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OL. 71, NO. 3
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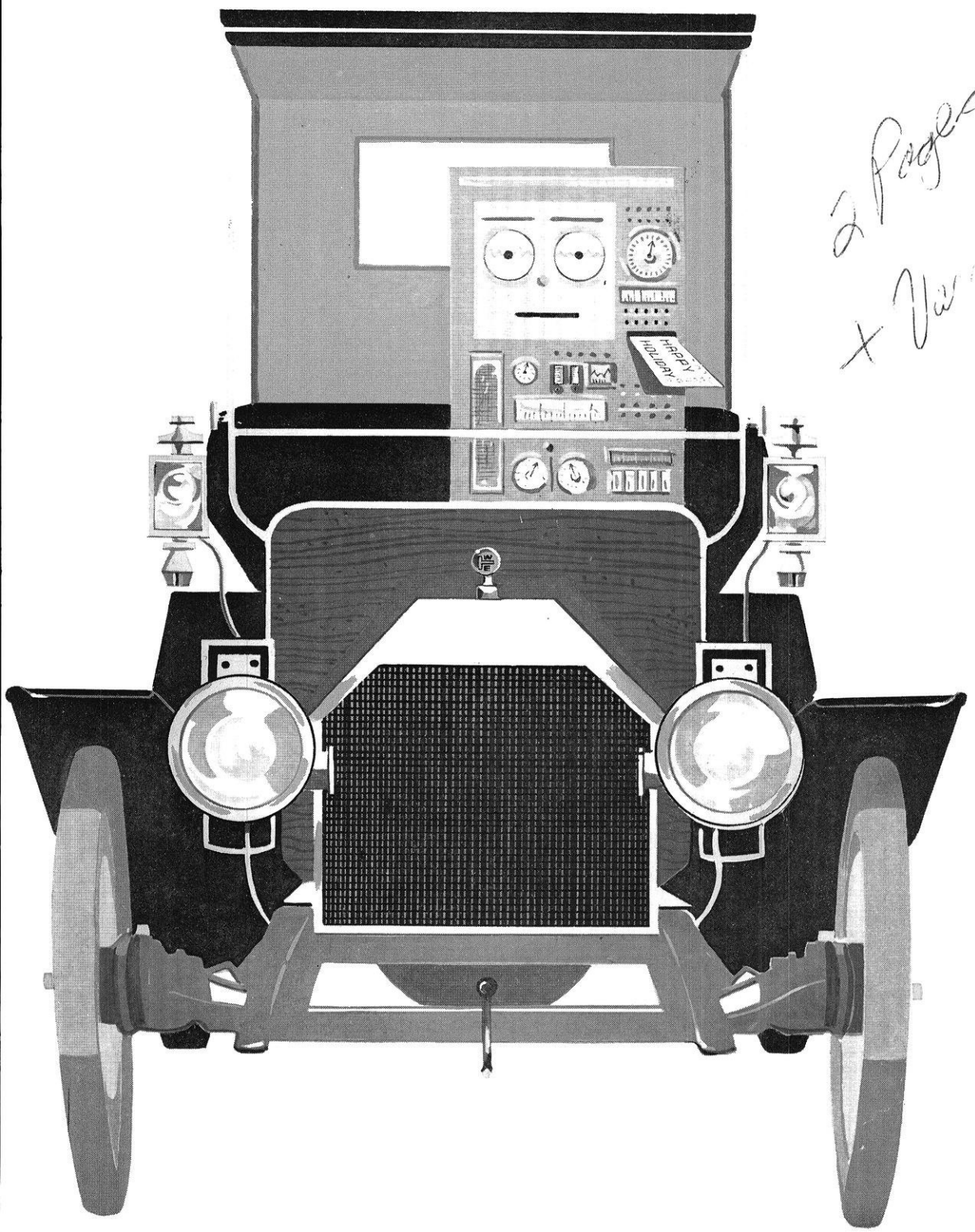
DECEMBER 1966

wisconsin engineer

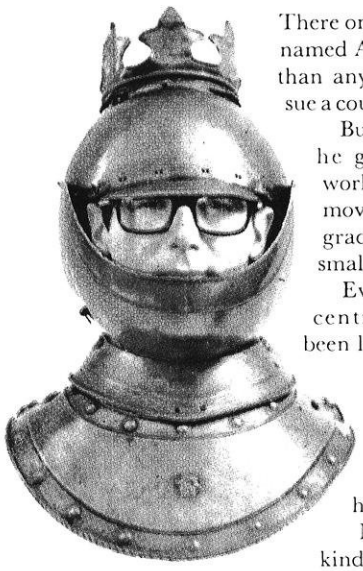
- **Computer Driven Auto** page 27



2 Pages
+ Varnish Rem

Go Westinghouse, Young Man!

A modern fable with technical overtones.



There once was a college senior named Arthur King who more than anything wanted to pursue a course of excellence in life.

But which course? Should he go into government work, or enlist in a protest movement, or go on to graduate school, or join a small company, or . . .

Even Dr. Merlin, an eccentric professor, who'd been like a father to Arthur, was stumped for an answer.

Then Arthur met Mr. Greeley, the recruiter from Westinghouse.

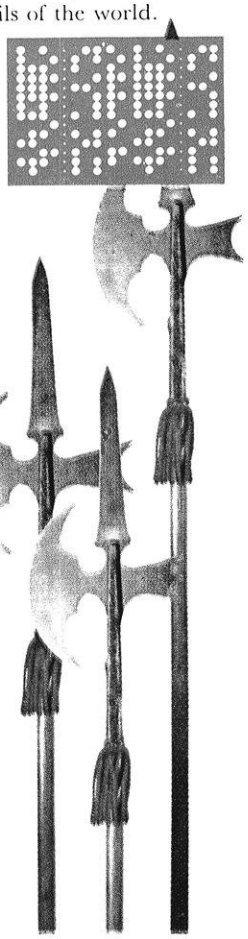
Mr. Greeley was a kindly man with a warm smile, and he explained that, by joining forces at Westinghouse with other young men of the realm, Arthur could spearhead efforts to combat the evils of the world.

Mr. Greeley urged Arthur:

"Go Westinghouse, young man."

And Arthur did.

He elected to join the Industrial Group, one of six large operating organizations within Westinghouse.*



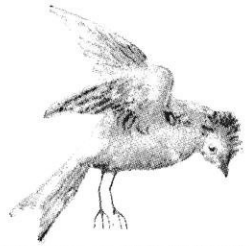
Arthur's first assignment: help develop a process computer system that would completely automate a big steel mill in a small European country.

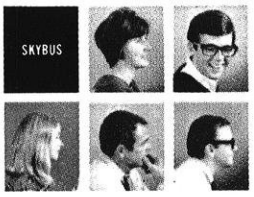
The project was a decided success, providing the economy of the little nation with a much-needed shot in the arm.

Though a grateful citizenry wanted to reward young Arthur, he modestly singled out as more deserving his friend and colleague Val, a prince of an engineer.

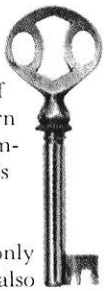
Val was already renowned for his part in helping develop the famous Westinghouse materials handling systems—including fully automated refuse reclamation systems, ship to shore and other bulk handling, and computer-controlled warehouses.

Back in the states only a few hours, Arthur and Val, along with a determined band of project engineers, were given another special assignment—this one by a large city in the South. The mayor and his councilors wanted to transport people more efficiently in and around a futuristic new international airport. The advanced concept was designed to reduce the walking distance of passengers between the planes and the air terminal. Officials asked pointedly for Arthur's group to help develop this transportation system.





Many were the nights that Arthur and his men worked 'round a table strewn with blueprints and calculations.



It was hard work, but it was good work.

Finally the day arrived for the unveiling of this Skybus . . . a series of sleek, ultramodern passenger cars riding on rubber wheels and computer-controlled to accommodate the thousands of passengers entering and leaving the greater metropolitan area airport.

At dedication ceremonies, the mayor not only gave Westinghouse the keys to the city. He also gave to Arthur the hand of his fair maiden daughter, Guinevere. Warm-hearted young Guinevere was also technically oriented and had served as a consulting engineer with her father's planning commission.

Guinevere made plans to work at the Westinghouse Standard Control Division where a complete line of electrical distribution equipment—bus duct, breakers, circuit devices, motor controls—is manufactured. Incidentally, women are welcome at Westinghouse, an equal opportunity employer.

Together, Arthur and Guinevere helped coordinate the increasing number of Westinghouse turnkey projects being applied to the cities of America, obtaining in the process their fair share of the coin of the realm.

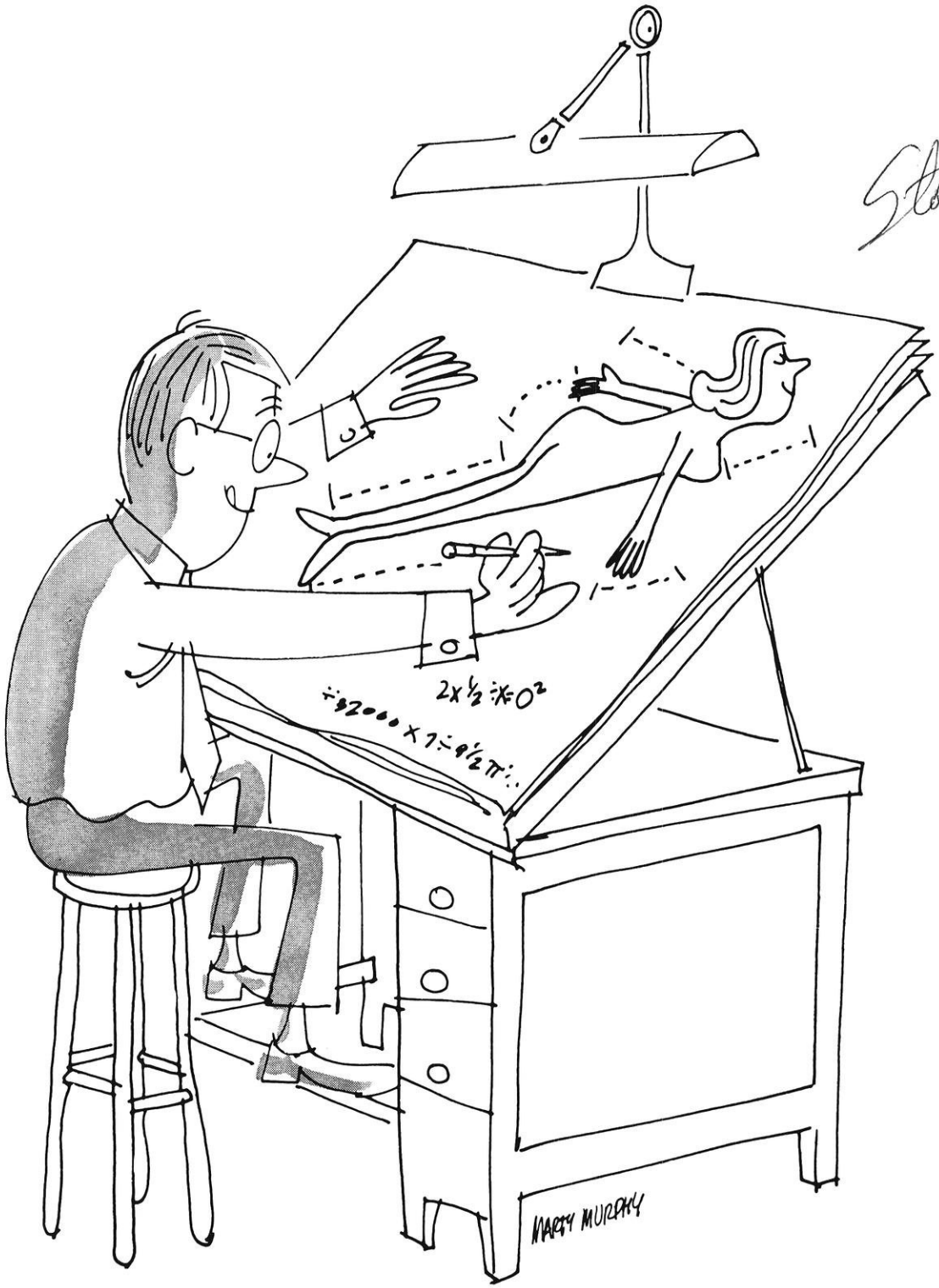
And they lived happily ever after.

