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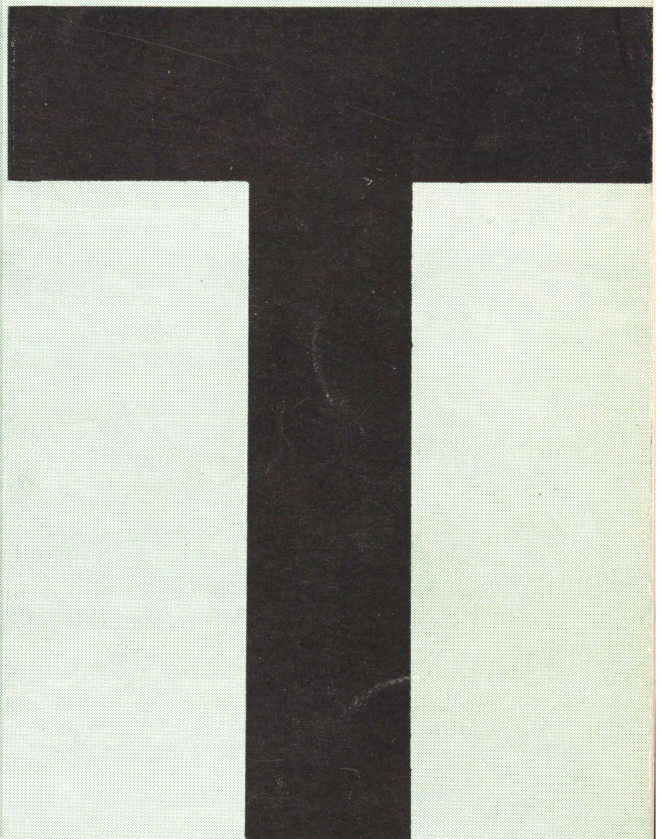
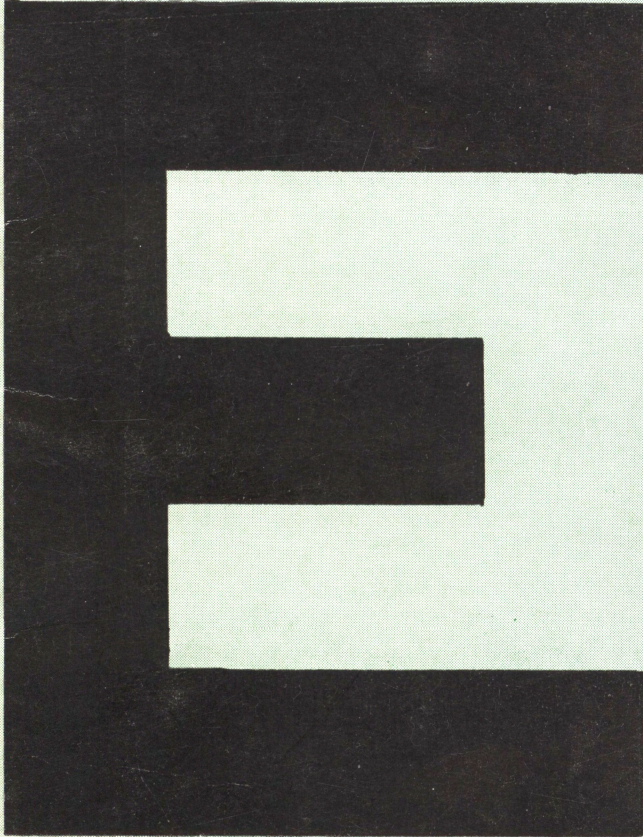
MISSOURI

# SHAMROCK

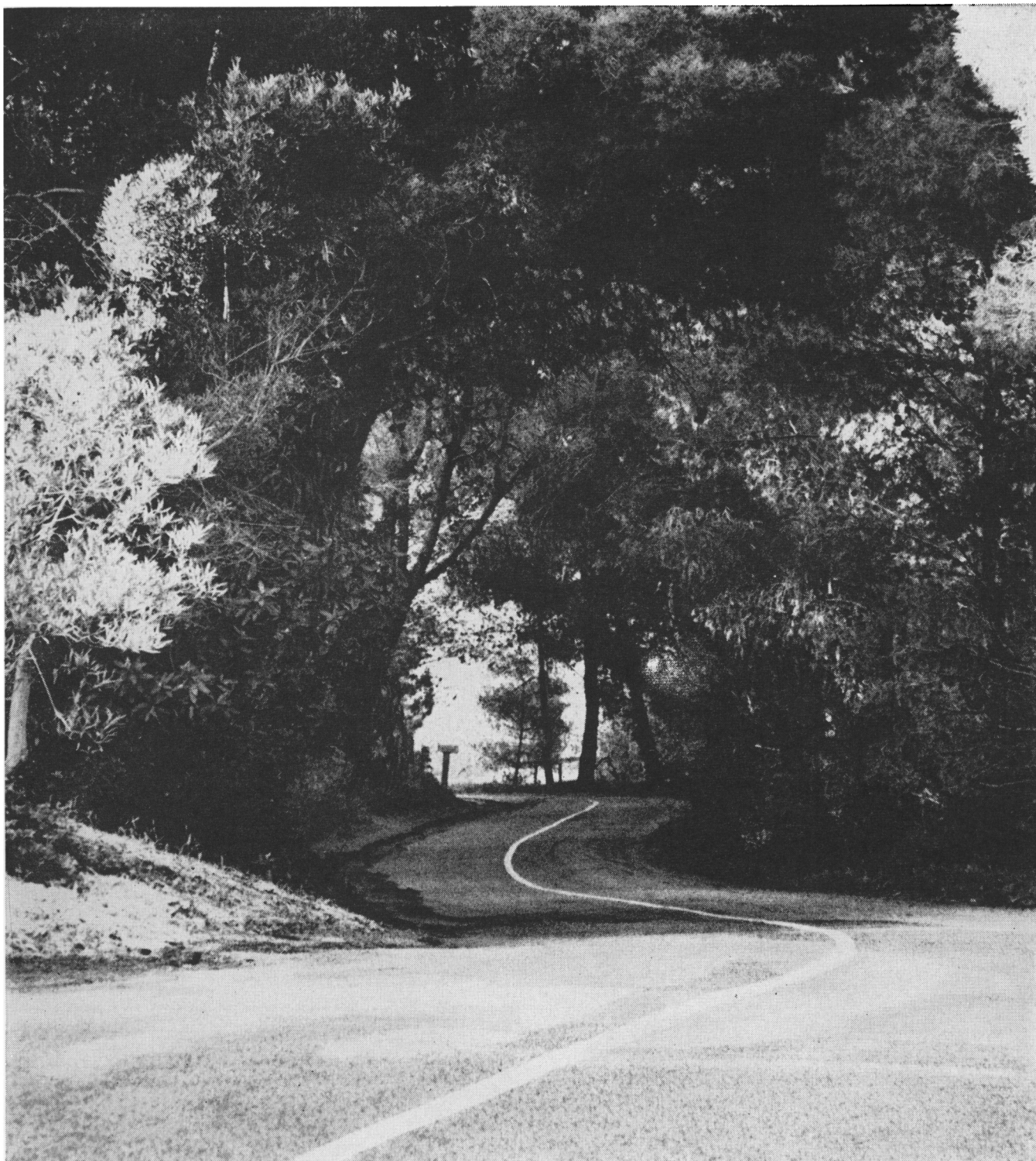
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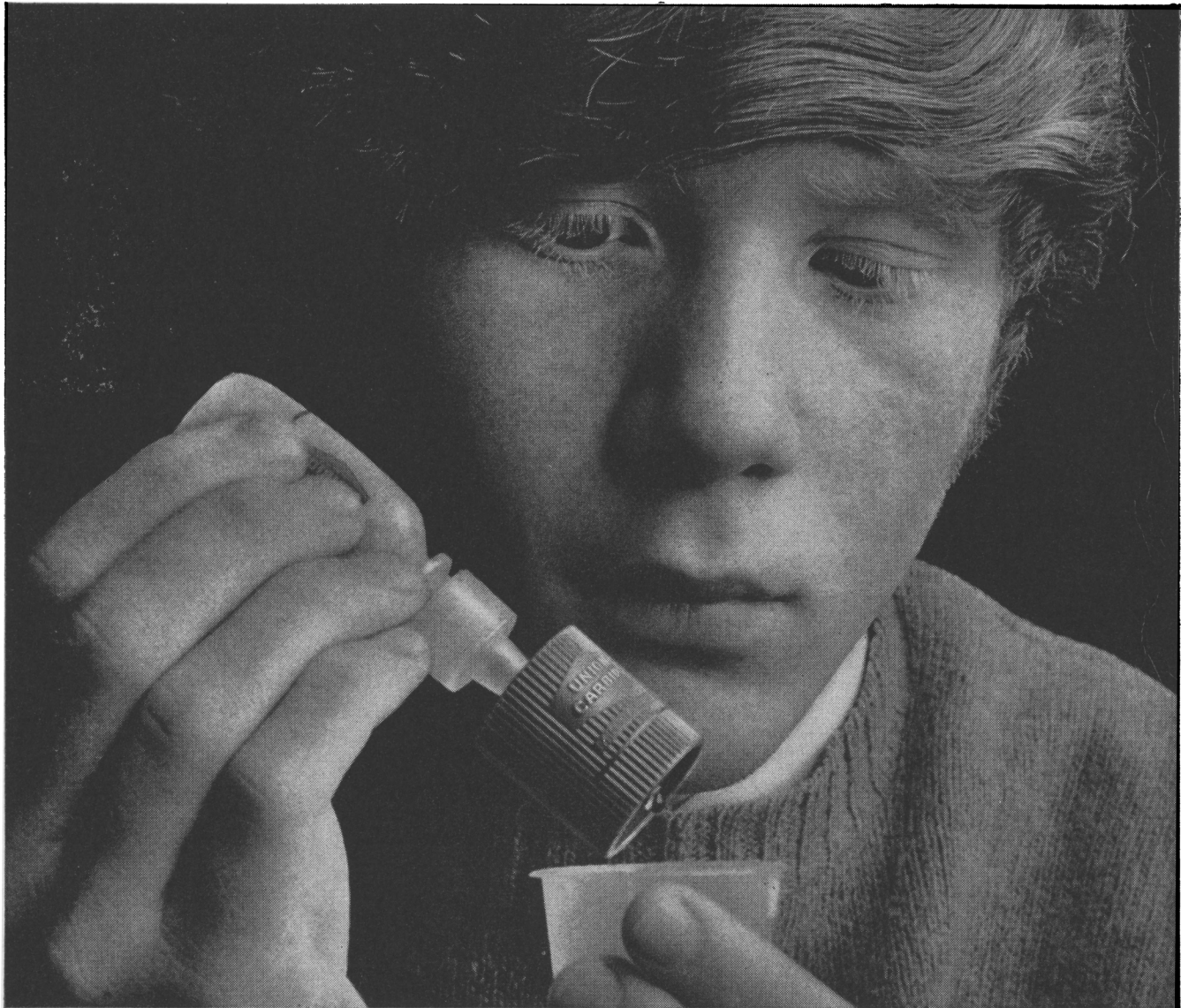
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# He's learning that there's more to atomic energy than atomic bombs.



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How they can be used to detect cancer,

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But we also hope the human race will profit, too.

By showing some kids a power once used to bring death.

And teaching them how it can bring a better life.



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270 Park Ave., New York, N.Y. 10017

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# MISSOURI SHAMROCK

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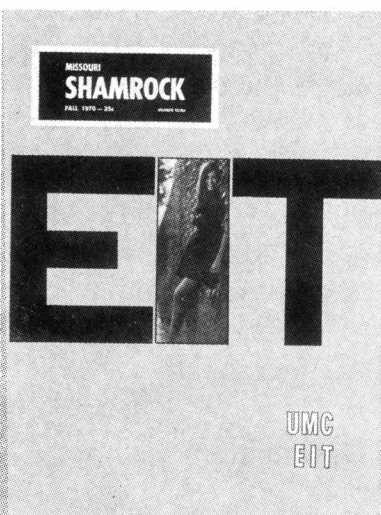
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The cover girl for this issue is Debbie Blood, the SHAMROCK Sweetheart. The photography is by Steve Peterson.

