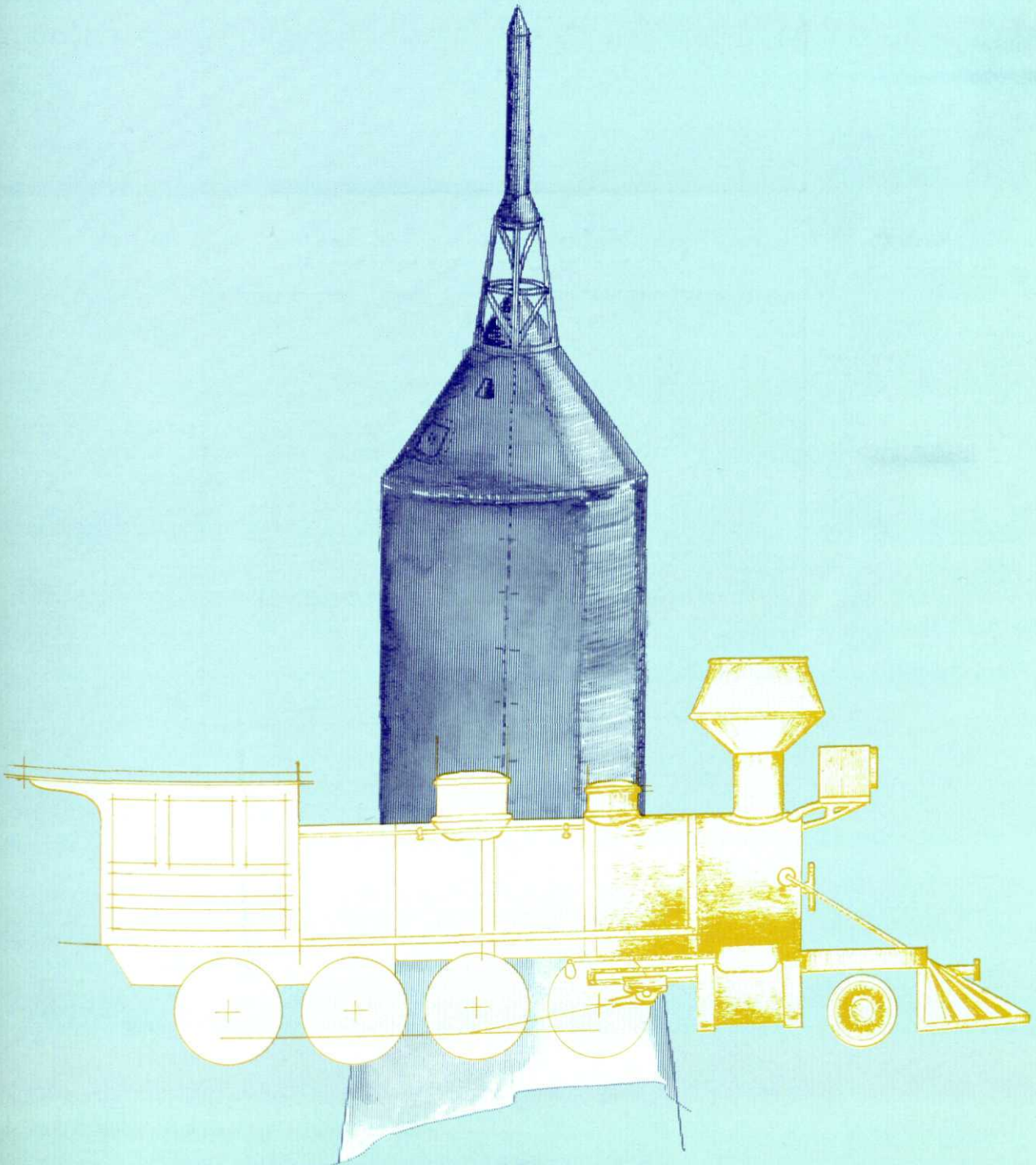


# SPARTAN ENGINEER

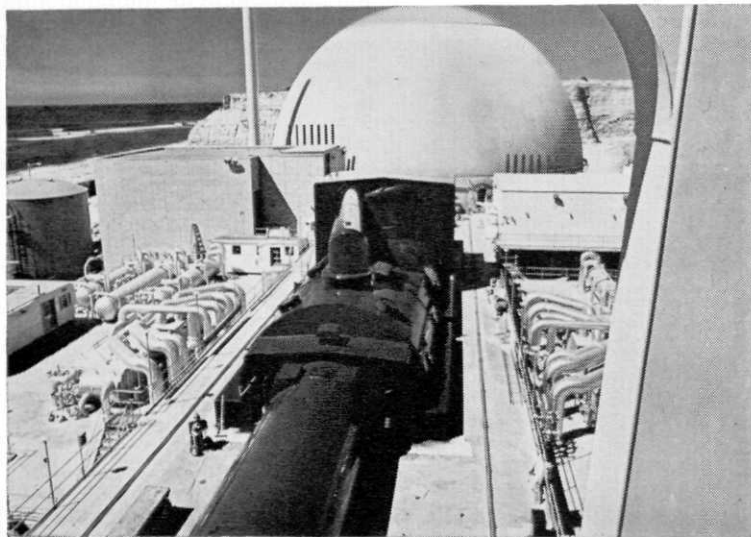


MARCH, 1969

25¢



# Westinghouse needs engineers who understand this generation



or this generation.



In the next ten years, demand for electricity will double. What's Westinghouse doing about it? Plenty. We're number one in commercial nuclear power. We're working on an advanced breeder reactor. We're spending \$450 million to boost our production capacity.

Okay, that's Westinghouse, the

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You can be sure...if it's

**Westinghouse**





## How would you keep it from having a nervous breakdown?

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Maybe you can help.

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But we need answers in other areas too.

And people to find them. Chemists, Physicists. Marketing specialists. Programmers. Accountants.

Write William G. Benner, Coordinator, College Relations, Executive and Professional Placement, NCR, Dayton, Ohio. If you've got the right answers, he's got the questions.

It's all part of an NCR plan

to revolutionize the way businessmen do business.

An equal opportunity employer.

**NCR**

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**NCR. Business will never be the same.**



# Did you read this ad about the research facilities of Continental Can?

It ran in The Wall Street Journal, and it's quite a story. It tells how Continental is developing the packages of the future. It describes the largest research organization in packaging with an annual budget of more than 22 million dollars.

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We need mechanical, electrical, electronic or chemical engineers, chemists, specialists in data processing, food scientists, physicists, mathematicians, metallurgists.

For a reprint of our research story—write to John G. Mikota, Recruiting Supervisor at the address below. Or see our recruiting representative. He'll be at your campus on April 2.



**Continental  
Can Company**

Chicago Technical Center  
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# SPARTAN engineer

MICHIGAN STATE UNIVERSITY

VOLUME 22

NUMBER 3

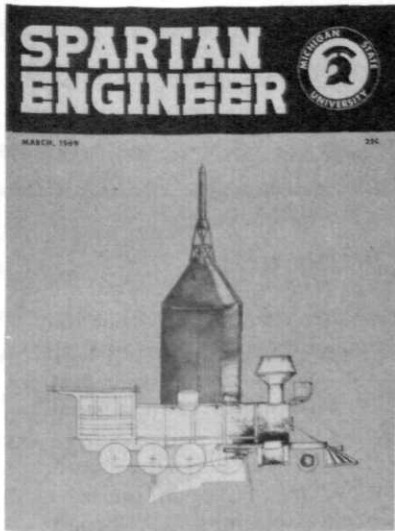
MARCH, 1969

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Davis Chase	art editor
David Sumner	advertising manager
Spike Cline	circulation manager
Wayne Zilka	staff writer
Alan Shratter	staff writer
Mary Harvey	editorial assistant
Russ Andre	humor editor

## ADVISOR

Mr. Logan Blank



This month's cover by Davis Chase shows how much engineering has changed over the last fifty years.

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Nothing helps a young engineer's career like being given a challenge. Which is another way of saying a *chance to fail* now and then. To make his own mistakes.

At Western Electric we give our newly recruited engineers responsibility almost immediately. They make their own decisions. Learn from their own errors.

Don't get us wrong. We keep our

demands reasonable enough so that our recruits can make their decisions at their own pace. But our thinking is, a man feels awfully good about even a small decision when it's *his*.

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A lot of hard work never hurt anyone.



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MANUFACTURING & SUPPLY UNIT OF THE BELL SYSTEM  
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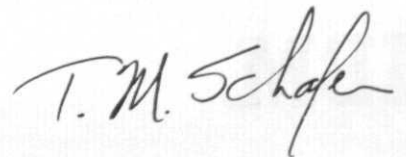
# editorial

I noticed recently in an article in *Fortune* magazine that, in the last five years, the percentage of top executives in U.S. corporations who were trained as scientists and/or engineers has dropped from 18% to 12%. Those individuals who occupy the top level positions in both industry and government undeniably are the opinion makers and the molders of our future. Why then, in an era of exploding technology (no pun intended) do those with technical backgrounds seem to be getting to the policy making level less frequently? It could be that technical people, in general, are more interested in maintaining the exponential rate of growth of technology than in the use to which their technology is put. Or, it could be that technical people are becoming less and less *able* to make any decision other than what size resistor, bolt or pipe to use in their latest assigned project. And that isn't shaping the future, baby.

Well, maybe you don't care about shaping the future, all you want is a nice quiet lab somewhere and a couple of technicians and a draftsman and a boss who doesn't yell very loud. That's good—you just go home and do

those homework problems that your instructor told you to do and forget about everything past that exam you have next week. Oh, there is one thing that you could do to prepare for your future—lock yourself in the garage this weekend with your car—and leave the engine running. That way your lungs will begin to get accustomed to the atmosphere that your children will have to breathe. That would make your eyes smart you say? Have you ever been to Los Angeles?

The point I really wanted to make in this space is that for everyone, technology is not an end in itself but rather a means for obtaining a better way of life, where each man is free to define his "better way of life". Whether or not the technical advances which have been and will be made are to be used to obtain a better life, or to be abused by neglect of by-products and side effects, is largely determined by those in managerial positions. With few exceptions the road to the executive suite is not travelled by those with technical competence alone. And with only MSU basics in addition to your technical courses that's about all you'll leave here with—technical competence alone.



## Engineering and Science at IBM

# "You're treated like a professional right from the start."

"The attitude here is, if you're good enough to be hired, you're good enough to be turned loose on a project," says Don Feistamel.

Don earned a B.S.E.E. in 1965. Today, he's an Associate Engineer in systems design and evaluation at IBM.

Most of his work consists of determining modifications needed to make complex data processing systems fit the specialized requirements of IBM customers.

### Small teams

Depending on the size of the project, Don works individually or in a small team. He's now working with three other engineers on part of an air traffic control system that will process radar information by computer.

Says Don: "There are only general guidelines. The assignment is simply to come up with the optimum system."

This informal working environment is typical of engineering and science at IBM

Don sees a lot of possibilities for the future. He says, "My job requires that I keep up to date with all the latest IBM equipment and systems programs. With that broad an outlook, I can move into almost any technical area at IBM."

### Check with your placement office

If you're interested in engineering or science at IBM, ask your placement office for more information. Or send a letter or resume to Mr. Irv Pfeiffer, IBM Corporation, Dept. CC2007, 100 South Wacker Drive, Chicago, Illinois 60606.

