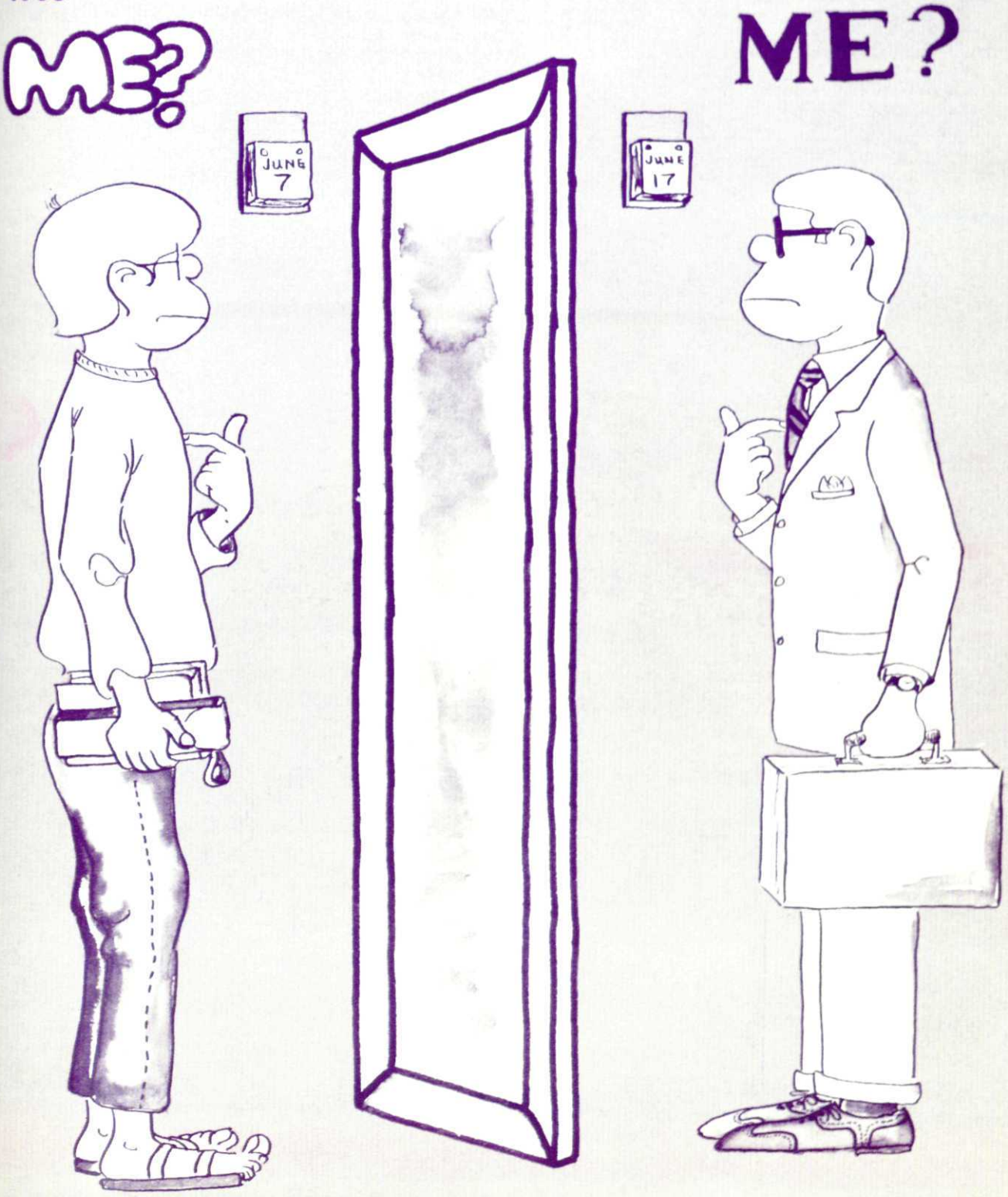
SPARTAN ENGINEER

AY, 1968



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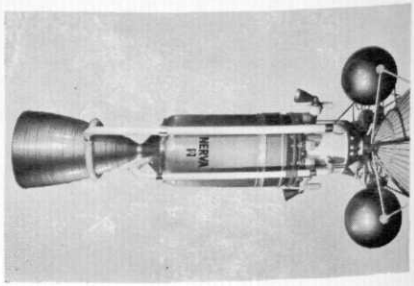

These graduates needed: Electrical Engineering, Mechanical Engineering, Chemical Engineering, Materials Science, Nuclear Engineering, Aerospace Engineering, Physical Sciences.

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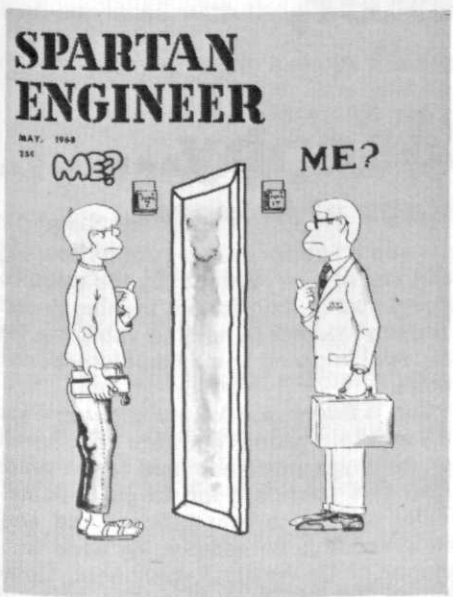
SPARTAN engineer

VOLUME 21 NUMBER 4 MAY,1968



June is the time of year when many of us have to face that cold, cruel world for the first time. This month's cover, by Davis Chase, shows one of the more obvious changes that takes place in a graduating senior.

ARTICLES:

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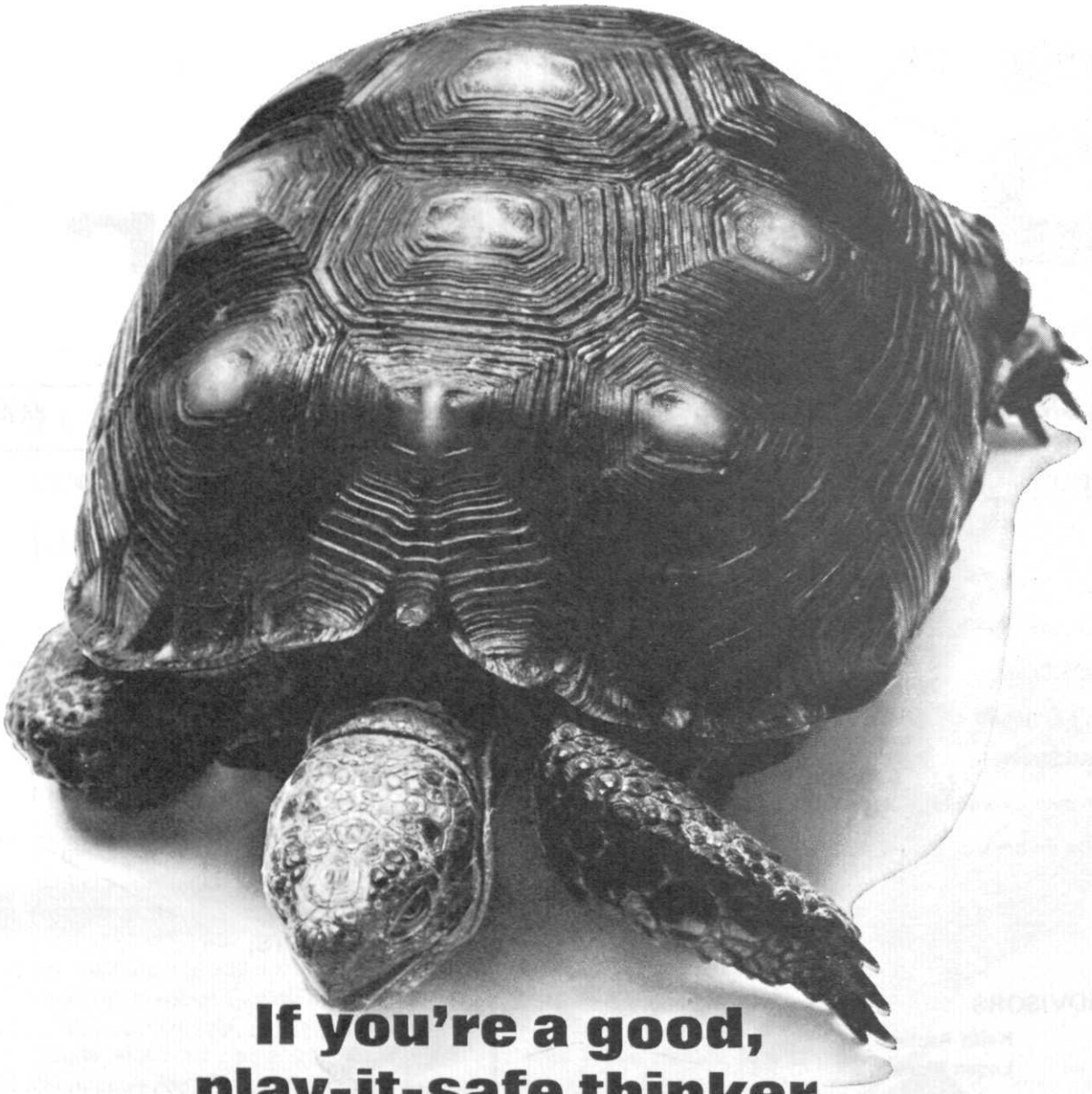

