placement Office is particularly active, and large numbers of students can be seen congregating around the placement bulletin board and preparing for interviews.

ACADEMIC ADVISING

While all undergraduate students have departmental academic advisors, students are sometimes referred to the assistant dean's office for additional information. As far as time permits, he does try to respond to all such inquiries. The dean's office staff is also very helpful in providing information, answering questions and helping process students through pre-registration, final registration, course changes, and many other important actions.

The assistant dean's office is also responsible for keeping an up-to-date record on the academic standing of all undergraduate students. Letters are prepared regarding probation, dismissals, dean's list recognition, and congratulations on other unique achievements. The assistant dean is also chairman of the College of Engineering Academic Appeals Committee, a hard-working group responsible for acting on all written and personal appeals for re-admission.

MINORITIES DIRECTOR

Combined with his other responsibilities, Dean Braisted also serves as Director of the Minorities Engineering Program. He is responsible for helping promote the Minorities Engineering Scholarship Program, assisting with the recruitment of minority engineering students, and serving as faculty advisor to the Society of Black Engineers.

In addition to the many "hats" already described, the position of the assistant dean interfaces directly with a large number of undergraduate activities. Important to these is fulfilling such committee roles as: member of the College Executive Council, chairman of the Academic Appeals and Operations Committee, chairman of the Undergraduate Guidance Committee, ex-officio member of the College Course and Curriculum Committee, and participant in the activities of the College Scholarship Committee. The assistant dean is also involved with many others in helping prepare for the Fall 1987 accreditation visit by representatives of Accreditation Board for Engineering and Technology.

The rewarding part of being assistant dean is the opportunity to work directly with so many students, and to participate in so many activities related to undergraduate engineering education. As Dean Braisted states, "I'm proud of this place; I see faculty members going the extra mile for their students. I continually see staff members making extra contributions, and I am impressed with what so many students accomplish."

DR. GRAHAM

by Don Monin

It has been said that those people who are doing what they truly enjoy tend to be the best at what they do. Many such people are encountered in the UMC College of Engineering. One example is Associate Professor of Electrical and Computer Engineering, Hu Graham.

Teaching at a university was Dr. Graham's goal when he entered the Massachusettes Institute of Technology in 1960. At this university, he received his Bachelor's and Master's degrees before completing a Doctorate in Engineering in 1969.

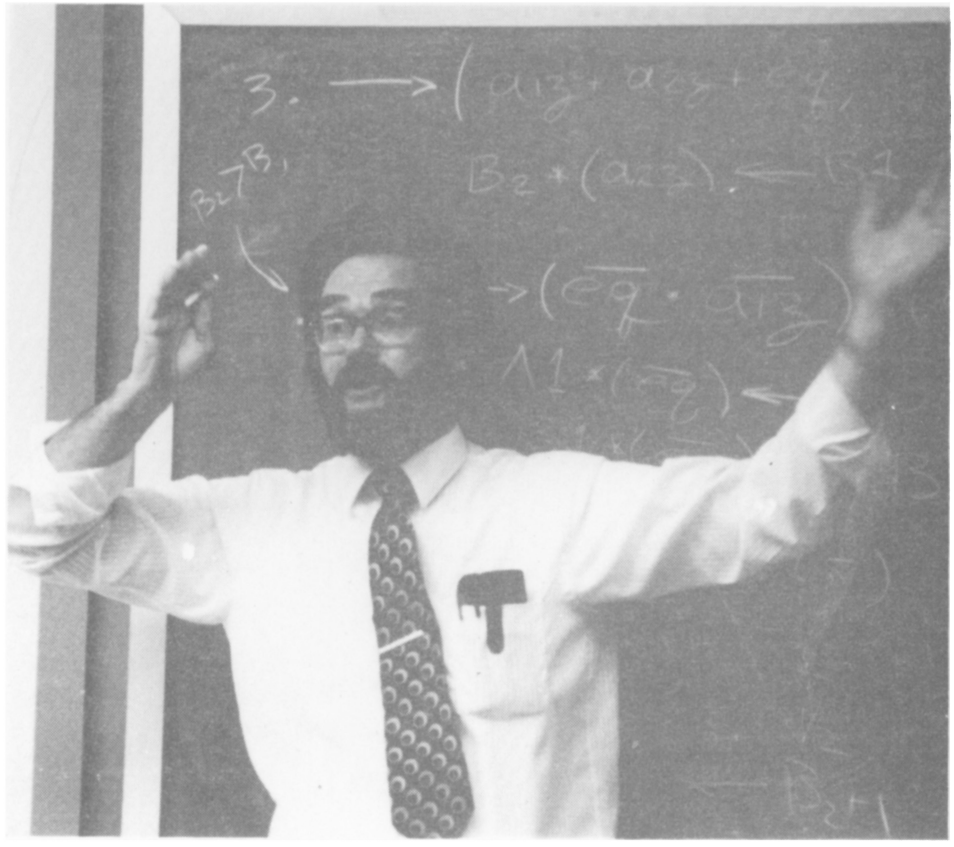
While completing his Doctoral Degree, Graham, along with his thesis professor and a business associate, started a computer company. This company designed computer terminals to meet customer specifications. After receiving his Doctoral Degree, Graham worked in this company until 1973, allowing business to sidetrack him from his original goal of teaching.

However, after spending four years in the business world, Graham decided to pursue his teaching desire. He began his teaching career at Lafayette College, an undergraduate private college in Easton, Pennsylvania. In the summer of 1977, Graham took a position teaching in the UMC Electrical Engineering Department. In addition to teaching engineering courses. Graham does research in computer architecture and parallel processing. He is a firm believer in the idea that the future for engineers lies in the field of computers.

In teaching his classes, Graham's primary concern is that students learn. He feels that students tend to neglect the purpose of education. "Students should take courses seriously. They don't try to understand what they are studying, they just do enough to get by," Graham said.

Perhaps this attitude has been the catalyst for Graham's teaching techniques. As senior Electrical Engineering major, Chrissa Pavlopoulos, states, "Dr. Graham's lectures are some of the greatest to attend. His enthusiasm and interest for the subject are so obvious that he just draws your attention. You find yourself anticipating whatever he says next." This sentiment was reinforced by another EE student, Chip Walburn, as he said, "When I had him for ECE 205, he was well prepared for his lectures and would go out of his way to help students understand. He was the best professor I've had at this university."

Outside the classroom, Graham partakes in a variety of hobbies. These have included fishing, bow hunting, and his most recent endeavor - flying. Upon receiving his pilot's license three years ago, Graham bought a small plane - a Cessna 172. Instead of driving on vacations, Graham along with his wife, Lois, and their two children now go sightseeing in the plane. Dr. Graham is truly an example of a great professor and engineer.