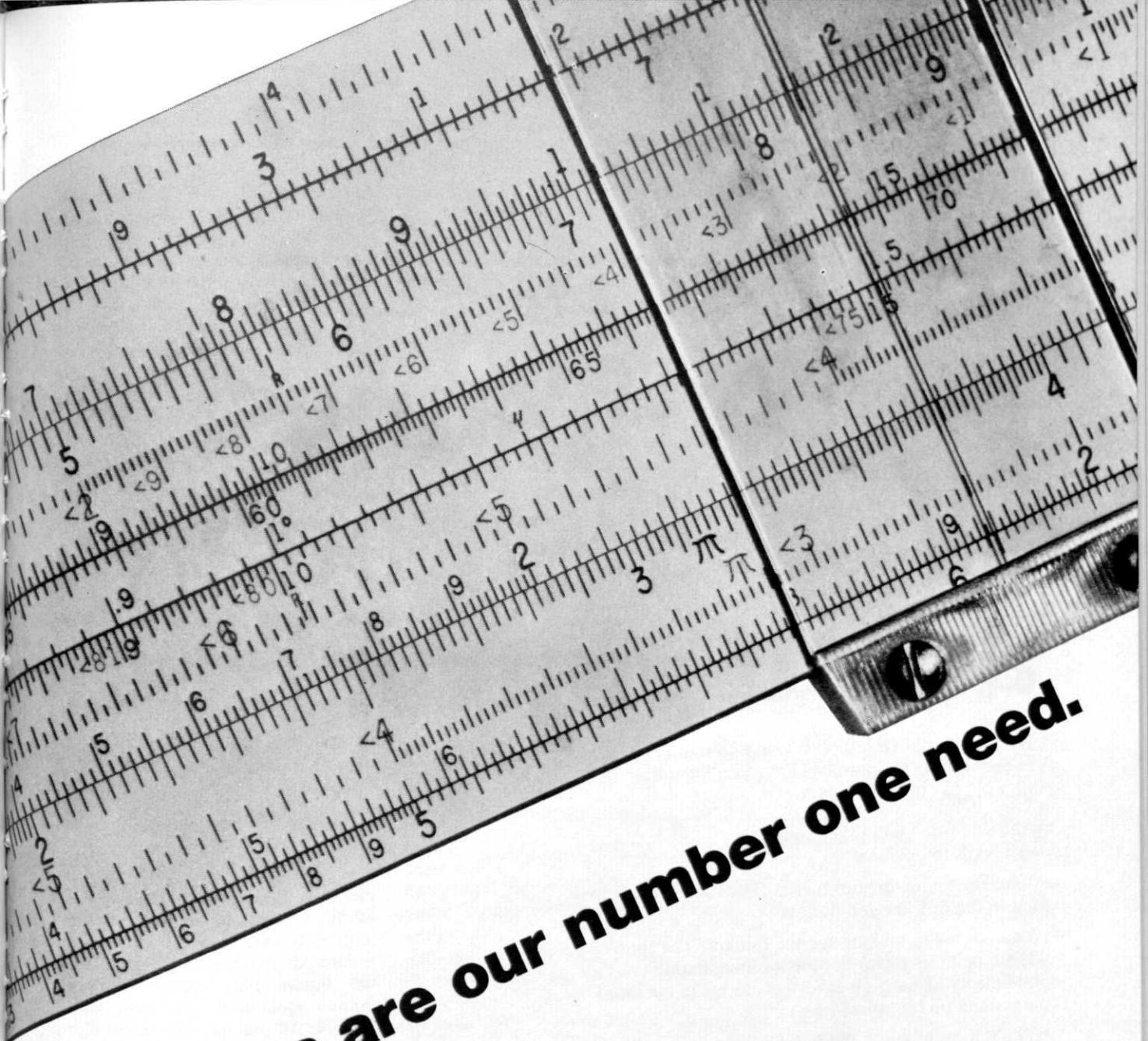
We'd like to hear from you even if you're headed for graduate school or military service.

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# Engineers are our number one need.

A diversified and challenging career is yours at Monsanto because the key to our future rests with engineers of ability.

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# “There are lots of big companies. What’s so good about yours?”

Here’s what: at IH you won’t have to stand in line waiting for responsibility. You’ll get it.

Right from the start.

And you won’t be pushed into a job that leads to nowhere.

You’ll move up on your merits. The sooner you can cut it, the quicker you’ll move.

You see, we’re looking for the thinker. The innovator. The type of guy who has lots of imagination and plenty of guts. (It takes guts to make decisions and stand up for your ideas.)

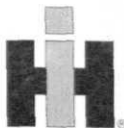
You’ll have to be on the ball all right. But we’ll give you plenty in return.

For one thing, we’re diversified. You’ll find all kinds of action in steelmaking, motor trucks, construction or farm equipment. And lots of things in research and development. (We’ve got some far-out ideas on laser beam construction equipment, solar energy and nuclear power.)

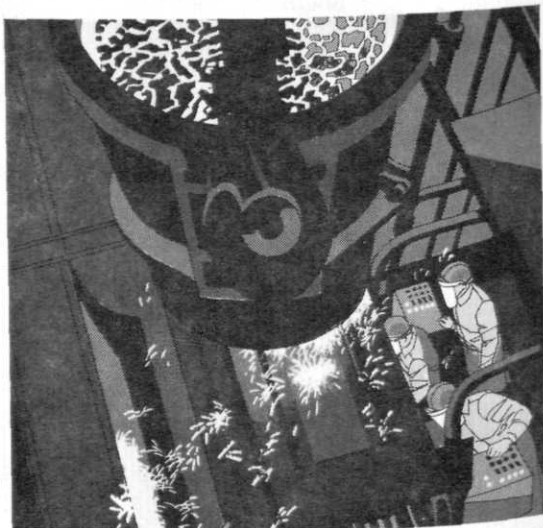
In other words, we’re working on things that should shape the future. Yours and ours.

So talk to your campus placement officer about us. He’ll give you the word on the jobs we have in engineering, accounting, production management and sales.

Sure, we’re a big company. But we’re big in a lot more ways than just size.



**INTERNATIONAL HARVESTER**  
An equal opportunity employer M/F



Continuous casting, vacuum degassing and basic oxygen steelmaking in progress at IH Wisconsin Steel. Plant is one of first in U.S. combining all three processes.

*Hey diddle-diddle  
The cat and the fiddle  
The cow jumped over the moon*

If you think *cow* is an inaccurate description of Apollo 8, you've never seen a Saturn-V close up. The thing is built like a bridge—I-beams, steel plates, tie rods, internal bracing, rivets thrown in every time it seemed like a good idea. With the capsule securely screwed into the top, the whole mess was 30 yards longer than a regulation

see why. After twenty years of getting nothing but handshakes and testimonials for his pioneering, he hit it lucky—a Guggenheim and a research grant from his old Alma Mater—and he had the pleasure of continuing his studies in the middle of a New Mexican desert (plenty of privacy, and the chance of a lifetime to bone up on Navajo culture). Virtue is always rewarded—for Robert Goddard WWII brought a civil service job with the

that Oberth guessed wrong and took out German citizenship. Several weeks later he found himself standing in a train station with the clothes on his back, a stuffed sachel in one hand and a one-way ticket to a grubby little village out in the boonies called Peenemunde in the other.

Adolf Hitler, if you'll recall, was a bit of a fanatic at times. He had a thing (to name only one) about gadgets—particularly the kind that could conquer the world. One day rockets caught his eye; Hitler requisitioned a few recent college grads and put them to work. One of these—Wernher Von Braun—was chosen head of the group, chiefly for two reasons.

- (1) he came from a good family—in fact, technically, Von Braun is a Count (don't laugh, at the time it was important);
- (2) he was a former student of Oberth's.

Speaking of Herman, he didn't hit it off too well with Wernher—it seems that bombing London wasn't exactly what he had in mind back at old Heidelberg. So Oberth pattered about, pulling an absentminded-professor routine, and in general made himself useless. Before long he was on the go again—this time transferred to the anti-aircraft division in Berlin—and Von Braun suddenly found himself holding a large and very empty bag.

Although not what you'd call brilliant—and certainly no Oberth—Von Braun was a good engineer, and as such he knew rule #3 of practical engineering—**If you don't know, look it up.** (no prizes for guessing the first 2)

Wernher frantically dug into his files while the Nazi High Command suggestively twitched their riding crops. His best bet turned out to be Goddard's sixth and last success—a nifty little lox and kerosene burner with good performance and even better potential. The Peenemunde Boys used good old German know-how, applied new technology, streamlined the aerodynamics, named it the V-2, and reached for their Lowenbraus with a sigh when it finally left the ground to wobble off in the general direction of the British Isle.

As you probably know, job security in those days wasn't what it is now—by 1945 Von Braun and his staff were busy updating resumes and investigating other employment

(Continued on page 28)

# An informal report...

... INTO THE BACKGROUND OF THE  
GREATEST ENGINEERING FEAT SINCE  
THE CREATION OF THE UNIVERSE.

(SEE GENESIS)

By Alan Shratter

football field and checked in at a dainty 6.2 million pounds. The fact that the monster actually got off the ground, let alone escaped gravitation and made it to the moon and back is conclusive proof that money can accomplish what technology cannot.

Whither the Apollo 8? Whither Lovell, Anders, Borman, the Houston Spaceflight Center and 100 billion dollars never to be seen again? And, incidentally, whose bright idea was this in the first place?

Goddard started it all. After graduating from a college in—of all places—Wyoming, he began singlehandedly to put together the foundations of rocketry; turning it from a casual amusement on the 4th of July into an exact science. Knowing the extent of his work, you'd think that Goddard filled the sky with experimental rockets. Actually, he only got six of the damn things to fly, but each one was a significant advancement in the state of the art.

It's pretty unlikely that Goddard's goal was to reach the moon, but he definitely did want to get off the earth—and considering his life, you can

Navy and a relocation to Annapolis. Overcome, perhaps, by the thought of never again having to hock his underwear for a new gyroscope, he died in 1945—long before rockets hit it big, and leaving it to the Guggenheim Foundation to collect \$1,000,000.00 from the U.S. Government for patent infringement.

Meanwhile, across the Atlantic, another dreamer was busy beating his head against a wall. This was Herman Oberth, and he should have gotten the message when his doctoral thesis on interplanetary travel got him laughed out of Heidelberg. Things brightened up a little when he ran into Goddard's work, but not much—the American always seemed a couple of jumps ahead of him. A good sport if there ever was one however, Oberth corresponded with Goddard and continued working, publishing (usually at his own expense), teaching, and traveling—he was shuffled around from college to college in Central Europe, no one willing to keep the kook on the staff for longer than a couple of years.

It was in 1940, while lecturing at the Munich Technological Institute,

# In the time it takes to complete some training programs, you could be a success at Celanese.

We feature a sort of do-it-yourself training, rather than long, dreary formal programs. It's your ball, but we'll go all out to help you carry it just as far and as fast as you can go. When you need a hand, it will be there—from experienced pros. Your on-the-job, on-the-project experience will be thorough.