# From The Editor's Desk

As engineering students we owe very much to the administrators and the faculty of the College of Engineering for saving the IBM 360/50 computer from removal from the computer center in the Electrical Engineering Building. Last summer administrators outside of the College of Engineering chose the removal of the computer as a method of cutting the budget. After the presentation of a well documented case by the College of Engineering to these administrators, the decision was made to retain the present computer facilities.

The College is using a lease-purchase option and will own the present facilities by 1975. Two-thirds of the computing costs for these facilities, including the purchase, are covered through research grants and contracts. As a result, the computer should be available to Engineering students and faculty for years to come.

The availability of the computer to faculty and students was recognized as one of the strong points of the College of Engineering by the committee which extended accreditation for the College last year. In the 1970 winter semester, students in ninety-one classes used the computer. In addition, faculty have been able to use their access to the computer as a selling point in acquiring a large part of the research funds granted to the College each year.

*Mark Heinemann*  
*Editor*

# “There’s a little more freedom here to direct my own research than at most company labs.”

Bob Pfahl, Western Electric

Thermal energy is his field. And since 1968, Bob Pfahl has been doing research and development in radiant heat transfer on the staff of Western Electric’s Engineering Research Center.

Well-backgrounded, Bob holds three degrees from Cornell University—a bachelor’s in mechanical engineering, and a master’s and doctorate (received in 1965) in heat transfer.

“My job is self-motivating,” said Bob. “I have to look ahead to see where I think research should be done.”

And one such area was the design of heating equipment. Western Electric uses radiant heating in a variety of manufacturing processes because it’s quick and inexpensive, and because it can be applied at a distance.

However, because of the limitations of existing reflectors, radiant heating has been limited to small areas. Bob has developed a reflector shape which uniformly distributes energy from a compact mercury arc lamp over larger circular areas.

“Many projects grow out of previous or existing work,” Bob said. He explained that in order to calculate the reflector shape, he had to first design an instrument to measure reflectance of the reflector material.

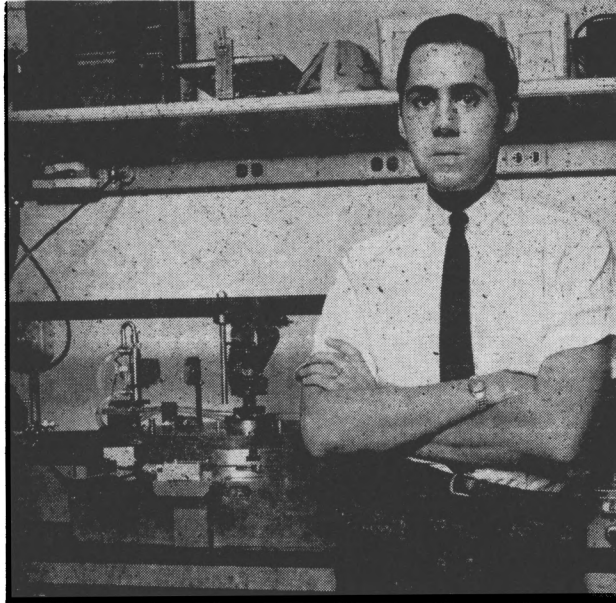
“But we’re well supported here at Western Electric,” said Bob. “We have very fine lab equipment—and can obtain the equipment we need.”

So Bob designed and built his “spectral bi-directional reflectometer.” It provides data for a computer program he created that calculates reflector shape by numerically integrating a set of differential equations.

Bob is currently working on the development of an even newer type reflector which will distribute energy from line type fila-

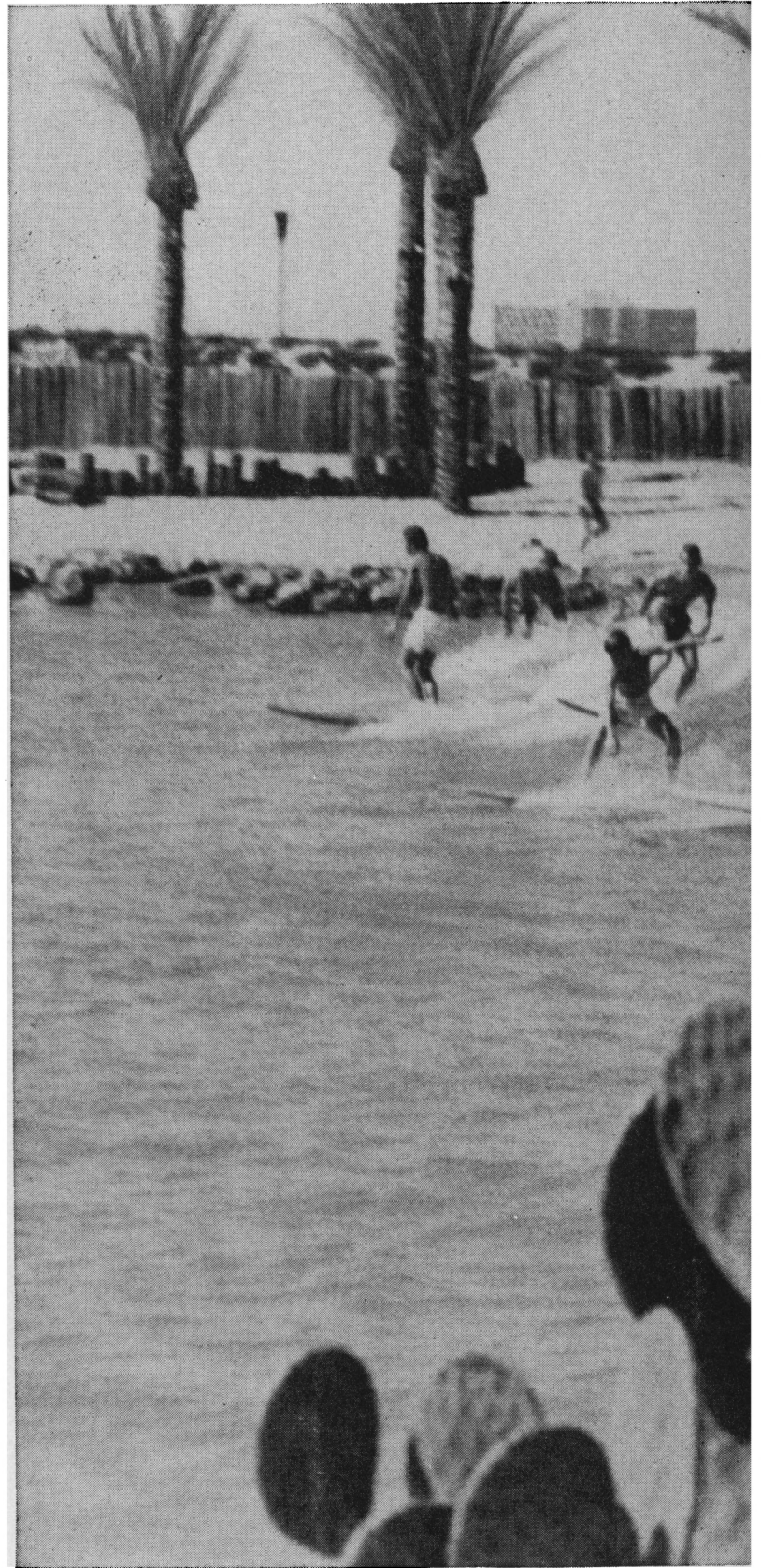
ment lamps over a large rectangular area. An array of these reflectors will allow the uniform heating of almost any size workpiece.

“We’re free to look around for our own projects,” said Bob. “I like that—that’s why I’m here.”

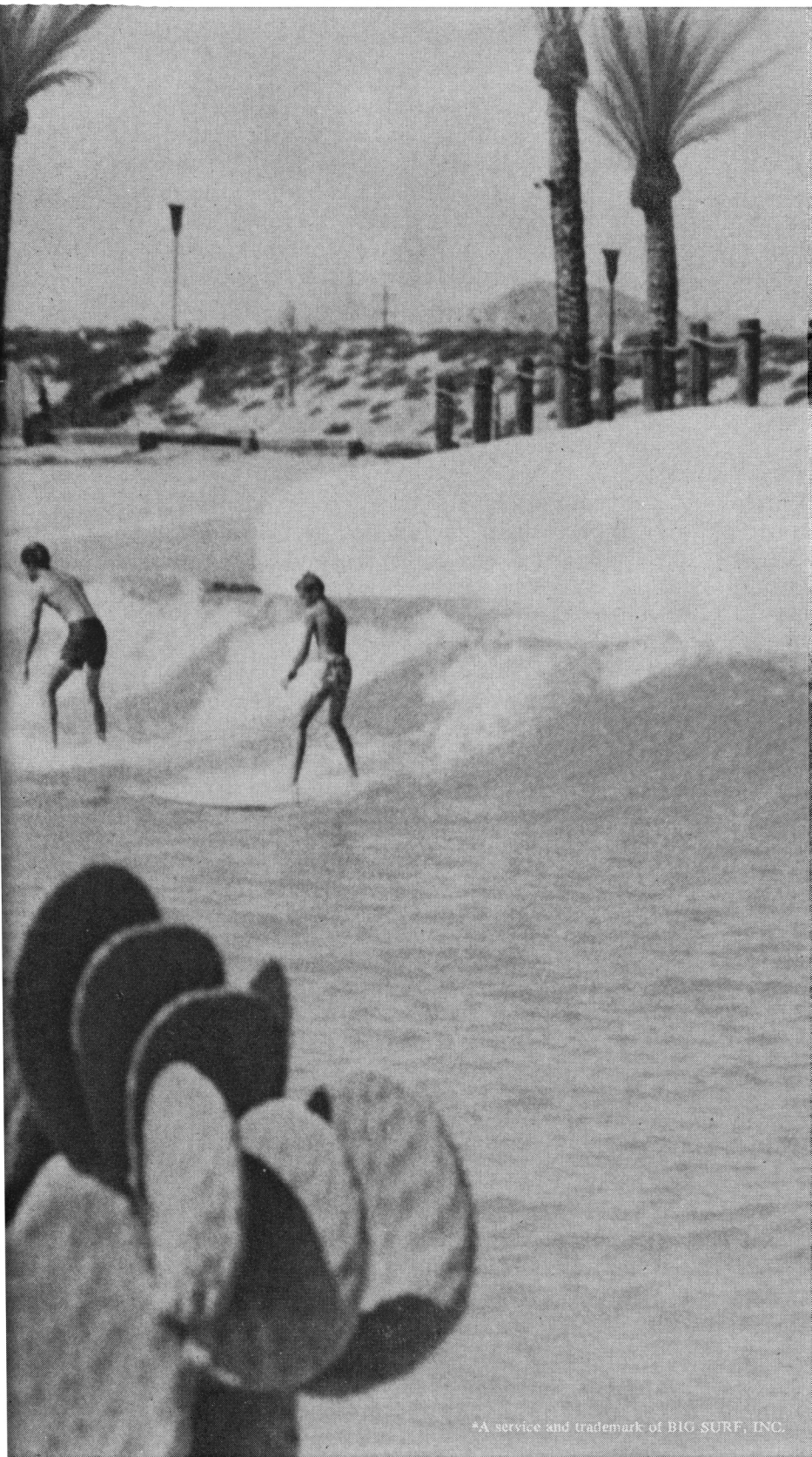


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Surfing has come at last to the Arizona desert.

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If you'd like to do something about making waves in the desert, or fighting famine in India, or anything else that a diversified company does to improve life, pick up a copy of our brochure "Careers with FMC" from your placement office. Or write FMC Corporation, Box 760, San Jose, Calif. We're an equal opportunity employer.



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# A Guide To Interviewing And Placement

by John Cunningham

Your future is analogous to a house and its construction and in order to build this home you must start with a plan or blueprint. After your plan has been drawn, it will be necessary to obtain building materials and occasional professional help. Combine these essentials with a lot of hard work and you will have built a future that is both strong and safe for your prospective family. Fail to develop any of the preceding items and . . . well, let's think positive. Most of you have already drawn a blueprint for your future. This article will attempt to help you in obtaining the building materials and professional help, and will also guide your efforts in establishing a rewarding career.

On October 8, 1969, Mr. Herbert P. Krog, a Registered Professional Engineer, a member of the American Institute of Chemical Engineering and a chemical engineer with the Union Carbide Corporation in South Charleston, West Virginia, spoke to the members of the ASME on "How to Evaluate a Potential Employer." Mr. Krog who has been in chemical process design and plant start-up for 9 years, stated that there were four steps for evaluating an employer. These are: 1) Establish your goals, 2) Analyze the characteristics of the firms with whom you are interviewing. 3) Match the firm's goals to your own individual goals and 4) Decide upon the company which you feel offers the most challenging and rewarding career. If the above steps are followed, you will have made a better career choice for the effort.