A Message from Jack Sandridge, P.E., President

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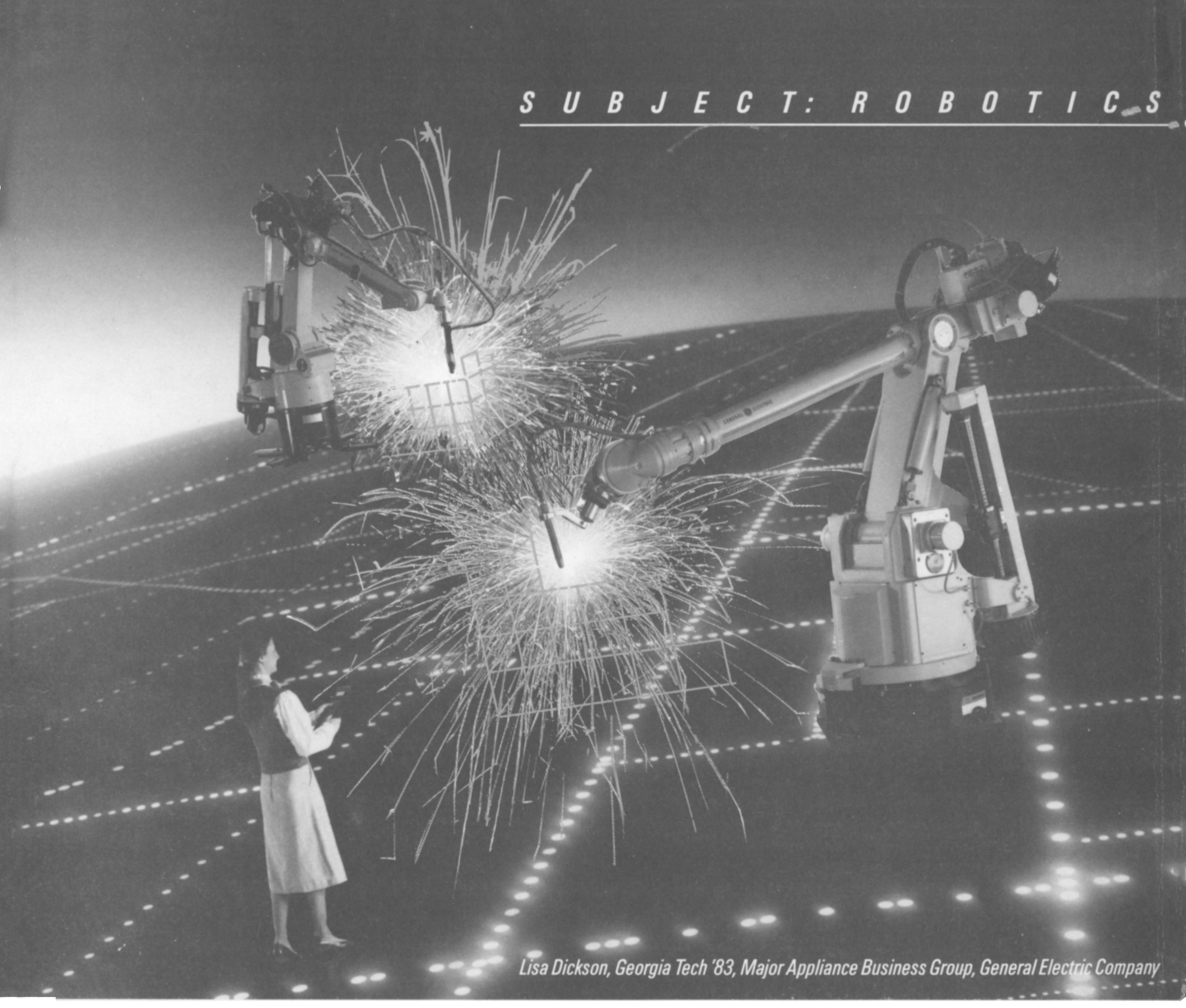

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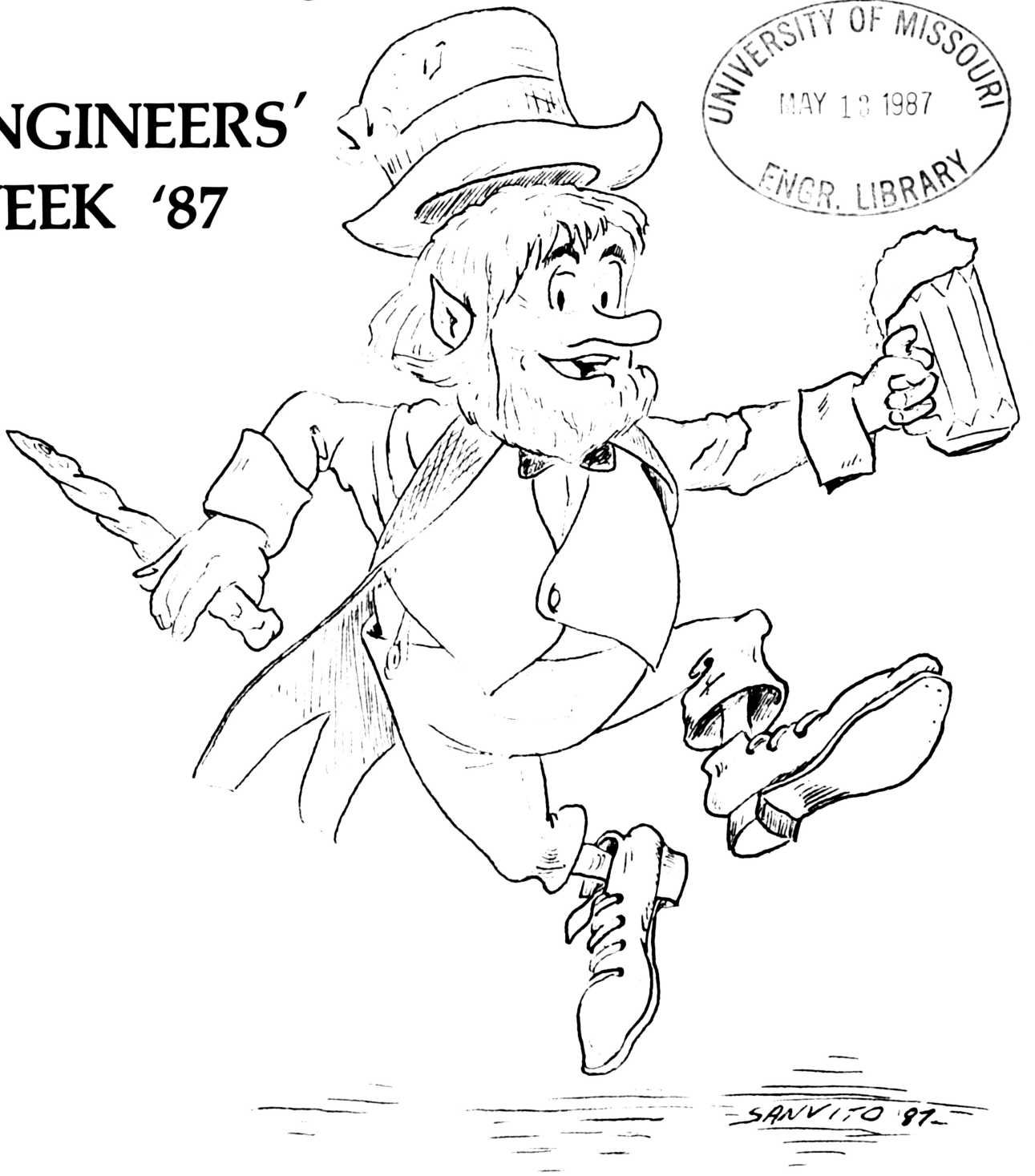
Missouri