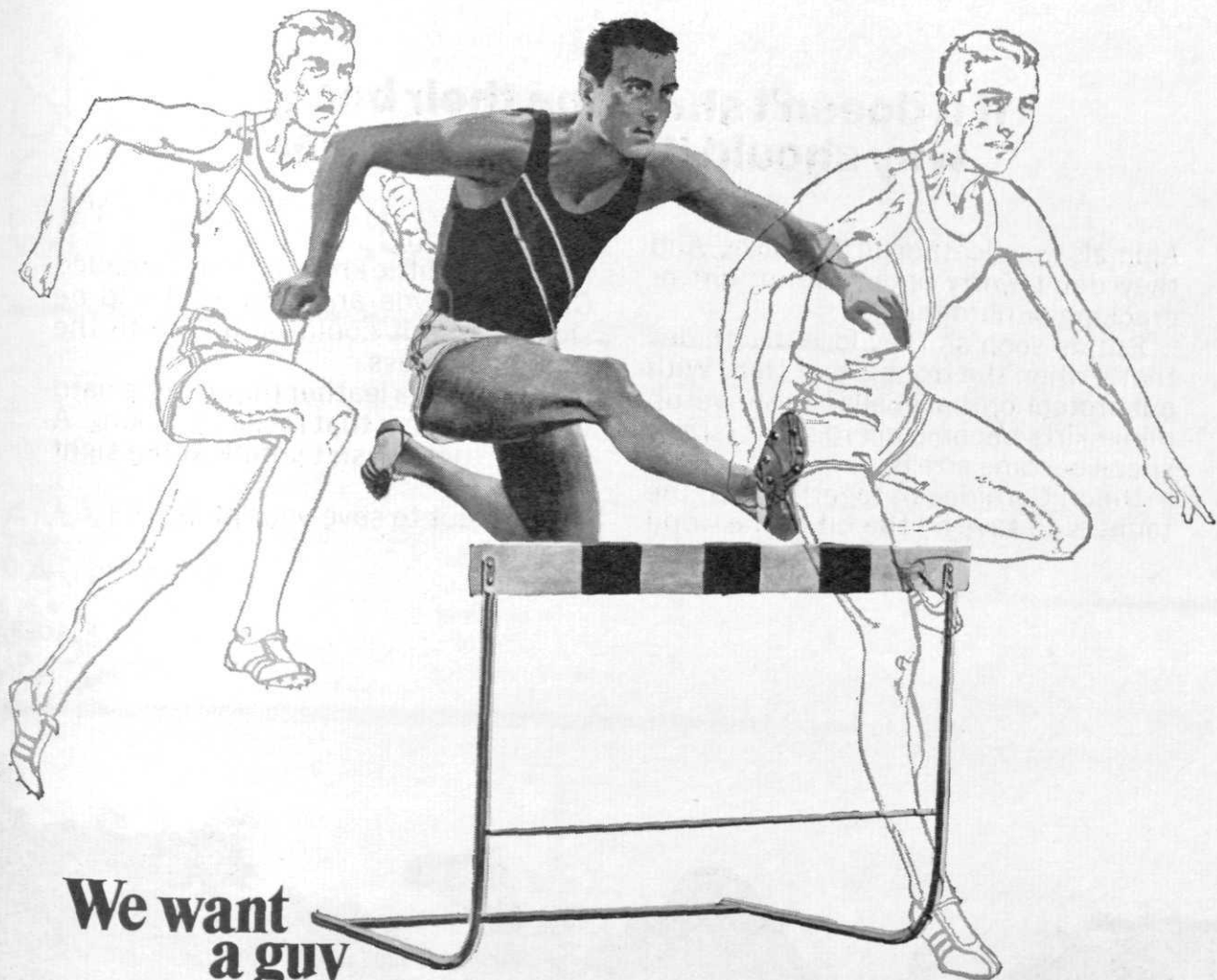
And, frankly, we need you on the job right now. To help us continue a growth rate that's zoomed from 318 million to 1.1 billion dollars in sales over the last 10 years. Besides a lot of hard work, we think the reason is that we are really many companies. Fibers. Chemicals. Plastics. Coatings. Petroleum. Each pursuing its area of expertise autonomously against a broad corporate plan. This freedom of operation makes it possible to give you as much responsibility as you're ready for. And we'll work along with you

to make sure that you can grab more as soon as you can handle it.

If you have a degree in chemistry, chemical, mechanical or industrial engineering, physics or marketing or accounting—plus a large degree of initiative and imagination—Celanese has a lot to offer you. In professional growth. In rewards based on performance, not how old you are or how long you've been with us.

Discuss us with your faculty and placement officer. Talk to our representative when he's on your campus. Or write to: John B. Kuhn, Manager of University Recruitment, Celanese Corporation, 522 Fifth Avenue, New York, N. Y. 10036.  
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**We want  
a guy  
who keeps a level head.**

Dictionaries define hurdling as jumping over a hurdle in a race.  
Obviously, Webster never made the track team.

“A good hurdler never jumps,” the experts tell us. “He tries  
to duplicate the movements of sprinting. The head stays level.

It’s never higher over the hurdle than it is between them.”

A level head helps overcome any obstacle. Take bearing problems.  
They’re best approached by a person with training, determination  
and the ability to think things through.

Are you such a person? When you run up against a tough problem, are you  
able to take it in stride? And do you like the challenges of rugged  
competition, and the rewards that come from winning?

Then write The Timken Roller Bearing Company, Canton, Ohio 44706.

Ask our Manager of College Relations to give you a tryout.

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**TIMKEN®**

THE TIMKEN COMPANY MANUFACTURES TAPERED ROLLER BEARINGS, FINE ALLOY STEEL AND REMOVABLE ROCK BITS.

## If it doesn't shrink on their backs, why should it shrink on yours.

Animals wear leather all their lives. And they don't worry about rain or dirt or cracking or hardening.

But as soon as they lose their hides, that's when the trouble can start. Without protection, baseballs can shrivel up, mini-skirts become micro-skirts, size 9 shoes become size 8.

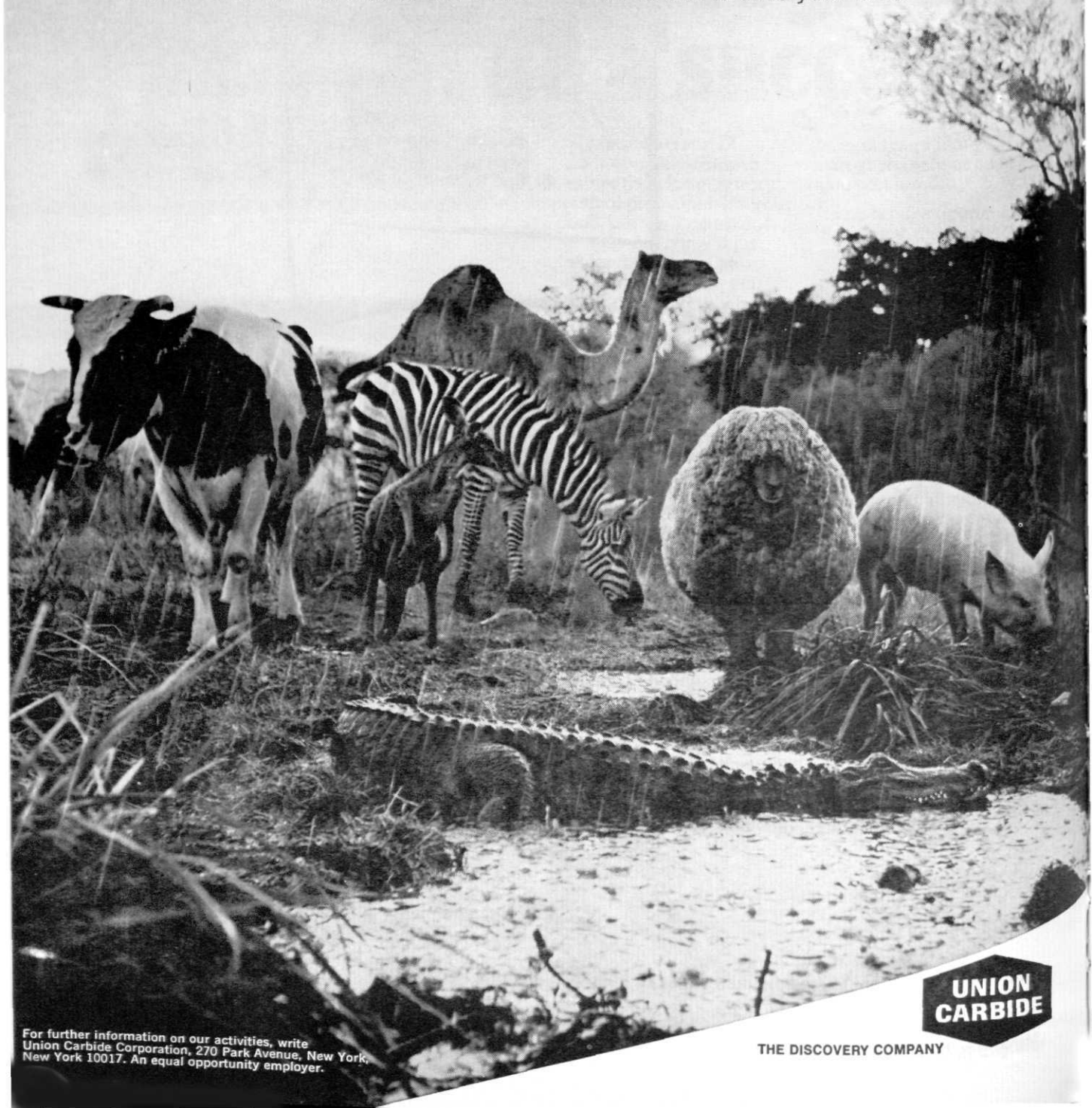
Union Carbide got together with the tanners to save a little bit of the world

from shrinking.

We took a little known chemical called Glutaraldehyde and refined it and designed it so it could be added to the tanning process.

To give you a leather that resists hardening. A leather that resists cracking. A leather that doesn't shrink at the sight of water.

We're out to save your hide.



For further information on our activities, write Union Carbide Corporation, 270 Park Avenue, New York, New York 10017. An equal opportunity employer.

**UNION  
CARBIDE**

THE DISCOVERY COMPANY

# Student Organizations

## *Editor's Note:*

*Professional organizations provide the student with an opportunity to gain insights into his chosen field at a time when he still has the most options open to him. Descriptions of the student branches of professional organizations and the activities of these student branches will be a continuing feature of the Spartan Engineer.*

## AMATEUR RADIO CLUB

The Michigan State University Amateur Radio Club welcomes as members all who are interested in amateur radio operating and experimentation. Holders of valid amateur licenses may use the facilities of the club station W8SH. W8SH, with modern equipment, is active on all amateur frequencies and annually makes thousands of contacts with amateurs all over the world. Radio enthusiasts not holding licenses may take part in the club's educational program, may have the use of the receiving facilities, and may participate in other activities. The station is located in Room 339 Engineering Building. Meetings are held each Thursday at 7:30.

## AMERICAN SOCIETY FOR METALS (ASM)

The student chapter of the American Society for Metals is sponsored by the Jackson Chapter of the national society of metallurgical engineers. Membership is made up of students in the mechanical engineering department as well as students enrolled in metallurgy. Activities include attendance at meetings of the Jackson Chapter as well as meetings of the student chapter on campus. The purpose of the student organization is to bring the student into contact with practicing engineers and with industrial problems involving metallurgy and machine design.

## PI TAU SIGMA

Pi Tau Sigma is an honorary mechanical engineering fraternity, established to foster high ideals and scholarship within the engineering profession.

The Tau Epsilon chapter of Pi Tau Sigma was formed on the MSU campus in 1949 and was officially recognized by the national fraternity in 1950.

Chapter activities consist of initiation procedures and ceremonies to honor top level Mechanical Engineering students and also several business meetings during the year to plan service projects for the Engineering College. Such projects as student-faculty administrative matters, participation in the Engineering Exposition each spring term, and the annual selection of the outstanding sophomore Mechanical Engineering student for the L. G. Miller award are some of the main functions of the organization.

# We developed TV transmission. But a lot of engineers still don't get the picture.

Like, we'll ask a graduating engineer:  
"What opportunities do you think an engineer has  
if he works for the telephone company?"

And, zap—we get a blackout!