You may ask yourself, "What can I do toward making a decision on a specific field I want to enter?" or "How can I decide upon a specific field?" If you have decided upon a specific field, allow yourself a greater insight into this field. Work at a part-time or summer job which will allow you to observe people in these specific fields at work. If you want to become an electrical engineer dealing with micro-circuits, wouldn't it make a lot more sense working as a draftsman or photo lab technician with an electrical concern than working as a hot dog vender in a baseball park? Don't get me wrong, I have nothing against a person watching a free game, but will the free games help you decide whether or not micro-circuit engineering is for you? For those of you who have not chosen a specific area, try to get a summer job in a general field. If you want to become a civil engineer, how about a job as a draftsman with a surveying company? This type of employment will not be the type in which you will want to be engaged for the rest of your life, but it will give you an insight into what the regular employees do and will make the choice of a career a little easier. If you are going to graduate this year or were unable to get the

type of summer job you wanted, the previous method is a little late. If this is the case, another method of establishing your goals is to talk to people in the general or specific fields that interest you. Ask such questions as what they like about their jobs, what they dislike, is their job challenging, what exactly are their responsibilities, and how they decided upon their careers. Most of these people will be happy to answer questions about their choice. By choosing a specific field, you will have laid the foundation for your future home and now comes the time to start building the framework.

The framework of your house consists of a few pre-interview steps. Read as much as possible about the companies in which you are interested. Many companies have invested in pamphlets and brochures which may be obtained on the first floor of the Engineering Building near the interviewing rooms. These brochures indicate whether a company is a production or service firm, into what fields the companies delve, a little about what a potential employee can expect to find in each field, objectives of the companies and occasionally a brief financial resources statement about the companies. You can also find out about companies through advertisements in magazines, papers, on radio and television. Each of these items help build a "company image" in your mind. It is most important that you know about a company prior to an interview, if not for the sake of aiding your decision as to which companies to interview, then for creating a good impression with your potential employer.

Other pre-interview steps concern the use of the placement facilities offered by the University of Missouri. The potential graduate can, of course, interview on his own, but why go to the trouble and expense when it can be done by the Placement Office (Room 101—Engineering) at no cost to you? If you plan to interview through the Placement Office you must fill out an MCPA (Midwest College Placement Association) form. From this original form, copies are made to be distributed to companies with whom a student wishes to interview. A student may indicate his desire to interview a particular company by placing his name on the sign-up sheets on the bulletin board just outside the Engineering Dean's office. There is no limit to the number of companies you may interview. A list of companies and interview dates may be obtained in the Placement Office. If a schedule is full, contact the Placement Office and they will contact the respective company to try and obtain additional interviewers to handle the overflow of interested students. If this is not possible, your MCPA form will be given to the recruiter so that they may contact you later. If any problems arise such

as a student missing an interview for a valid reason or a company failing to show up for interviews, the Placement Office will try to remedy the problems.

As of this year, the University of Missouri has developed a new service for alumni. If an alumnus has become dissatisfied with his present job, he may contact the Placement Office which will aid him in locating a more satisfactory employer through campus interviews or by furnishing the alumnus with a list of companies requiring personnel with his type of degree for a particular area of the United States. Sometimes companies will contact the Placement Office requesting a list of dissatisfied alumni and these lists will be furnished at no cost to the alumni. If a student or alumnus runs across any problems regarding interviews, the Placement Office will try to help . . . FREE.

As a last step to completing the framework to your house, if you are investigating the possibilities of foreign service, you should consider *all* aspects of life in another country. These aspects should enter into your considerations when reaching a final decision about a company.

Now you are ready to put the roof and walls on your home for the future. Interviewing is one of the most important steps in choosing a career. The interview will start with a brief talk about last week's football game or the "price of peas in Persia" to put the interviewee at ease. After this informal chat the interviewer will get down to business. This gives you a chance to evaluate the company and it also gives the interviewer an opportunity to evaluate you. Your main concern when interviewing is to obtain information which you were unable to find in the company's brochures. **ASK QUESTIONS!** This point can't be emphasized enough. This is your big opportunity to find out what opportunities there are for job advancement in your particular field, what the company has to offer in the way of responsible and challenging tasks if you are hired, what training would be required and how much, how diffi-

cult it is to change departments if you became dissatisfied, etc. This is also the period during which the interviewer will attempt to gain insight as to your personality, your future goals, your interest in the company, and many other areas of your career interests. It is all important at this time that you create a good impression on the interviewer because he will have the last word as to whether a company will forget about you or invite you for a location visit. Listed below left are a few do's and don'ts of interviewing.

Remember, the interviewer is your friend until you show him otherwise. Just be yourself and convince him that his company will not regret any offer made to you.

At this point you are ready to put the finishing touches on your home and move in the furniture. This step involves the plant visit and the final decision. Your plant visit with the company is your opportunity to re-view the company and vice-versa. This is where you will actually see your peers doing what you will be doing in the near future. Find out what these people are like. Talk to them and ask their opinion of the company. If the majority of them are happy with their jobs, it is very probable that you will be satisfied with your job, also. If many of them are unhappy, well . . . it makes you wonder. You are also much more likely to choose a company in which your fellow employees are honest, friendly and have a sense of humor than one in which you will be working with grouches. Take a look at your supervisor. Does he like his job? If he is much older than his subordinates, then there may be little chance for advancement. Does your supervisor accept questions from his subordinates with the same spirit in which they were asked or does he "hate to be bothered?" How is the company running their operation? Is it smooth or are there a lot of hang-ups? Observe the training in which you will be engaged. Match your qualifications with those of your peers. Find out what the company does to prevent technical obsolescence. Are your fellow employees eager to help you? You may also wish to explore the recreational facilities of the city or town along with the educational and housing aspects. There are many questions to be answered on these trips to plant locations. Don't waste this valuable time. All these observations and many more will give you a pretty good picture of any company and the surrounding community.

Now comes the last step in completing your "home." The decision. This decision should not be made hastily. It will affect your career. Consider all aspects of the companies you have seen. It may even be helpful for you to make a table listing the good and bad points of each company. When you have compared potential employers and reached a decision you will, of course, inform the one you have selected for your acceptance. But, don't forget to notify the companies you did not select of your rejection, and thank them for their offer. You have just completed your mansion . . . a rewarding and challenging career.

#### *DO*

- Act natural
- Be prompt & courteous
- Speak distinctly
- Be an attentive listener
- Present a neat appearance
- Ask relevant questions
- Present your strong points
- Offer a firm handshake

#### *DON'T*

- Let nervousness show
- Show up late or miss in interview
- Chew gum or smoke
- Yawn, slouch or look around the room
- Wear extreme clothes or hair-dos
- Do all the talking
- Criticize yourself or oversell yourself
- Offer a limp handshake

**If you are a senior...**

**1971**



# could be the most important year of your life.

As you contemplate one of the most important decisions of your life, you will want to remember this: it is not just "a job" you are seeking—it should be the beginning of a career. And if it is to be successful, both you and your employer must need and want each other.

To help you with your decision, we invite you to consider the opportunities at Pratt & Whitney Aircraft. Currently, our engineers and scientists are exploring the ever-broadening avenues of energy conversion for every environment . . . all opening up new avenues of exploration in every field of aerospace, marine and industrial power application. The technical staff working on these programs, backed by Management's determination to provide the best and most advanced facilities and scientific apparatus, has already given the Company a firm foothold in the current land, sea, air and space programs so vital to our country's future.

We select our engineers and scientists carefully. Motivate them well. Give them the equipment and facilities only a leader can provide. Offer them company-paid, graduate-education opportunities. Encourage them to push into fields that have not been explored before. Keep them reaching for a little bit more responsibility than they can manage. Reward them well when they do manage it.

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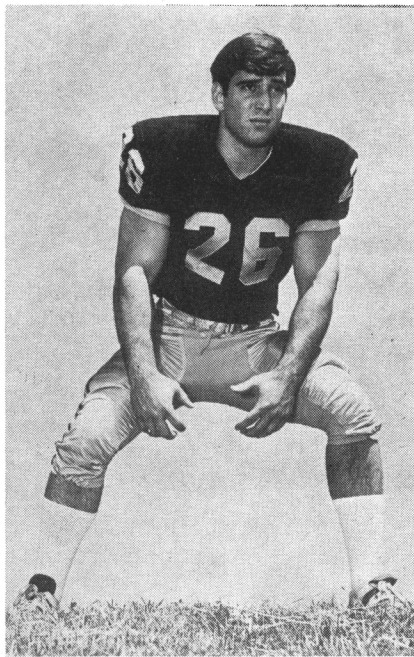
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# FOOTBALL

# ENGINEERS

by  
Rusty Grimm

It seems as though an age old expression pertaining to the men who play the game of football is dying- or at least its being rapidly disproved. The cliché, "a football player is all brawn and no brains" simply no longer holds true. More and more, gridiron performers make successful careers away from the striped field, in too many vocations to even begin to count. At UMC, not only has the football program turned out fine teams and great players, but also very talented men in engineering, science and other fields of study. It is amazing to think of the time these men spend on the practice field, followed by the hours they must spend poring over their books. In the demanding field of engineering, there are seven varsity and four freshmen ball-players who divide their time between sports and studying. It's obvious that men such as these, who do both so well, can be nothing but successful in later life.



**NIP WEISENFELS**

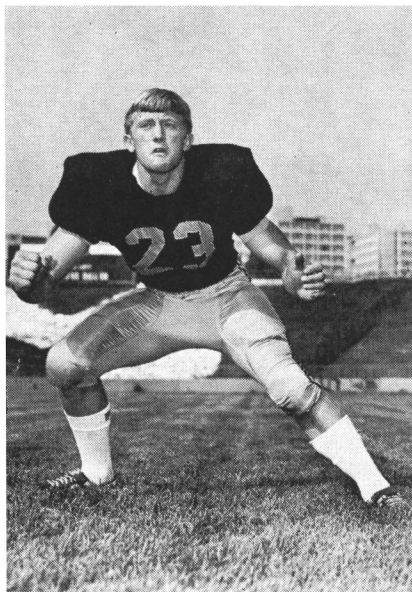
John (Nip) Weisenfels, in his third year as a Bengal regular, has matured into a tough, dependable

middle man in coach Dan Devine's rugged Mizzou defense. The 5-11, 204-pound Weisenfels, voted Line-man-of-the-Week last season by *Sports Illustrated*, is known for his smashing tackling and good mobility. The 21-year old Weisenfels, a native of Webster Groves, received a serious knee injury early in the Mizzou season, but is expected to return after an absence of a few games. Not only is Nip tough on the field, but posts some of the top grades in Chemical Engineering as well.

\* \* \*

It is sometimes tough for a sophomore to win a starting role on the always tough Tiger squad, but Roger Yanko, a 5-11, 194 pound linebacker, is one of the few who has done it. Yanko is instinctively tough and a surefire tackler. His grades in Civil Engineering have been outstandingly good, showing the 20-year old is at home not only on the gridiron, but also in the classroom.

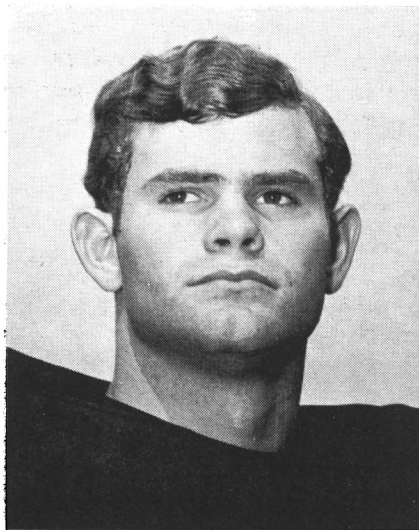
THE MISSOURI SHAMROCK



**ROGER YANKO**

\* \* \*

J. L. Doak is an aggressive player who likes to hit, a sophomore defensive end. Doak moved from his linebacking position on the frosh team, then passed up a year to get better acquainted with his new spot. Number 90, a strong athlete with good range, is seen often by opponents who are returning kicks. With two years of eligibility remaining, the Electrical Engineering major from Cameron has a big Missouri future ahead.