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CELANESE

Editorial

THE LESSER OF TWO EVILS?

As is obvious from the size of this issue, most of our advertisers have given up hope of hiring any more graduates and have said goodbye to our readers until next year. Many of the seniors have accepted jobs with these and other companies, and soon will be reaping the rewards of four (or more) years in the College of Engineering. (Note the picture of one of these fine lads on the cover.)

As was stated in the last issue, these graduating seniors are faced with the prospect of spending the next two years of their lives in the armed services. We delved into many aspects of the draft in that issue, but the ramification expressed in Ron Diehl's poem needs further inspection.

There has been much talk going around the senior class about trying to find jobs with deferments, which are still available from some local draft boards. Most of those seeking deferments are just afraid of Viet Nam or mad at losing two years of experience in their chosen field. But there are the other so-called pacifists who believe that the war is wrong, and that by obtaining a deferred job they will not have to participate in it.

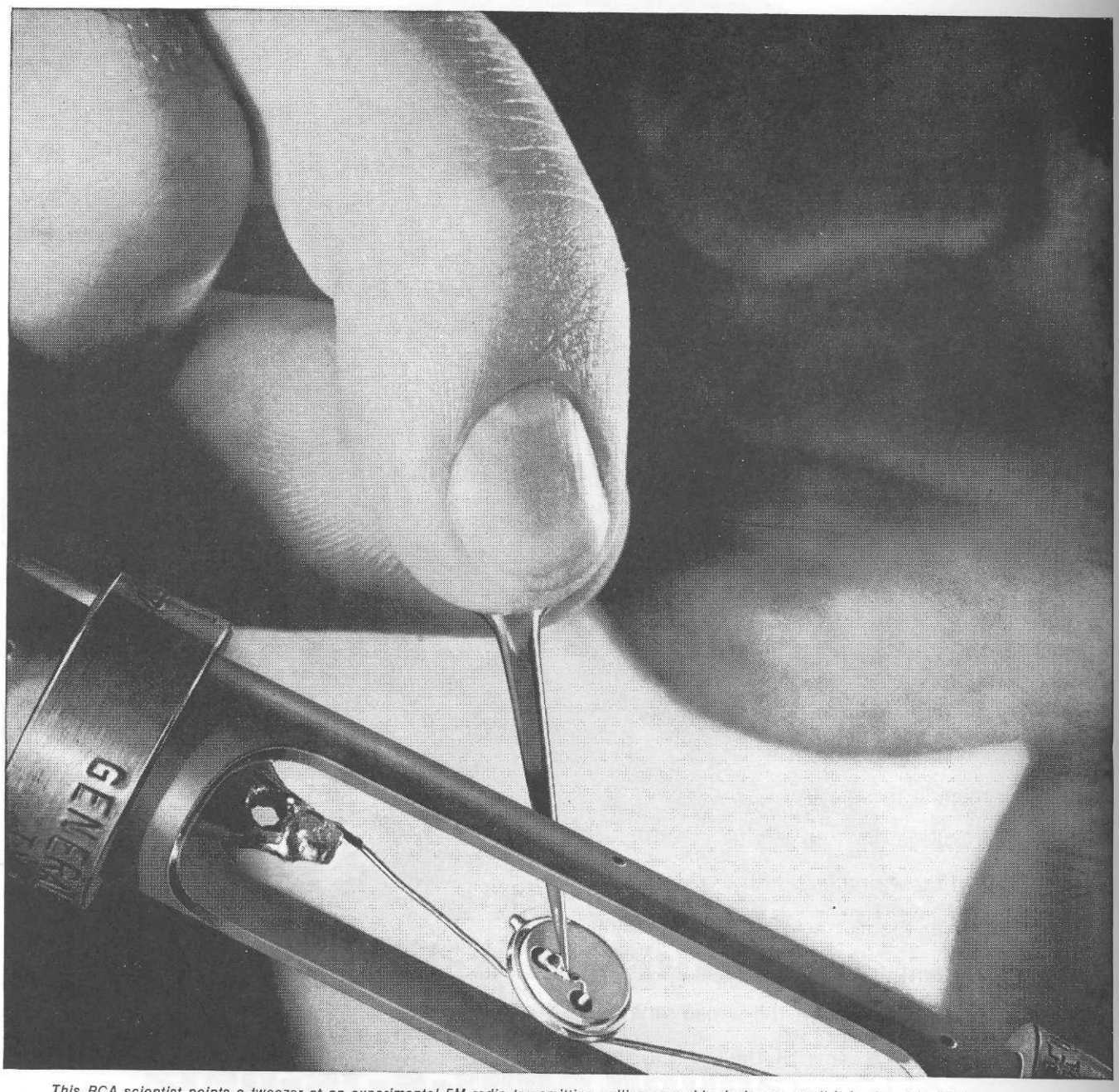
We are all forced to take the Humanities series at MSU, and the one thing I remember from those courses is that there is such a thing as human ethics. No matter how few people follow the principle, it is right and just not to harm a fellow human being. The engineer who believes a deferred job will help him follow this code is only fooling himself.

If a person eliminates the possibilities of leaving the country or going to jail, he is left only with the alternatives of the Army or a deferred job. If he wants to choose the least destructive of these two alternatives, he must choose the army. A soldier with a weapon can only be responsible for those he actually kills, and the property he actually destroys. The engineer who helps design the weapon, however, plays a part in each killing, and each piece of destruction done by the soldier. The sad part, which I learned on some of my interview trips, is that very few of the deferred engineers feel responsible at all.

It is extremely hard to make decisions such as this. Many feel no qualms at all about the war, but for those who do, accepting fighting as a lesser evil than sitting in a lab designing new weapons is very difficult.

This is my last issue as editor. In a few weeks I will join this country's labor force in a non-deferred job and wait for my draft board. By this time next year, I will probably have to make the decision discussed in this editorial. Perhaps I will not have the courage to stick to my convictions and accept soldiering rather than engineering, but I hope otherwise. I wish myself, and all other graduates, good luck.

Gary Romans



This RCA scientist points a tweezer at an experimental FM radio transmitting gallium arsenide device so small it is almost invisible.

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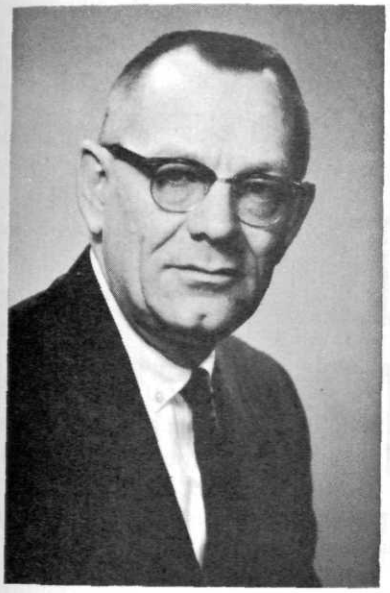

Dr. Lawrence W. Von Tersch

NEW DEAN OF ENGINEERING

Dr. Lawrence W. Von Tersch, Acting Dean of Michigan State University's College of Engineering for the past 15 months, has been appointed dean of the college.