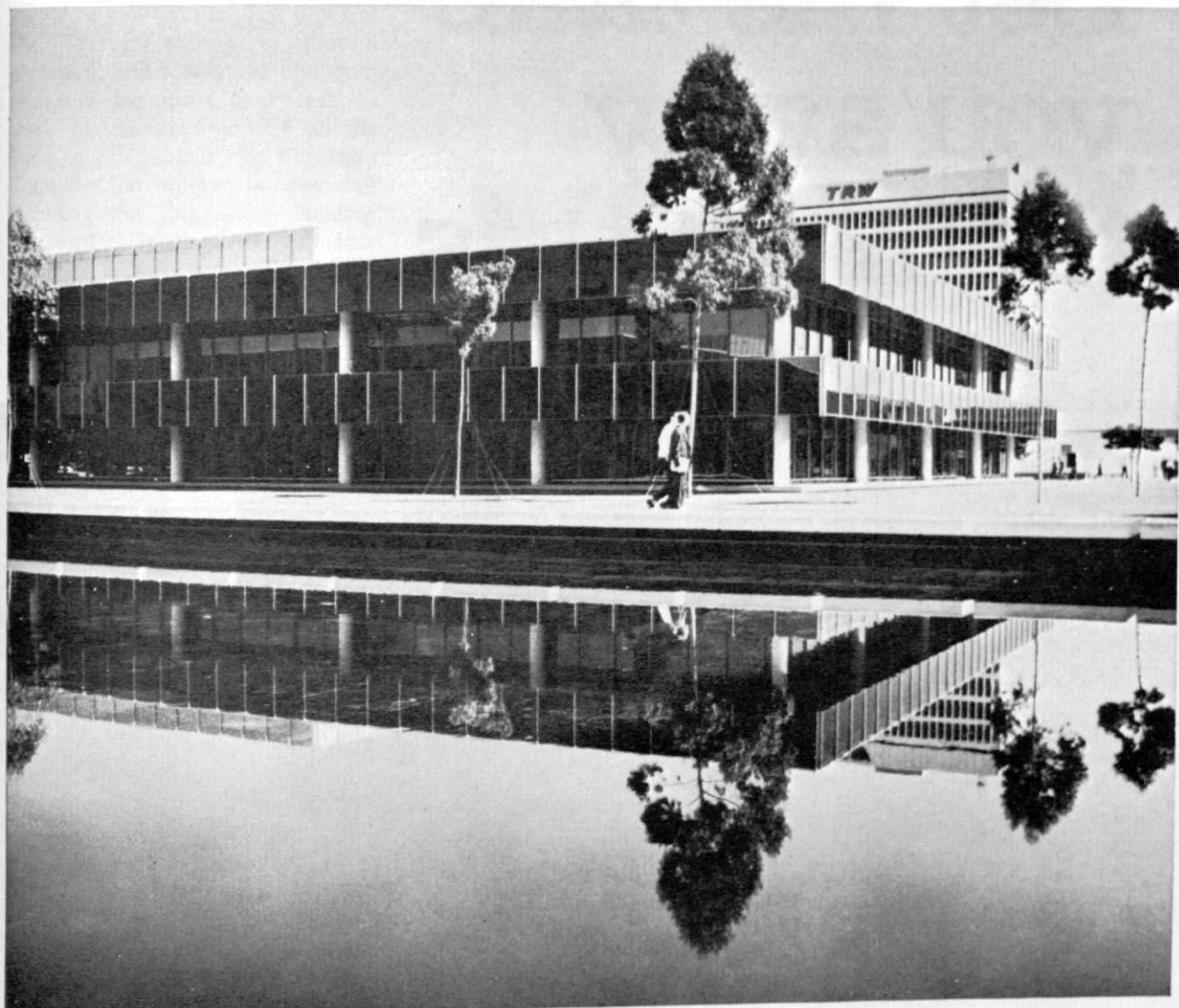
Well, we think the company responsible for  
engineering innovations such as the transistor, radio  
astronomy, high fidelity and stereo recording,  
magnetic tape, synthetic crystals, negative feedback,  
sound motion pictures, microwave relay, electronic  
switching, the solar battery and telstar deserves a  
consideration that's strong and clear.

When the Bell System recruiting team comes  
to your campus, be sure to talk to them. Or ask your  
Placement Director for the name of the Bell System  
recruiter at the local Bell Telephone Company,  
an equal opportunity employer.

We'll turn you on.







## ***From your campus to ours...***

Last year more than 100 graduates came to our campus at TRW Space Park in Redondo Beach, or to our Houston or Washington, D. C. operations. Of the more than 16,000 men and women in TRW Systems Group, over 7000 are college graduates. Their major fields of interest are as varied as your own: Engineering, Behavioral Sciences, Physical Sciences, Computer Sciences, Life Sciences, Management Sciences, and the Humanities.

It's characteristic of TRW Systems Group that many of our employees continue to do advanced and applied research in the same area of specializa-

tion they worked on in college.

For our challenges are much like yours.

We're deeply involved in the exploration of space and the defense of the Free World. We're also applying these advanced technologies to the complex social problems of today...transportation, health, urban renewal, land planning, water and air pollution, global communication, ocean sciences.

As they work to meet these diverse challenges, many of our employees are continuing their study for advanced degrees with TRW's blessing and financial help. That's just one of the reasons

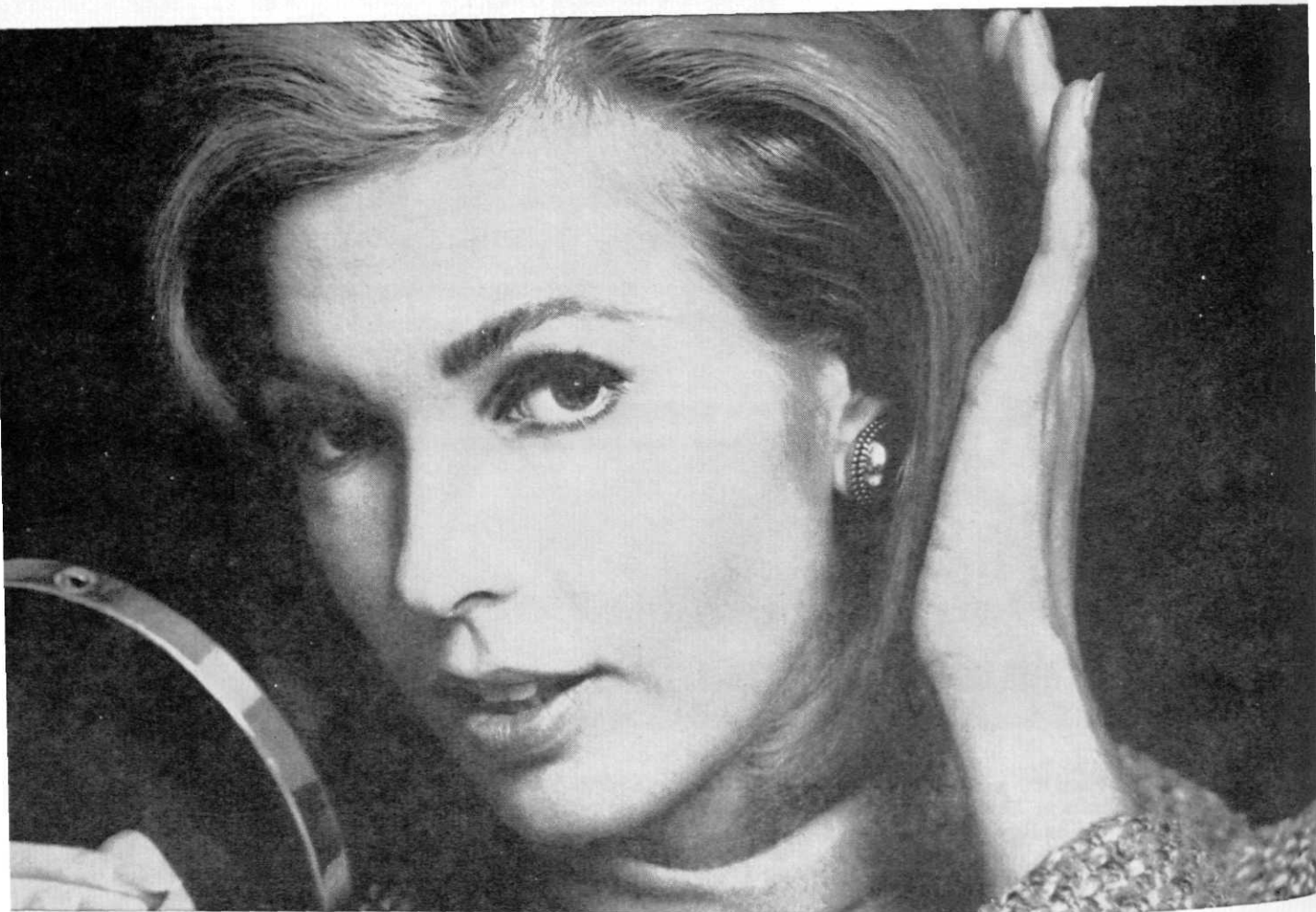
so many people have found the move from their campus to ours a natural and rewarding one.

Perhaps you'd like to consider the same move. Make an appointment to see us when we're on your campus (see below), or write to Dr. W. D. McIvers, College Relations, Room 7001-J, TRW Systems Group, One Space Park, Redondo Beach, California 90278. TRW is an equal opportunity employer.

# **TRW®**

*TRW Systems Group is a major operating unit of TRW INC. (Formerly Thompson Ramo Wooldridge Inc.), where more than 70,000 people at over 250 locations around the world are applying advanced technology to electronics, space, defense, automotive, aircraft and selected commercial and industrial markets.*

# Let me take you away from all this.



Away from indecision. From confusion. Away to Allison Division of General Motors. Where young aerospace engineers become first team varsity. On a winning team.

In case you haven't heard, Allison is where everything is happening right now. There's an entire family of gas turbine engines for you to work on. Turbofan. Turbojet. Turboprop. Turboshaft. New and exciting projects. The kind you've

dreamed about. Projects that extend far into the future. Not a here-today-gone-tomorrow atmosphere. At Allison, the work's here today, and here to stay.

So come on along. You've worked hard for that degree. Don't waste it. Go where it'll do you the most good. Write Ken Friedlein, Scientific Placement, Dept. 303, Allison Division of General Motors, Indianapolis, Indiana 46206.

**Allison**  
An equal opportunity employer M/F



The construction field is one of the fastest moving of modern industries, and locally the Christman Company has made more than its share of contributions. Of all the buildings on campus, the Christman Company has worked on over half including the Engineering Building. Currently leading this dynamic company is Harry L. Conrad, a 1940 graduate of Civil Engineering and one of the areas most active engineering alumni. Mr. Conrad is currently a National Director for the Association of General Contractors and is also one of ten alumni who works closely with the College of Engineering in reviewing the present curricula of all majors.

While most students are not completely committed to a particular career, Mr. Conrad knew his field early in his life as he watched construction crews working and became a brick layer as soon as he turned eighteen. One of the highpoints of his early working days was reaching the penny a minute wage rate!

For those students interested in the construction area, many firms hold summer training programs which not only give practical experience but also show real rather than printed descriptions of the business. Mr. Conrad feels that the educational needs of the construction industry are three-fold being:

1. Construction engineers with Civil Engineering degrees and a strong enough education to pass the registered engineers examination.
2. Technicians who supervise field work, layouts, and handle some of the testing necessary.
3. Apprenticeship programs to merge modern technology with dexterity for highly effective workmen.