**J. L. DOAK**

FALL 1970

Mark Clark, from Belleville, Illinois, is in his first year of varsity competition. At 6-1, 208, Clark was voted the outstanding interior lineman on last year's frosh team. At offensive guard, the 19-year old Clark has already seen a lot of action, and is fast improving.

\* \* \*

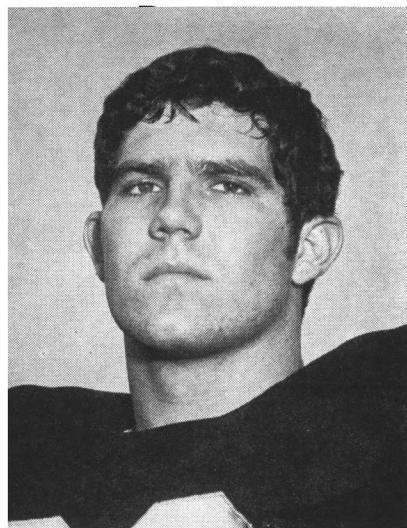
Bob Schmitt, a 20-year old sophomore, was looking forward to his first season as a varsity squad Bengal. But during the two-a-day drills last fall, he sustained a severe shoulder injury that has sidelined him this season. At 6-2, 215, the Crystal City native was big enough to take the knocks a defensive tackle gets during the season. Schmitt's name has already appeared on the Dean's List for his work in Civil Engineering.

\* \* \*

In some years when a squad has a surplus of players at one position, a coach may elect to move some of his more talented players to the scouting team, and change them to a new position. On that team, they gain a year of experience without sacrificing a year of their eligibility. Craig Schnur, a 6-3, 200 lb. defensive end-linebacker is one such player. The hard hitting sophomore hails from Excelsior, Minn.

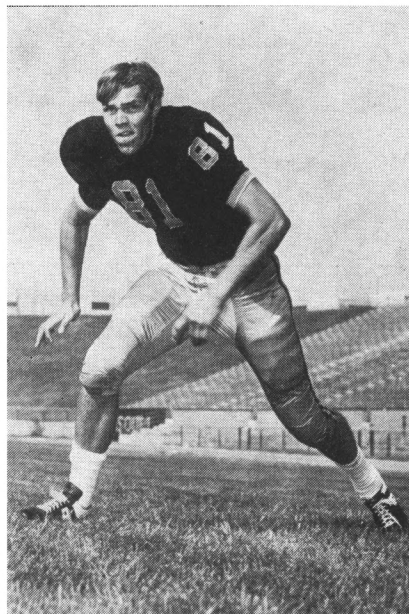
\* \* \*

On the field of play, there is always a man who seems to come up with the "big play." Mike Bennett, a senior defensive end, is that type of player. He is an aggressive type of wingman, who puts immediate pressure on the passer. He was hurt last year, but came back to win a place on the All-bowl team after Mizzou's Orange Bowl loss. The 21-year old Bennett stands 6-3, and weighs 208. A Chemical Engineering major, he is from Breckinridge, Missouri.



**ROBERT SCHMITT**

To make good grades and to make the varsity are the aspirations of all freshmen footballers. To the four engineering frosh grid players, this goal means countless hours of study and practice. Bill Cox, Ray Goff, Mike Haley and Craig Preston could be the players whom engineers and Mizzou fans could be seeing a lot of in the coming seasons.



**MIKE BENNETT**

## Requirement for Registration

As a Professional Engineer:

# THE "ENGINEER-IN-TRAINING" EXAMINATIONS

Revised by  
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Jefferson City, Mo. 65101**

How does a person earn the title of Registered Professional Engineer? According to the registration laws in Missouri, a Registered Engineer is "any engineer registered in good standing, and legally authorized to practice engineering in this state." The definition of an EIT engineer is a "person enrolled by the Board as an engineer-in-training." To become an engineer-in-training a person must pass a preliminary examination

Under the present Missouri laws a person applying to register as a professional engineer must pass both the preliminary examination and a second examination. Each examination consists of two sessions. The first examination takes three hours in the morning and three hours in the afternoon. It covers mathematics and basic sciences. This examination can be taken in the semester prior to graduation or at the time when registration as a professional engineer is attempted. The minimum time to complete the process of registering is eight years and at this time the second examination may be taken. Four of the eight years must be spent in employment as an

engineer before this test, which covers the theory and practice of engineering, may be taken. A person must register thirty days prior to the date the test is given.

Sessions I and II of the examination constitute the preliminary examination. Candidates for registration as professional engineers and candidates for enrollment as engineers-in-training must take this examination. Both groups get the same test and are required to answer the same number of questions. Session I covers mathematics, chemistry statics, thermodynamics, and fluid mechanics. Session II consists of physics, dynamics, electrical theory, mechanics of materials, and economic selection. This part of the examination can be taken in April in Columbia.

Sessions III and IV are for candidates for registration as professional engineers. The questions cover the theory and practice of professional engineering. It is the same for all candidates. A candidate who is going to take this test should have a broad knowledge of the various branches of engineering in addition

to a specific knowledge of his own field. The examinations allow a reasonable choice as to the problems that can be worked. The passing grade for each examination is seventy per cent.

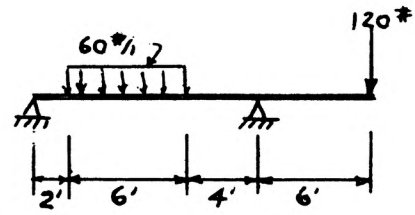
To qualify for the examinations a person does not need any formal education. Eight years of professional engineering experience is required. Three of those years must be fulfilled after the age of twenty-one. An engineering student who has been awarded a degree in engineering from an accredited engineering school may count four years toward the total of eight which are required. In addition one year of satisfactory teaching in engineering subjects in an engineering school is equal to one year of engineering experience.

The University of Missouri offers a refresher course consisting of a lecture series to aid prospective professional engineers and engineers-in-training. The lectures are designed for engineers who have been away from school for a time and need to review. Dr. Ralph H. Luebbers is in charge of the program.



## SAMPLE PROBLEM: MECHANICS OF MATERIALS

**FIND:** The value of  $y$  at the position midway between the supports and at the overhanging end for the beam shown.

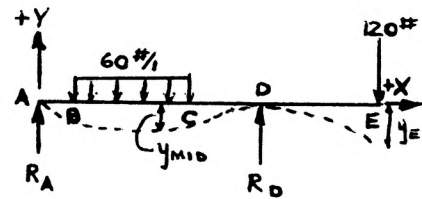


**SOLUTION:**

First: Find Reactions

$$\sum M = 0 \quad R_A = 150 \text{ lb.}$$

$$R_D = 330 \text{ lb.}$$



Using Double Integration Method,  
write Moment Equation beginning at A.

$$EI \frac{d^2 y}{dx^2} = M = 150x - \frac{60}{2} \langle x-2 \rangle^2 + \frac{60}{2} \langle x-8 \rangle^2 + 330 \langle x-12 \rangle$$

$$\text{Integrating: } EI \frac{dy}{dx} = V = 75x^2 - 10 \langle x-2 \rangle^3 + 10 \langle x-8 \rangle^3 + 165 \langle x-12 \rangle^2 + C_1$$

$$\text{Integrating again: } EI y = 25x^3 - \frac{10}{4} \langle x-2 \rangle^4 + \frac{10}{4} \langle x-8 \rangle^4 + \frac{165}{3} \langle x-12 \rangle^3 + C_1 x + C_2$$

To evaluate  $C_2$ , it's known that deflection  $y=0$  at supports

$$\text{At A, } x=0 \quad \therefore EI y = 0 = C_2$$

To evaluate  $C_1$ , it's known that  $y=0$  at D,  $x=12'$

$$\therefore EI y = 0 = 25(12)^3 - \frac{10}{4} \langle 12-2 \rangle^4 + \frac{10}{4} \langle 12-8 \rangle^4 + 0 + 12C_1$$

$$C_1 = -1570$$

Now to obtain midspan deflection,  $y_{mid}$ , at  $x=6'$  use deflection eq.

**NOTE:** Moment equation is based on the definition  $M = (\sum M)_L$  which means only values to the left of section studied are considered. Hence, loads to the right of the exploratory section (ie, terms with negative values within brackets) are neglected.

Hence, the deflection equation becomes

$$EI y = 25(6)^3 - \frac{10}{4} \langle 6-2 \rangle^4 + \frac{10}{4} \langle 6-8 \rangle^4 + \frac{165}{3} \langle 6-12 \rangle^3 - 1570(6)$$

$$EI y = 25(6)^3 - \frac{10}{4} (4)^4 - 1570(6)$$

$$y_{mid} = \frac{-4660}{EI}$$

And, at the overhanging end,  $x=18'$

$$EI y = 25(18)^3 - \frac{10}{4} \langle 18-2 \rangle^4 + \frac{10}{4} \langle 18-8 \rangle^4 + \frac{165}{3} \langle 18-12 \rangle^3 - 1570(18)$$

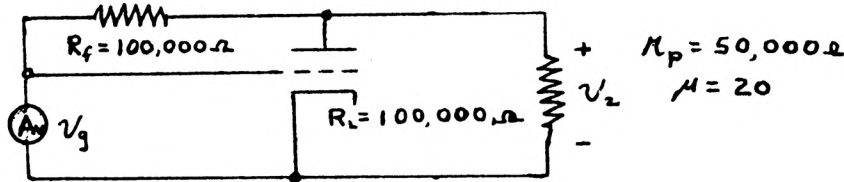
$$EI y = 25(18)^3 - \frac{10}{4} (16)^4 + \frac{10}{4} (10)^4 + \frac{165}{3} (6)^3 - 1570(18)$$

$$y_E = \frac{-9420}{EI}$$

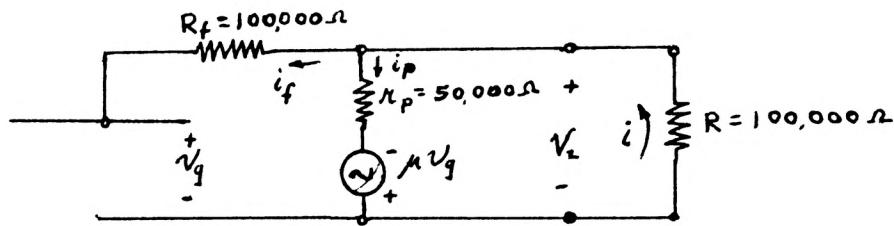
SAMPLE PROBLEMS

Given: The A-C equivalent circuit of a Triode amplifier with feedback is illustrated herewith.

Find  $A_v$ . Then remove  $R_f$  the feedback resistor and Find  $A_v'$



SOLUTION:



To FIND  $A_v$ :

Loop Eq.  $20v_g = -v_2 + i_p(50,000)$

Sub  $i_p$   $20v_g = -v_2 + 50,000 \left( \frac{v_g - 2v_2}{100,000} \right)$

$20v_g = -v_2 + \frac{v_g}{2} - v_2$

$19.5v_g = -2v_2$

$\frac{v_2}{v_g} = -\frac{19.5}{2}$

Now

$A_v = \frac{v_2}{v_g} = -\frac{19.5}{2}$

$A_v = -9.75$

To get  $i_p$ :

$i_f = \frac{v_2 - v_g}{100,000}$

$i_p = i - i_f = i - \left( \frac{v_2 - v_g}{100,000} \right)$

$v_2 = -i(100,000)$

$i = -\frac{v_2}{100,000}$

So  $i_p = -\frac{v_2}{100,000} - \left( \frac{v_2 - v_g}{100,000} \right)$

$i_p = \frac{v_g - 2v_2}{100,000}$

Ans.

To FIND  $A_v'$ :

Loop Eq.  $20v_g = i(150,000)$

Sub.  $i$   $20v_g = \frac{-v_2(150,000)}{100,000} = -\frac{3}{2}v_2$

$\frac{v_2}{v_g} = -20 \left( \frac{2}{3} \right) = -\frac{40}{3}$

$A_v' = \frac{v_2}{v_g} = -\frac{40}{3} = \underline{\underline{-13.33}}$

Ans

Given: A 30 mile section of a transmission line is terminated in its characteristic impedance. A 10-volt signal with angular frequency of  $\omega = 2\pi \times 10^4$  radians per second is impressed at the input end of the line. The line has the following parameters:  $R=25$  ohms/mile;  $L=1$  millihenry/mile;  $G=21$  micro-mhos/mile;  $C=0.06$  microfarad/mile.