Shamrock

The UMC College of Engineering Student Magazine

ENGINEERS' WEEK '87



APRIL/MAY 1987

Missouri
SHAMROCK

The UMC College of Engineering Magazine

April/May, 1987 Vol. 80 No. 3

contents

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Foremost, the Missouri Shamrock acknowledges its advisors, Robert W. Leavene, Jr., Associate Professor of Electrical and Computer Engineering, and Annette Sanders, Director of Engineering Communications, UMC College of Engineering.

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Anthony L. Hines, professor of chemical engineering and associate dean for engineering research at Oklahoma State University, has been named dean of the College of Engineering at the University of Missouri-Columbia.

As associate dean for engineering research at Oklahoma State, Hines has administrative responsibility for the development of research at OSU's College of Engineering. This includes overseeing two research laboratories employing 50 research and staff personel. He has served as associate dean and as professor of chemical engineering since 1983.

"We are bringing to the College of Engineering a dynamic leader with a proven record. This is a major investment in the college and we are confident of great dividends. Dr. Hines knows quality in education and he will bring strong leadership to this critical position," says Provost Lois DeFleur.

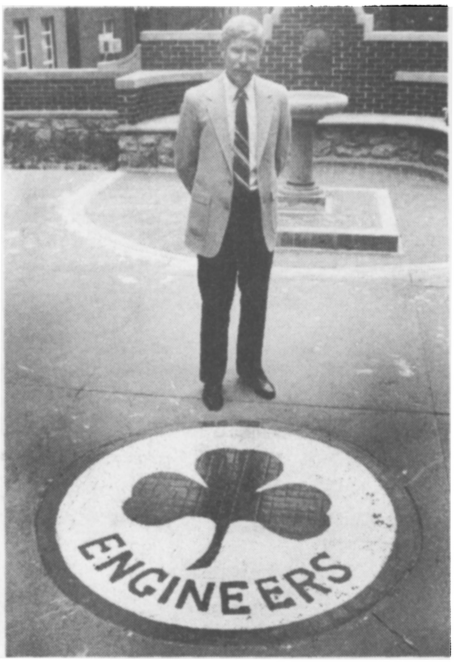
Before joining the faculty at OSU, Hines served as the first chair of the department of chemical engineering at the University of Wyoming. He earned accreditation for the department and developed one of the strongest chemical engineering programs in the country. When Hines left Wyoming, the university's chemical engineering department was listed by the American Society of Engineering Education as the top funded department in the United States on a per faculty basis.

"In addition to an impressive academic record, Dr. Hines has a track record of obtaining millions of dollars through outside research grants as well as a demonstrated ability in private fund raising," says Interim Chancellor Duane Stucky. "These skills are important as we work together to seek financial support and to provide a competitive edge for Missouri's economy."

Hines has been a principal investigator or director of more than 10 research projects in the areas of liquid metals, waste removal, diffusion and oil shale processing. He has published more than 50 professional publications and written a senior-graduate level textbook.

Hines received his bachelor of science degree from the University of Oklahoma in 1967 and a master's in chemical engineering in 1969 from OSU. He earned a PhD in mechanical engineering and thermal sciences from the University of Texas at Austin.

Hines will assume his new position on Aug. 1, 1987.



from the editor's desk

ENGINEERS WEEK: Fact or Myth?

I recently received an interesting letter from a gentleman who graduated from the University of Missouri in 1937. He had returned to Columbia for Engineer's Week, and was disappointed by the fact that most of the engineering students that he talked to had no knowledge of the important "facts" concerning St. Patrick and Engineer's Week in general. Suddenly I got concerned with how little I actually knew about St. Patrick, so I decided that it was about time for a little history lesson. A visit to the Engineering Library ironically showed me that the best place to find this kind of information is in back copies of the *Missouri Shamrock*.

I found that the original edition, printed in 1906, was dedicated "To St. Patrick, the perfect integral, whose first derivative was an engineer." According to this issue, Engineer's Week originated in 1903 when a group of devoted engineering students suddenly came down with a severe case of spring fever. An uproar was started by the announcement that "whereas, in the ranks of the Engineering Department there are many of noble birth and Irish blood, and whereas, the ancestors of many of our most illustrious students came from Erin's Isle, and whereas, St. Patrick was an Engineer, therefore, be it resolved, that the Engineering Department take a holiday on St. Patrick's Day, cut all classes, and attend a morning prayer-meeting in a body." No engineering student attended a class on March 17, 1903. The following year, St. Patrick's day was again a holiday for all engineering students except the seniors, who received a strong recommendation to attend - if they were interested in graduating. In 1905, the first kowtow was held, and when the Knight of St. Patrick declared St. Patrick's Day a holiday for the Engineering Department, it was accepted by all - including the faculty!

A few other interesting bits of trivia that I found are listed below:

- The three leaves of a shamrock represent love, valor, and wit.
- For many years, there was a big dispute as to whether St. Patrick's actual birthday was March 8 or March 9. Finally, it was generally agreed upon that he was worth two saints combined, so the dates were added, and his birthday is now celebrated on March 17.
- The reason St. Patrick is considered the Patron Saint-of engineers is because he made the first "worm drive".
- St. Patrick predicted the founding of the University of Missouri. Evidently, Mrs. O'Leary's cow became mute, so St. Patrick was called in to help. After his examination he put forth his most saintly airs and commanded the cow - 'YOU MOO!' (U. Mo.).

Janis Ehrhardt

Janis Ehrhardt, Editor
Missouri SHAMROCK

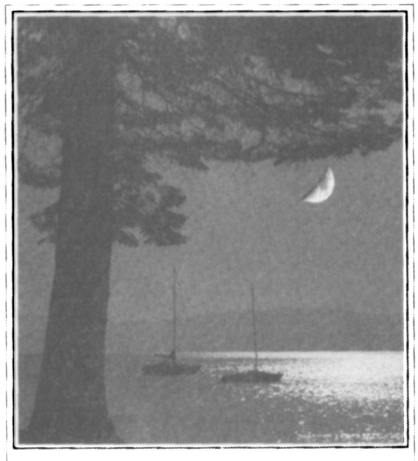
GIMME A BREAK

by Shelly Moats

Tons of homework and back-to-back tests left little room for spring fever; but as soon as the weekend rolled around, engineering students at the University of Missouri-Columbia set out for their different destinations. Spring break is not taken lightly by students here at Ol' Mizzou, even among those in the College of Engineering.