The Civil Engineer who wants to go into construction must become a registered engineer as well as have adequate summer training to be both successful and proficient. Mr. Conrad

# WORK MERGED WITH WISDOM

Comments by Harry L. Conrad

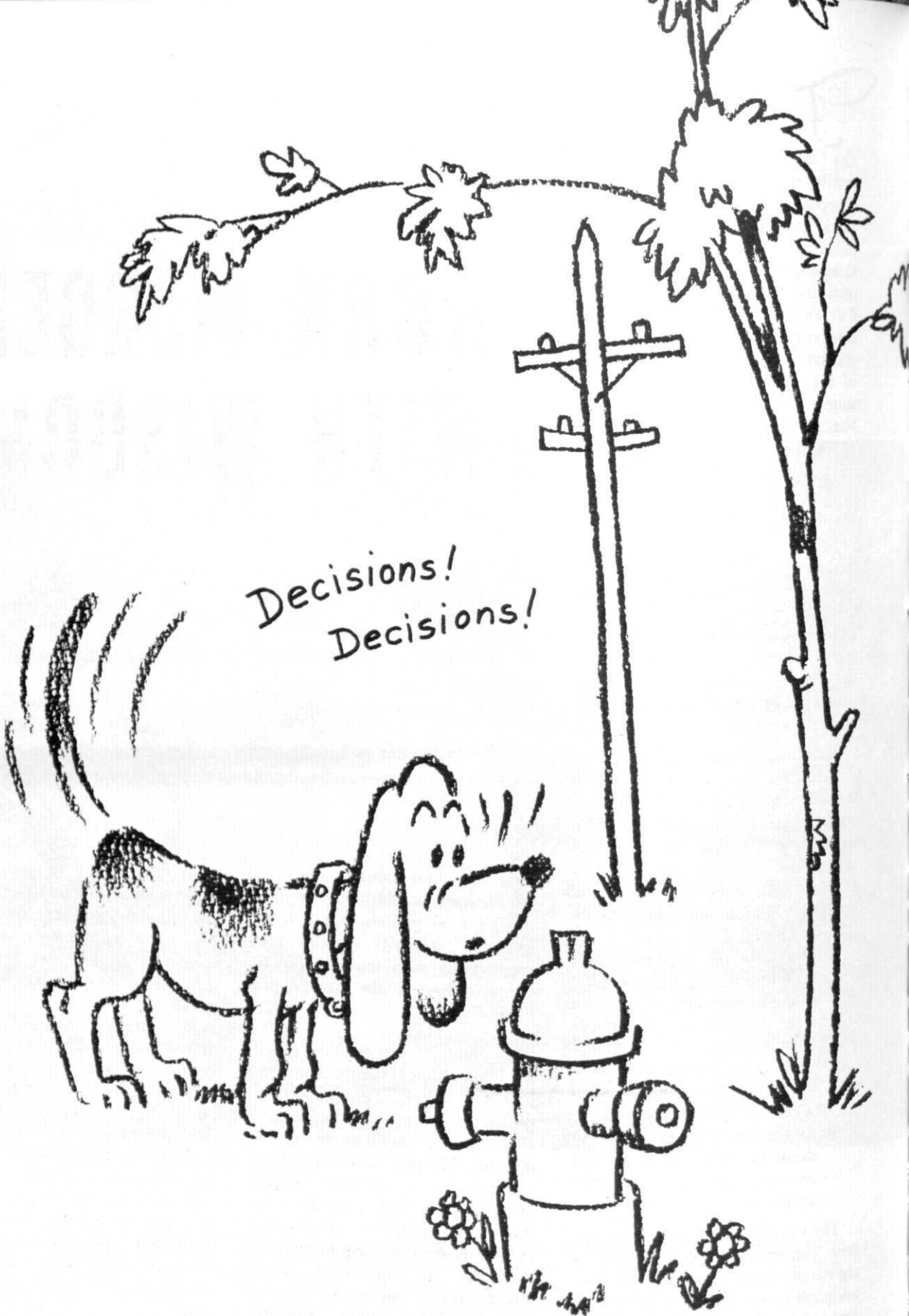
by Art Bell

feels that those students who excel scholastically should obtain as much education as possible, but that the average student should seek employment with responsibility for "responsibility is the world's best teacher".

As far as the industry is concerned, Mr. Conrad feels it fails to attract and help the emerging engineer before he graduates, for undergraduate help is vital to the continuation of the industry. This help takes the form of summer jobs, summer training programs, and field work where the student does—instead of watches. Also as the engineer is learning to apply his knowledge, an experienced worker should supervise and consul him so he gains confidence rapidly. Although

these are some of the industry's self-criticisms, the major concern of the student is to constantly evaluate his potential, realize where his interests lie, and get completely involved in the industry as much as possible.

Mr. Conrad became so involved in the construction field that he worked from bricklayer to engineer to president of the company without losing the satisfaction of doing it all through hard work and wisdom. When a person like Mr. Conrad looks back and realizes that his path to success was not miraculous, but due to hard work and the proper training, we will all benefit from his opinions and concerns over future engineering leaders and their current educational needs. □



Decisions!  
Decisions!

# Some decisions are relatively unimportant. Where you put your engineering talent to work is not.

As you contemplate one of the most important decisions of your life, we invite you to consider a career at Pratt & Whitney Aircraft. Here, you will find wide-open opportunities for professional growth with a company that enjoys an enviable record of stability in the dynamic atmosphere of aerospace technology.

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- **MATERIALS SCIENCE • CERAMICS • MATHEMATICS • STATISTICS**
- **COMPUTER SCIENCE • ENGINEERING SCIENCE • ENGINEERING MECHANICS.**

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A**  
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Randy Trost, Wisconsin '67

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If you'd like to talk with Randy Trost about B&W, call him collect at our facility in Lynchburg, Virginia, AC 703 846-7361.

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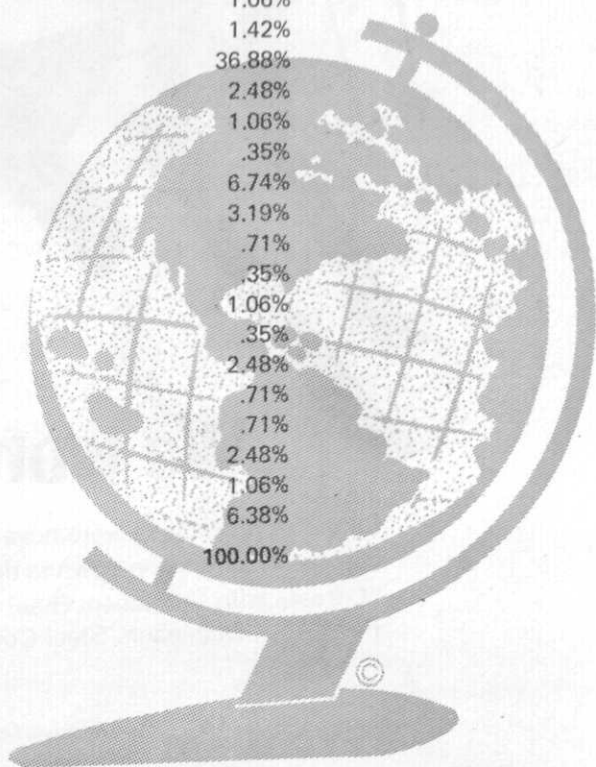
The Babcock & Wilcox Company, 161 East 42nd Street, New York, New York 10017.

**Babcock & Wilcox**

# GEOGRAPHIC DISTRIBUTION

## OF 1967 - 1968 GRADUATES OF THE COLLEGE OF ENGINEERING

State	Number of Students	Percentage of Total
Arizona	7	2.48%
Arkansas	1	.35%
California	17	6.03%
Colorado	1	.35%
Connecticut	3	1.06%
Delaware	2	.71%
Dist. of Columbia	2	.71%
Florida	6	2.13%
Hawaiian Islands	1	.35%
Illinois	28	9.93%
Indiana	11	3.90%
Iowa	4	1.42%
Kentucky	1	.35%
Louisiana	2	.71%
Maryland	3	1.06%
Massachusetts	4	1.42%
Michigan	104	36.88%
Minnesota	7	2.48%
New Jersey	3	1.06%
New Mexico	1	.35%
New York	19	6.74%
Ohio	9	3.19%
Oklahoma	2	.71%
Oregon	1	.35%
Pennsylvania	3	1.06%
Tennessee	1	.35%
Texas	7	2.48%
Virginia	2	.71%
Washington	2	.71%
Wisconsin	7	2.48%
Foreign	3	1.06%
Other	18	6.38%
<b>Total Students</b>	<b>282</b>	<b>100.00%</b>





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Career opportunities were never better at Bethlehem Steel. Get the cold facts. Schuss on down to the placement office and pick up a copy of our booklet, "Careers with Bethlehem Steel and the Loop Course." Or write: Manager of Personnel, Bethlehem Steel Corporation, Bethlehem, PA 18016.

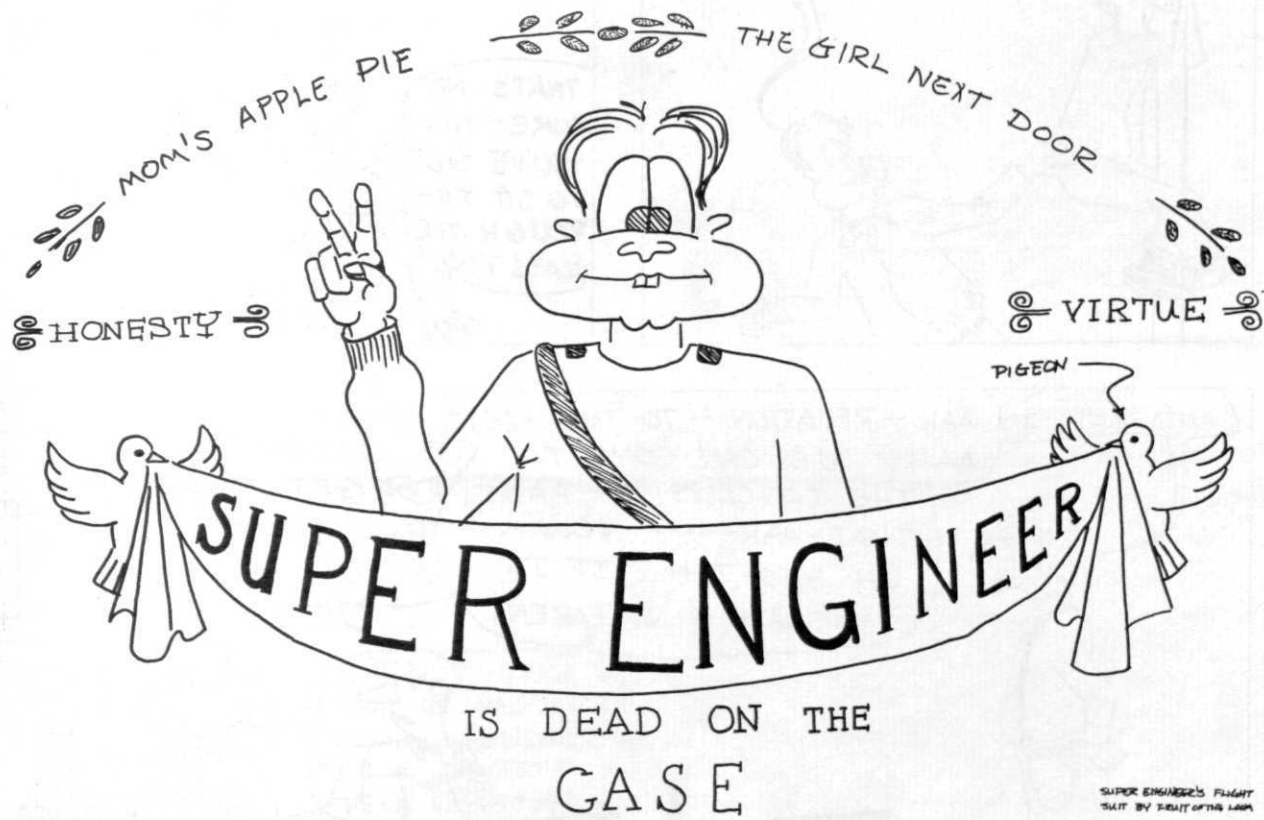
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*An Equal Opportunity Employer in the Plans for Progress Program*