SOLUTION:

A. Since the line is terminated in  $Z_0$ , there will be no standing waves.

$$\therefore V = V_s e^{-\gamma l}$$

Compute: The value of the voltage at the output end of the line.

B. The propagation constant:  $\gamma = \sqrt{ZY} = \alpha + j\beta$

We are here interested in  $\alpha$ , the attenuation constant

$$1. Z = R + jX_L = 25 + j\omega L = 25 + j2\pi \cdot 10^4 \cdot 10^{-3} = 25 + j2\pi \cdot 10$$

$$Z = 25 + j62.8 = 67.6 \angle 68.3^\circ, \text{ ohms}$$

$$2. Y = G + jB_c = G + j\omega C \quad C \text{ in farads}$$

$$= 21 \times 10^{-6} + j2\pi \cdot 10^4 \cdot 0.06 \times 10^{-6} = [21 + j3770] \times 10^{-6}$$

But  $21 \ll 3770$

$$Y \approx j37.70 \times 10^{-4}, \text{ mhos}$$

$$3. \gamma = \sqrt{ZY} = \sqrt{(67.6 \angle 68.3^\circ)(37.7 \times 10^{-4} \angle 90^\circ)}$$

$$\gamma = 10^{-2} \sqrt{(67.6)(37.7)} \angle (68.3 + 90)$$

$$\gamma = 0.505 \angle 79.2^\circ$$

$$\alpha = 0.505 \cos 79.2^\circ = 0.0914 \text{ nepers/mile}$$

C. Terminated in  $Z_0$ :

$$V = V_s e^{-\gamma l} = V_s e^{-l(\alpha + j\beta)} = V_s e^{-\alpha l} \cdot e^{-j\beta l}$$

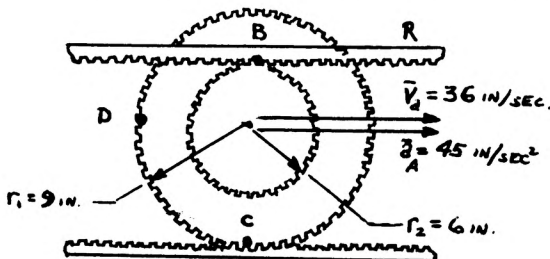
$$\text{and } |V| = V_s e^{-\alpha l}$$

$$= 10 e^{-0.0914 \cdot 30} = 10 e^{-2.74} = \frac{10}{15.5} = 0.645 \text{ V}$$

So at the receiving end,  $|V| = 0.645 \text{ Volts}$

Ans.

DYNAMICS Given: The center of the double gear has a velocity of 36 in/sec. to the right and an acceleration of 45 in/sec<sup>2</sup> to the right. Find:  
A) the angular acceleration of the gear B) the accelerations of points B, C, and D of the gear.



# Problem



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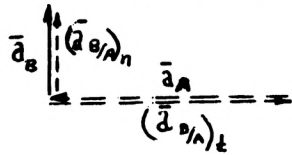
UNIVERSITY \_\_\_\_\_

MAJOR \_\_\_\_\_

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Virgil Hanson, Gulf Oil Corporation, P. O. Drawer 2100,  
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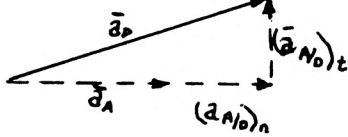
### ACCELERATION OF C



$$\begin{aligned} \bar{a}_c &= \bar{a}_A + \bar{a}_{A/C} = \bar{a}_A + (\bar{a}_{A/C})_t + (\bar{a}_{A/C})_n \\ &= \bar{a}_A + \bar{\alpha} \times \bar{r}_{C/A} - \omega^2 \bar{r}_{C/A} \\ &= 45\bar{i} - 5\bar{k} \times (-9\bar{j}) - (4)^2(-9\bar{j}) = 144\bar{j} \\ \bar{a}_c &= 144 \text{ in/sec}^2 \uparrow \end{aligned}$$

ANS.

### ACCELERATION OF D



$$\begin{aligned} \bar{a}_d &= \bar{a}_A + \bar{a}_{A/D} = \bar{a}_A + (\bar{a}_{A/D})_t + (\bar{a}_{A/D})_n \\ &= \bar{a}_A + \bar{\alpha} \times \bar{r}_{D/A} - \omega^2 \bar{r}_{D/A} \\ &= 45\bar{k} - 5\bar{k} \times (-9\bar{i}) - (4)^2(-9\bar{i}) = 189\bar{i} + 45\bar{j} \\ \bar{a}_d &= 194 \text{ in/sec}^2 \angle 13.4^\circ \end{aligned}$$

ANS

## MATHEMATICS

Given: Observations are taken from a balloon of two objects 40,000 feet below on a plain. Find: The distance between the objects if the observation data from balloon to objects is given as:

- A) Bearing  
B) Depression Angle

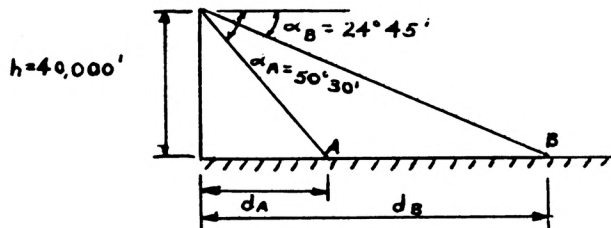
#### OBJECT A

36° East of North  
50° 30'

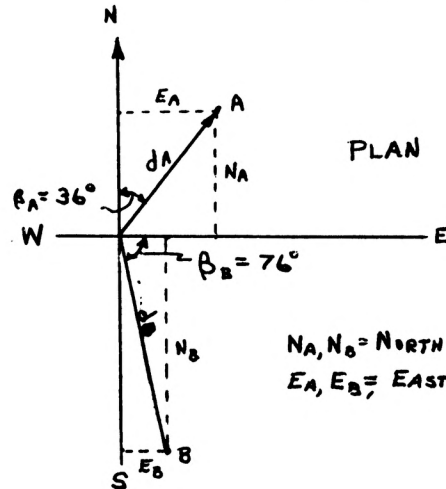
#### OBJECT B

76° South of East  
24° 45'

#### LOCATION SKETCHES



HORIZONTAL PROFILE



PLAN

$N_A, N_B =$  NORTH COORDINATES  
 $E_A, E_B =$  EAST COORDINATES

From the Horizontal Profile

$$\tan \alpha_A = \frac{h}{d_A}$$

$$d_A = \frac{h}{\tan \alpha_A}$$

$$\tan \alpha_B = \frac{h}{d_B}$$

$$d_B = \frac{h}{\tan \alpha_B}$$

Coordinate lengths are:

$$E_A = d_A \sin \beta_A = h \frac{\sin \beta_A}{\tan \alpha_A} = 40,000 \times \frac{0.5878}{1.2131} = 19,360 \text{ ft.}$$

$$N_A = d_A \cos \beta_A = h \frac{\cos \beta_A}{\tan \alpha_A} = 40,000 \times \frac{0.8020}{1.2131} = 26,400 \text{ ft.}$$

$$E_B = d_B \cos \beta_B = h \frac{\cos \beta_B}{\tan \alpha_B} = 40,000 \times \frac{0.2419}{0.4610} = 20,980 \text{ ft.}$$

$$N_B = d_B \sin \beta_B = h \frac{\sin \beta_B}{\tan \alpha_B} = 40,000 \times \frac{(-0.9703)}{0.4610} = 84,300 \text{ ft.}$$

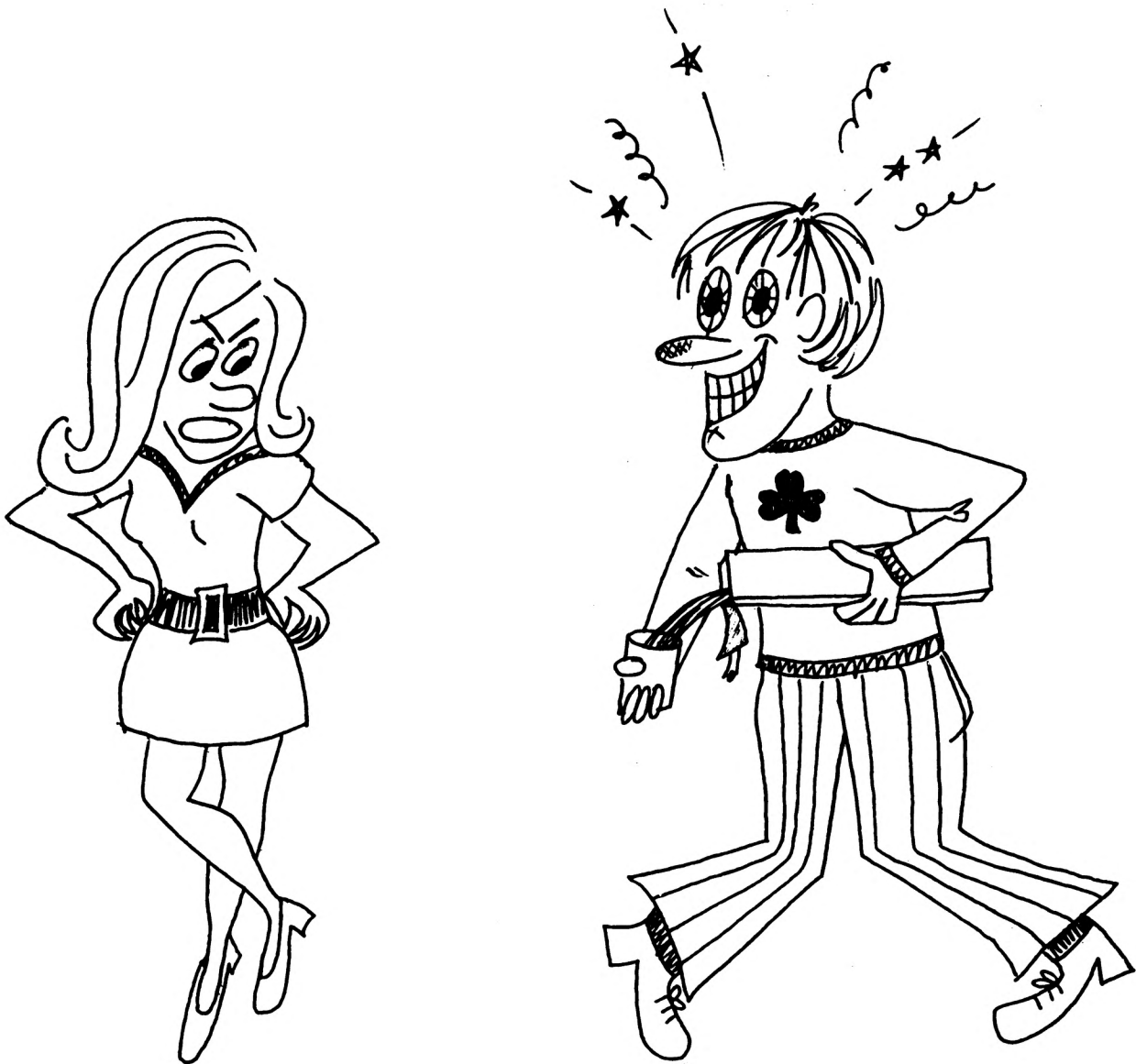
From distance formula

$$\begin{aligned} d_{AB} &= \sqrt{(E_A - E_B)^2 + (N_A - N_B)^2} = \sqrt{(19,360 - 20,980)^2 + (26,400 - (-84,300))^2} \\ &= \sqrt{(1620)^2 + (110,700)^2} \end{aligned}$$

$$d_{AB} = 109,750 \text{ FT.}$$

ANS

# Episodes in ENGINEERING



"AND I THOUGHT YOU CARRIED A SLIDE RULE!"