MORAL: By joining Westinghouse, you too can slay the dragons that beset modern society, and, in company with other stout hearts, win yourself a fair maiden.

You can be sure if it's Westinghouse

For further information, contact the Mr. Greeley who'll be visiting your campus in weeks to come or write: L. H. Noggle, Westinghouse Education Center, Pittsburgh, Pennsylvania 15221.

*Westinghouse is looking for bright young men and women for these widely varied operating groups: Consumer Products / Industrial / Construction / Electronic Components & Specialty Products / Atomic, Defense & Space / Electric Utility



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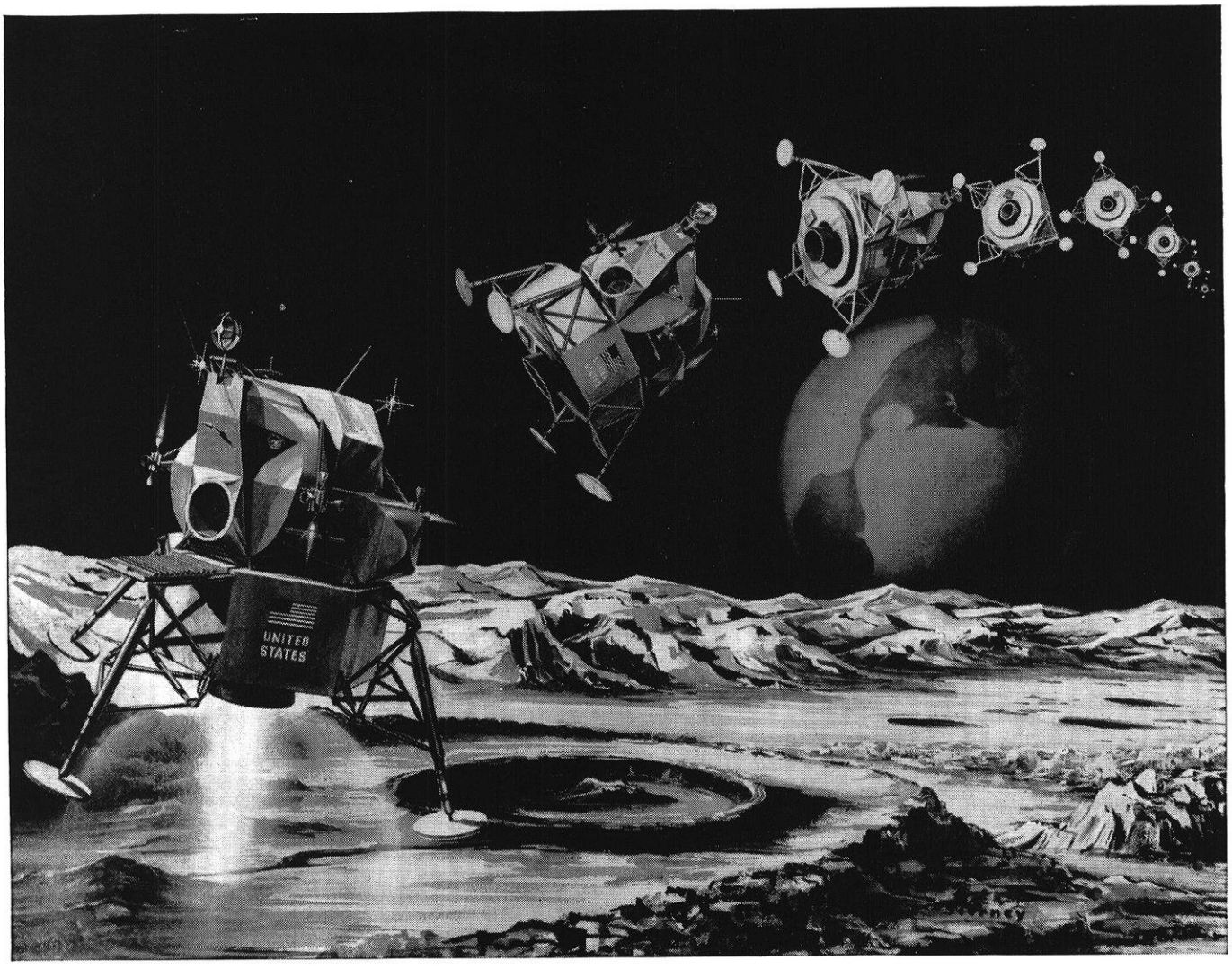

Drawing shows projected descent of the LEM (Lunar Excursion Module) for the Apollo Mission to the Moon. LEM will descend from the CSM (Command and Service Module) to the lunar surface, land, and return to the CSM. Two central components of the LEM system which control the descent to, and ascent from, the moon are the Attitude and Translation Control Assembly and the Descent Engine Control Assembly. RCA has designed and produced these systems in addition to other critical electronics systems, necessary to the success of the mission.

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REAPPEARING NONENTITIES:

wisconsin engineer

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EDITORIAL

/0

WELL, winter, that is snow etc., has finally arrived and Christmas is getting closer. The staff and I want to wish all of our readers a merry day, or whatever you want to have. We plan on a large celebration ourselves, since this is our third issue and all's well.

We observe that as the first beautiful snowfall gently covers the sidewalks, buildings, and cars, it is easy to see how much of the smoke from the smoke stack ends up in our own back yards. I think we have been overlooked in the big "pollution cleanup"! Even so, the snow looks great, and all the staff is busy figuring how to abscond with the funds for a giant ski trip.

I am encouraged by the response to my question "What is the function of an engineering magazine on campus?" in last month's editorial. Although the replies have been more verbal than written, people have been interested enough to comment, which speaks for itself. Overall, it seems you feel as I do, that our aim should be to please the majority with a light readable magazine. We will try to do so.

Along that line, I am proud of the fact that this is this first magazine in a long while that is not only all-student written, but *all-staff* written. This year we are lucky to have some people who have the time and ability to write, and this is a big step towards getting a more student-oriented magazine.

To close, be good, take care, and have a happy holiday. I hope that all our readers and especially the staff make it through the vacation in one piece and without too large a hangover.

Mary E. Ingeman

DEAN'S DESK:

"what — me worry?"

John L. Asmuth

This is my first opportunity to write for the *Wisconsin Engineer*. I was invited to write an article but I was not assigned a topic. Freshman English was never quite that formidable! But I am much older now and much less self-conscious. Furthermore, a professional teacher will never pass up an opportunity to harass an audience. Basically, the topic is always the same: The professional teacher loves to talk about himself. In the classroom this over-inflated self esteem is sometimes skillfully obscured by giving the lecture a title such as "Electric Circuit Analysis", or "Measuring Instruments Do Tell Lies". In this article I will be more honest and admit openly that I will be the dominant figure in my discourse.

Recent events have forced me to conduct a study which might be entitled, "What in the World Does an Assistant Dean of the College of Engineering do with His Time?" or alternately, "Would the Course of History be Significantly Changed if All Assistant Deans Were Suddenly to Vanish in a Puff of Smoke?" My reason for making this study is that I have been attempting to fill such a position since last July.

One day last spring, Dean Wendt asked me to see him in his office. Now what? I had been associated with the College of Engineering in one capacity or another for most of twenty years, but I had never made myself conspicuous by doing anything that was very, very good or very, very bad. I had met with Dean Wendt in his office on only two previous occasions. Then I knew exactly why I was there and what was to be discussed before I knocked on the door. This time I did not.

I hope you know what I mean when I say that I was very much relieved upon being greeted warmly as I walked in. Dean Wendt got to the point immediately. Associate Dean Davidson was resigning to accept a very attractive position at another school. Would I, John Asmuth, accept an appointment as an Assistant Dean? I could take my time to think it over—a firm answer in forty-eight hours would be soon enough!

My first reaction was one of terror. I knew that Dean Davidson had spent a lot of time on budgetary problems, and I also knew that I grew an ulcer every month when I tried to balance my checkbook. Perhaps Dean Wendt saw the color drain from my face, but I started to breathe again when he pointed out that Dean Ratner had already taken on the budget work. My primary assignment would be something vaguely described as "Students". But not all students. Freshman Engineers are Dean Leidel's problem and graduate students are fiercely guarded by their thesis professors. Of the group not thus accounted for, my business would be mostly with those who are, or think they are, in some kind of academic hot water.

The light began to dawn. It has been my hobby, even my obsession, to assist students in finding a way to do the things they wanted to do, to take the courses they wanted to take, and yet satisfy the academic requirements of the College of Engineering and the University. In effect I was being invited to do more of the same, on a larger scale and with a little more authority. But there

was a price tag on the deal—my classroom assignment would have to be drastically reduced.

I discussed the whole problem with Mrs. Asmuth that evening and I received unqualified encouragement to accept. However, I will confide in you and admit that before that, I called on my long-time confidante and companion in zealous research on the Application of the Buckingham Pi Theorem to Land Transportation. (Think about that one, please!) I refer to Professor John B. Miller of the Electrical Engineering Department. First he asked me if this would mean that I would never finish grading some of the laboratory reports he submitted to me in 1946 and then he asked me if this appointment would mean that I would be able to perform marriage ceremonies. My answer was "NO" to both questions. At the end of a brief, carefully thought-out and precisely worded soliloquy of thirty minutes duration, Professor Miller urged me to accept.

I stopped in to see Professor Peterson, Chairman of the Electrical Engineering Department. He told me that the E. E. Department would miss me, of course, and that I would surely do fine work as an Assistant Dean, and how soon would I move out of my old office? You see, my departure would mean that there would be more room for someone else. Office space is almost as scarce as parking space. There would be some rejoicing amidst all the sorrow upon my moving to the Mechanical Engineering Building.

It must be very plain that I had already decided that I looked forward to being called an Assistant Dean. But having made my decision I very much wanted others to tell me that I was doing the right thing.