HOW OFTEN HAVE YOU TAKEN THE  
TUBE FROM SOME "BIMBO" OLD  
**FOGIE?** → WELL, HAVE NO FEAR →

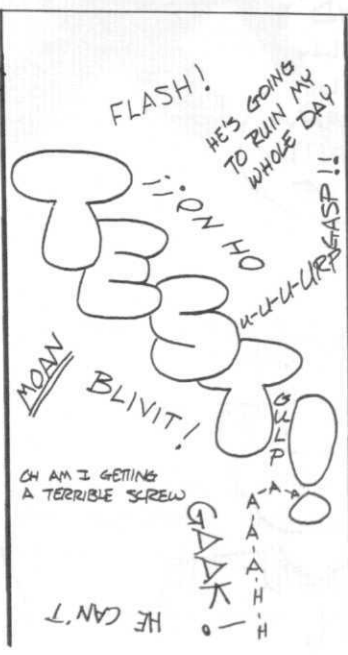
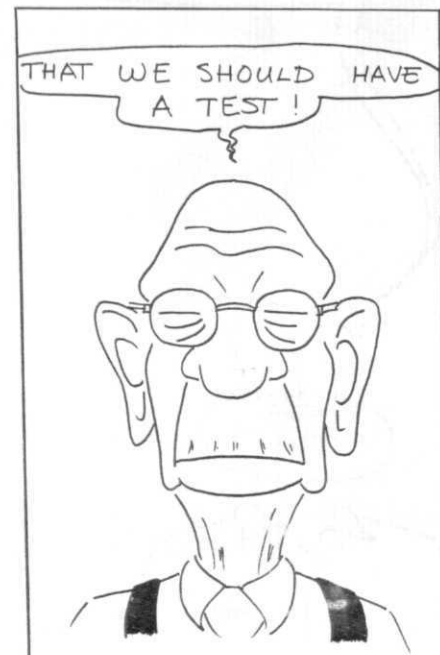
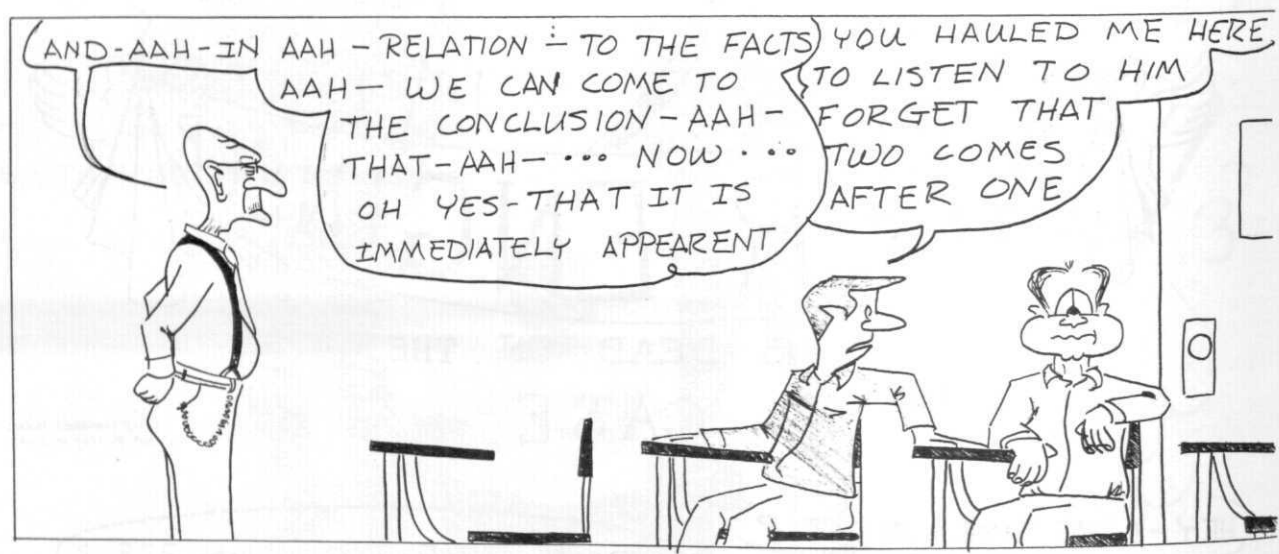
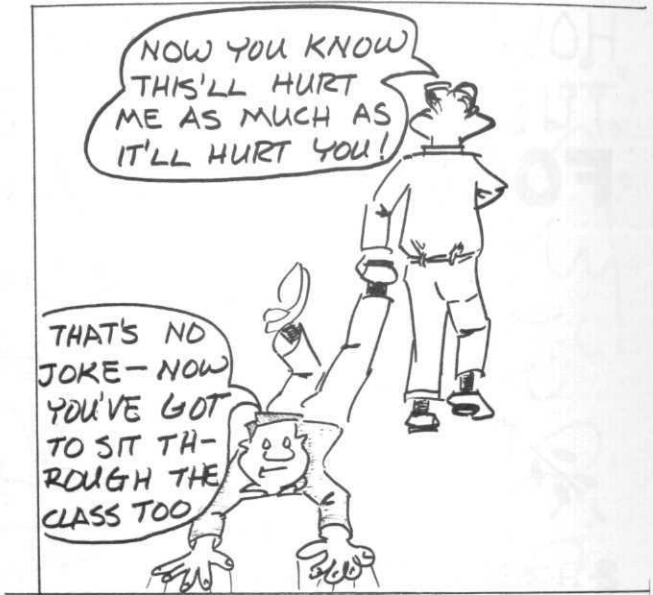


HEY - WHAT TIME IS IT?

I DON'T THINK I CAN STAND  
ALL THE EXCITEMENT - ALL  
THAT FACINATING MATERIAL -  
THE CHALLENGE - THE DRAMA  
AS YOU WAIT EXPECTANTLY  
FOR THE NEXT CRUMBS OF  
TRIVIA!

'BOUT TIME FOR MMM 373.2





HOW CAN THIS BE - KINDLY (?)

DR. C. NILE

JUST COULDN'T DO THAT - WELL BUNKIE YOU LOOSE !!!

CAUSE HE IS DOING JUST THAT

AND SO AFTER  
A WEEK OF  
DILIGENT STUDY

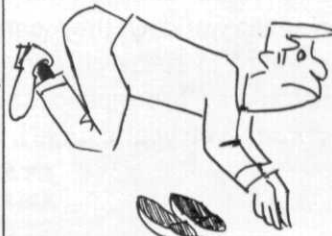
OH BOY IS THAT EVER  
A BIG SACK OF

CENSORED DUE  
TO  
UNIVERSITY POLICY



OH JOHN HAN-NA  
WHY CAN'T WE  
PRINT THESE THINGS -  
THEY CAN AFF AN-N  
AR-BOR - SO WHY NOT IN  
EAST LA-AN-SING?

TO THE TUNE OF  
OH SUZANNA



GLAD TO SEE YOU  
BOYS ARE SO READY  
FOR OUR LITTLE  
QUIZ



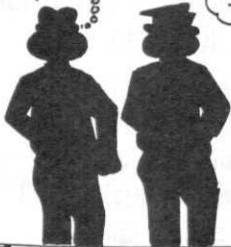
THAT TEST WAS HORRIBLE -

NO KIDDING

THERE WASN'T A THING ON  
THAT TEST THAT HAD A THING  
TO DO WITH THE THINGS HE  
SAID IN CLASS

GUESS I'LL DO  
SOME-  
THING

I DIDN'T NOTICE  
THAT HE HAD SAID  
A THING BESIDES  
"IT IS INDEED A  
HECK OF A NOTE"

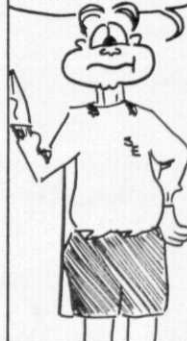


DR. NILE -- AH DR NILE

NO - I'M

YES - YES WHAT IS IT?  
HAVING TROUBLE WITH  
YOUR 1040 QUENCHING  
CURVES?

WE'LL USE HOOKE'S  
LAW OR MAKE IT  
BIGGER



SAY DOC -

NOW THE PHASE DIAG  
OF STEEL - NO - NO -  
LOOK AT AH - THE STRESS

DR. NILE I WANT STRAIN CURVE FOR  
TO TALK TO YOU WATER  
ABOUT YOUR CLASS

GLASS - NO MY BOY -  
STEEL - HOOKE'S LAW  
MARTENSITE - GOOD  
STUFF LIKE THAT

ENOUGH - I'VE  
HAD IT!



LEFT WITH  
NOTHING  
TO DO  
S.E  
ACTS!

SEE YA DOC!!!



FOR THOSE OF YOU WHO ARE CURIOUS THIS IS A PRUNE

Be frustrated. As only a participant can be.  We'll give you every opportunity to participate. To stretch your mind. To struggle with a problem until you get mad. Until you solve it. And get the credit you deserve.  We don't promise the world. Or the moon. Just the satisfaction of using your talents. Day after day.  Whether you're in research and development, marketing, refining, planning and engineering, or administration.  Your pencils are waiting.  **That's what we promise. If it's enough, talk to our representative on your campus. See our ad on the next page for the date.**

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Mechanical Engineering (B.S.)

Civil Engineering (B.S.)

You can work in one of our following departments:

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RESEARCH and DEVELOPMENT  
MARKETING  
CORPORATE STAFF

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Plant Engineering  
Field Engineering  
Process Economics Engineering  
Design Engineering  
Process Engineering  
Process Development Engineering  
Product Development Engineering  
Project Engineering  
Technical Sales Representative  
Industrial Marketing Engineering  
Structure and Design Engineering

Talk to our Representatives

P. A. DORSEY

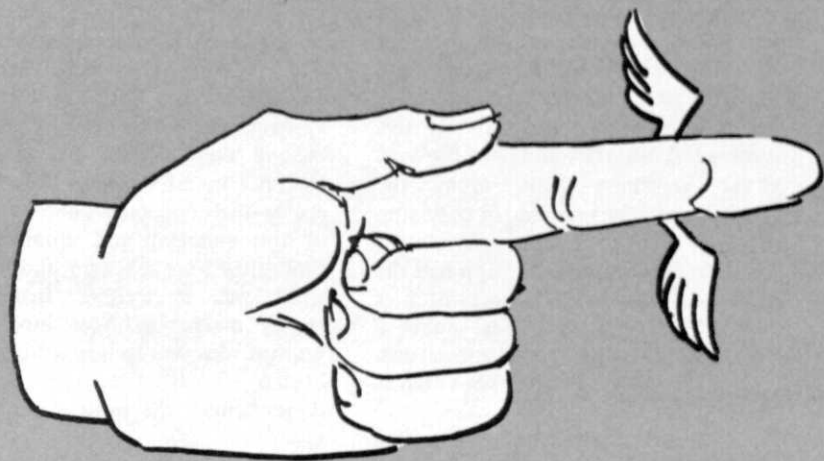
B. G. GOURDIE

April 8, 1969



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## SPARTAN ENGINEER

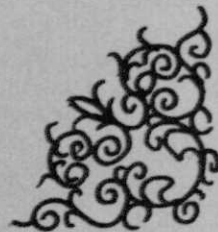
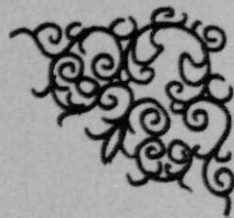
### FLYING FICKLE FINGER

of

# FATE

is  
given  
to

Anyone and everyone who  
thinks that "Soapy" Williams  
is MSU presidential material.