His appointment, effective immediately, was approved Thursday (April 18) by the MSU Board of Trustees.

He succeeds Dr. John D. Ryder, who is currently on leave of absence and who will continue as professor of electrical engineering.

Dr. Von Tersch was chairman of MSU's electrical engineering department from 1958 to 1965, when he was named associate dean for academic affairs of the engineering college. He joined the MSU faculty in 1956 as professor of electrical engineering and director of the Computer Laboratory. He has held the latter post since then, supervising installation of the 3600 Computer now in operation and directing construction of its predecessor computer, MISTIC.

A native of Waverly, Iowa, Dr. Von Tersch holds bachelor's, master's and Ph. D. degrees from Iowa State University, where he taught for 10 years before joining the MSU faculty.

At Iowa State he also served with the Institute of Atomic Research.

Dr. Von Tersch is past president and former chairman of the board of the National Electronics Conference, sponsored annually by professional organizations and midwestern universities.

He is a co-author of the book, "Recurrent Electrical Transients" and a member of the Institute of Electrical and Electronic Engineers.

SPECIFICATIONS

Academic degrees: B.S., 1943; M.S., 1948; Ph.D., 1953; Iowa State University.

Professional experience: Instructor, assistant professor, associate professor, and professor of electrical engineering, Iowa State University, 1946-56; associate engineer, Institute of Atomic Research, Iowa State University, 1951-53 and 1954-56; professor of electrical engineering, MSU, 1956- ; director of the MSU Computer Laboratory, 1956-1968; acting chairman, Department of Electrical Engineering, 1957; chairman, Department of Electrical Engineering, 1958-65; associate dean for student affairs, College of Engineering, MSU, 1965-1967; acting dean of engineering, 1967-1968; dean of engineering, 1968-

Organizational membership: Institute of Electrical and Electronic Engineers.

Publications: Co-author of book "RECURRENT ELECTRICAL TRANSIENTS" (Prentice Hall, 1953).

Other information: Dr. Von Tersch was president in 1960, and chairman of the board in 1962 of the National Electronics Conference.

Doesn't it seem like yesterday when you took everything in the house apart. First the toy cars and trucks . . . then your electric train . . . finally mom's toaster. You caught it for that, but you found out how everything worked, and later why.

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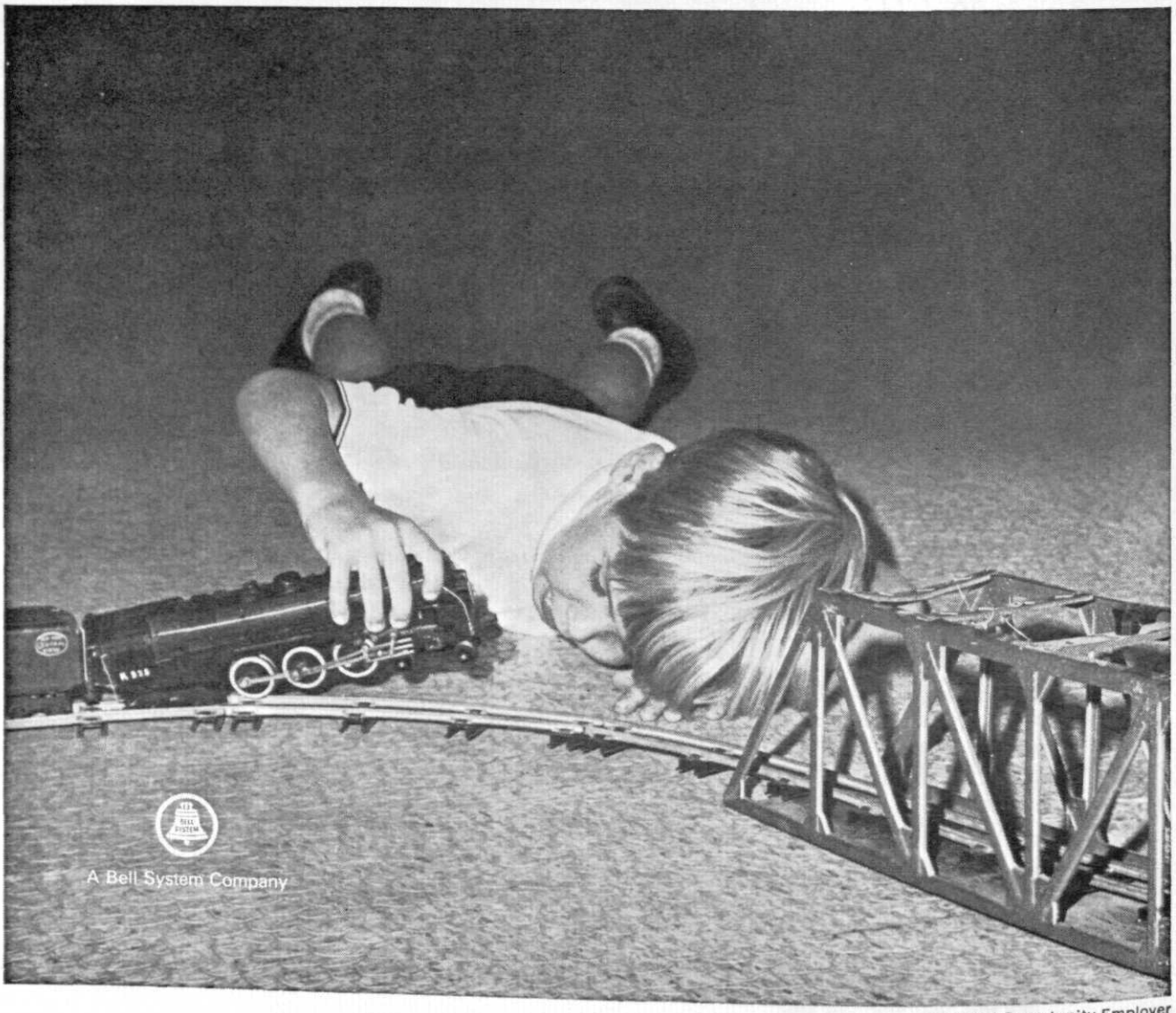

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WHY?

by ED O'BRIEN

IT finally happened one fine day. The world, with all its delights, misery, and hope—supposedly, everlasting hope, ignited.

In ten minutes all was gone and the war was over. The war that had ended all wars—and all hope.

The pyramids had never been built. What color had the sky ever been but black? Who could remember when the Kansas plains were filled with waving, golden wheat? Who was left to know?

Did the ideas live on? Did the ideas that had taunted that extinct race called "Man" to lay claim to his brothers' lands—and lives, still live on? Oh, but such power they had given him! In but a few seconds of eternity, Man had mastered his planet and dreamed of the heavens. Longingly, he searched the sky and studied the winged creatures and one day he found the secret to flight—and bombers—and missiles.

A boy in Venezuela looked up into the sky. How blue the sky was! A flash, then blindness. In the darkness he clutched his mother's leg. She too stared sightlessly, only love remained—then all was heat, and gone.

Did Democracy win, did Communism? Did the idea live on? The question, unasked and unanswered, drifts over the blighted, charred lands. The clouds of radiation, like prehistoric mist cling to the newly bared rock, but no trace of creation can be seen. Why?

"Peace." An emergency meeting of the U.N., called too late—members caught in the panic—their ears stopped—angry, rushing faces, clutching, pushing arms—then nothing.

"Peace," was that a word of these people? Did they know what it meant? Oh, but it was different with "War"—war—defense, fight, win, kill, victory—war. They knew war!

Patriotism, what did it mean to them? The love of mankind as a brother, or only the tolerance of those who live near, in their area, in their country.

Did the ideas live?

John Thomas remembered the day that the cloud was first sighted off Australia. Dark and poisonous, all said. But life and crops had to go on. Where could you hide? He remembered the first time the sickness took his body. Yet he worked on among his dying crops. Others moved away or stayed, either way they died.

John struggled to lift himself from the brown grass—it was the clouds they all had said, the clouds; the air. John lost the thought—tried to regroup it, and forgot all. His mind slowly sank into the blackness—engulfing his consciousness cell by cell as lights are turned off in an apartment building, until the last was gone.