As I said earlier, I have been making a study of what it is that Assistant Deans do, and I've learned a lot in these few months. At times I'm sure I've made a pest of myself going to Dean Ratner or to Mrs. Hoffman and saying, "Here's the story; now what do I think?" and then going to the secretary, Mrs. Butzine and saying, "Now here is what I think. What form do I fill out and where do I sign?" Don't let me give you the wrong impression. The red tape procedures make a lot of sense, but they must be subordinate to the real purposes of the University. I am expected to do everything I can to make use of the red tape as a servant and not let it become master.

I have become acquainted with many student problems. I cannot honestly say that I really enjoy hearing about other people's troubles. But once in a while I have the tremendous satisfaction of participating in a solution. The student body in Engineering is a very talented group for the standards of the College of Engineering are very high. As a teacher I am morally obligated to encourage the development of that talent to meet these standards.

In every position I have had in engineering, both in and out of teaching, I have had the opportunity to decide on my own what part of my work assignment should be. My present position is no exception. I am especially interested in the connections between high school subjects and the subjects required in the College of Engineering. I know perfectly well that industrial recruiters would like to employ more engineering graduates than are available. At the same time there is a very severe shortage of competent teachers of mathematics and science in the high schools and vocational schools. It seems to me that the needs of the nation would be very well served if a few graduate engineers were to give serious consideration to such teaching.

The financial sacrifice involved would be substantial. I would be very hesitant to mention such a career at all except for the fact that I have had many opportunities to observe rather strong idealism in many engineering students. Some of our graduates have sought Peace Corps assignments. If any engineering student expressed an interest I would be more than happy to assist in any way possible.

I haven't run out of ideas to write about, but my hand is tired and I have taken enough of your time. I appreciate having had your attention and invite you to let me return the favor sometime when you want someone to listen to your story.

Opportunities at Anaconda

in mining and metallurgy here and abroad, at Anaconda American Brass Co., Anaconda Wire & Cable Co., and Anaconda Aluminum Co.

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The legendary prospector trudging on foot through the wilderness scours the surface of the earth—with luck gets a hint of treasure inside through an outcropping of ore. But not all ore bodies come near the surface. And pressures to find more metals for the needs of growing populations are so great we can't wait for infrequent bonanzas.

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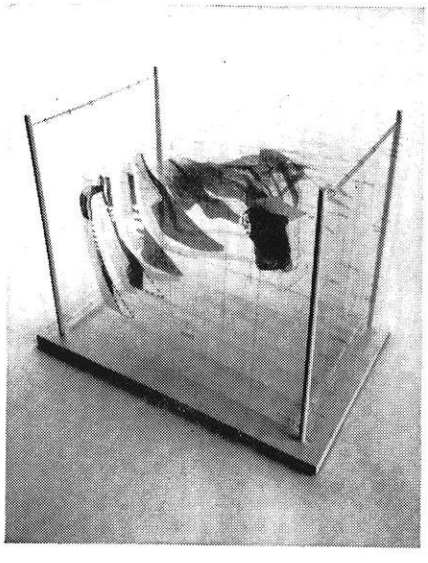
Then these target areas must be tested and evaluated in the light of experience and the critical and significant features commonly associated with ore-forming processes. The three-dimensional geological model shown below was prepared to help Anaconda geologists look under the earth's crust at a later stage in this process of evaluation.

Anaconda is a pioneer in the application of geology to mining and exploration. And it is intensifying and enlarging its program of laboratory and field research at geological headquarters throughout the hemisphere. This opens broad new job opportunities in all areas of earth sciences for geophysicists, geochemists, geological engineers, chemical engineers, physicists, and metallurgists.



Anaconda settles an old argument

The Statue of Liberty is one of the finest examples of natural patina in the world. And for years experts have argued whether this patina is basic copper sulfate or basic copper carbonate. Some felt there should also be a good percentage of chloride salts because of the salty atmosphere whipped up by the winds from the bay.

Anaconda spoiled all the fun by offering to get the answer. With the permission of the statue's custodians, metallurgists from the Research and Technical Center of Anaconda American Brass obtained adequate samples and made an extensive analysis.

The talents and skills of technically qualified men and women will always be needed by Anaconda in important positions in exploration, mining, extractive metallurgy, manufacturing, scientific research, sales, and administration.

If you would like more information about Anaconda or wish to apply for employment, write to: Director of Personnel, The Anaconda Company, 25 Broadway, N.Y., N.Y. 10004.

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Results of X-ray diffraction, semimicro chemical, and wet chemical processes proved a predominance of copper sulfate. This is easily explained by the high estimate tonnage of sulfur-bearing acids produced in New York's atmosphere every day—and by the difference between the free energies of formation of copper chloride and copper sulfate.

Basic copper chloride content was less than five per cent. And basic carbonates are virtually absent because they can't survive in the acid environment. This pleasant little side trip was by no means unrelated to the regular work of the Anaconda research teams. They are concerned with everything that happens to copper metals—and all the combinations of useful properties they can supply. They work on new finishes for copper metals and on industrial corrosion problems. They develop new alloys to meet new needs. They pursue pure research.

Anaconda's research and development are key factors in expanding copper's role in a rapidly advancing technology. It is opening new opportunities for college graduates at Anaconda American Brass in all fields of engineering, in business administration and sales.

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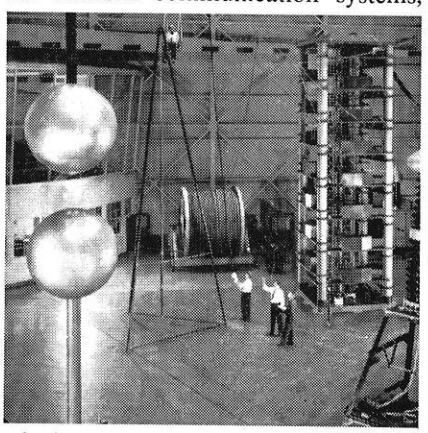
Anaconda, anticipating this need, built the best equipped high-voltage research laboratory in the cable business (see below)—and used it to develop the 345,000-volt cable now actually in use. And now, Anaconda Wire & Cable Co. is busy working on plans to satisfy power needs of tomorrow's cities.

Anaconda produces wire and cable not only for the utility industry, but also for modern communication systems,



telephone and CATV; and for countless applications in building and industry. Constant engineering investigation at the Company's four research centers is opening new frontiers of knowledge in wire and cable technology—new opportunities for engineering graduates.

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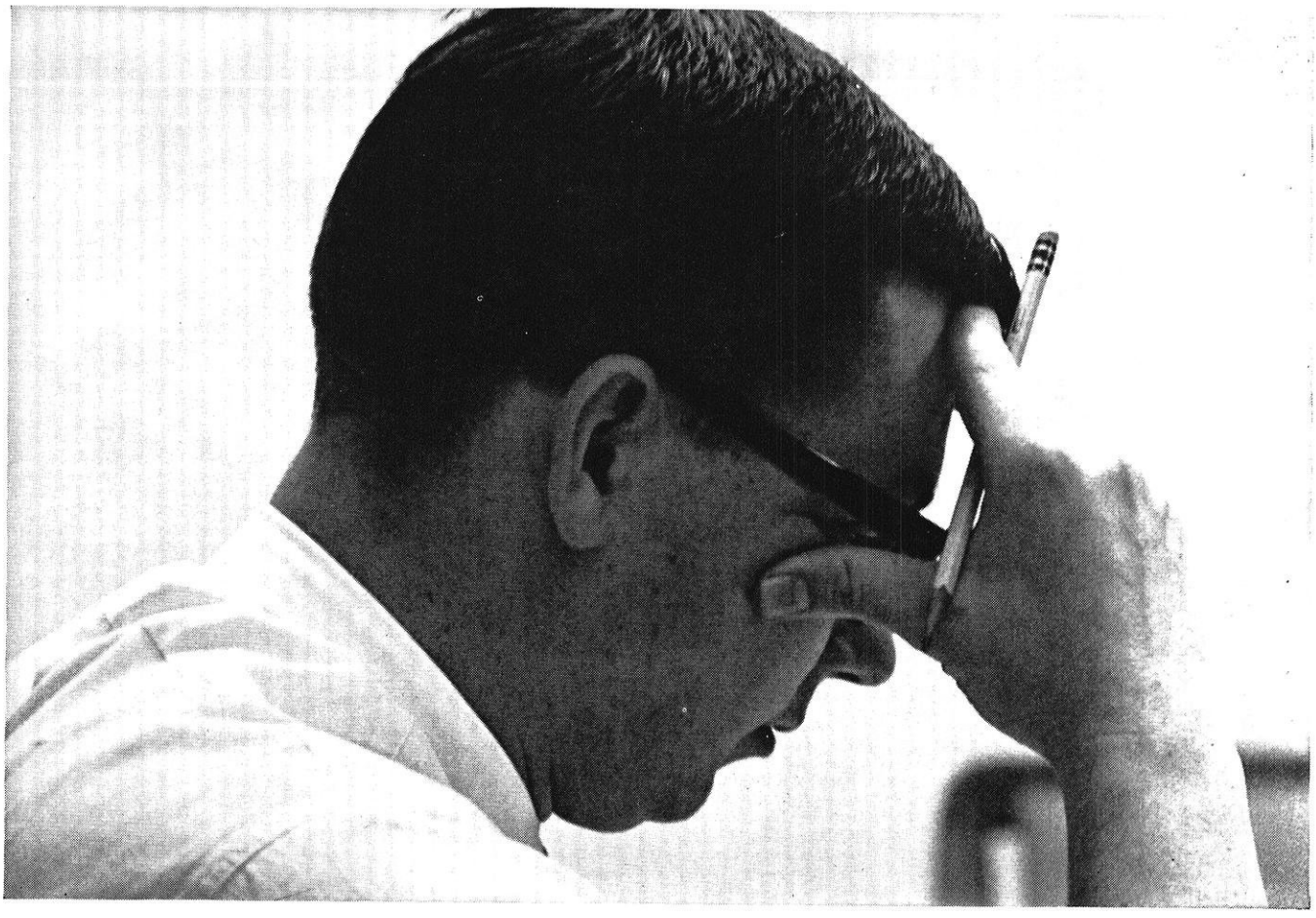

Career on Your Mind?

Think Future. Think Celanese. If you're ambitious, flexible, and imaginative—and if you're well trained in chemistry, chemical or mechanical engineering, physics, marketing or accounting—you're our man.

Why Celanese? You'll be working for a company that's growing fast—and "plans" to keep growing. 1965 sales rose more than 25% to about $900 million. Our future "planned" growth depends on our ability to attract top-notch people who have the drive and desire to aim for that second billion.

What makes you tick? Responsibility. Authority. Professional Recognition. Financial Reward. We know of no other company better able, or more disposed, to satisfy these needs. Working with Celanese, you'll have the chance to grow and broaden quickly.

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who'd expect that among our doctoral degree holders, chemists and chemical engineers outnumber electrical engineers four to one.

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GENERAL ELECTRIC

PICTORIAL:

REBEL

american motors

"The Now Cars" for '67 by American Motors have new body styling and more powerful engines that may well make them the "Excitement Machine". Biggest power changes are the V-8 for American and the 280 horse 343 for Rebel and Ambassador. It appears that A.M.'s three other models may join the Marlin as sporty cars with an acceptable amount of go. All A.M. cars compliments of Waters Motors.