Where spring break is concerned, engineers are divided into four groups. The first group is made up of those students who feel this vacation is a well-deserved rest after the barrage of homework and tests brought by the first half of the semester. Where did these students go and what did they do over break? Many of these students took the opportunity to make a change of pace by going out of state rather than out of their minds. For example, some went to Colorado to ski the slopes (which were nearly devoid of good snow); one student went to Washington State to visit relatives and try to find slopes with better conditions than Colorado; another student went on a four day cruise to the Bahamas; and while one student went to a farm in Oklahoma, several other students went to the more popular vacation spot of Fort Lauderdale to enjoy the sun after a mild but not so sunny winter. Even some professors opted to get away from the routine of school. One professor (whose name will remain anonymous to protect the innocent) went to Las Vegas and played the slot machines. The majority of these students, however, simply went home to Mom and Dad. What a relief to enjoy some delicious home-cooked meals for a change and to see good ol' Fido who hasn't seen his master since Christmas vacation.

The second type of engineering student doesn't have such an optimistic view on the purpose of spring break. These engineers are generally the ones who, for some reason or another, get stuck in Columbia for the week and are typified by the words, "Engineers do not have spring break, just a week to catch up!" Even those students who at least get to go home are usually so swamped with homework, labs, and tests that all they have time to do is study. (Let us all take a moment of silence in remembrance of those poor souls.)

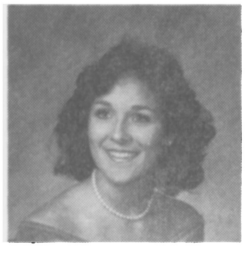


LAKE TAHOE

Then there is the third group of engineering students who is industrious enough to get a jump on his or her future career (hopefully as an engineer) or at least a head start at earning money now by working full or part time over spring break (presumably for next semester's tuition). These students worked at places ranging everywhere from fast food restaurants to computer programming in several cities including St. Louis, Kansas City, and Columbia. Those who have their own business found spring break an excellent time to catch up on undone business.

The last group is actually made up of the students who are any combination of the previous groups. For example, the student who travels to Hawaii for vacation but has so much homework to do that he takes it with him. (You won't find too many of this type.) Also the student who has much work to do at home but takes time out to get reacquainted with his or her long-distance sweetheart while the getting is still good. Obviously, most engineers fall into the mixed category. These are the students who allow the serious side of spring break to be interrupted by such activities as a trip to Rolla for the St. Patrick's Celebration. Other such activities included parties, blind dates, cruising, eating at fancy restaurants, and many more. This last group is also a catch-all in the sense that it also includes the engineering students who don't think they belong in any of the four groups, (so no one really got left out.)

Hopefully, no matter what the case, the engineers came back from spring break relaxed and ready to tackle the last half of the semester or at least caught up enough to go on.