WHY?

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OF

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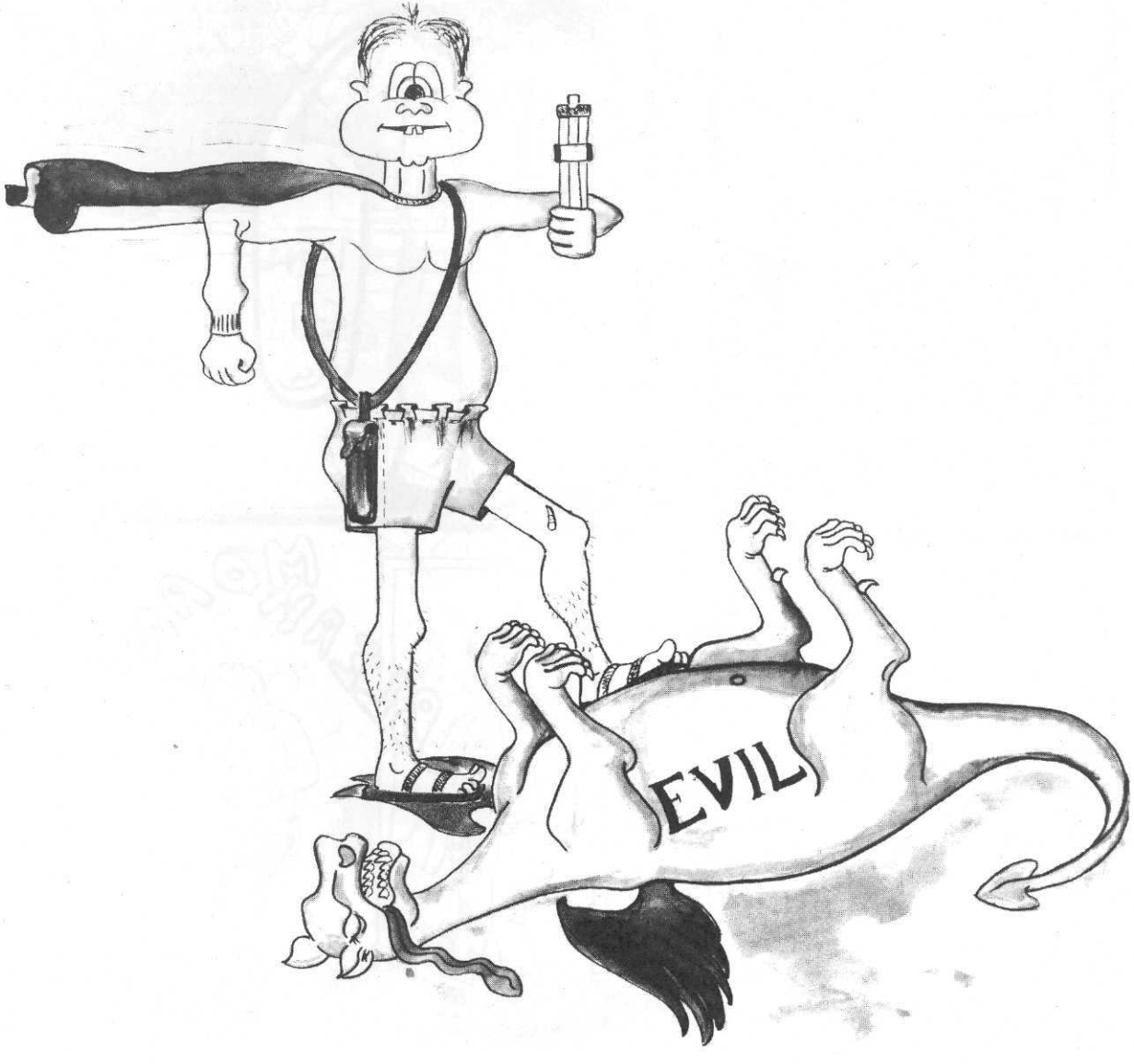
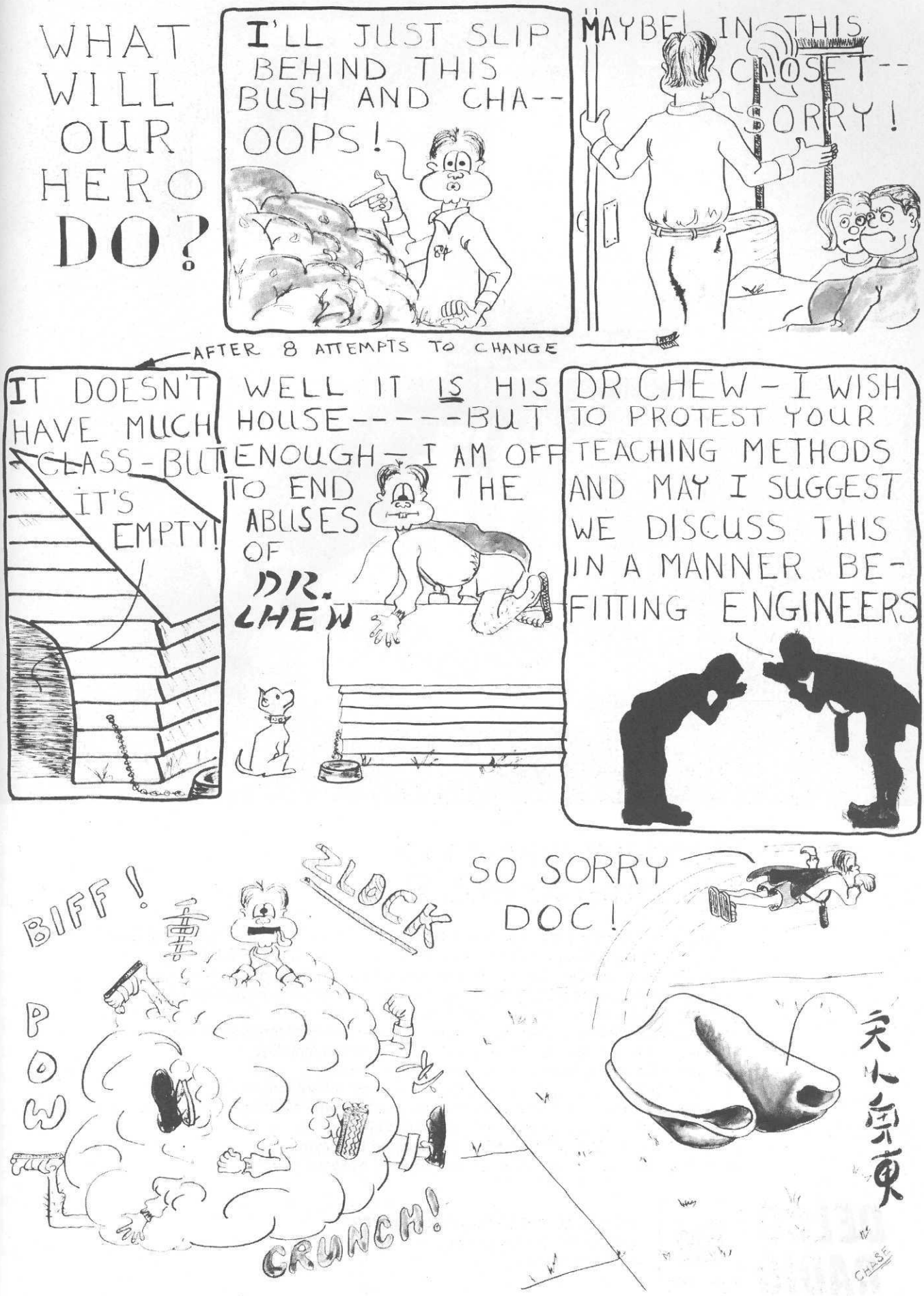
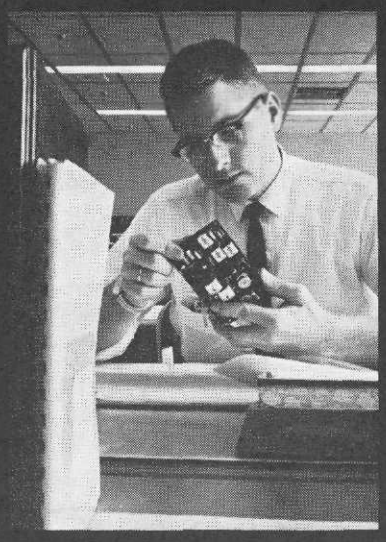
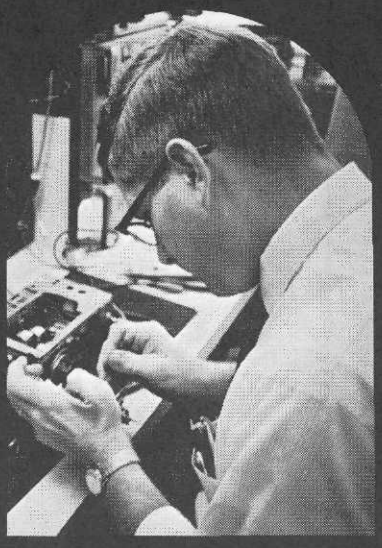
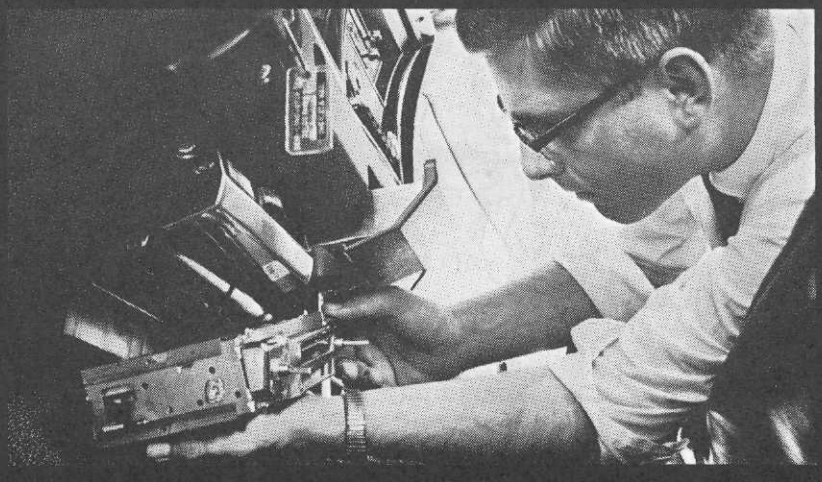