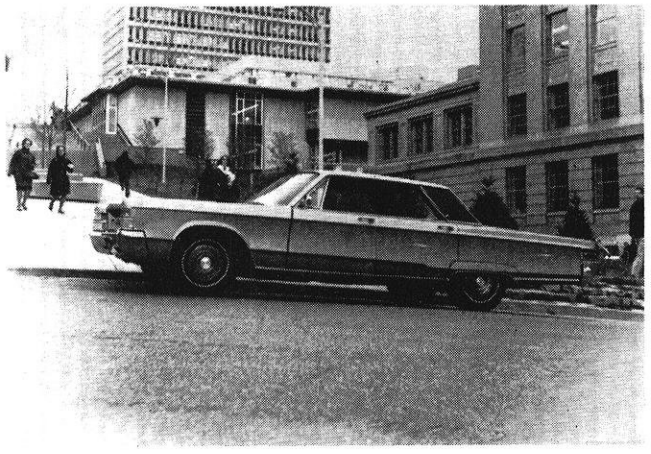
MARLIN

ROGUE

'67 in Style

CHRYSLER CORP.

CHRYSLER
NEW YORKER



PLYMOUTH
SATELLITE

PLYMOUTH
SPORT FURY

CHRYSLER 300

Chrysler Corporation has followed a program of slight evolutionary change for most of its '67 models. Some sheet metal changes and a slight rearrangement of power options using existing engines compose the major changes. The one radical change for this year was the Plymouth Barracuda which was not yet released for our photo deadline. The completely restyled 'Cuda is available with a 383 four barrel that will do 0–60 in a little over 7 seconds and tops out at about 115. All around, it appears to be a fast, sporty car with excellent handling that will be perfect for the student to take out on his weekend jaunts. Plymouths and Chryslers compliments of Duquaine & Blumer Motors. We regret that Dodges and Imperials were not available for photography at the time.

GM

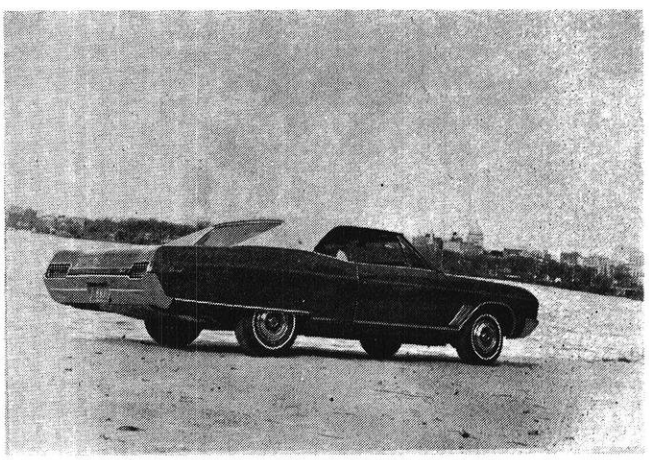
Chevrolet Camaro compliments of Hult Chevrolet; Buick Skylark from Zimbrick Buick; Oldsmobile Toronado provided by Ahrens Cadillac–Oldsmobile; and Pontiacs thanks to Schappe Pontiac, all of Madison.

This SS 350 Camaro, one of this new breed for 1967 is graced by U.W. senior Carol Daniel. The Camaro is GM's first entry into the semi-sport class with the Mustang and Barracuda. With the 350 engine, the Camaro is a well moving automobile, and if sales can move as quick as the car itself, it will be a common sight on the nation's roads.

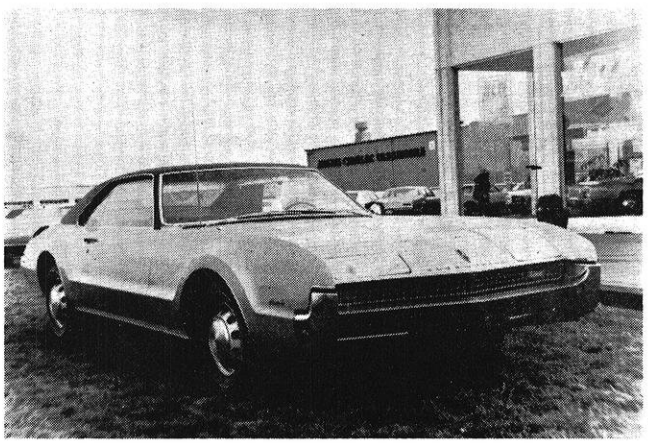
Alan Christensen

The new GTO is basically unchanged in styling from last year. The big change is in engines, with the basic engine being the 400 cubic inch eight.

The '67 Pontiac Tempest Sprint remains basically unchanged from last year. The OHC six introduced in the '66 models appears to be destined for success as a well-balanced and surprisingly fast power-plant in the hot economy class. One definite improvement that this photographer noticed in the new model was a separated turn signal indicator to go along with the other safety devices for '67. Previously a single light had indicated both left and right turn signals.



Buick maintains its luxury image with smooth flowing lines and rich interiors, even in its intermediate model. Skylark shown had rich red lacquer with white vinyl top, and white vinyl interior with very attractive and surprisingly comfortable head rests.



Oldsmobile Toronado which has been going strong for a year now is joined in the FWD class by the new Cadillac Eldorado, which unfortunately was not available for photography prior to the *Wisconsin Engineer* photo deadline. In addition to standard safety additions for '67, the Toronado is slightly restyled, doing away with breaks in its flowing lines such as the '66 toad eye retracted headlights.

The frisky '67 Mustang, with accentuated airscoops, a striking tail light treatment and an optional 390 cubic inch eight. Need we say more.

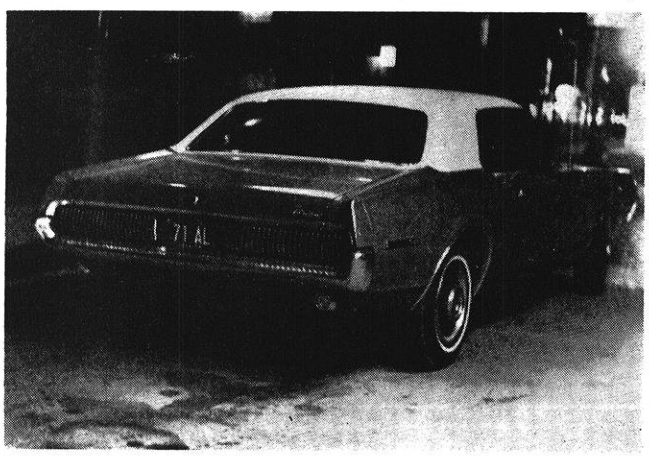
Thunderbird. Whether four doors or two, it is a better idea. T-Bird and Mustang furnished by Kayser Ford, Madison.

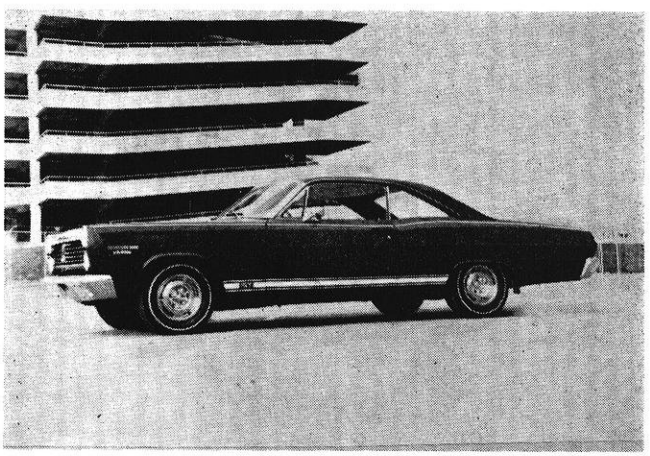
Mercury's top-of-the-line Marquis is a fine handling and very compatible car for its size, just the thing for those who like a solid highway cruiser that can still be driven down University Avenue during the rush hour without giving the impression that you are driving a city bus.

YOU'RE AHEAD IN A FORD

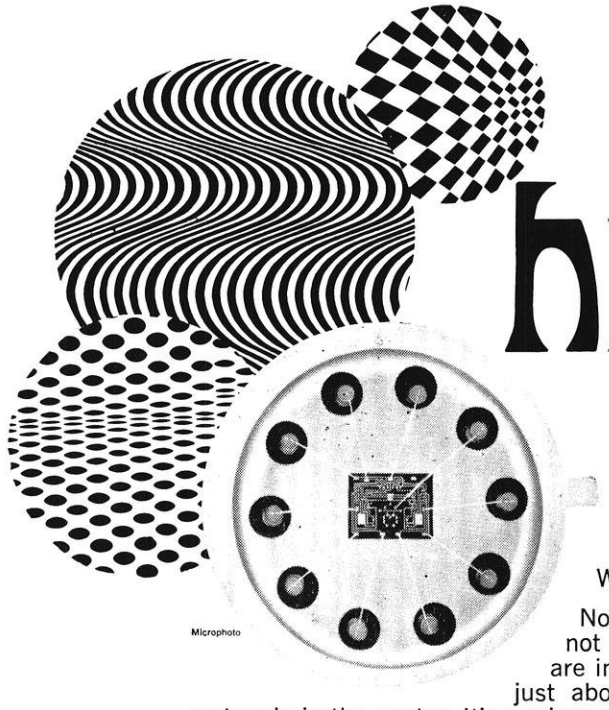
FORD

Bob-tailed Mercury Cougar is a new entrant for '67 in the sporty class. Heavier and more luxurious than its cousin the Mustang it still handles well and is very attractive to the eye. It looks as if this one should be a winner all the way for those who like a semi-sports car and yet do not want to give up the luxury class entirely.





Mercury Cyclone GT is primarily unchanged in body from '66, but it remains one of the hottest intermediates available. All mercurys were provided for our use by Doring Lincoln Mercury of Madison.



hip chip

What is it?

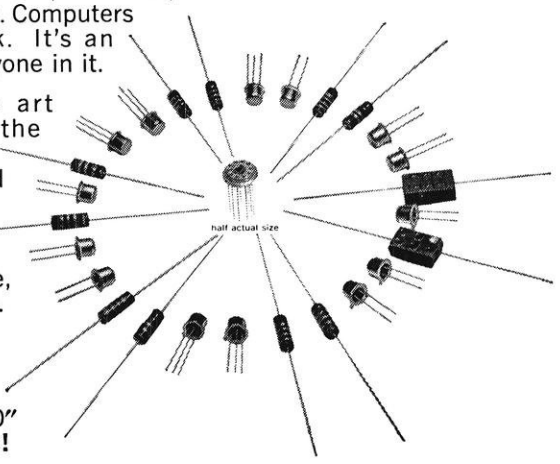
Not the op art discs — we're not about to describe them. We are interested in the micro-photo just above — specifically the little rectangle in the center. It's a minuscule chip of silicon produced in Motorola's semiconductor labs—on the verge of creating a scientific revolution all its own.

The chip's dimensions are 0.060″ by 0.080″—about the size of a baby B-B. That tiny area incorporates 14 transistors, 10 resistors and 2 capacitors—performing the same circuit functions as the 26 discrete components shown below. It's Motorola's chip off a new block of electronics—it's an integrated circuit.

But why all the fuss?