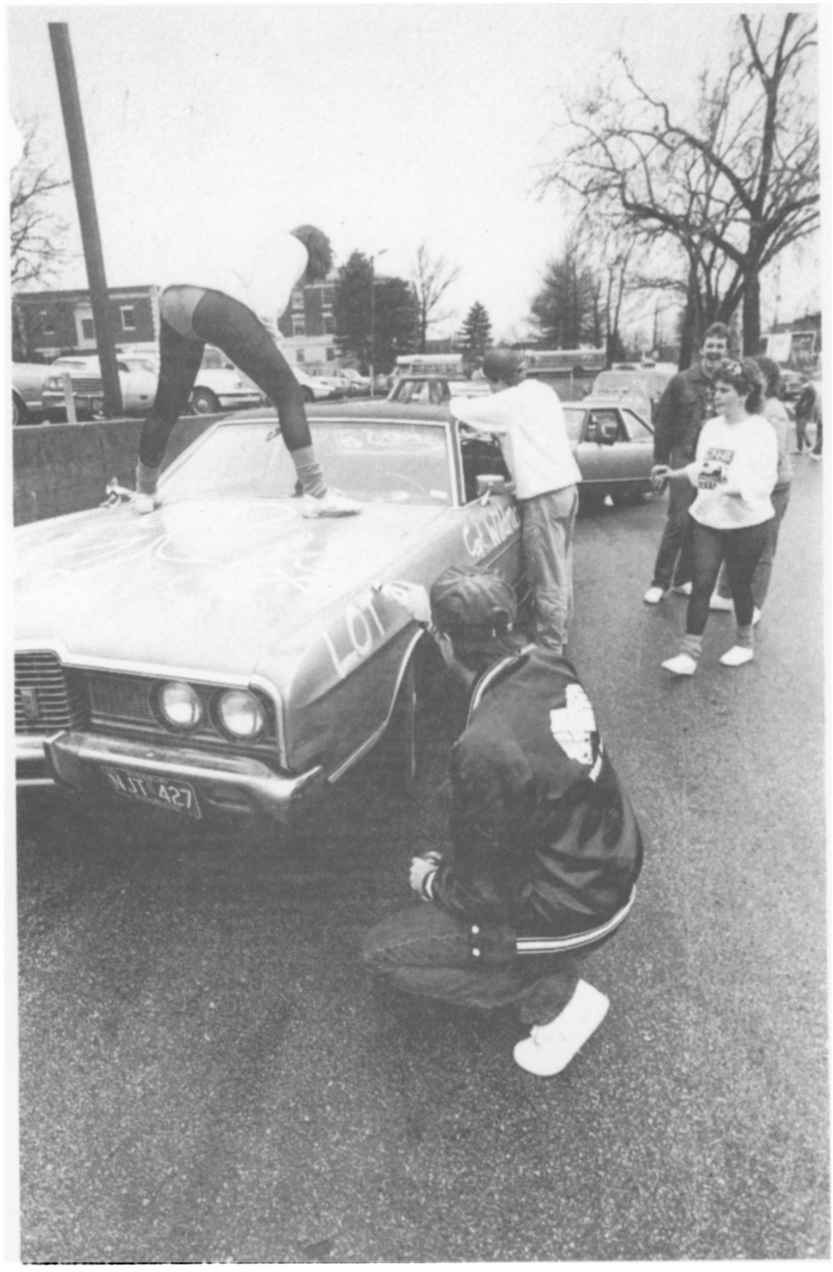


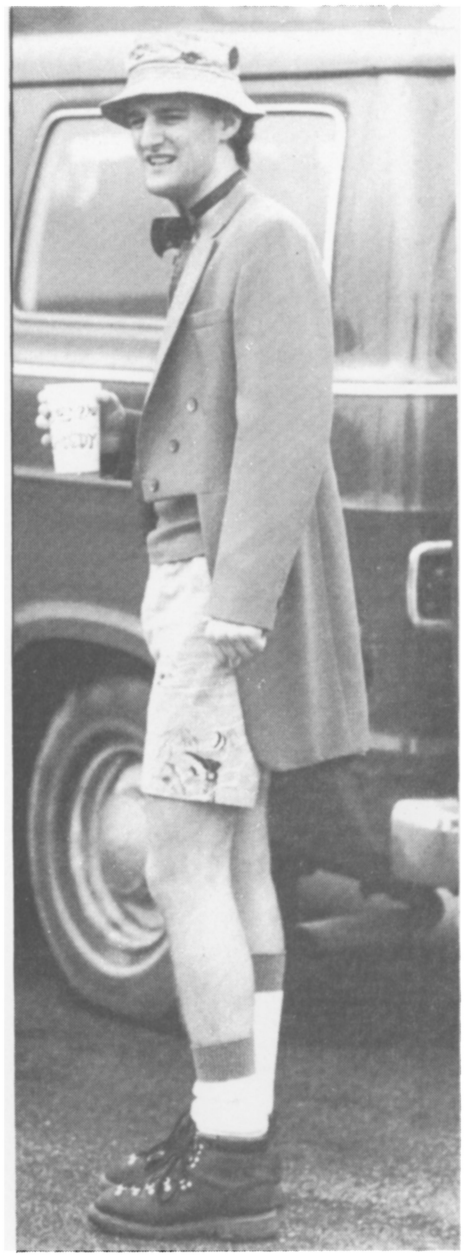
Shelly Moats is a sophomore from Kansas City, Mo. majoring in Electrical Engineering. This is her first year as News Editor for the *Missouri Shamrock*. She is a member of IEEE and Zeta Tau Alpha social sorority. Shelly enjoys playing volleyball, and visiting her family in Madrid, Spain.

ROAD RALLY '87

by Steve Sanvito

This year's Road Rally was a rousing success. Despite rain and cold temperatures, over thirty cars turned out to compete in the 45-mile event. The overall winners were Eric Schulte and Bridget McCandless. The most accurate time of 1 hour and 49 minutes was posted by the team consisting of Rick Wiehe, Joyce Clark, and Steve Sanvito. Dan Bischoff and Brian Sells were given a special prize for "the most courageous effort." The duo braved the elements by completing the course on a motorcycle. The rally ended at the Off Broadway Lounge, where everyone enjoyed sharing stories about their adventures.



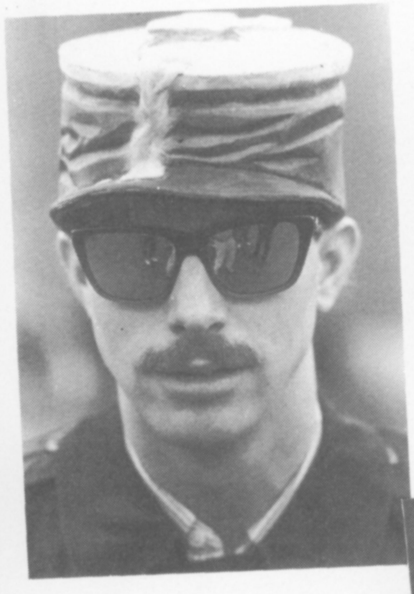


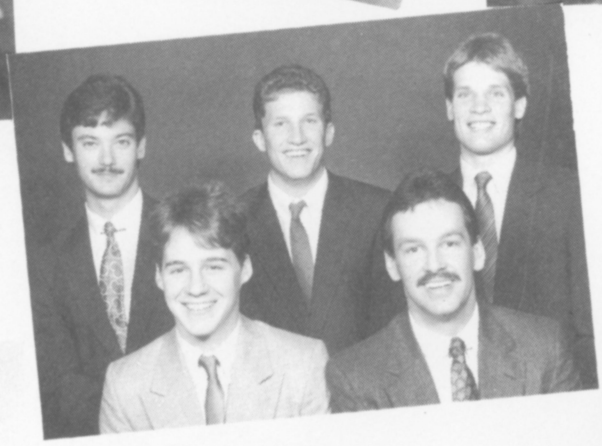
ENGINEERING BBQ

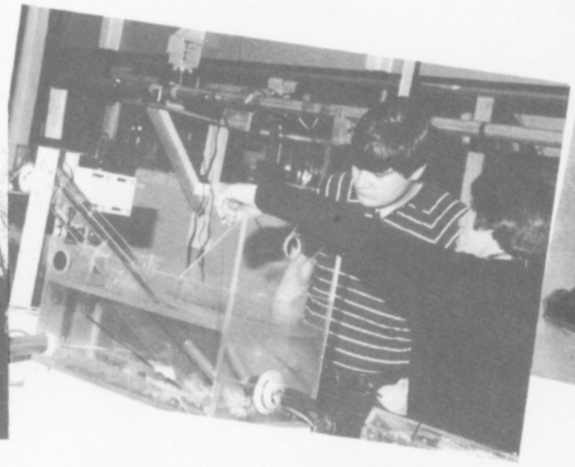
by Lisa Hemming

The engineering barbeque is one of the highlights of Engineers' Week and this year was no exception. It provides a chance for students, faculty, and friends to mingle informally. Over 200 people gathered at the Sunrise Optimist Club to enjoy good food, music, and of course, beer! According to this year's barbeque chairman, Kelly Flanegin, "If everyone had a good time, then it was a success." Everyone who attended will concur that the barbeque was definitely a success. Now if only we can wait till next year for another.


Engineer's Week
at Mizzou
MON. MARCH 2 SHILLELAGH HUNT
TUES. MARCH 3: S-PAC
PROF.-FOR-A-D