**SOLUTION:** Solve vectorally

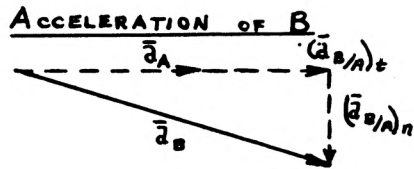
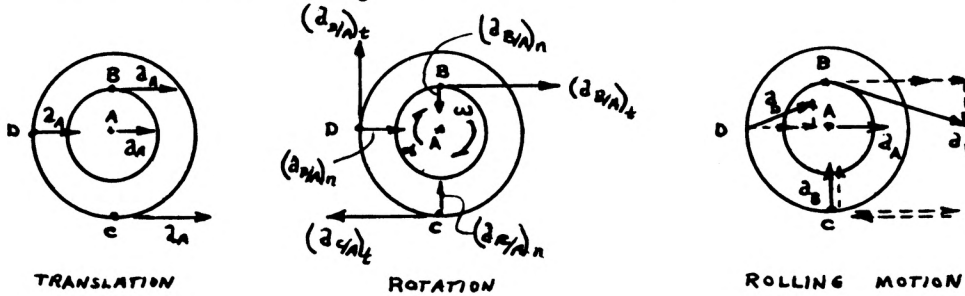
a) Angular acceleration

$$s_A = r, \theta; \quad v_A = \frac{ds}{dt} = r, \frac{d\theta}{dt} = r, \omega; \quad a_A = \frac{dv}{dt} = r, \frac{d\omega}{dt} = r, \alpha$$

$$\begin{array}{llll} \underline{So} & v_A = r, \omega & 36 \text{ in/sec} = (9 \text{ in}) \omega & \bar{\omega} = -4 \bar{k} \text{ radians/sec.} \\ & a_A = r, \alpha & 45 \text{ in/sec}^2 = (9 \text{ in}) \alpha & \underline{\underline{\bar{\alpha} = -5 \bar{k} \text{ radians/sec}^2}} \quad \underline{\underline{ANS}} \end{array}$$

b) Accelerations

Resolve motion of gear into a translation with A and rotation about A



$$\begin{aligned} \bar{a}_B &= \bar{a}_A + \bar{a}_{B/A} = \bar{a}_A + (\bar{a}_{B/A})_t + (\bar{a}_{B/A})_n \\ &= \bar{a}_A + \bar{\alpha} \times \bar{r}_{B/A} - \omega^2 \bar{r}_{B/A} \\ &= 45\bar{i} - 5\bar{k} \times 6\bar{j} - (4)^2(6\bar{j}) = 75\bar{i} - 96\bar{j} \\ \underline{\underline{\bar{a}_B = 121.8 \text{ in/sec}^2 \angle 52.0^\circ}} \end{aligned}$$

ANS

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- MECHANICAL ENGINEERS
- LABORATORY TECHNICIANS

For further information, write or call:

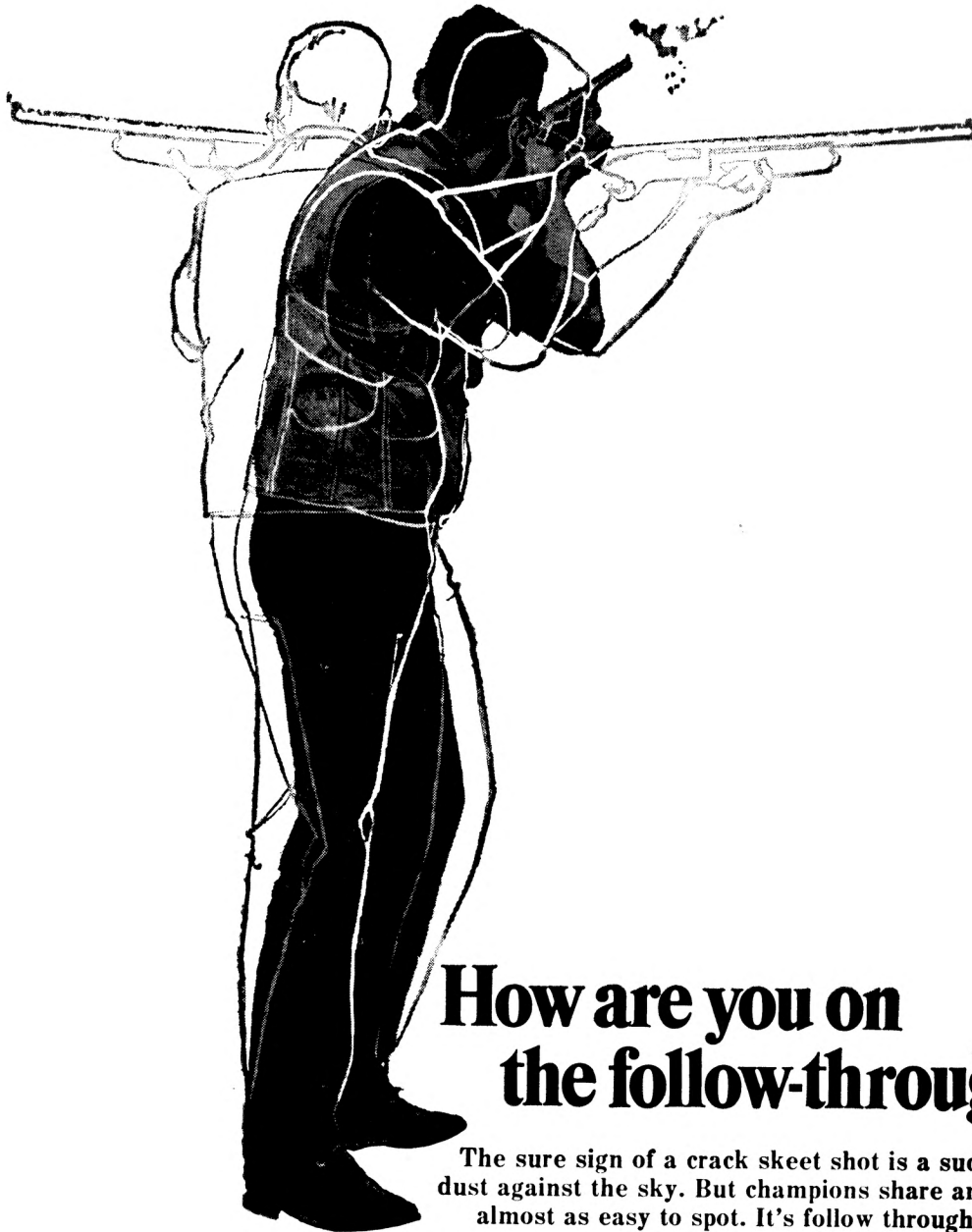
PERSONNEL DIRECTOR

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FALL 1970

Page 25



# Shamrock Sweetheart

by D. Brent Mendenhall

*Overalls seemed to have solved the problem of mini versus maxi for Fall Sweetheart Debbie Blood. Sometimes style must be sacrificed for practicality, particularly on outings in corn fields.*

*Although Debbie wears Aggie clothing, she is really an Engineers' girl at heart. Debbie is a freshman from Webster Groves majoring in Special Education and is a Kappa pledge. Her main activities have been studying and Young Life, a campus Christian organization. She has an interest in astrology and plans to teach after graduation.*

*When asked about her impressions of Mizzou, she said, "I like Missouri very much and really enjoyed the football season. I came to M.U. because I wanted to go to a big school and I have been quite happy with the size. Most of my classes are good but a few of the required courses sometimes seem boring. Also, I get along real well with the girls in my sorority and my dorm. I haven't met many Engineers but the ones that I have seem real nice."*



# *The Alumni Are*

## *Alive and Well in . . .*

**EDITOR'S NOTE:**

*Information on alumni is needed to fill  
this space. Please help us.*

---

INFORMATION QUESTIONNAIRE

Name \_\_\_\_\_

Address \_\_\_\_\_

Present Position \_\_\_\_\_

Year of Graduation and Degree(s) \_\_\_\_\_

What was your most memorable experience while an undergraduate engineer at M. U.?

# Our 50 year guarantee on clay pipe was ridiculous.

# Our new guarantee is twice as ridiculous.

We just raised our 50 year guarantee on the durability of clay pipe to 100 years.\* What's so ridiculous about that?

Mainly the fact that guaranteeing clay pipe for any length of time is like guaranteeing the law of gravity. Clay is one of those rare elements in nature that is virtually incapable of being corroded or chemically broken down.

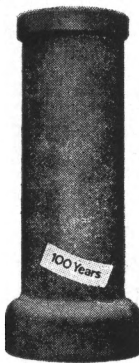
Clay is a residue. It's what is left after sun and rain and sleet and snow have beaten down on the earth for thousands of years. When the earth's crust can't be broken down any further, what you have is clay.

So you can find clay wastewater systems all over the country that have been serving for generations without ever wearing out.

And, we'd like to add that our patented urethane joint makes Dickey coupling pipe the

best you can buy. Constant compression, plus flexibility of the plastic material, make certain that a complete bottle-tight seal results throughout the entire joint area. The most dependable and total seal you can get in a wastewater system . . . even if settling occurs.

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\*Dickey Clay will supply—free of charge—replacements for any clay pipe which has been damaged, destroyed or impaired in service for a period of 100 years from contract date, if damage has been caused by corrosion or other chemical decomposition from acids, alkalis, sewage or industrial wastes (except Hydrofluoric Acid) or damage by rats or other rodents whether pipe is used for industrial, residential or general drainage purposes. Damage from improper handling, placement or trench loading is not covered.

# Clubs, Honoraries, Societies etc. . . .

by Josie Stanford

## ENGINEER'S CLUB

The Engineers' Club is an affiliate of the National Society of Professional Engineers. The Club serves as a forum for topics of general interest to engineers, such as programs on engineering curriculum, ecology, graduate work, professional opportunities, and campus activities at monthly meetings. In addition, the Club actively supports the *Missouri Shamrock* and participates with the Missouri Society of Professional Engineers. The membership of the St. Pat's Board, the planning committee for Engineers' Week, is drawn from the Engineers' Club.

This year's officers are Bill Cloud, President; Ron Dupree, Vice President; Roger Wagner, St. Pat's Board Chairman; Bruce Kothe, Secretary; Scott Hall, Treasurer; and William Douglas, Business Manager.

## TAU BETA PI

The Missouri Alpha chapter of Tau Beta Pi was granted its charter sixty-eight years ago this November 15. Its purpose is to recognize those students who have achieved high scholarship and distinguished alumnae in the field of engineering.

A pledge class is selected each semester from among the junior and senior classes. Pledge duties include the polishing of a roughly cast replica of the Bent, writing an essay on some facet of engineering and obtaining signatures of officers, advisors and a specified number of actives and alumni.

Projects include a teacher evaluation in which students rate all professors on a 4.0 scale. The professor with the highest "GPA" is awarded \$200 and a plaque. It also sponsors a slide rule class and hopes to establish a tutoring service for freshman and sophomores.

Officers are: President, Bob Schwegman; Vice President, Dennis Fessler; Recording Secretary, Gary Schlemper; Corresponding Secretary, Larry Murphy; Treasurer, Dr. James Rathke; and faculty advisors Dr. Carroll E. Goering of Agricultural Engineering, Dr. Jay B. McGarraugh, C. E., Dr. Robert G. Combs, EE., and Dr. Darrol Timmons, MAE and NE.

## STUDENT COUNCIL

Engineering Student Council members are elected by the engineering student body for terms of one year. Two upper classmen delegates and one freshman delegate are elected during the fall and winter semesters. Two graduate student delegates are elected by the Council from the engineering graduate students in general. Current officers, elected by the Council are: President, Dennis Maasen; Vice President, Steve Hamblin; Secretary, Dale Klein; and Treasurer, Glenn Moll.

Past activities include participation in the Convocation ceremony, distribution of student activities funds, and representing students having problems concerning university administration policies. Activities planned for this year include winter and spring convocations, a fall engineering bar-b-que, development of a test file system and the Big Brother program.

## ASAE

Membership in the American Society of Agricultural Engineering is open to all agricultural engineering students. Programs are planned for meetings which are held on the second and fourth Tuesdays of every month. The annual fall outing, the first event of the year, was held recently. Phil Noellsch, President, stated ASAE's purpose as being that of promoting interest in the field of agricultural engineering. Other officers include Bill Anderson, Vice President; Dave Rabe, Secretary; Vince Ellebracht, Treasurer and Leroy Hahn is faculty advisor.

## ALPHA EPSILON

The purpose of this honor society is to promote the ideals of the engineering profession and to recognize those who exhibit a high level of attainment in the agriculture engineering profession. Activities of the society include fall and winter banquets in honor of new initiates.

Alpha Epsilon officers this year are: Charles Fulhage, President; Ellis Tuttle, Vice President; Dick Spray, Secretary and Bill Anderson, Treasurer. Faculty advisor is Dr. David Currence.