Because the integrated circuit is the key to untold electronics marvels, hitherto impractical. Because its small size, weight, and power consumption lessen the cost of complex systems and improve performance. Because it's more reliable, to boot.

Integrated circuits already are used in design plans for amazing new computers — computers which will, in effect, function as special extensions of the human brain. Computers which, in time, will almost think. It's an exciting business. It challenges everyone in it.



Within a year, the solid state art will develop the means to store the content of the Encyclopaedia Britannica in a one inch cube—a solid state memory system. One day, every important university library will have electronic knowledge banks connected, perhaps by satellite, for instant exchange of information.

People generally are impressed by the chip with 26 components. But hang on. We've now got one in the lab not much larger (0.120″ by 0.120″) . . . **with 524 components!**

Hip chip? You bet.

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MOTOROLA

COVER STORY:

it's a MAZEing Go SAE

By GARY SUHM

THE first Sunday in October is traditionally characteristic of what Wisconsin folks proudly refer to as their "Indian Summer," and October 2, 1966 was just one of those typically bright, sunny Indian Summer days which magnetically attract city folks to the peace and quiet of Wisconsin's colorful countryside. It was one of those Sunday afternoons which might quietly suggest a scenic drive along the winding, back country roads of southwestern Dane County, and that's just what the Society of Automotive Engineers had in mind for the fifty-nine contestants entered in their Fall road rallye that day.

What Is a Road Rallye?

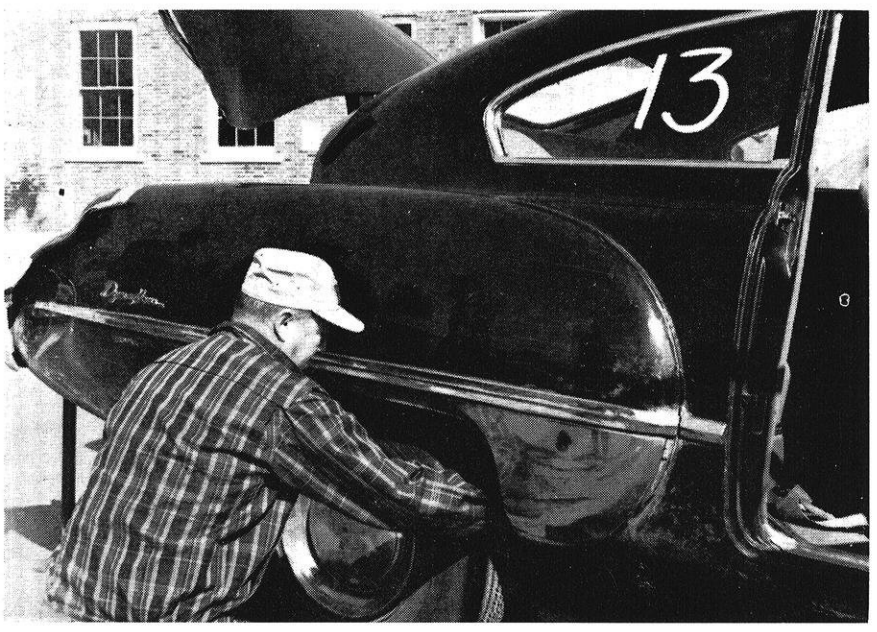
The SAE rallye scheduled that Sunday was only one of numerous such events which are sponsored in the Madison area from time to time, and which are indicative of the rising popularity enjoyed by this rapidly developing sport. Contrary to popular misconceptions, a road rallye is neither a speed contest nor an automobile endurance trial, and perhaps it is wise to consider what now appears to be an obvious question: "Just what is a road rallye?" In general, a rallye is a test of a driver's ability to properly and accurately interpret an intricate set of instructions prescribing a predetermined route which he must traverse in a fixed interval of time. Besides being an alert driver, the successful contestant must generally be imaginative; familiar with his vehicle, as well as its limitations; and capable of co-operating with a navigator, who will assist him in the interpretation of instructions, the selection of routes, and various time and distance calculations—all of which are essential to the art of rallying. The performance of each driving team is then rated on a point basis, penalties being awarded for violations of rules and regulations, and for deviation from pre-established travel times.

The SAE Course

Sponsored by the student Society of Automotive Engineers in conjunction with the Ford Motor Company, the October rallye began in the parking area at the rear of the Mechanical Engineering Building, and was designed to cover over one hundred miles of Dane County roads, the official route being divided into three segments or "legs." Located at the termination of each of the three legs was an official checkpoint with markers indicating the ideal travel time and the ideal mileage for that particular leg of the rallye. Mileage ratings for each leg of the journey were determined with a Stevens dual electric odometer, and a ten mile marker located at a point exactly ten miles from the starting line allowed contestants to adjust their odometer readings to agree with rallye mileage.

Extensive Safety Check

Sunday's rallye was prefaced by a comprehensive safety check, which was conducted on all vehicles entered in the event. In-



She passed the brake test . . . afterward, the bumper jack froze . . .

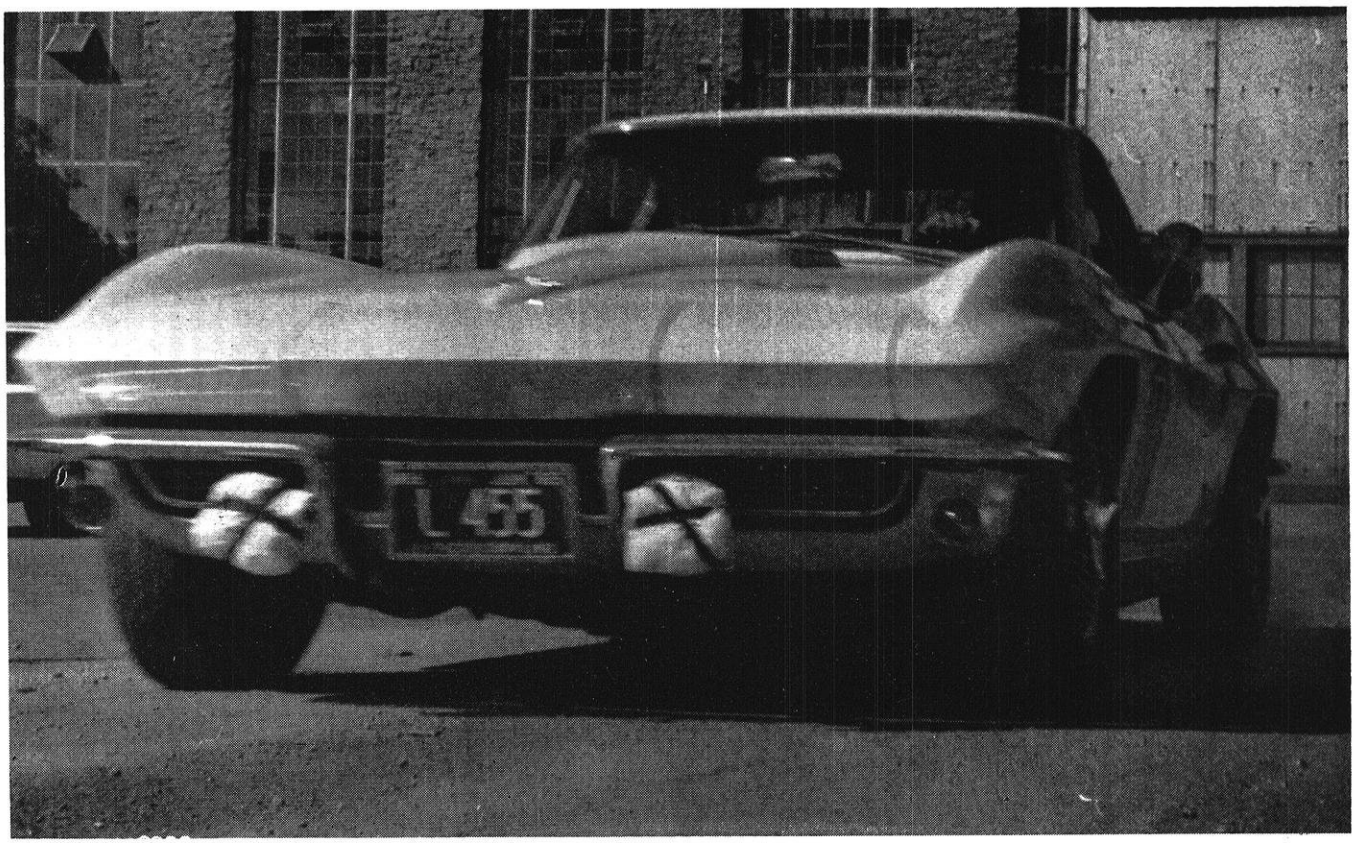
cluded in the safety check, which began at 10:00 o'clock that morning, was an inspection of brakes, wheels, steering, horn, headlights, and turn signals. It was understood that the safety inspections were a necessary prerequisite for participation in the event and that "failure to pass any test would result in penalty or disqualification, depending on the nature of the defect." Safety inspections were conducted in an orderly, assembly-line fashion, with each contestant first receiving a dash plaque and an entry identification number which was located on the right front door of each vehicle.

Conducted at the rear of the Minerals and Metals Building, the brake test was by far the most spectacular feature of the safety check. A twenty foot stretch of sand spread on the parking area with an eighty foot approach was used to carry out the test. Drivers were requested to use the approach as an acceleration strip, and instructed to forcefully apply the brakes along the sand strip so as to "lock" the wheels. Both standard and emergency brakes were required to pass this test, and those which exhibited doubtful results were inspected manually for unacceptable braking action.

Jack 'em Up

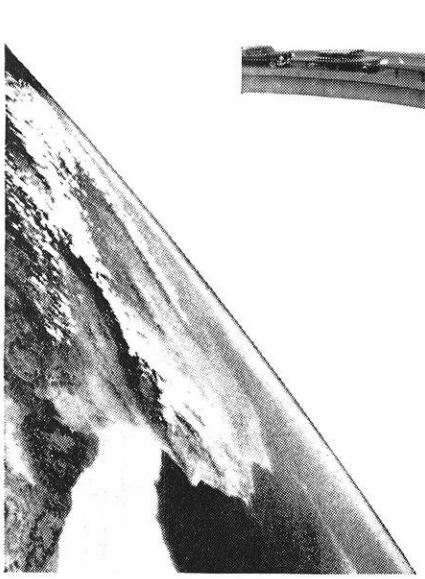
Among those who were requested to jack up the rear wheels on their vehicles was Brian Lutz whose 1949 Buick Roadmaster apparently failed to convince disputing officials that the automobile's braking system conformed to acceptable standards. Pulling off to the side where the '49 Buick was to undergo the manual brake examination, Lutz began searching the trunk for something which vaguely resembled a bumper jack. The jet black Roadmaster, identified by an ironic entry position—number 13!—soon attracted a small gathering of amused spectators. After mastering the manipulation of his awkward bumper jack, and after successfully hoisting the rear wheels without damage to the Roadmaster's rear bumper, Lutz was cleared of the brake inspection and authorized to participate in the rallye—a decision which met with the approval of the crowd which had gathered to appreciate his predicament. With his vehicle cleared of safety inspection and five minutes remaining before his official starting time, Brian now faced a new crisis. It had taken Lutz and several sympathetic onlookers over five minutes to raise the Buick's rear bumper almost three feet off the ground. With his bumper jack now frozen in that position, it soon appeared that number thirteen's prospects for scoring in the rallye were rather dim. While Lutz and several bystanders attempted to rock the Roadmaster from its temporary perch, another member of the crowd located a hydraulic lift from a nearby building. Amid cheers from the crowd, Lutz and his navigator were soon on their way to the starting line—and one couldn't help wondering if old number thirteen really did have a chance of winning the rallye!