## AN INFORMAL REPORT . . .

(Continued from page 9)

opportunities. The best offer came from Uncle Sam, and eventually most of them relocated to Huntsville, Alabama.

### Huntsville, Alabama?

You've got to remember that this was right after WWII; rockets were mysterious, romantic, and dangerous Flash-Gordon-type gadgets just this side of death rays and The Blob. In case anything went wrong the authorities in charge wanted to be sure that it happened in a place that wouldn't be missed. Al Capp had the rights to Dogpatch, so the authorities settled on the next best thing—a fly-blown North-Alabama cotton town which during the war had been used as a depot for storing poison gas.

Huntsville has one outstanding characteristic—it is located within a valley at the tail end of the Appalachians. This allowed the Peenemunde Boys to build their homes up on the side of the valley; from there they can look down upon the peasants below—just like in the old days. In gratitude for this thoughtful touch, they built the Army a new rocket. Using good old German-American know-how and Yankee-Aryan ingenuity, they took the V-2, enlarged it, applied new technology, renamed it the Redstone, and sent out for another six-pack of Schlitz when it fulfilled all expectations.

At this point inter-service rivalry began to heat up. "If the Army can have rockets, so can we," said the Navy as it began work on the Vanguard and Polaris.

"And just what business," the Air Force wanted to know, "does anyone else have with guided missiles?"—and the Atlas hit the drawing boards.

"Boys," the Army said to Wernher and the crew, "the competition is catching up with us; get on the stick." What they did was to take the Redstone, enlarge it, apply new technology, rename it the Jupiter, and haven't we been through all of this before?

SPUTNIK! (You think you were shocked—Huntsville looked like an undertaker's convention.) While Congress appropriated money like mad and swore that the USA would never get caught with its pants down again, the ultimate humiliation came—the Navy, not the Army, put America's

first satellite into orbit. The concept of staging—putting one rocket on top of another—was what had out-maneuvered the Army, not superior hardware. Later, the Redstone and Jupiter put bigger and better satellites up, but somehow it wasn't the same.

The Army was completely phased out of the space game with the creation of NASA, but the Peenemunde Boys remained alive and kicking—they weren't out of it yet, Dad, not by a long shot. They had an ace up their collective sleeve—no more of this enlarging and uprating jazz, times they were a-changin' and the new word was *innovation*. Instead of merely making a bigger Jupiter, the brilliant idea was to take a Jupiter and strap 7 Redstones around it—gentlemen, the birth of the Saturn I.

Strictly speaking the Saturn I was only a booster—only the bottom state—but even so it was powerful enough to orbit much more mass all by itself than any staged combination of rockets then available. This was graphically demonstrated as Saturn after Saturn roared into orbit with a dummy second stage filled with sand. A live second stage turned the Saturn I into a Saturn Ib, and the Ib's were no less successful. All Saturns, in fact, have fantastic reliability; because of the way they are built it is possible to hold them on the pad under full thrust for over three seconds—plenty of time for computers to check out all systems and correct anything correctable.

"Try that," sneered NASA, "with an Atlas."

The reference was to the fact that the Atlas—the Air Force's pride and joy—cannot support its own weight; it must be pressurized with helium to stand on the pad, and if it were held down under full thrust it would probably shake apart. Most of the remark, however, can be chalked up to sour grapes. Although some of the early Mercury capsules had been put up by Redstones and Jupiters, the more glamorous Gemini and Apollo capsules had been orbited by Atlases and the Air Force's other baby, the Titan.

"Just what do you think you're proving," retorted the Air Force, twisting the knife, "by blowing \$100 million a shot to orbit 5 tons of sand?"

This, too, was sour grapes. President Kennedy had committed the

USA to the moon and, no way around it, the only thing big enough to do the job was the Saturn. In a final burst of glory the Peenemunde Boys gave it one more go—they took the Saturn I, enlarged it, applied new technology, etc., etc., etc., and lo and behold the Saturn V appeared amid blaring trumpets, loud huzzahs, and some unpleasant grumblings from disgruntled taxpayers who suggested that for the same price a marble staircase could have been built to the moon (ha! shows what they know).

Finally, the big payoff. After the expenditure of more manhours than the building of the Great Pyramids and the Normandy landing put together, the luck of the training schedule put Anders, Lovell and Borman on top of the Saturn V—and I think you know the rest.

A quick summary before conclusions are drawn—

Goddard's sixth model begat . . .

the V-2, which begat . . .

the Redstone, which begat . . .

the Jupiter, which begat . . .

the Saturn I, which begat . . .

the Saturn V, and we make it to the moon by burning kerosene.

*Pravda* called it—and quite accurately too—"a typical example of the capitalistic taste for empty spectacularism." Yeah, well . . . eat your heart out, *Pravda*.

On the home front, *Time* magazine named Anders, Lovell and Borman their "Men of the Year"—proving once again that even if Time-Life's heart is in the right place, its head is, as usual, six feet up its—

Anyway, the moral of this little story is one which all you starry-eyed engineering students had best learn and heed before venturing out into the cruel, hard world:

Nothing is as important as a sense of timing. In other words, you're an *Engineer*—drive the gravy train, don't help build it.

# OCCUPATIONS OF 1967 - 1968 GRADUATES OF THE COLLEGE OF ENGINEERING

## MECHANICAL ENGINEERING:

Graduate School	Government	Automotive Manufacturers	Aero-Space	Other R & D	Misc.	Total
10	3	16	7	11	10	57

## ELECTRICAL ENGINEERING:

Graduate School	Government	Computer Manufacturers	Electronics	Aircraft & Aero-Space	Electrical Equipment	Misc.	Total
12	11	10	30	18	14	15	110

## MECHANICS, METALLURGY & MATERIALS SCIENCE:

Graduate School	Government	Automotive Manufacturers	Metals Suppliers	Misc.	Total
4	0	3	5	6	18

## CHEMICAL ENGINEERING:

Graduate School	Government	Oil Companies	Chemical Companies	Misc.	Total
10	3	7	12	6	38

## CIVIL ENGINEERING:

Graduate School	Government	Construction Companies	Misc.	Total
7	19	9	7	42

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A new and modern pavement design system that incorporates solutions made from extensive computer analysis, The Asphalt Institute's method uses data from the AASHO Road Test, the WASHO Road Test, British road tests and the in-use experience of several states.

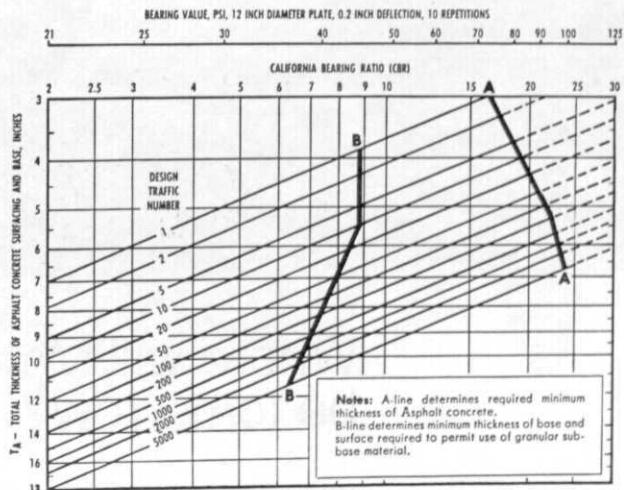
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\*Full-Depth Asphalt pavement is an Asphalt pavement in which asphalt mixtures are employed for all courses above the subgrade or improved subgrade. Full-Depth Asphalt pavement is laid directly on the prepared subgrade. **TA**—a mathematical symbol used in The Asphalt Institute structural design formula to denote Full-Depth.

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Thickness Design Charts like this (from the MS-1 manual) are used in this computer-derived method. This chart enables the design engineer quickly to determine the over-all Asphalt pavement thickness required, based on projected traffic weight and known soil conditions.

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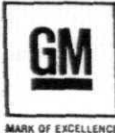
Name \_\_\_\_\_ Class or rank \_\_\_\_\_  
 School \_\_\_\_\_  
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## Where will Matt Tate be tomorrow?

Wherever the project leads, Matt Tate is on his way. Board . . . bench . . . conference table. This young engineer sees them all at Delco. He was there when the project came from the car division. He'll be there when the model shop builds his prototype. He'll be looking over the shoulders of draftsmen, mechanics and stylists. The project's his. From start to finish. Step by step, skill by skill, Matt Tate's growing with the job. The question is . . . can you say the same? Take a good hard look at how your career shapes up, compared with Matt's and his colleagues' at Delco. We need men who want every week to be a little different. For details, call collect. Area Code 317/459-2808. Or write: Mr. C. D. Longshore, Supervisor, Salaried Employment, Dept. 500, Delco Radio Division of General Motors, Kokomo, Indiana.

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HEADS HE'S GOT MONO - TAILS THE FLU

HASC



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You might think that if you come to work for us we'll stick you behind a desk making phones for the rest of your life.

Uh-uh.

Don't be misled by the word *Telephone* in our name.

Actually we're a group of over 60 companies and some of them happen to be in the telephone business. They're in our General Telephone group and are involved in developing new ways for man to communicate.

So if you want to work for our phone group, you can.

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panies, like Sylvania.

Sylvania manufactures over 10,000 products alone, knocking out everything from Micro-Electronic Semi-Conductor Devices to Educational Communications Systems.

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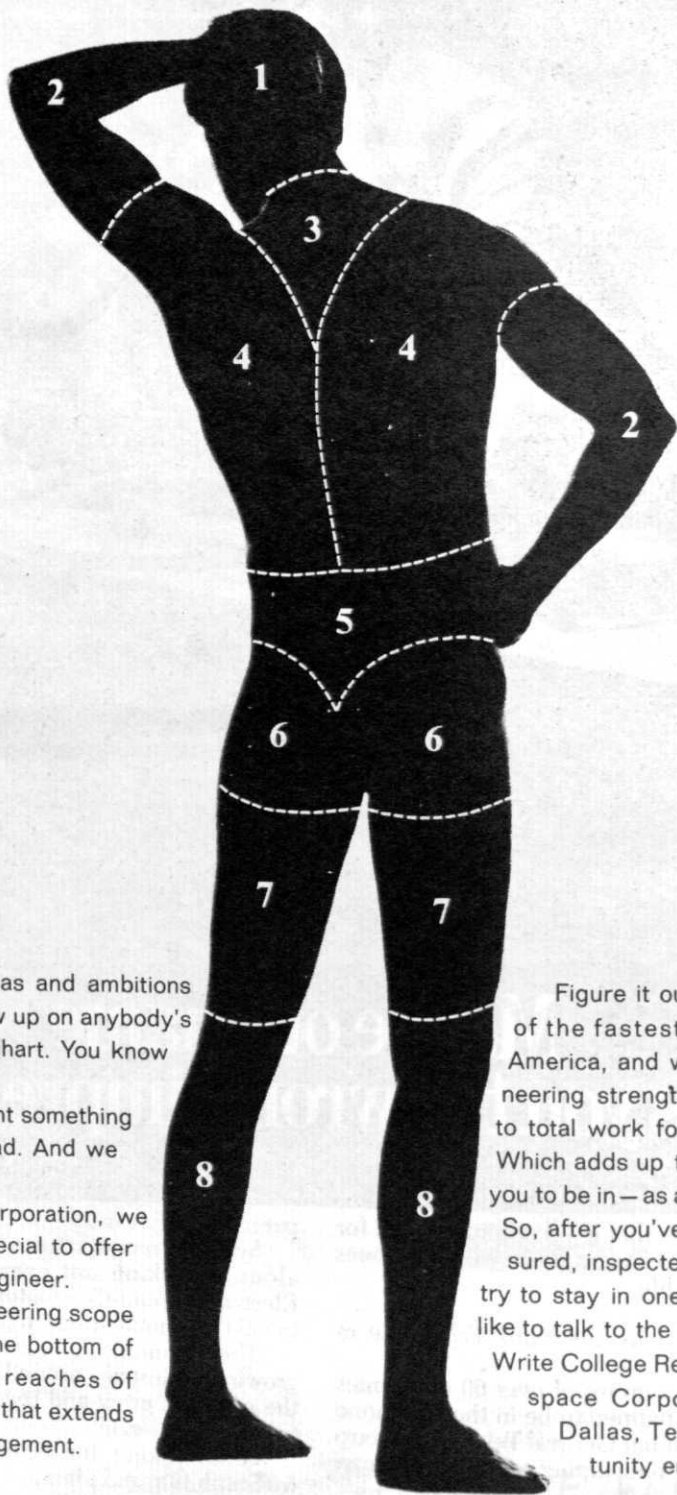
We're looking for Scientists and Engineers with ambition and ideas.