### *AIChE*

All chemical engineers are eligible to join the American Institute of Chemical Engineers. Speakers will be scheduled for many meetings. On November 10, Paul Hodges spoke on the topic, "The status of laws and environmental engineering for Monsanto Company. Steve Sanders is President of AIChE for this year.

### *ASCE*

The American Society of Civil Engineers is instrumental in better acquainting faculty members and students. It helps foster professional spirit towards civil engineering through sponsoring lectures by men from industry and related fields, films and activities. Meetings are held monthly and all CE's are invited to join.

The first activity of the year will be the annual football game between the graduate students and the undergraduates. A field trip will be held in the spring. Last year ASCE went to Kansas City where they toured the sports complexes, the international airport and visited a bridge construction project on the Missouri River. A banquet dinner is also held in the spring.

Officers this year include: President, Jim Harvey; Vice President, Ken Welch; Secretary, Ron Kincaide; Treasurer, Ron Younker and faculty advisor, Prof. D. H. Guell.

### *CHI EPSILON*

Pledges were selected at the Sept. 30 meeting of the honorary fraternity of civil engineering. A smoker was held October 14 and initiation will take place later this semester following the traditional "key signing." President, Dennis Sprick also announced that the graduate students will challenge the under-grads to a football game to be held soon.

Chi Epsilon helps to create a better working relationship between faculty members and students. Other officers include Vice President, Steve Hamblin; Secretary, Bob Preusser; Treasurer, Joe Parsons and the editor of the TRANSIT, the bi-yearly magazine of the national chapter, is Bob Koirtyohann. Professor McGarraugh is faculty advisor.

### *ALPHA PI MU*

Alpha Pi Mu is the industrial engineering honorary fraternity. Its primary function is that of recognition. Selection is based on scholarship and contributions to the field of industrial engineering. Membership is extended to faculty members and people from industry as well as to students. New members for this year were selected recently. Larry Drumond is President.

### *IEEE*

This professional electrical engineering organization, open to all EE's, features monthly meetings and speakers from industry. In this way EE students are kept informed about new developments in their field. At the first meeting, Wednesday, October 14, Mr. J. A. Smith of Western Electric spoke on the manufacture of integrated circuits. IEEE's first project of the year will be a joint project with Eta Kappa Nu to install a ninety-year-old generator, given to Missouri University by Thomas Edison, in a display case. Dennis Fessler is serving this year as President, Ron Riedel as Vice-President, Chris Albrecht is Secretary and Mark Ebbitts is Treasurer.

### *ETA KAPPA NU*

The purpose of this national electrical engineering honorary is to promote scholastic achievement and interest in electrical engineering. HKN sponsors programs and projects of interest and service to the EE Department and the College of Engineering. President, Bill Block announced that the organization's first project of the year will be a joint effort with IEEE to put the 90 year-old generator on display.

### *ASME*

Membership in the American Society of Mechanical Engineers is open to all mechanical engineering students. Its purpose is to provide a link between working professionals and students. Speakers from industry or films will be scheduled for every meeting. The slate of officers for the year includes: President, John Kornegay; Vice President, Ron Dupree; Secretary, Bruce Kothe; Treasurer, Bruce Yarbrow, and Dr. Braisted will serve as faculty advisor.

### *AIAA*

The purpose of the American Institute of Aeronautics is to advance the art, science and technology of aeronautics, astronautics and hydronautics. It provides an effective channel of technical communication among professionals in these fields through technical publications, national and local meetings, seminars and public information services.

Any full-time graduate or undergraduate may become a member of the AIAA Student Branch. Professional membership is available for those not enrolled as students. Membership is open to any person with a professional interest in aerospace and is not restricted to any engineering department or to engineering in general.

AIAA held its first meeting October 8, 1970. At this meeting Southwestern Bell presented a Laser-Holography demonstration. Future plans include a field trip to tour a Boeing 747 and a presentation by a test pilot.

Officers for this year are: Chairman, Dale Klein; Vice-Chairman, Lloyd Coperhaver; Secretary, Don Sudheimer; Treasurer, Robert Schwegman. Faculty advisor is Dr. Dave Wollersheim.

*PI TAU SIGMA*

The two-fold purpose of the Mechanical and Aerospace engineering honorary is to promote the development of qualities necessary to be an engineer and to recognize outstanding students. New pledges were chosen at the first meeting, October 10, and subsequent meetings will feature speakers. Ken Mitchum is President this year. Others in office are Vice President- Bruce Yarbrow; Corresponding Secretary-Frank Weber; Recording Secretary- John Carlock; and Treasurer- James Ellis.

The MISSOURI SHAMROCK would like to encourage you to become involved in Engineering student activities. A list of all of the Engineering student organizations can be found below. If you are interested in any of these organizations, please get in touch with one of the officers or the advisor.

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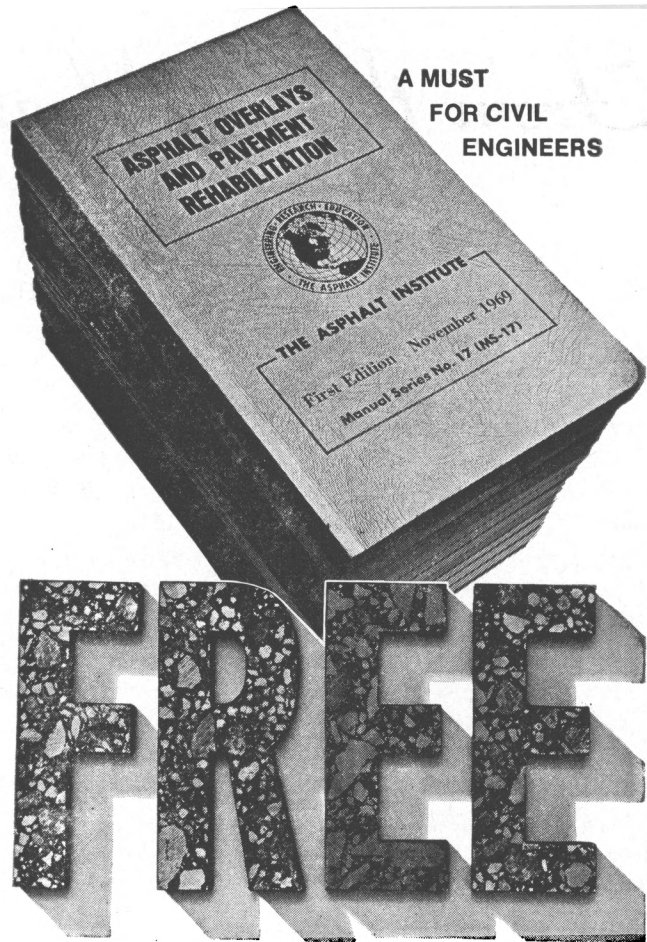
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# From the Backlog:

by Gary Venable

## 50 Years Ago, 1920

The 1920 *Shamrock* was a year book. It was dedicated to the "Missouri Valley Champions of 1919. That impregnable line that held Ames on the two yard line for four downs. That fighting backfield that Kansas couldn't stop."

The annual was divided into the disciplines of engineering. Each division had an introduction, a group picture of the representative society, and individual pictures of the juniors and seniors with listings of their activities and personal comments by the *Shamrock* Staff.

One point which was made in the editorials was the overcrowded conditions. Four hundred students were enrolled in the Engineering College.

The annual was topped off by several pages of pure "Bullarney."

## 40 Years Ago, 1930

The 1930 *Shamrock* was also a yearbook like the 1920 *Shamrock*. It was dedicated to "Professor Harry Rubey in appreciation of his earnest efforts, sincere manner, and his true nobility of character in all matters of student interest."

It should also be noted that an articles in last year's *Shamrock* again recognized Professor Rubey. The College of Engineering is fortunate to have men like Professor Rubey who have dedicated their lives to engineering students.

The *Shamrock* then opened with individual pictures of all the engineering students, a list of their activities, and comments by the *Shamrock* Staff on "Einstein's Chief Contemporary" and "The Engine School's Gift to Women."

One of the editorials noted the increase in the required credit load

for engineering students to one hundred and thirty-six hours.

## 30 Years Ago, 1940

The *Shamrock* was published in magazine form with two or three articles by students, Engineering organization reports, a gossip page entitled "Around the Columns" and, of course, "Bullarney."

An article in the October *Shamrock* "Ag Engineers See Industry at Work" described a tour of six farm machinery manufacturers in different cities. The sponsor was the American Society of Agricultural Engineers.

An Article in the December *Shamrock*, "Progress in the Chemical Engineering Department," noted the expansion of the Chemical Engineering Department since 1937. One hundred and seventy-one students were enrolled.

It is interesting to note the advertisements: six bottles of Coke cost twenty-five cents, suits were cleaned and pressed for fifty cents, and movie tickets were only thirty-five cents.

## 20 Years Ago 1950

The October 1950 *Shamrock* had an article, "Death of the Old Iron Horse." It had pictures of old steam engines being cut up for scraps and predicted that virtually all twenty-nine thousand steam engines still in service would be retired by the end of the decade. Another article "A Weavin' of the Green" explained the functions of the Engineers' Club.

The November issue had an article, "This is the Turbo-Jet." It described the history and developments of the turbo-jet. It noted the use of jet powered transport planes in England and Canada.

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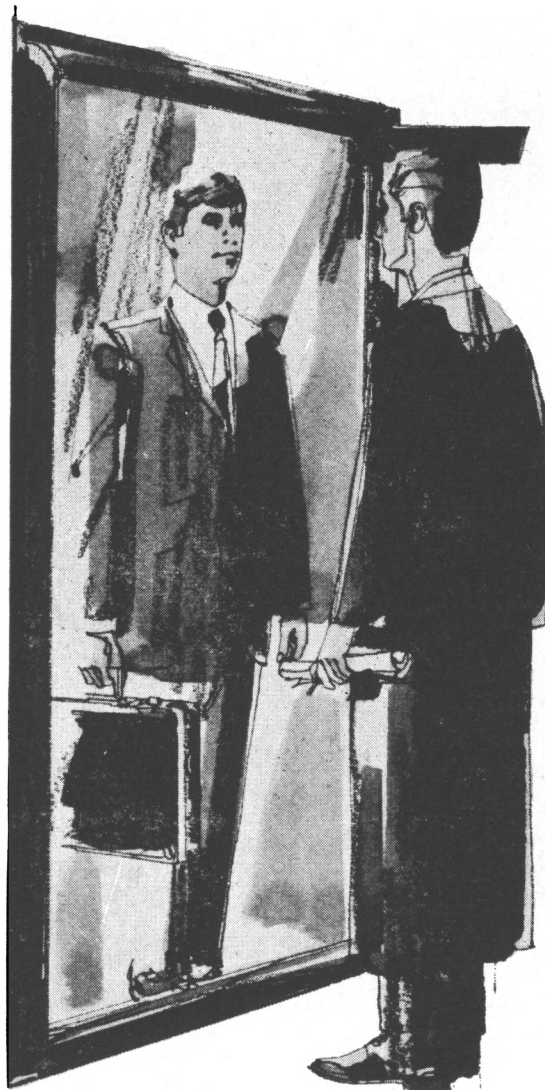
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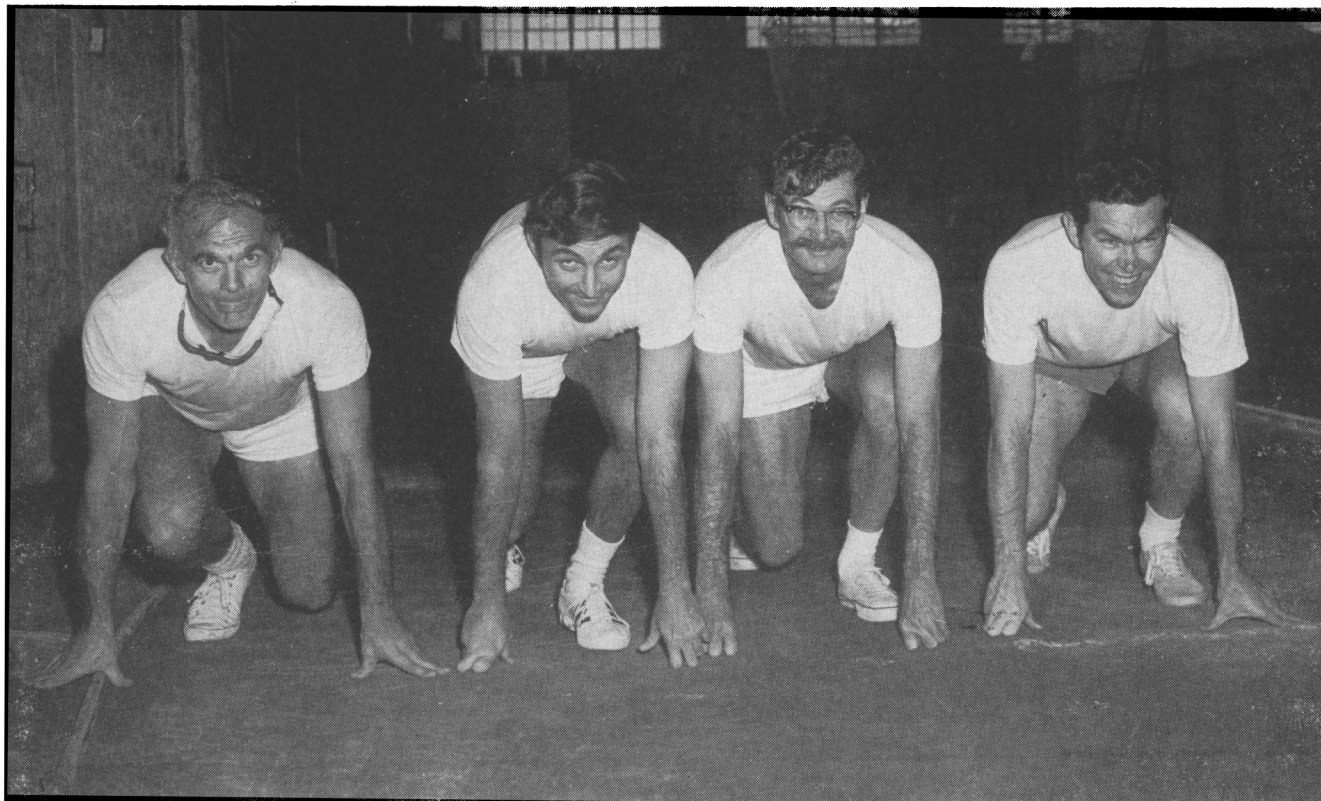
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## ChE Profs Beat the Clock