NOW AS MANSFIELD FINSTERWALL CONTINUES HIS FIGHT AGAINST EVIL — WE DISCOVER HIM SPEAKING WITH AN OLD FRIEND EMIL SAN PAKU
HI EMIL — WHY SO GLUM?
HELLO MANNY — OH I'VE GOT TO GO TO ME 439 RIGHT NOW, BUT EVERY TIME I GO — I GET MY POOR MIND BLOWN!!
IT CAN'T BE ALL THAT BAD —
OH NO!?! WELL WHY DON'T YOU COME AND SEE!
O.K.
LATER
Q.E.D.
GAAK!
BLEAHOAN!


WHAT WILL OUR HERO DO?
I'LL JUST SLIP BEHIND THIS BUSH AND CHA--
OOPS!
MAYBE IN THIS CLOSET--
SORRY!
AFTER 8 ATTEMPTS TO CHANGE
IT DOESN'T HAVE MUCH CLASS-BUT IT'S EMPTY!
WELL IT IS HIS HOUSE------BUT ENOUGH-I AM OFF TO END THE ABUSES OF DR. CHEW
DR CHEW-I WISH TO PROTEST YOUR TEACHING METHODS AND MAY I SUGGEST WE DISCUSS THIS IN A MANNER BEFITTING ENGINEERS
BIFF!
POW
ZLOCK
CRUNCH!
SO SORRY DOC!
CHASE







Mondays never look the same to Bob Byse

When you're breaking ground on a new idea at Delco, you don't see a lot of your own desk. For Bob Byse, design engineering means work with two dozen solid professionals . . . people whose specialties range from microelectronics to model making to production. Wherever the project leads, Bob Byse is on his way. And every skill is at his disposal. Right through full production.
And beyond. If there's trouble shooting under dealer warranty three years from now, Bob Byse is still the man we'll call for. That's why no two Mondays ever look alike to Bob Byse and his colleagues at Delco.
The question is . . . can you say the same? Take a good hard look at how your responsibility shapes up, compared with Bob's. In fact, why not discuss it with us. By letter or telephone. Collect. Area Code 317/459-2808.
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THE ENGINEER AND EDUCATION

One major criticism of the engineering profession by those outside of it is that, in general, engineers have too narrow a perspective on many subjects. These people contend that because of the technical nature of an engineer's education, he loses sight of the world around him. They cite case after case of engineers who have retreated into their own little world, thereby avoiding the many trying experiences of our complex society.

The sad part about the general public's view of engineers is that in many cases it is true. Many students of engineering feel that the only subjects in their curriculum that are worthwhile are the ones of a technical nature. Their attitude is one of disregard for subjects not directly related to their major field of study. They feel that their time is too valuable to waste on subjects that they will not directly need in their profession.

This attitude on the part of students can be attributed to several factors. One of these is the structure of our educational system. The student in engineering in the United States usually has his final two years in college completely filled with technical courses. Because he knows this, the student usually tries to get as much background as possible by taking as many technical courses as possible in his first two years of college. This effectively eliminates many of the various other courses that the student may have had an interest in taking. In a way, the student is forced into a narrow path which traps him unless he actively attempts to escape it.

A second factor determining the attitude of other engineering students is that of high interest towards the student's own studies. Because of the very nature of an engineering education the student must possess a high degree of interest in his studies lest he become discouraged and decide to change his major. The student that possesses the motivation to succeed in engineering often lacks interest in other fields because he sees his own as being the most important. This leads to a rejection or avoidance of courses that may be far removed from the subject of engineering.

Another determining factor for some students is based on a practical approach. They feel that taking courses outside of their major will be wasting valuable time which could be spent on their engineering courses. Because of the difficulty of most engineering curricula many students need all the time they can get just to do well in their required courses and thus could not take additional courses even if interested in them.

Because of all these factors, it is not hard to see why the average engineering student is more or less trapped in the narrow path of his curriculum. What most students don't understand is the need to attempt to escape it.

The engineer must constantly strive to learn all fields; not just his own. He needs to understand his surroundings and to interact with others in a way which will be a credit to his profession. While it is true that he cannot learn all this at college, he must start there or he will not possess the basis for future understanding.

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AN EQUAL OPPORTUNITY EMPLOYER

the Social Engineer

by

dennis faulkner

In spite of man's increasing sophistication in the world of science, he is still living in a primitive society. From the earliest of man's societies, where witch doctors attempted to control the actions of the tribe by imposing taboos and rituals, man has attempted to control his society. Today much time and effort is being expended toward this end in the field of social science.

Social science is supposedly concerned with defining and controling man's social systems. It calls itself a science, but is it really? The social scientists have created a large and superfluous terminology in an effort to create a science dealing with social systems, but have not met all the qualifications necessary for a science to exist. First they have never defined a deterministic system to describe society, and second there is no method of implementing social philosophies into working ideas. The social scientists are actually social philosophers, the counterparts of the physical scientists. What is lacking in social science is the counterpart of the engineer, a so called social engineer.

The job of the social engineer would be to implement social philosophies into actual working methods used to control the social system. To do this, one would first have to define a deterministic system through which to work. In such a system human whims and desires would be inputs instead of the variables that define the system. Under such a system one could determine the outcome given a certain set of conditions, and determine controls which would give desired outcomes. Therefore one could discover how a society would be affected without actually experimenting with the society itself. Once the necessary controls are decided upon, they could be introduced into society to produce the desired results.

Basic to this approach would be the determination of the variables of the system. Since it is the humans in a society that must be "controlled", human factors could not be chosen as variables. These factors would instead be introduced to the system as inputs which would be acted upon by control variables to give desired outcomes. Choosing variables to relate these inputs to actual outcomes would probably be the hardest task required to set up this deterministic system, but not an impossible task.

The feasibility of applying this approach to a social system can be judged by looking at how it has been applied to other fields. An example is its application to economics. Kaines did this in his theory of games and economic behavior. He formulated a general model where one could study the relative effects and properties of the economic system. Setting up such a system for a social system should certainly be no less possible than it was for an economic system.