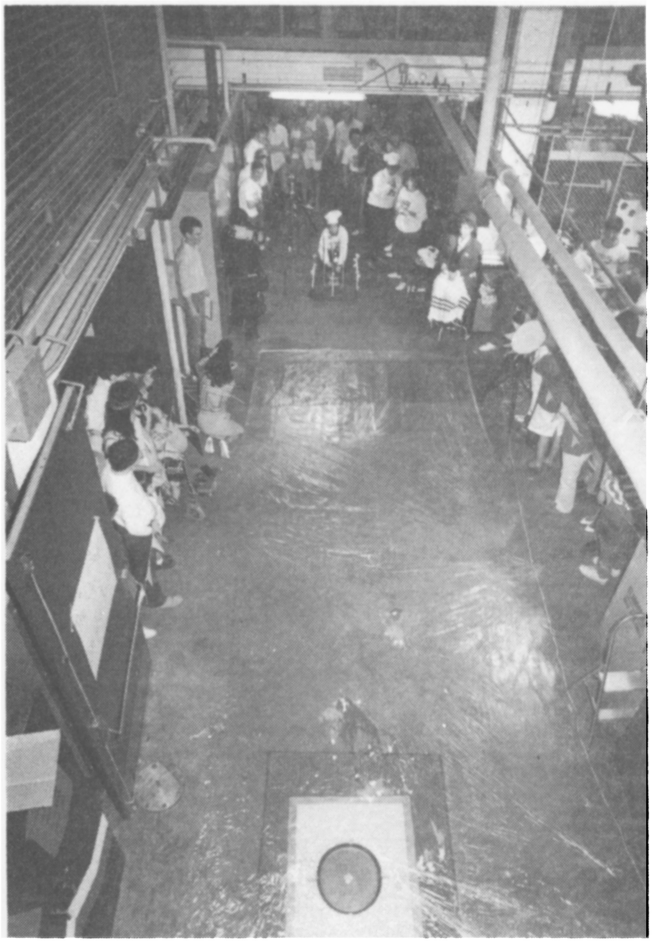


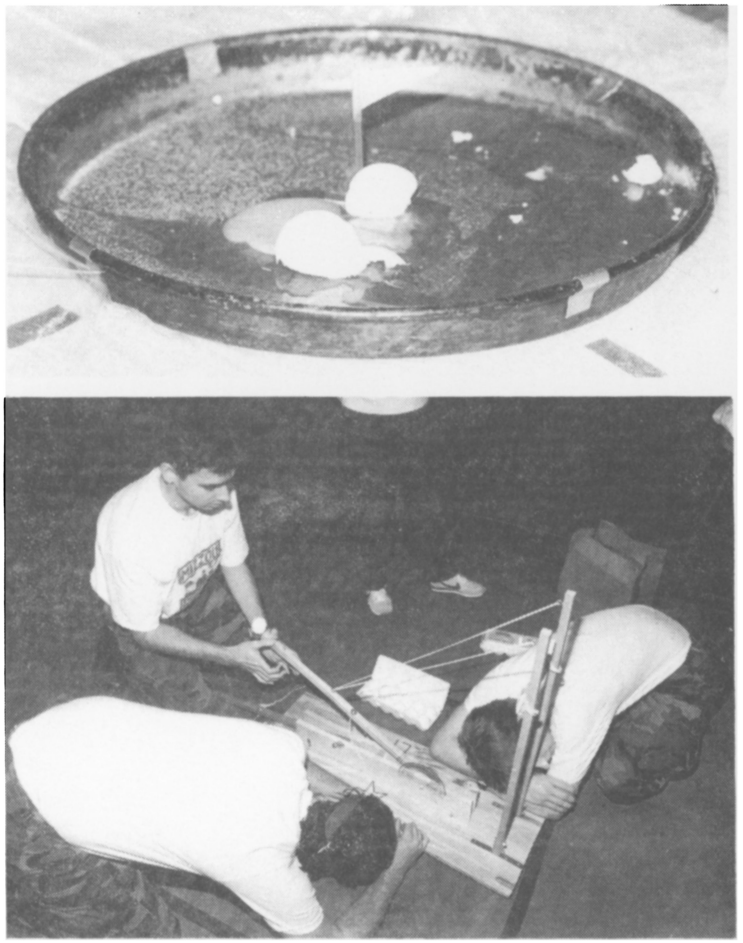


EGG CATAPULT

by Lisa Hemming

The mechanical engineering high bay area was the site of the 4th annual Egg Catapult contest sponsored by ASME. Contestants put their engineering know-how to the test as they launched eggs from homemade catapults toward a frying-pan target 25 feet away. On several occasions the audience found the "yoke" was on them as eggs sailed off course into the crowd of spectators. The prize for the most creative launch went to John Swope, Randy Harris, and Mike Finn, better know as St. Pat's Seige Squad. Jeff Moore (King Katapult) was the undisputed winner, coming within 4 inches of the bullseye. Eggs were provided by Jo Manhart of Columbia, on behalf of the Missouri Egg Merchandising Council.





ON THE HUNT

by Maureen Steiniger

Columbia residents must have wondered last week when they witnessed several engineering students running around the Boone County Courthouse in a frenzy, peering into janitorial closets and digging in the wood chips piled outside. The reason for this somewhat bizarre behavior was the 1987 Shillelagh Hunt, chaired by Brian O'Donnell, a senior in electrical and computer engineering, and one of this year's King Candidates.

Throughout Engineers' Week, Brian supplied daily clues to a number of registered hunting teams, consisting of faculty and students. When they thought they understood the meaning of the clue, the teams dashed around campus, searching for the 1987 Shillelagh on their latest hunch.

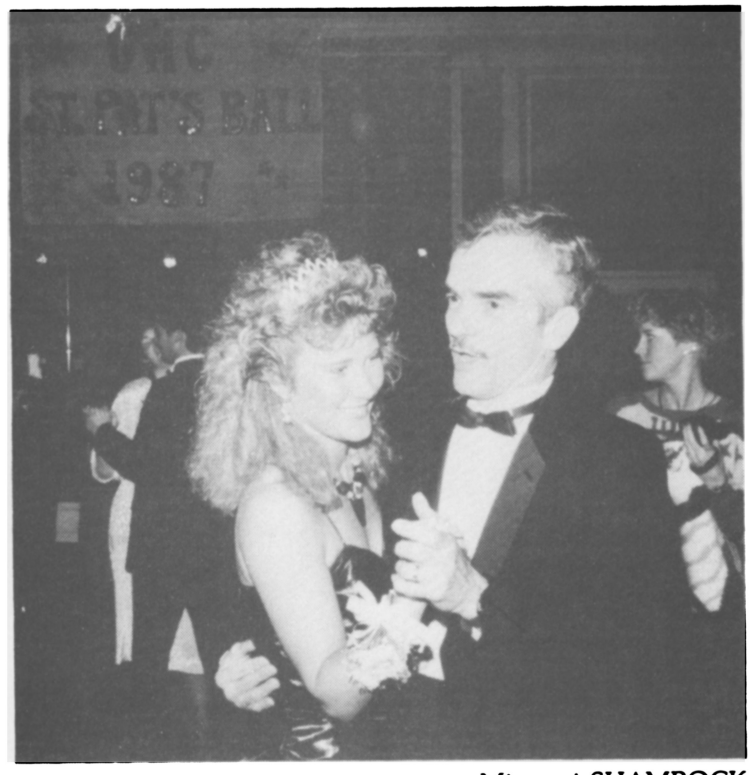
A Shillelagh—the traditional walking stick of Ireland—is a four to five foot sturdy piece of wood, usually carved from a tree limb. For engineers, the Shillelagh is connected with the mystique of St. Patrick, and is a much coveted souvenir of Engineers' Week.