**PROFESSORS** at the College of Engineering, University of Missouri-Columbia, take their marks for the second annual worldwide four-mile championship relay for chemical engineering faculty members. From left, they are: Dr. Truman S. Storvick, professor; Dr. Jack Winnick, associate professor; Dr. Richard H. Luecke, associate professor; and Dr. J. Lloyd Sutterby, assistant professor.

Sponsored by the American Institute of Chemical Engineers, the event provides for the recognition of physical achievement by ChE faculty members. Running against the clock in competition with the times turned in by other chemical engineering faculties, the UMC College of Engineering scholar-athletes ran their four-mile relay in 24:30.5. And that's 3½ seconds faster than the time of last year's winners from the University of Pennsylvania. The Missourians' individual times for each mile run varied from 5:41.1 to 6:46.2, with the slower times being

turned in by the younger members of the College of Engineering's relay team.

This year's winners will be announced November 30 at the annual meeting of the American Institute of Chemical Engineers to be held in Chicago, Ill. The name of their school will be engraved on the permanent trophy donated by the University of Pennsylvania.

### NEW FACULTY

Dr. Harry Pearle comes to the Electrical Engineering Department from Northwestern in Chicago where he received his Doctorate in 1970. He received his M.S. from the University of Illinois in 1964 and his B.S. degree from Cooper Union Engineering School in New York City in 1963. Dr. Pearle earned his Doctorate with the aid of a Fellowship from the National Institute of Health. He will be doing research here at the University in the Bio-Engineering field. Dr. Pearle, a bachelor of 29, did his Ph.D. thesis

on how single nerve cells in the brain analyze visual information from the eye. He is teaching EE 401, a graduate level course in advanced Bio-Medical Engineering.

The following were selected for **WHO'S WHO IN AMERICAN UNIVERSITIES AND COLLEGES** by the Engineering Student Council on September 28, 1970.

Mike Bennett; Bill Block; Dennis Bruns; Bill Cloud; Dennis Fessler; Steve Hamblin; Mark Heinemann; Dale Klein; Dave Leake; Dennis Maasen; Phillip Noellsch; Glenn Ogden; Eldon Stan Powell; Stephen Sanders; Robert Schwegman; Warren Seering; Roger Wagner; John R. Weisenfelds; Ursula Wollschlager; Khalil Zahr.

An error was made in the April 1970 **MISSOURI SHAMROCK**. The Electrical Engineering Department and not the Industrial Engineering Department won first place for its lab exhibits during Engineers' Week. Please excuse our error.

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# BULLARNEY

The professor who comes in 15 minutes late is rare; in fact he is in a class by himself.



M.E.: "I went out with a girl last night who really had something."

E.E.: "So?"

M.E.: "I think I've got it."



Many engineers think a good time is going places and undoing things.



A woman saw an elephant in her yard and immediately called the police. "Chief," she said, "there's a queer looking animal out here in my backyard. He's picking flowers with his tail."

"Yes," said the sergeant, "and what does he do with them after he's picked 'em?"

"Never mind," was the answer, "you wouldn't believe me if I told you."



Harry was playing his usual 18 holes of golf Saturday afternoon. He had just sliced into the rough off the 17th tee and was about to chip out when he noticed a long funeral procession going by on an adjacent street. Harry removed his cap and stood still until the funeral passed. Later at the club house, a fellow golfer greeted Harry.

"Say, that was a nice gesture you made today, Harry."

"What do you mean?"

"I mean it was nice of you to take off your cap and stand respectfully when that funeral passed," his friend explained.

"Oh, yes," said Harry. "We would have been married twenty-six years next month."

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A plunging neckline is something you can approve of and look down on at the same time.



"Do you know what good clean fun is?"

"No, what good is it?"



Then there was the Indian chief who installed electric lights in the tribal latrine, thus becoming the first Indian to wire a head for a reservation.



English Prof: "What's the difference between war and peace?"

M.E. "There never really was a good war!"



MAE 254 lectures are like steer horns: a point here, a point there, and a lot of bull in between.



A Mechanical Engineering professor and a fine arts Ph.D. were chatting at a recent faculty tea. Said the arts professor, "I had a weird day Wednesday. I asked the class who wrote 'The Merchant of Venice' and one of them replied, 'It wasn't me, sir!'"

"Ha, ha," laughed the Engineering professor. "And I suppose the rascal had done it all the time."



Doctor: "How's the Engineering patient this morning?"

Nurse: "I think he's regaining consciousness. He tried to blow the foam off his medicine!"

Papa Stork: "I surely had a busy day. I delivered 152 babies."

Mama Stork: "Yeah, me too. I delivered 145 babies."

Kid Stork: "Well, I can't deliver babies like you grownups can, but I did have fun today scaring the hell out of a couple of college kids."



"How did you find the ladies at the dance?"

"Oh, I just opened the door marked Ladies and shore enough there they were."



Then there was the country girl who, while milking a cow, saw a boy coming up the road. She called to her father, "Oh father, there is a boy coming up the road."

Her father promptly replied, "Go into the house."

She called back, "But father, he is a college man."

"Then take the cow with you," he replied.



Owner: "How did you come to puncture this tire?"

Chauffeur: "Ran over a milk bottle."

Owner: "Didn't you see it in time?"

Chauffeur: "No, the kid had it under his coat."



"Ah wins."

"What you got?"

"Three aces."

"No you don't. Ah wins."

"What you got?"

"Two eight's and a razor."

"You sho do. How come you is so lucky?"

THE MISSOURI SHAMROCK

**Kodak**

## The lively engineer and the fat-cat corporation *or* The recruiter's dilemma of 1971

As in any selection process, if you can afford the best and the best is available, you pick the best. "Best" here means the liveliest minds and personalities. And there comes the dilemma: pick them, or pick those who won't rock the boat? On today's engineering campuses there is a scarcity of bright people interested in nothing but engineering. The boat will have to rock a bit. Let her rock. Eastman Kodak Company, Business and Technical Personnel, Rochester, N. Y. 14650. An equal-opportunity employer.

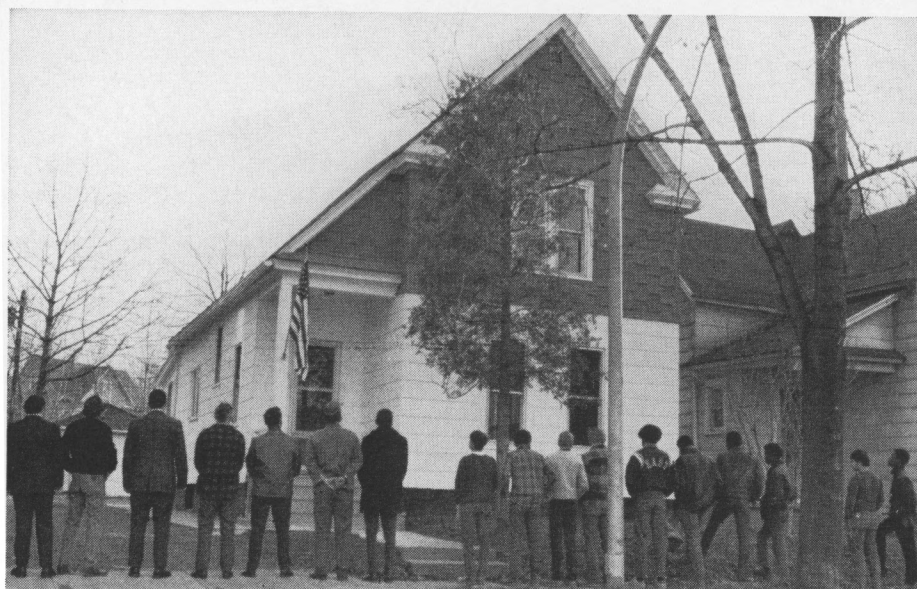
\* \* \*

Dick Pignataro is a mechanical engineer from Georgia Tech. His job has to do with engineering, construction, maintenance, and utilities for the manufacture of film, paper, and chemicals by the most advanced methods available. The

office next to his was occupied by a 24-year-old personnel man named Bob Lee.

One night over a beer these two under-30 types were getting themselves worked up over the contrast between life as lived a mile or two outside the plant gates and the sleek technology inside those gates. Instead of letting it drop, they put together a proposal for rebuilding badly decayed houses. It called for high-grade Kodak talent, Kodak seed money, and faith in the premise that kids can hate school and yet take pride in doing a job right. Seemed like puddin'-headed humanitarianism unlikely to get very far up the chain of command.

Three weeks later, high aloft in a jet, their idea was being explained to the company president. He liked it.



Pignataro, Lee, Kodak construction supervisors, and young men of Rochester, N. Y., admire house the young men rebuilt. The first year several dozen such houses are being rebuilt by a work force of 100 part-time students. Since interest in the sonnets of Shakespeare is at present negligible among these students, their studies tend more toward figuring how many

boxes of tile to order for a 9' x 13' kitchen floor. Building-trades unions counsel. So do bankers, realtors, and schoolmen. The renovated homes are sold to poor people at prices they can afford. It is better to light a candle than to curse the darkness. If the candle is too dim, try a halogen-vapor lamp.

# When you can hardly hear yourself think, it's time to think about noise.

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Noise is pollution. And noise pollution is approaching dangerous levels in our cities today.

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Screaming won't help matters any. But technology will. Technology and the engineers who can make it work.

Engineers at General Electric are already working to take some of the noise out of our environment. One area where they're making real progress is jet-aircraft engines.

Until our engineers went to work on the problem, cutting down on engine noise always meant cutting down on power. But no more.

GE has built a jet engine for airliners that's quieter than any other you've ever heard. A high-bypass turbofan. It's quieter, even though it's twice as powerful as the engines on the passenger planes of the Sixties.

And NASA has chosen General Electric to find ways of cutting engine noise even further.

It may take an engineer years of work before he can work out the solution to a problem like noise in jet engines. And it may be years before his solution has any impact on the environment.

But if you're the kind of engineer who's anxious to get started on problems like these and willing to give them the time they take, General Electric needs you.

Think about it in a quiet moment.

Or, better yet, a noisy one.

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