There were other minor crises which highlighted the safety check. Completion of his brake test found the driver of entry number twenty-six sprawled beneath the rear axle of his vehicle, attempting to unlock his brakes. One at a time, however, each entry passed the vehicle inspection and found its way to the starting line. Soon there was an uninterrupted flow of vehicles leaving the parking area at

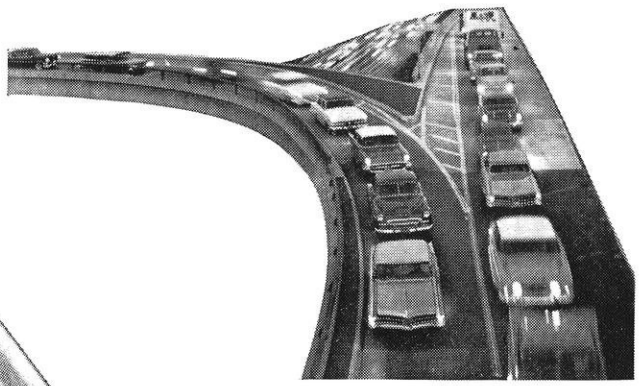


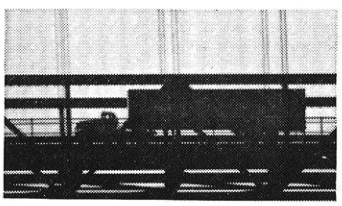
Henry Beck . . . Corvettes would dominate . . .

These are some exciting things Bendix® is doing. You could be doing them, too!

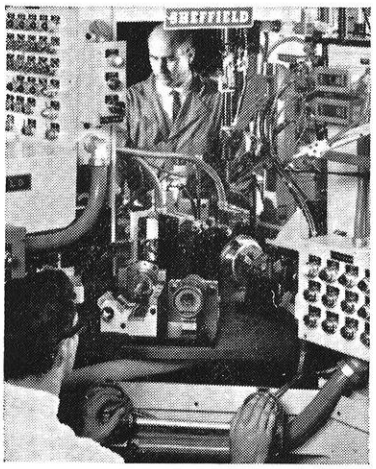


Space and missiles. Bendix activities span many phases of the U.S. space program—from producing guidance and control systems to studying the nature of the moon's surface.



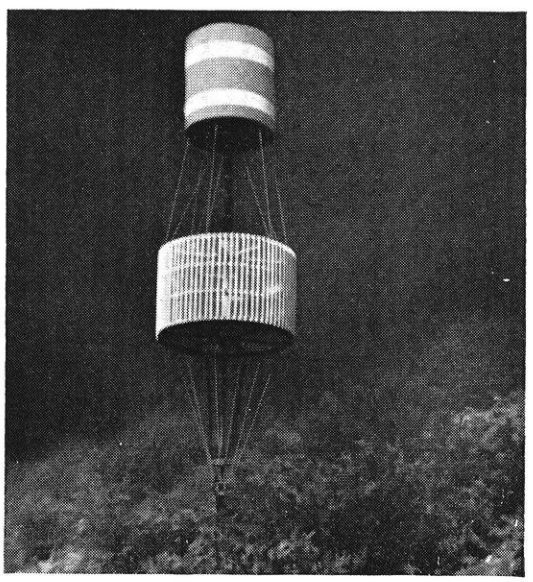


Automotive. Brakes, steering, carburetion and other related components are continually being improved by Bendix engineers.



Automation. Bendix is providing manufacturers with many types of cost-cutting equipment—including numerical control systems and automatic gaging and monitoring systems.

Aviation. Results of Bendix research include the first commercial all-electronic autopilot and, just recently, the first FAA-approved all-weather landing system.



Oceanics. Bendix is a leader in this new field. Developments include navigation devices to withstand pressures at 3 miles deep, underwater telemetry, guidance/control systems for anti-submarine torpedoes and submarine steering systems.

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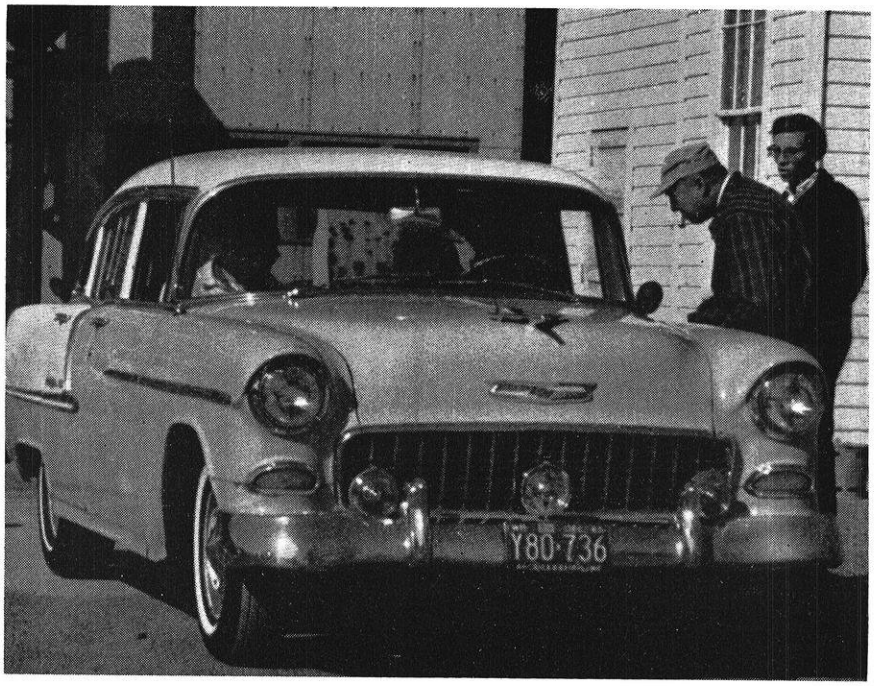


Fred J. Brown, Jr. . . . "tech inspection" was a necessary prerequisite . . .

two minute intervals, with the first entry departing at 11:00 o'clock, and the last participant scheduled to sign out shortly before one o'clock that afternoon.

Chevys Dominate Entries

As one after another of the entries signed in, it became apparent that Corvettes would dominate the rallye competition. Of the fifty-nine care entered, fourteen were Corvettes, seven were Corvairs, and Chevrolets followed up in third place with six entries. Ford Pontiac and Triumph all had five representatives entered. Among the remaining entries were an Austin–Healy Sprite, a Volvo, a Porsche and one tiny Sunbeam.

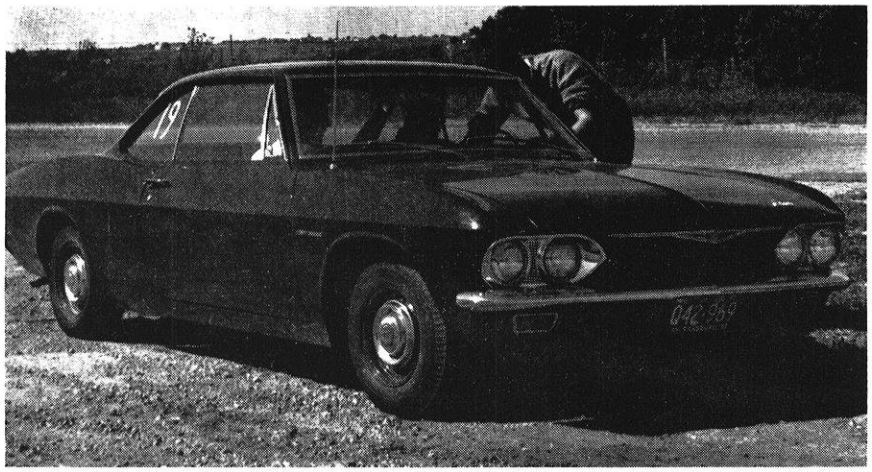
Rallye Package & Point Count

At the starting line, each driver received a set of route instructions two minutes prior to his scheduled starting time. Distributed with the instructions was a panic envelope which would direct the driver to the nearest checkpoint in the event that he should become so hopelessly lost that he was no longer eligible to receive credit for that particular leg of the rallye. Each leg was scored separately on a basis of 1800 points per leg. One point was deducted from this total for each second that the driver was under or over the standard arrival time. After a driver was one-half hour behind his scheduled arrival time, all of his 1800 points had been deducted, and he was then justified in opening his panic envelope, since he had already lost all possible credit for that leg of the rallye. A 500 point penalty was awarded to any vehicle caught entering a checkpoint from the wrong direction, and a 300 point deduction was granted to any contestant engaging in unnecessary conversation with checkpoint officials. Additional points were awarded for correct answers to the questions incorporated in the instruction sheet. An orientation hand-out, elaborating the rules and regulations for the rallye, explained the remainder of the scoring system. It becomes obvious that the foundation of each team's score depended on the driver's timing, and it was suggested to all contestants that they could improve their timing by keeping an accurate tabulation of their average speeds. The route instruction sheets distributed to each of the contestants designated the average speed which the driver should attempt to maintain for each leg of the journey in order to complete that stretch of the rallye in the standard time interval. In order to achieve an accurate approximation to the specified average speed, each team would have to continually calculate their average speed by dividing travel distance by travel time. In this way, each driver would know whether or not he was averaging more or less than the recommended rate and could speed up or slow down accordingly. In order to maintain an accurate knowledge of their relative standing in the rallye, it was recommended that each team include the following basic items among their rallye equipment: Two watches with sweep second hands, slide rule, stop watch, and clip board with paper and several pencils. The official map for the rallye was the Dane County map which contestants were authorized to obtain from the City-County Building or the State Highway Commission. Probably the most challenging aspect of rallying is the task of interpreting the instructions, which are compiled with the intent of confusing the driver and provoking his imagination. The list of instructions issued in this rallye were far from being a mere accumulation of left-turn, right-turn directions. Consider, for example, the driver's first instruction after passing the ten-mile point: "Look for acorns in the shade, but don't go into the woods." Just as amusing was an instruction which asserted "With Mineral Springs Beer you have got to go right!" Some confusion undoubtedly resulted when navigators stumbled onto this one: "Keller was a rock-hound to the bitter end!" There seemed to be some dispute as to just where the bitter end was!

Bring Conversion Tables

For those who were mathematically oriented, there were instructions designed to defy the mathematical competence of even the most persistent navigator. For instance, there was an instruction directing the driver to turn "right after 114,000 inches" and another advising an average speed of 45.466 feet per second—try converting that rapidly into a figure you can conveniently read on a speedometer!

Those who successfully muddled their way through an intricate maze of seventy-six confusing instructions were confronted with the following observation: "Would you believe that you will now approach the starting line (since that is where you should be)? Change average speed to 186,000 miles per second, and POOF!" Those who



First arrival at checkpoints #1 & #2.

found their finishing position slightly removed from the starting position consulted their panic envelopes under the number four section and were consequently advised to "go home and start preparing for the SAE Spring rallye in May 1967!"