The triumphant finders of the hidden Shillelagh were announced at the Engineers' Barbeque. The winning team, titled "The Clueless Hunters," consisted of Rick Distler, Chris Kingsley, Chris Korinek, and Maureen Steiniger, all serniors in electrical engineering. They received a dinner at Minsky's and free yogurt coupons as prizes. All indicated, however, that it was not the prizes that drove them. As Rick stated, "We had a blast trying to figure out where it was. We were ready to kill Brian for confusing us, until we found it."

ST. PAT'S WEEK ENDS WITH A BANG

By Chrissa Pavlopoulos

Engineer's Week 1987 drew to a close on Saturday, March 7, at the St. Pat's Ball. The ball was held at the Tiger Hotel from 9:00 pm until 1:00 am and was organized by Maureen Steiniger and Chrissa Pavlopoulos. The theme was "Ireland" and the mood was festive, as all those students who had been involved in Engineers' Week cut loose together one last time. The night's events climaxed at 10:30 when St. Pat, with a little help from St. Pat's Board Chairman Mark De Young and Engineers' Club President John Janboretz, crept forward to announce the Engineering King and Queen for 1987-1988. Dean Cyrus Harbourt crowned Day Shai as the Queen of Love and Beauty, and the Dean's daughter, Anna Harbourt, crowned Terry Connor as the King of Valor and Wit. The remaining finalists for the position of Engineering Queen were Cynthia Ballew, Kelly Carona, Robin Goodwin, and Jane Gordon. The finalists for Engineering King were Kelly King, Eric Logan, Brian O'Donnell, and Brett Uldrich.



A QUESTION OF COMPETITION

by Keith Lockette

"The United States is losing its ability to compete in world markets," the President's Commission on Industrial Competitiveness stated in 1985. In 1986 the United States accumulated a $169.8 billion trade deficit, its largest ever. As before, the United States ran up its largest deficit with Japan, a record $58.6 billion in 1986, the largest trade imbalance between the two nations. It was up from a $49.7 billion deficit with Japan in 1985. The next largest deficit was the 12-nation European Economic Community, $26.4 billion, up from $22.6 billion the year before. Experts argue that America's colleges and universities must respond if the United States is to regain it's competitive edge.

The situation is simply stated: there aren't enough students taking the right courses or enough qualified instructors to teach them. Requiring more foreign languages and international studies, experts say, would aid American businesses in communicating in the world marketplace. Experts also maintain that universities must graduate more scientists, physicists, and engineers and recruit and retain more faculty to teach them.

In 1986 the United States accumulated a $169.8 billion trade deficit, its largest ever.

Recent statistics from the American Society for Engineering Education show increased vacancies for engineering professors, especially in the areas of electrical and computer engineering. Vacancies run particularly high, approximately 20 percent, at the level of assistant professor. The University of Missouri-Columbia is no exception. There are currently sixteen open positions for engineering professors, five of which are in the department of electrical and computer engineering.

The reason for this shortage of engineering professors seems to be the disparity between the lucrative salary that a bachelor's degree recipient can receive if he chooses to go directly into industry and the debt incurred plus low income that a student would have to live on while pursuing master's and doctoral degrees. Todd Ehinger, a senior in mechanical engineering, agrees saying, "I was definitely encouraged by my professors to start work on my master's but it's pretty tough to think about graduate school when someone is waving a paycheck in your face".

In an effort to cope with this problem, the American Electronics Association is offering $10.5 million dollars in the form of grants and forgivable loans to promising engineering students willing to pursue graduate engineering degrees. To be eligible for this aid, a student must agree to teach at least three years at a university. While these loans and grants would ease the burden of expenses incurred while working on a graduate degree, there is still the issue of wages and opportunities for corporate advancement that a graduate student will miss out on while in school.

Ignorance of world culture is also a reason cited for the United States' inability to compete in the world market. "Americans know neither the globe or the cultures of people who inhabit it," according to *International Education, Cornerstone of Competition*, a report published by the Southern Governor's Association.

. . .there aren't enough students taking the right courses or enough qualified instructors to teach them.

About 10,000 Japanese businessmen work in the United States selling Japanese cars and electronics equipment; most speak English. In Japan, about 900 Americans are pushing "Made in the USA" products; few speak Japanese. In Japan the study of foreign languages receives much greater emphasis than in the United States. The study of written English is required in nearly all Japanese middle schools and high schools. In college, reading and writing proficiency in two foreign languages is required for graduation.

In its report, the Southern Governor's Association called for more course work in international studies, geography, cultural awareness, economics and foreign languages. Many universities have already begun to integrate the recommended courses into their existing curricula. The University of Texas-

Austin now requires all students to demonstrate a foreign language proficiency equivalent to the completion of two semesters of college coursework in order to receive a bachelor's degree in engineering. The addition of extra course work to an already crowded four-year program is not always possible, however. Given the rapid rate of technological changes, added course requirements will be needed to ensure technically competent graduates.

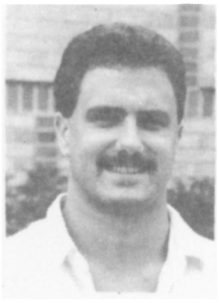
How the question of competitiveness is eventually addressed will affect Americans' jobs and standards of living. "We are rapidly coming to a point that if we want the kind of life that we have all become accustomed to, every last one of us has to be a player in the international, industrial/economic picture," says Cyrus Harbourt, the dean of the college of engineering at the University of Missouri-Columbia. With the trade deficit growing at a rate of five percent a year it is a question that must be answered quickly. Says Harbourt, "we are far past the point that we can pull our heads in like the turtle and wait for this to blow over."

Given the rapid rate of technological changes, added course requirements will be needed to ensure technically competent graduates.

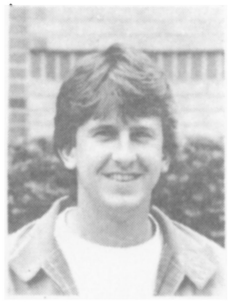
Keith Lockette is a senior from Butler, Mo., majoring in electrical engineering. This is his first year as technical editor of the Shamrock. Keith plans to pursue a masters degree in acoustical engineering after graduation. When he's not crunching numbers, Keith enjoys playing the piano and hitting the bars.

WHERE CREDIT IS DUE. . .

Many students on the *Shamrock* staff do a lot of behind the scenes work and get little recognition. Below are staff members who have worked hard but haven't been previously acknowledged in the magazine.



Rick Distler is a senior from St. Louis, Mo. He is majoring in Electrical and Computer Engineering and will graduate in August. He is currently the business manager of the Shamrock, as well at the president of Eta Kappa Nu, Honorary Electrical Engineering Society. His hobbies include bicycling, skiing, basketball, racquetball and generally having fun.



Matt Ehlmann is a senior from St. Charles, Mo., majoring in mechanical engineering. This is his first year as advertising manager for the Shamrock. Matt enjoys playing basketball, snow skiing, and sleeping.