Steps in this direction have already been taken. Perhaps the best example of this is the book *Games People Play* by Eric Berne. Here the relations between people are defined so that individual human traits can be introduced as inputs to find the relations between certain people. Enlarged and extended such a system might be applied to society as a whole, using the very powerful mathematics of game theory.

In its present state, social science is just a plaything for philosophers, people who dream of changing society but have no way of accomplishing their dreams. Until a system of implementing ideas into working plans is developed, it will remain that way.

COMPUTER DISPLAY CONSOLES

Selected classrooms at the University of California at Santa Barbara have been equipped with computer display consoles to help students and teachers solve a variety of problems in mathematics, engineering and the sciences.

An IBM computer, a System/360 Model 50, has been installed to implement an advanced research and instructional system. Classrooms in five departments have been equipped with display consoles for experimental use in a variety of courses including calculus, electrical engineering, sociology and psychology.

Using a technique called on-line computation—developed by Dr. Glen J. Culler, Director of the UCSB Computer Center, and Dr. Burton D. Fried, Professor of Physics at UCLA—a time-sharing system eventually will link various other universities throughout the country to the computer via a network of telephone lines. At present, consoles at UCLA and the Harvard Computation Laboratory, Cambridge, Mass., are lined to this computer.

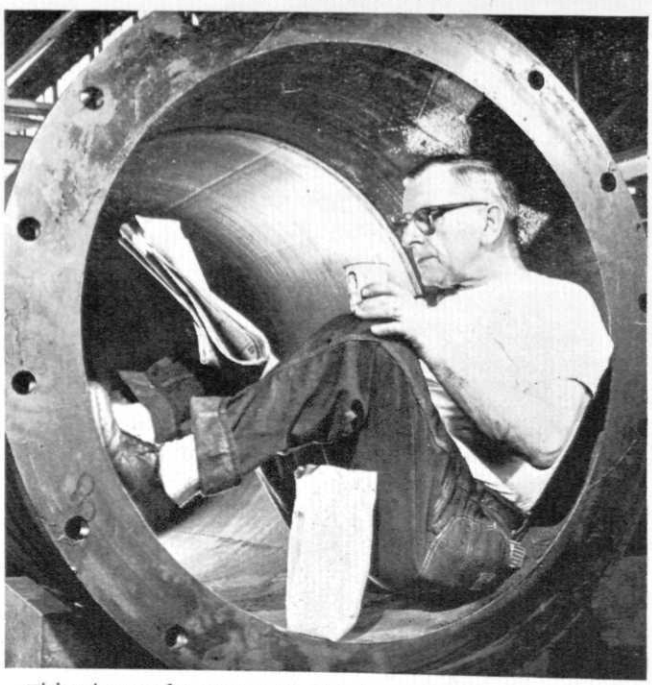
The display consoles, called "teleputers", consist of a calculator-like keyboard labeled with mathematical symbols and a screen similar to a television tube. A student or researcher enters his problem into the computer through the keyboard. Each step toward a solution may be displayed on the screen in numerical or graphical form, as desired by the user.

The capabilities of this system will broaden the boundaries which have traditionally limited the study of mathematics and the sciences. For the student, the system will help provide a better grasp of the abstract concepts common to these fields. The student who is able to see successive steps in an experimental solution of his problem gains many insights not available with the traditional theoretical approach.

For the researcher, the speed and advanced problem-solving capability of the new system will enable him to extend his investigations into areas which have been too complex for solution using ordinary techniques.

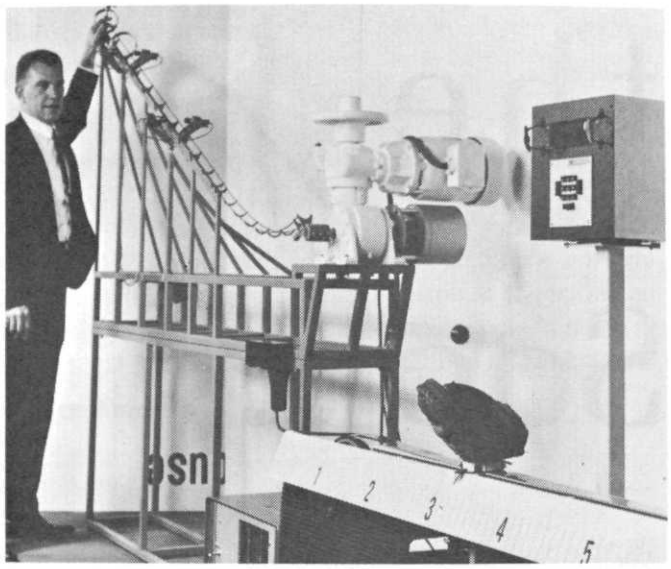
Teachers, by means of a master console, will be able to monitor each of the students in a classroom and review their progress. The teacher can also construct examples of problems on his console and display the images on all other stations in the classroom.

HOW BIG IS BIG?

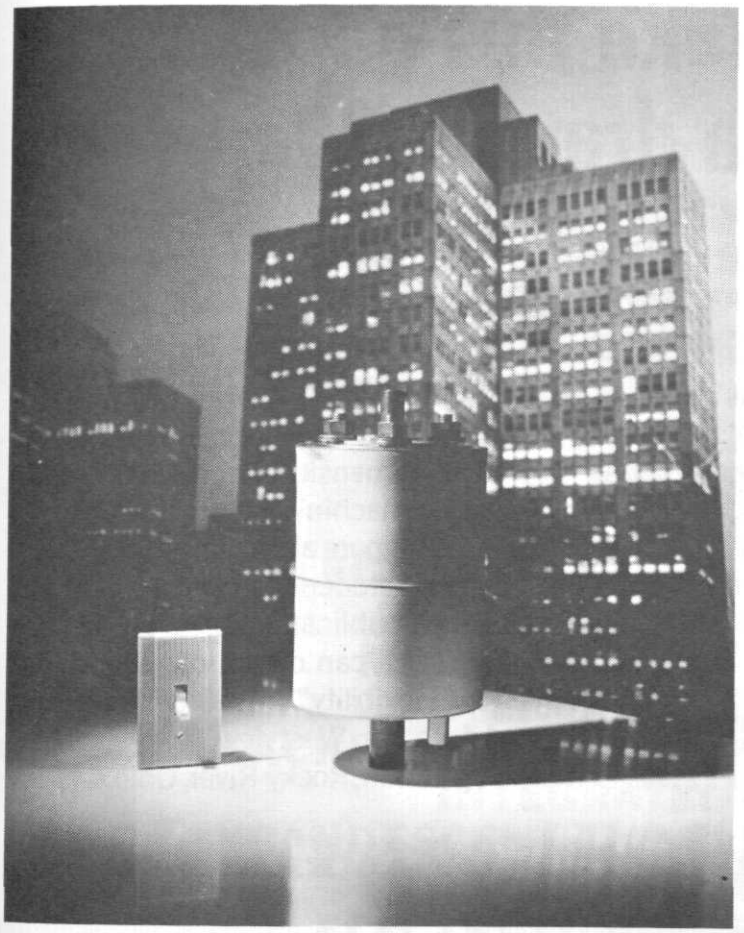


This photo of a man eating his lunch inside a piece of hose is simply a photographer's way of showing just how big a rubber hose can be. Hand-built at Goodyear's Industrial Products Division plant in Akron, Ohio, this hose has an inside diameter of 38 inches, is nearly two and one-half inches thick and 12 feet long and contains more than a ton of rubber. Steel wire reinforcement and metal end fittings raise its weight to nearly 5,000 pounds. The hose will be used to dredge river and harbor bottoms.

COMPUTER-CONTROLLED BALL GAMES?



Big league ball players don't have to worry about their jobs being taken over by a computer—yet. But Westinghouse Electric Corporation has put together what could be the world's most complex ball catcher to demonstrate the split-second decisions and actions possible through industrial process control computers. A ball is rolled down the incline, a Prodac® computer uses information from sensors along the incline to decide where the ball will land, and dispatches the ball glove to catch it—unerringly. During demonstrations of the system at the Chemical Industries Exposition, the ball is sent down the incline at different speeds and angles in futile attempts to confuse the computer.