Rallyemasters Craig Jackson and Bill Grosshandler Devise Rugged Route

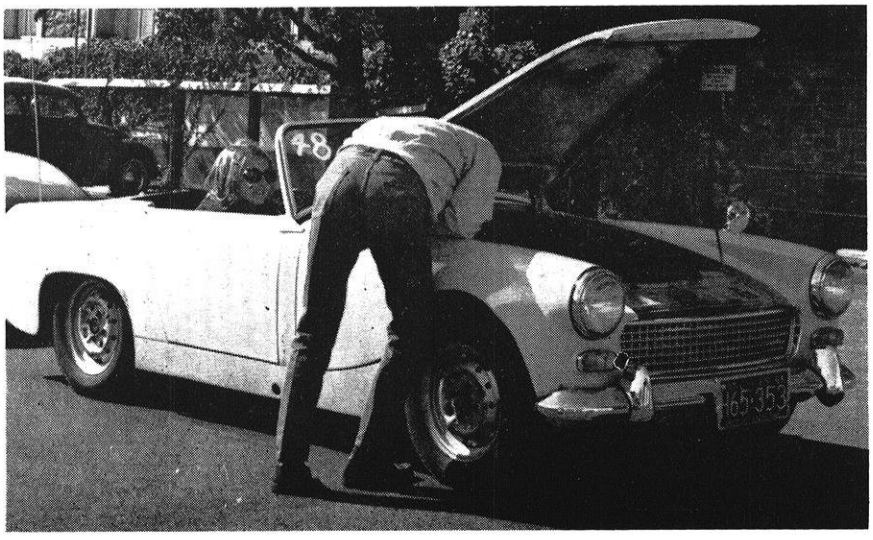
Craig Jackson and Bill Grosshandler, rallyemasters for the Fall rallye, were responsible for designing what proved to be a rather frustrating route—and not only for the participants. The reporter and photographer who were assigned to cover that route struck out early Sunday morning, armed with two University professors, a powerful late model LeMans, and a two by two foot map of the rallye area, on which the entire route was clearly marked and labelled in orange ink—and even they became lost. One can well imagine the difficulty which the contestants must have had—without the aid of clearly marked maps!

Mileage

The ideal mileages for the three legs of the rallye were 44.45 miles, 31.60 miles, and 20.44 miles respectively, with the corresponding ideal travel times being 5046 seconds, 3218 seconds, and 1800 seconds. Of the fifty-nine teams entered, twenty-two finished without using panic envelopes, fourteen teams used the panic envelope only once, and two teams resorted twice to the final recourse.

Check Points

Officials, anxiously awaiting their first arrival at check point number one that morning, gave John Henderson and his navigator a rousing welcome when their Dodge Lancer signed in shortly after 12:30. Two and one-half hours later, as officials anxiously anticipated their first arrival at the second checkpoint, it was a Dodge Lancer that rounded the wide curve, climbed the long hill which constituted the final stretch of leg number two and signed in as the first arrival.



Finalists

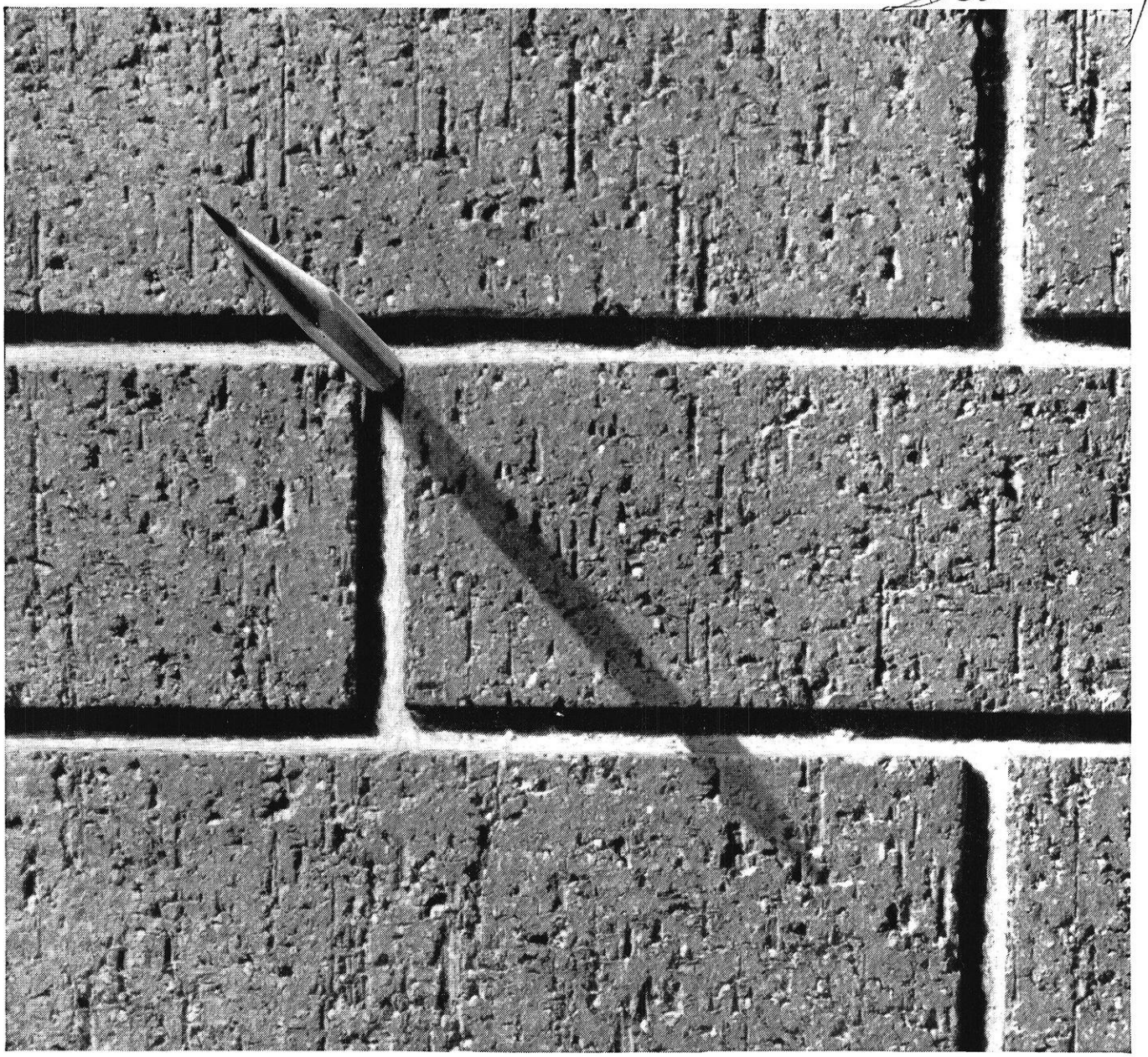
Entry number forty-two scored the least number of penalty points on the first leg with a total of 358 points deducted. Entry number fifteen captured the title in the second leg with a remarkably low assessment of six points, and entry number twenty-six topped that record in the third leg, finishing with an unbelievable four point penalty!

Winners of the SAE Fall rallye were Mr. R. Bethke and his navigator, Tom Kofler, whose 1960 Corvair chalked up a total of 4,444 points out of a potential 5400. Ralph Evans and his navigator, Mr. Armstrong, pushed their '64 Corvette to a 4,090 point score, which placed them in the first runner-up position, and following in third place were Ron Acker and Lee Morse, whose '59 Corvette won them a 3,269 point total.

Evans and Armstrong held the best overall score for the first leg of the rallye, and of the three winning entries, none managed to outscore the other two more than once. Evans and Armstrong held the lead in the first round, Bethke and Kofler underscored their two rivals in the second, while Acker and Morse captured the third round competition with a score which topped all those attained by any of the three leading drivers, having lost only twenty-five points on that leg. It is interesting to note that Acker and Morse also held the record for the worst score attained by any of the three rivals, having forfeited all 1800 points on the first leg. Trophies were awarded to the three winning teams by the Society of Automotive Engineers.

Professor Easton and Professor Borman, advisors to the student Society of Automotive Engineers, worked closely with the group and with the rallyemasters in preparing for the Fall rallye. Considerable preparation was required for the event, and the results of the Society's efforts were an encouraging stimulus to the projected plans for their Spring rallye, scheduled for May of next year.

Standing ad



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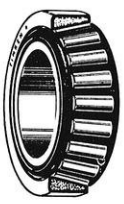

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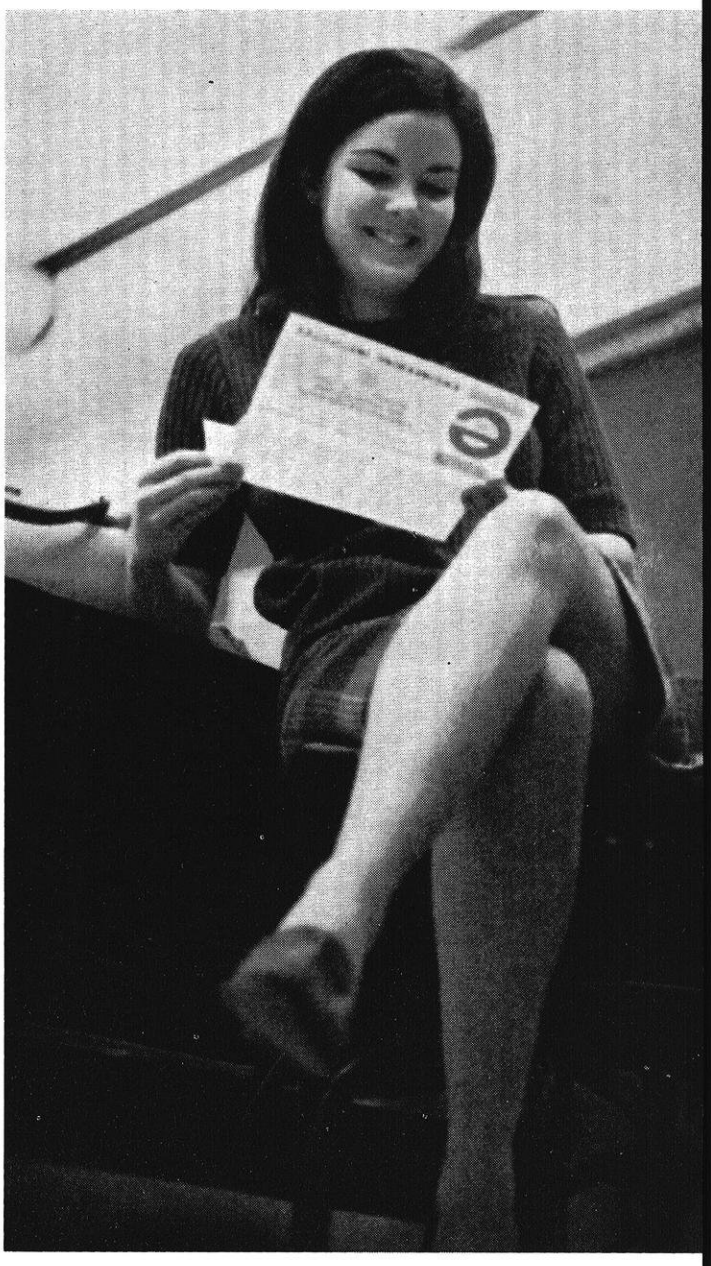