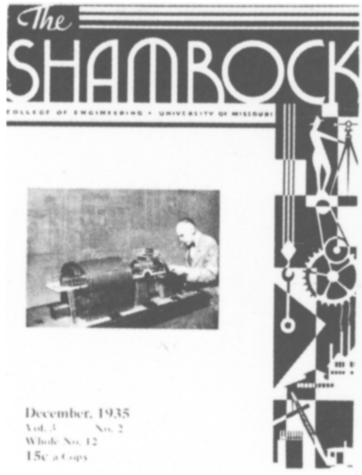
IN MEMORIUM

It was with great sadness that the engineering department learned of the death of Michael K. Rust. A senior in mechanical engineering, Mike was killed in an automobile accident in April of this year.

In addition to being an outstanding student, Mike was involved in many activities outside of class. Mike was president of the UMC Fencing Club; a member of the Engineer's Club; a finalist for Engineering King in 1986, and a volunteer for the Loaves and Fishes Soup Kitchen. He was also involved in the Newman Center. Mike will be dearly missed by those who knew him.

Help Keep The Tradition Growing . . .

1914



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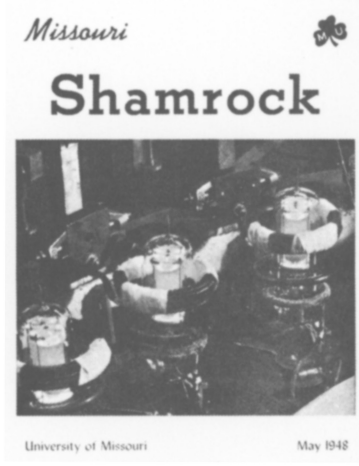

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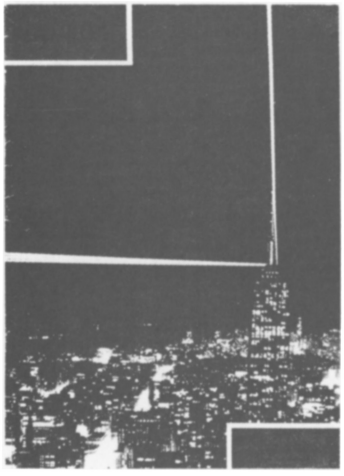

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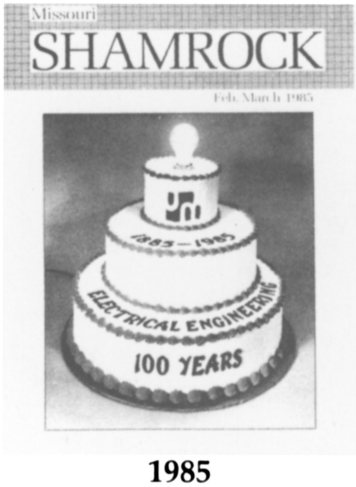
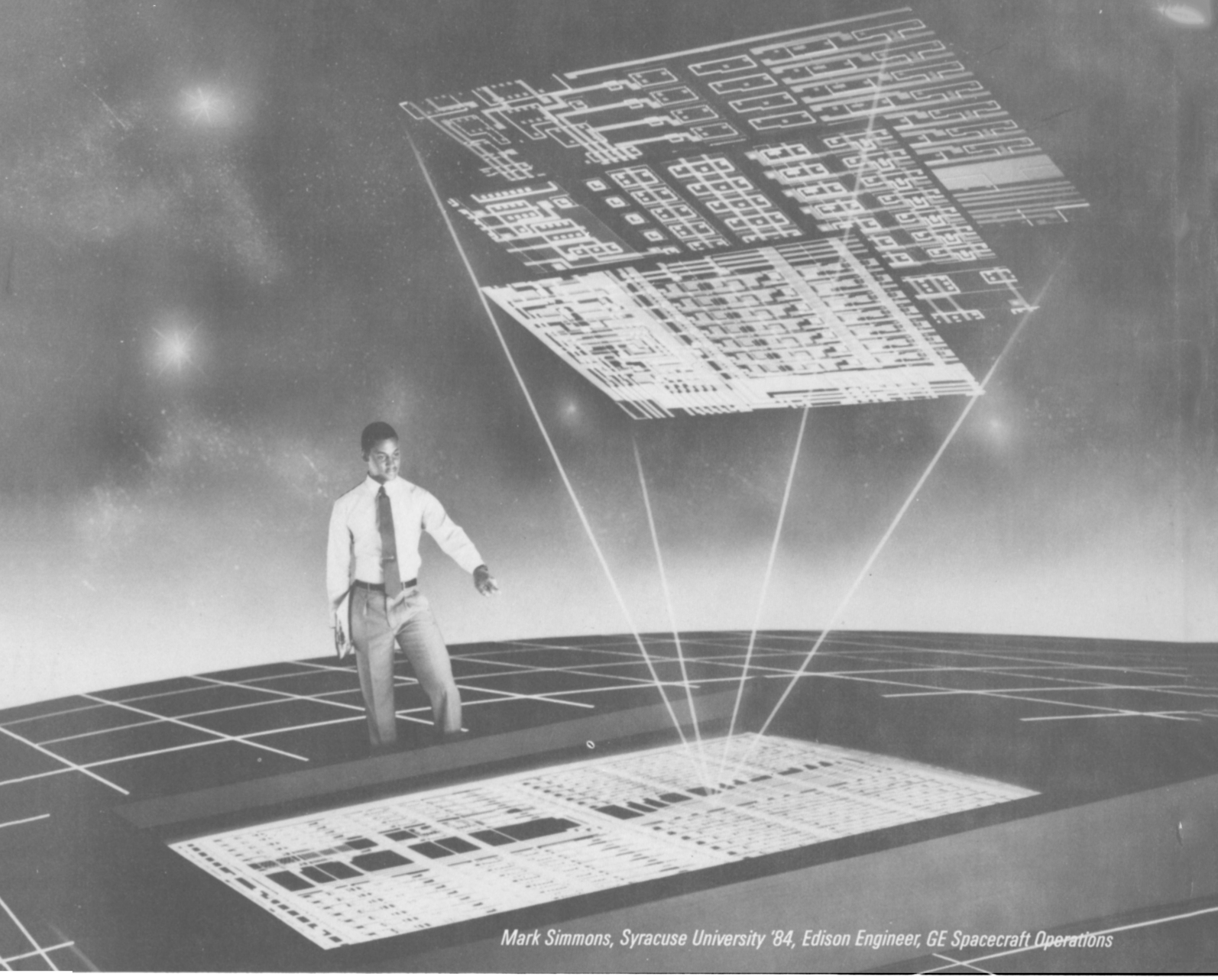


1985

Don't Miss Your Chance
to join the **SHAMROCK**
when recruiting and orientation
begin early next summer



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