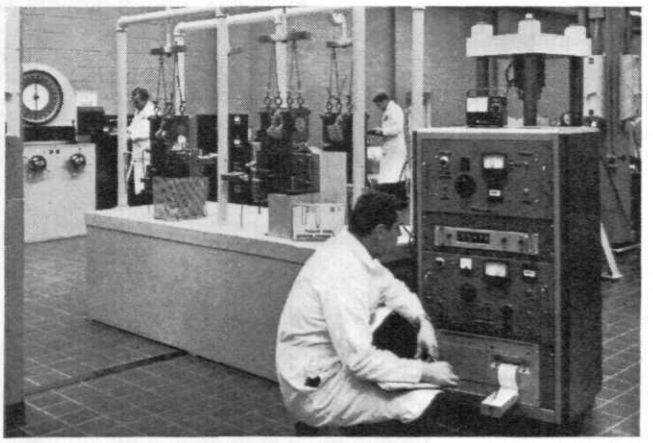


SUPER SWITCH

This new electrical switch, called a vacuum interrupter, can turn "on" and "off" as much as 12,000 amperes of electric current—enough to brightly light 2,500 six-room homes or several modern office buildings like those silhouetted behind it. Developed by the electronic tube division of Westinghouse Electric Corporation, Elmira, N. Y., the interrupter switches all of this current at 15,500 volts and in less than one-fiftieth of a second. In contrast, the wall switch beside it has a rating of 15 amperes at 125 volts. The new super switch, only about six inches in diameter and eight inches long, is used for the high-power switching of power line equipment, motor controls, radar transmitters and similar applications.

FUTURES

Career opportunities unlimited in the Malleable castings industry.



Fatigue Life Analysis. Eutectic Cell Size. Carbon Equivalent Determinations. Those titles represent just a few areas of current investigation by Malleable foundries into methods of improving their product and its method of production. Research has produced literally volumes of new and useful data in recent years . . . so much so that there is a dearth of engineering talent to put this knowledge to work.

Many important changes are just around the corner. Computer control of melting cycles will soon be applied on a practical basis. Die casting of iron may be coming out of the theory stage. The pace of new discoveries will be just that much faster in the years ahead.

Take a hard look at a career in the Malleable castings industry. Malleable foundries are of a size where you will have the opportunity to put your top skills to use almost immediately. It's a growing industry, as witnessed by the $75 million expansion program now under way. Its future is as bright as that of its major customers — producers of cars, trucks, and other transportation products, farm, construction and other types of machinery.

The image of the foundry laboratory as a cubbyhole is being shattered. Pictured above is one of several new laboratory facilities built by producers of Malleable castings in the last few years.

MALLEABLE FOUNDERS SOCIETY • UNION COMMERCE BUILDING
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MALLEABLE FOUNDERS SOCIETY

Can you make this part without a drawing?

Casting is so versatile that a designer can often develop complex components that are almost too difficult to draw . . . That's why many prototype steel castings are developed directly from models.

Take this high-speed refrigerator impeller. Worthy of a sculptor's efforts, it not only looks good, but must perform faultlessly. . . And it does, at 12,500 rpm in subzero temperatures.

Cast-steel permitted the designer to choose the right composition for maximum toughness at low temperatures, without compromising for machinability or weldability. Cast in a ceramic mold, the impeller has fine surface finish and close dimensional tolerances, thus eliminating costly machining.

Want to know more about *cast-steel?* We're offering individual students free subscriptions to our quarterly publication "CASTEEL". Clubs and other groups can obtain our sound film "Engineering Flexibility." Write Steel Founders' Society of America, Westview Towers, 21010 Center Ridge Road, Rocky River, Ohio 44116.

STEEL FOUNDERS' SOCIETY OF AMERICA

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BLACKBOARD BY WIRE TEACHING SYSTEMS
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The young executive had taken $100,000 from his company's safe and had lost it playing the stock market; he was certain to be discovered. In addition, his beautiful wife had left him. Down to the river he went, and as he was clambering over the bridge railing a gnarled hand fell upon his arm. He turned and saw an ancient crone in a black cloak, with wrinkled face and stringy gray hair.

"Don't jump," she rasped. "I'm a witch, and I'll grant you three wishes for a slight consideration."

"I'm beyond help," he replied, and told her his troubles. "Nothing to it," she said cackling. "Alacazam!" The money is back in the vault. Alacazam! Your wife is waiting for you at home with love in her heart. Alacazam! You now have a personal bank account of two hundred thousand dollars!"

The man, stunned to speechlessness, was finally able to ask, "What—what is the consideration I owe you?"

"You must spend the night with me," she smiled toothlessly.

The thought of staying with the old crone repulsed him, but he decided it was worth it. In the morning, the distasteful ordeal over, he was dressing to go home when the old crone asked him, "Say, sonny, how old are you anyway?"

"I'm forty-two years old," he said. "Why?"

"Ain't you a little old to believe in witches?"

SE

"My girl got a new car."
"Chevrolet?"
"Naw."

Statistics show that Vassar graduates have 1.7 children, while Yale graduates have 1.4 children on the average. This proves that women have more children than men.

SE

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 them?"

SE

He: "Pardon me, but you look like Helen Brown."

She: "Yeah, and I don't look too groovy in blue either."

SE

Wisdom: Knowing what to do.
Skill: Knowing how to do it.
Virtue: Not doing it.

SE

And then there was the tugboat that committed suicide when it found out that its mother was a tramp and its father was a ferry.

SE

A covey of fledgling pilots was given physical examinations at the induction center. After being poked at, thumped, weighed, listened to, the doctor at one end of the room announced: "There are a number of bottles on this table. I want a sample from each one of you."

"From here?" squeaked one of the boys in disbelief.

(Q) was low and Smith suffered little lost work content in knocking him out to infinity with a severe blow on his negative charge. Eddy made a quick comeback with acceleration (a) stripping off Smith's outer electrons; this so upset the villain's equilibrium that he was converted into cosmic radiation and vanished in the realms of space, leaving Eddy the resultant vector in the combat.

Old Cat Ion, attracted to the spot by Smith's oxidation, beamed upon the young dipole. "Brave young lad," he emitted, "you have satisfied the boundary conditions and by the theorem on uniqueness are the only one for my daughter."

"Our love will not be transient," said Eddy as he formed a closed circuit about her.

"Darling, we'll raise a one parameter family of second order infinitesimals," murmured Anne happily. As time (t) approached infinitely, they lived happily.

SE

A young engineer took his girl to an open air opera one beautiful warm summer evening. During the first act he found it necessary to excuse himself. He asked the usher where the men's room might be found.

"Turn to your left, and walk down to the big oak tree, and there it is."

The young engineer did as he was told and in due time returned to his seat.

"Is the second act over yet?" he asked his girl.

"You ought to know," she replied, "you were in it."

jokes . . .

Socialism: You have two cows, keep one, government takes other for poorer people.

Communism: You have two cows, government takes both, gives you some milk.

Fascism: Government takes both cows, shoots you.

Unionism: Two cows go on strike for more hay. No feed, no milk.

Capitalism: Sell one cow to buy bull.

Modernism: Shoot the bull and breed artificially.

SE

The best way to get through Engineering is to be like a swimming duck. Keep calm and cool but paddle like hell underneath.

SE

Girl: "You play the piano beautifully. When did you take it up?"

E.E.: "I started playing the piano the day my glass of beer fell off my violin."