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Or make an old one easier to live in.

### General Telephone & Electronics

Have your day  
in the  
butcher's market.  
Then check with the man from LTV Aerospace.



As a man, you've got ideas and ambitions and values that won't show up on anybody's version of the butcher's chart. You know it and we know it.

As an engineer, you want something more than your daily bread. And we know that, too.

At LTV Aerospace Corporation, we have something pretty special to offer you — as a man, as an engineer.

We've got scope. Engineering scope that can take you from the bottom of the ocean to the outer reaches of space. Opportunity scope that extends to the top levels of management.

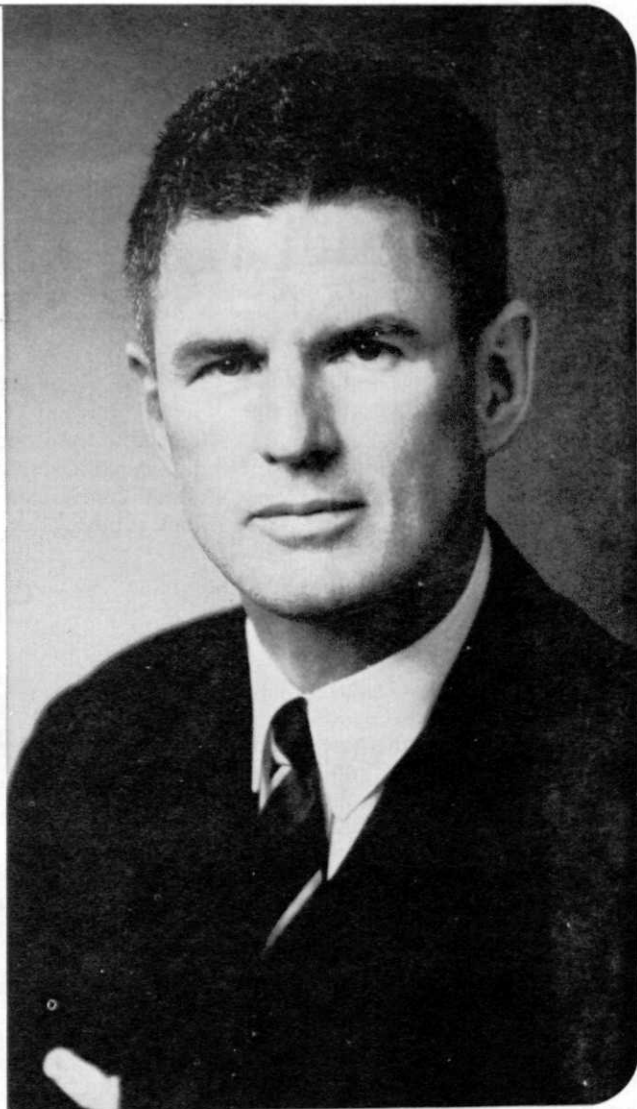
Figure it out. LTV Aerospace is one of the fastest growing companies in America, and what we grow on is engineering strength. Our ratio of engineers to total work force is exceptionally high. Which adds up to a pretty good spot for you to be in — as an engineer, and as a man. So, after you've been weighed and measured, inspected and all but dissected — try to stay in one piece, won't you? We'd like to talk to the whole man.

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continuing exploration program carried on both here and abroad, seeking new deposits of lead, zinc, and other minerals to meet the demands of an expanding international market. □ Wherever you look — in our mines and mills, our research and development laboratories—there are challenges for young engineers with imagination and enthusiasm. □ Whatever your field of interest, be it civil, electrical, mining, metallurgical or chemical engineering —at St. Joe there’s an opportunity to use your talents and imagination, and to work with men with the knowledge and experience that have made St. Joe a leading member of the mining and metals industry.”

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5J-354

# ENGINEERS

A panhandler collapsed in the middle of the street and immediately a large crowd gathered.

"Give the poor man a drink of whiskey," said a little old lady.

"Give him some air," said several men.

"Give the man a drink of whiskey," repeated the little old lady.

"Call an ambulance," someone suggested.

"Give him a drink of whiskey," the little old lady insisted.

The babble continued until suddenly the victim sat bolt upright and demanded, "Will you all shut up and listen to the little old lady."

SE

Entropy is a Commie plot.

SE

A man was having trouble with his parakeet. Every night when he came home from work, the bird would fly up on his shoulder and pick holes in his shirt. After thoughtful deliberation the man decided that the only solution was to file off the bird's beak. So he went to the hardware store to buy a file.

When the salesman found out why the man wanted the file, he tried to talk him out of it, explaining that the parakeet could not eat without his beak. But it was all to no avail, so he reluctantly sold him the file.

A few weeks later the man was back in the hardware store and the salesman recognized him.

"How's your parakeet?" asked the salesman.

"Oh, he's dead," the man replied.

"See, I told you so! I knew that your bird would die because he couldn't eat with his beak filed off!"

"Yeah," replied the man, "but I think he was dead when I took his head out of the vice!"

A man caught in a snow drift looked up and saw a Saint Bernard coming toward him with a keg under his chin. "Oh, look", he exclaimed, "here comes man's best friend and look at the big dog, too."

SE

A farmer was phoning a veterinarian. "Say, Doc," he said, "I've got a sick cat. He just lays around and licks his paws. He has no appetite. What shall I do for him?"

"Give him a pint of castor oil," said the vet.

Somewhat dubious, the farmer forced the cat to take a pint of castor oil. A couple days later he met the vet in town.

"How's your sick calf?" inquired the vet.

"Sick calf! That was a sick cat I had."

"My Gawd, did you give him that pint of castor oil?"

"Sure did."

"Well, what did he do?" asked the vet.

"Last time I seen him," said the farmer, "he was going over the hill with five other cats. Two were digging, two were covering up, and one was scouting for new territory."

SE

The theatrical agent trying to sell a new strip act to a night-club manager was raving about the girl's unbelievable 72-26-40 figure.

"What kind of a dance does she do?" the manager asked, duly impressed by the description of the girl's dimensions.

"Well, she doesn't actually dance at all," the agent replied. "She just crawls out onto the stage and tries to stand up!"

Irritated Thermo Prof.: "If there are any morons in this room, please stand up."

A long silence, and a lone freshman rose.

Professor: "Why, do you consider yourself a moron?"

Freshman: "Well, not exactly, sir, but I hate to see you standing all alone."

SE

"How'd you get a flat tire?"

"Ran over a bottle of milk."

"Didn't see it, huh?"

"Naw, the kid had it under his coat."

SE

A man in an insane asylum sat fishing over a flower bed, a visitor approached and asked, "How many have you caught?"

"You're the ninth," was the reply.

SE

Raquel Welch is an entropy sink.

SE

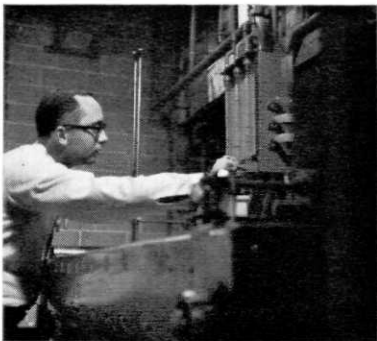
Two hunters in Africa were caught by cannibals and put into a huge cooking pot. One man laughed hysterically. Annoyed, the other man asked, "What's so funny?" The first one replied, "If they only knew what I was doing in their soup!"

SE

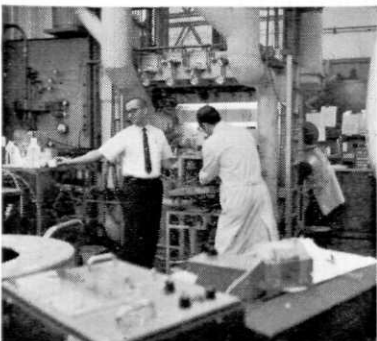
She had a contagious smile . . . trench mouth!



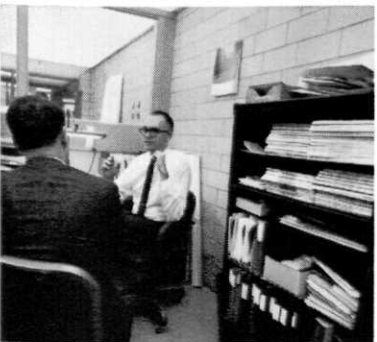
Joined September '68



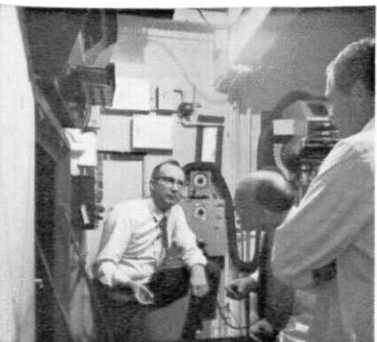
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or

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that way ▶

Your ambitions may lead you close to the cutting edge of the state of the art in your profession, whether it's industrial, chemical, mechanical, or electrical engineering. In the set of pictures on the left you see the environments of some Kodak chemical engineers, for example, who have not drifted away from chemical engineering.

The other column shows the work environments of other real Kodak chemical engineers who have chosen to broaden out into work more involved with people, as in administration and marketing. Perhaps this is the direction you prefer.

Drop us a line telling us in which column your picture belongs. A wrong answer now will not count against you.

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## Pete Drobach has a knack for getting to the root of a problem.

High school students John Magish and John Ripley would be the first to agree.

They're both student members of a "big brother" program that Pete sponsors. Each week, they spend several hours of their own time helping less advanced classmates with their studies.

Pete is more than a sponsor. He's also a consultant—particularly when they're stumped by the logic of a tough "new math" problem.

But when Pete graduated from Rutgers in 1964, it wasn't these youngsters with their homework problems that brought him to General Electric. It was the chance to help people in industry solve tough technical problems. A career in technical marketing at General Electric gave him the opportunity.

Today, Pete's an application engineer in steel mill

drives and automation systems. His ideas on how to apply products from many of GE's 160 separate businesses enable his customers to improve the efficiency and productivity of their plants.

Like Pete Drobach, you'll find opportunities at General Electric in R&D, design, production or marketing that match your qualifications and interests. Talk to our man when he visits your campus. Or write for career information to: General Electric Company, Room 801A, 570 Lexington Avenue, New York, N.Y. 10022.

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