SE

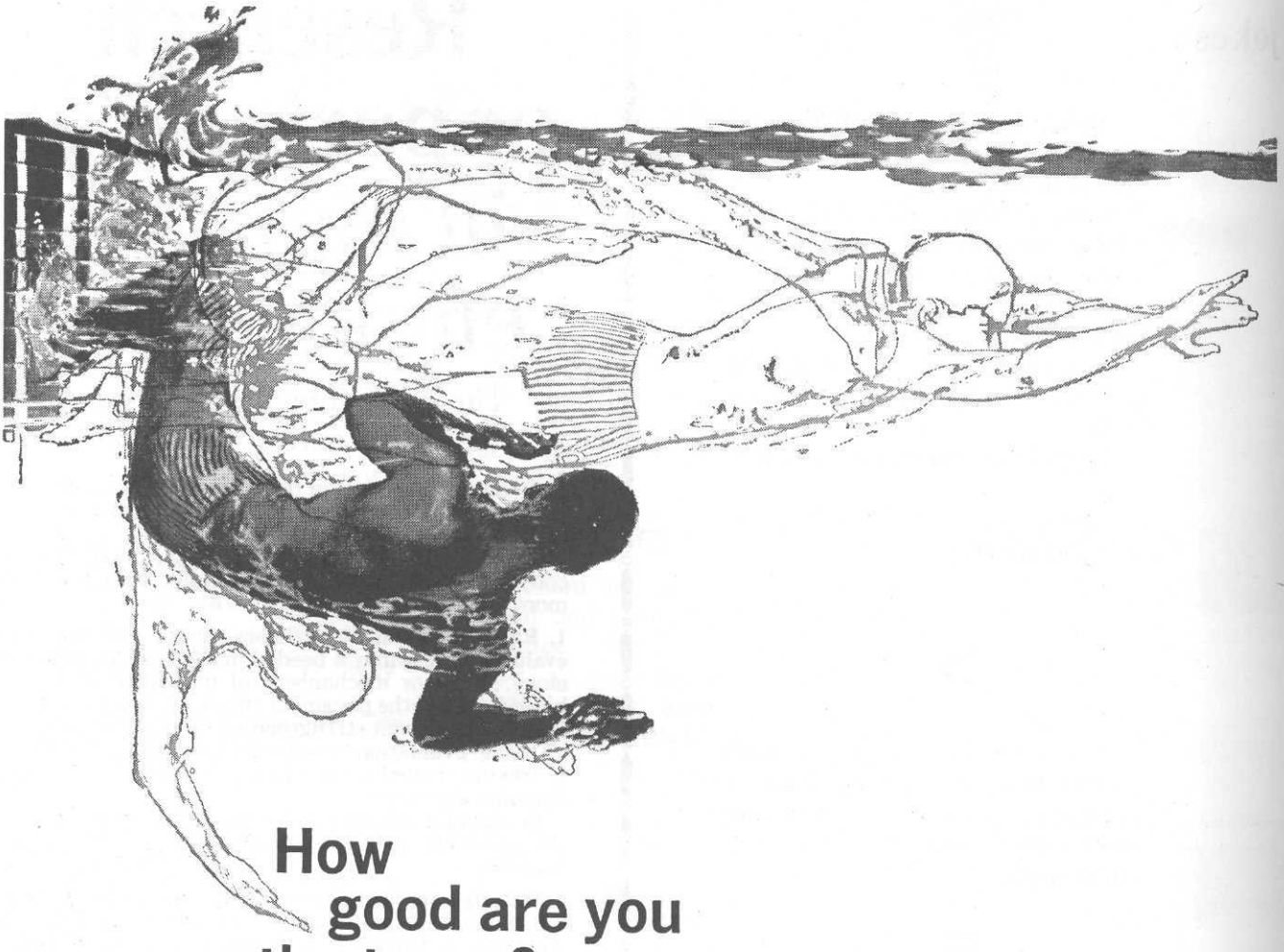
The other day I took a test and my head was as empty as the breakfast room in a hotel at Niagara Falls.

SE

Definition of a nervous guy: A man with a wife, a girl friend and a bank note—all a month past due.

SE

Did you hear about the sleepy French bridegroom who fell asleep the minute his feet hit the pillow?



How good are you on the turns?

A strong stroke isn't enough to win in freestyle swimming. Experts say: "Watch the turns."

"A champion won't touch with his hand," they tell us. "He begins his overhead tumble with a downward stab of his right arm, twists as his feet hit, then explodes forward with a powerful pushoff."

Their conclusion: "Experience and smart coaching develop a championship turn."

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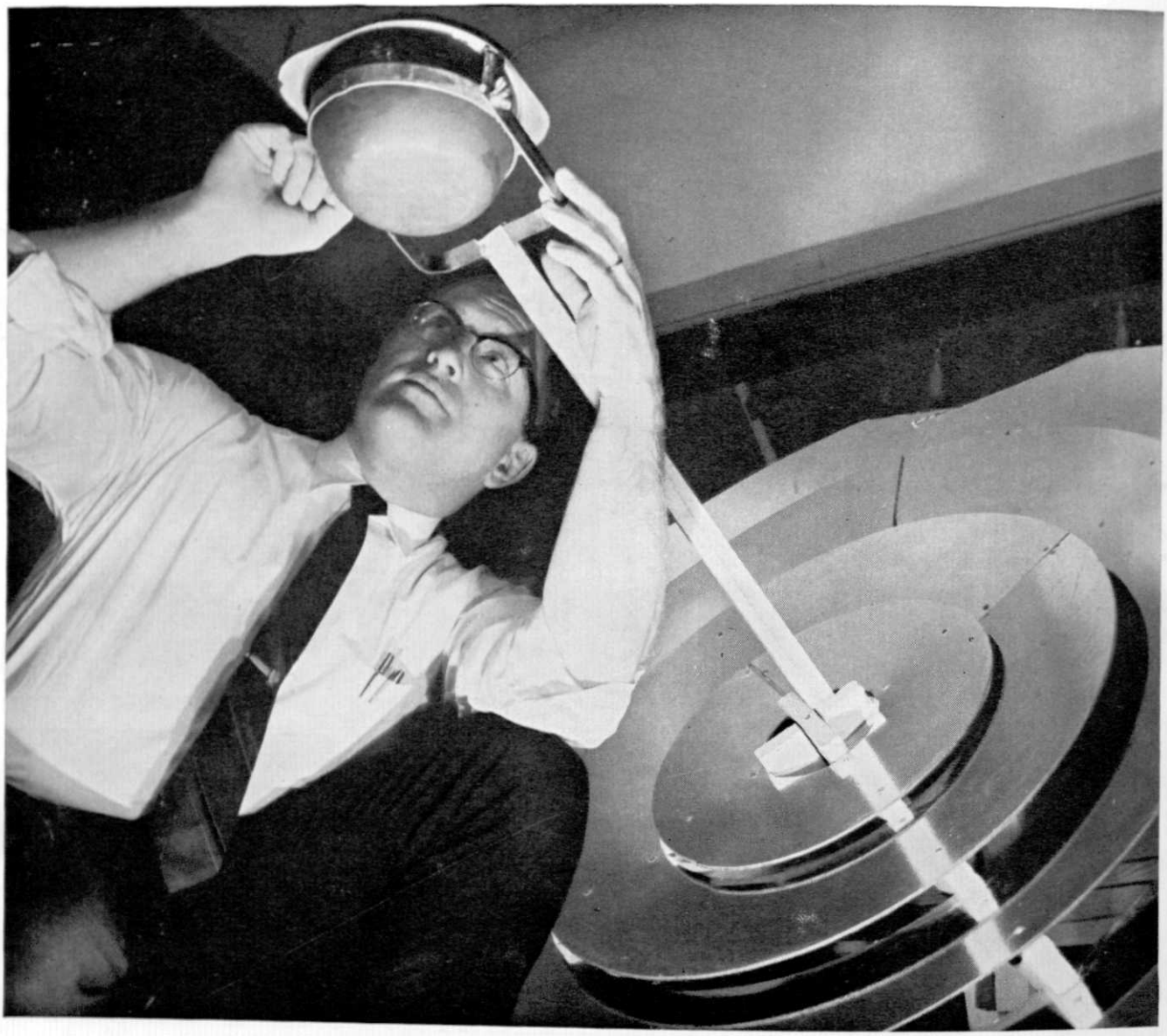

Dan Johnson has a flair for making things.

Just ask a certain family in Marrakeck, Morocco.

A solar cooker he helped develop is now making life a little easier for them—in an area where electricity is practically unheard of.

The project was part of Dan's work with VITA (Volunteers for International Technical Assistance) which he helped found.

Dan's ideas have not always been so practical. Like the candlepowered boat he built at age 10.

But when Dan graduated as an electrical engineer from Cornell in 1955, it wasn't the future of candlepowered boats that brought him to General Electric. It was the variety of opportunity. He saw opportunities in more than 130 "small businesses" that make up General Electric. Together they make more than 200,000 different products.

At GE, Dan is working on the design for a remote control system for gas turbine powerplants. Some day it may enable his Moroccan friends to scrap their solar cooker.

Like Dan Johnson, you'll find opportunities at General Electric in R&D, design, production and technical 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 801Z, 570 Lexington Avenue, New York, N. Y. 10022

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