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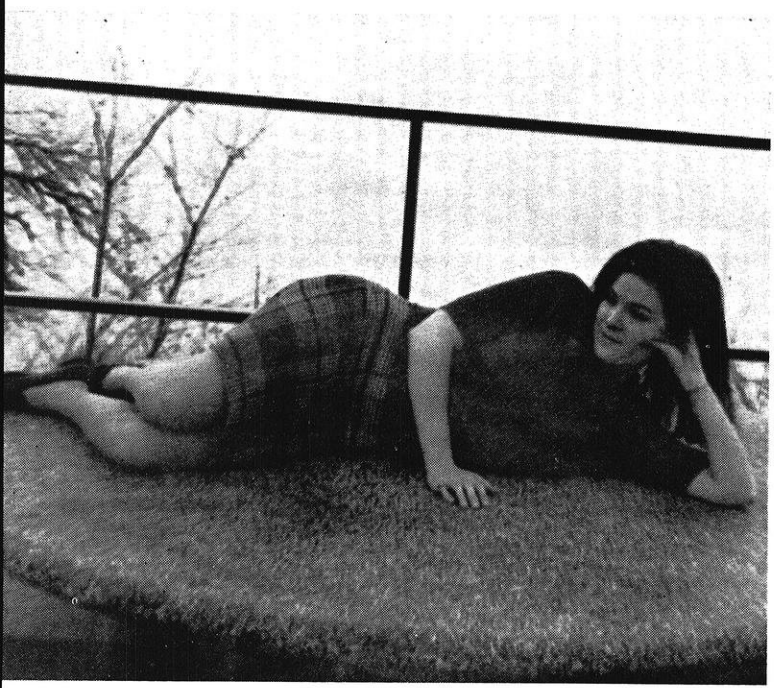

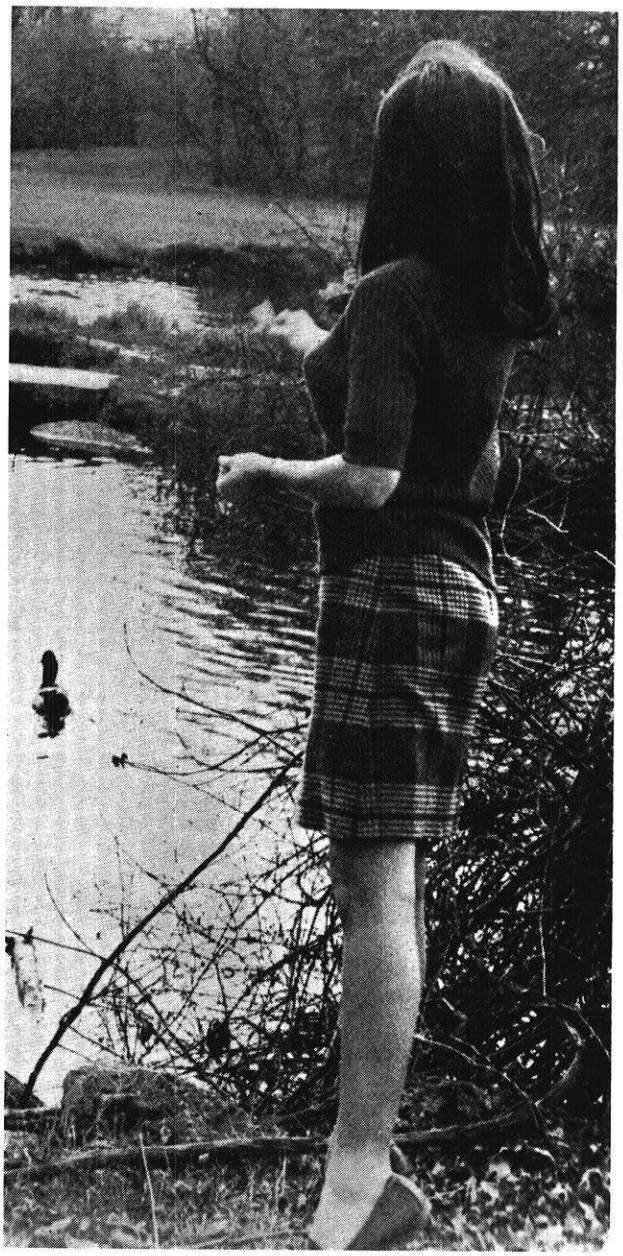

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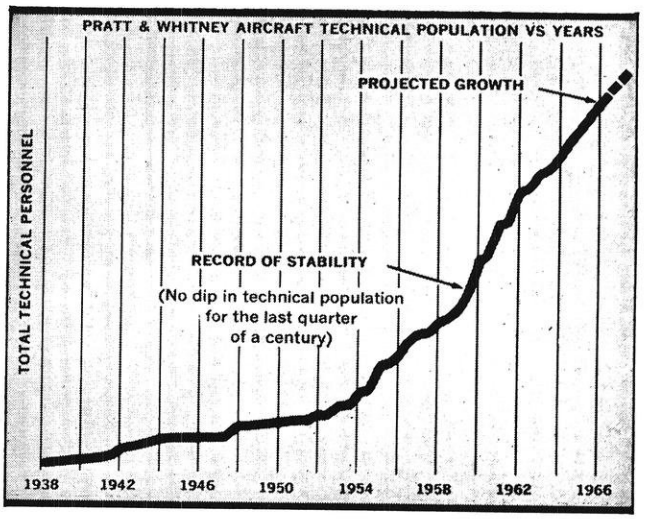

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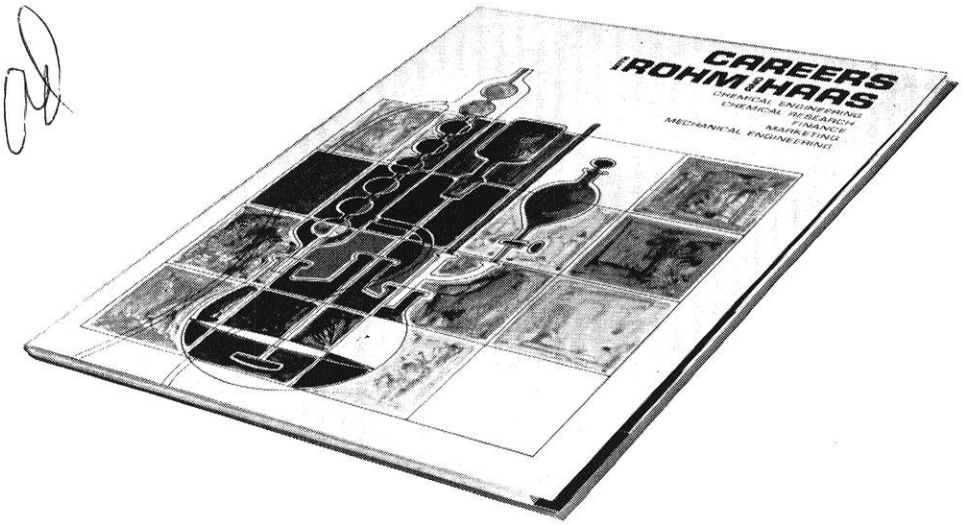

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10

By GARY SUHM

DAIR

PICTURE yourself on a long, lonely segment of highway. It's a rainy night, and you're trying to stretch your gasoline to the next service station, when sure enough, the engine begins to sputter. You coast to the shoulder and stop, while your wife, who suggested a stop in the last town, gives you that special look which she reserves for such occasions. It's a ticklish situation at best, but easily remedied. You reach for the instrument panel mounted beneath your dashboard, and simply dial a series of numbers. A reassuring voice acknowledges your message, and within a few minutes, gasoline has arrived and you're on your way again. Unbelievable?

After a long, hard day behind the wheel, you are finally completing the final stretch on what appears to be an isolated section of the freeway. With your nerves in a semi-alert condition, you are not capable of reacting to emergency situations, and as you rocket along at high speed, you are unaware that a semi-trailer lies jack-knifed across the road in the fog ahead. Suddenly, a voice blares from the instrument panel: "Road blocked ahead—use next exit." Science fiction, perhaps?

It's one of those hectic holiday weekends when thousands of the nation's citizens are destined to be slaughtered on highways from coast to coast. Driving cautiously along a high-speed stretch of freeway, you are concentrating on the erratic zig-zagging traffic pattern ahead, unaware that you are rapidly approaching an uncontrolled entry—and a potential safety hazard. Immediately, a brightly lighted warning flashes across the screen on your dashboard: "Yield." Convinced yet? Let's consider one more example.

You are not accustomed to high speed freeway driving, and are easily confused by cloverleaves and cleverly designed intersections. You must travel the freeway in order to reach a destination in a minimum of time, and wish to confine your attention to alert driving, without having to be concerned with selecting the proper lanes, exists, entries and turns. To solve the problem, you merely insert a punched destination card into the slot on your instrument panel and proceed merrily on your way, concentrating on your driving and the confusing flow of traffic on the road before you. As you approach each exit or intersection, your dash-screen indicates your disposition—turn right, turn left, or straight through. Consequently, you arrive safely at your destination without mapping your course and without making route decisions—they have all been made automatically! Interested? Let's see what it's all about.

Engineers at the General Motors Research Laboratories have demonstrated this new experimental road–vehicle communications system, designed to remind motorists of speed and traffic signs, enable them to summon help in an emergency, and provide automatic routing for trips. The new system, known as Driver Aid, Information and Routing system or DAIR for short, is the most comprehensive yet developed for highway communications.

Today's complex roadways, increased vehicle speeds and heavy traffic intensify the driver's need

—Courtesy General Motors

The visual sign minder alerts the driver to the road ahead.

for frequent directions and information. DAIR meets this need for increased safety and driving enjoyment with a simple, low-cost communications system which works equally well for slow city traffic and high-speed turnpike driving. Incorporating four basic features, a two-way radio, a display panel with warnings to supplement upcoming traffic signs, messages about the road ahead, and an in-car route direction indicator, DAIR could be made available either as a single package unit or as separate compatible building-blocks. Let's take a closer look at each of the four essential features incorporated in the DAIR system.

Two-Way Communication

The motorist uses a coded dial message for summoning aid or alerting an aid and information center for two-way radio communication. At a strategically located traffic center, the station operator receives a printout of the aid requested, the vehicle license number, and the route or highway marker number. The operator dispatches the aid and assures the caller by voice acknowledgement that help is on the way.

A standard Citizens Band transceiver in the vehicle is equipped with an encoder which has a telephone-type dial. This dialing system protects the driver and his family by making it difficult for unauthorized persons to receive and answer the call for help. The car's location is transmitted in code, picked up by the nearest repeater, and relayed to the service center by wire. In a typical installation, repeaters would be located every three to five miles—depending on the terrain.

For road or travel information, the driver dials "0." The base station operator acknowledges and requests direct two-way voice operation on another Citizens Band channel. The driver also can dial "1" for police, "2" for an ambulance, "3" for a fire truck, or "4" for a tow truck with gasoline and a mechanic.

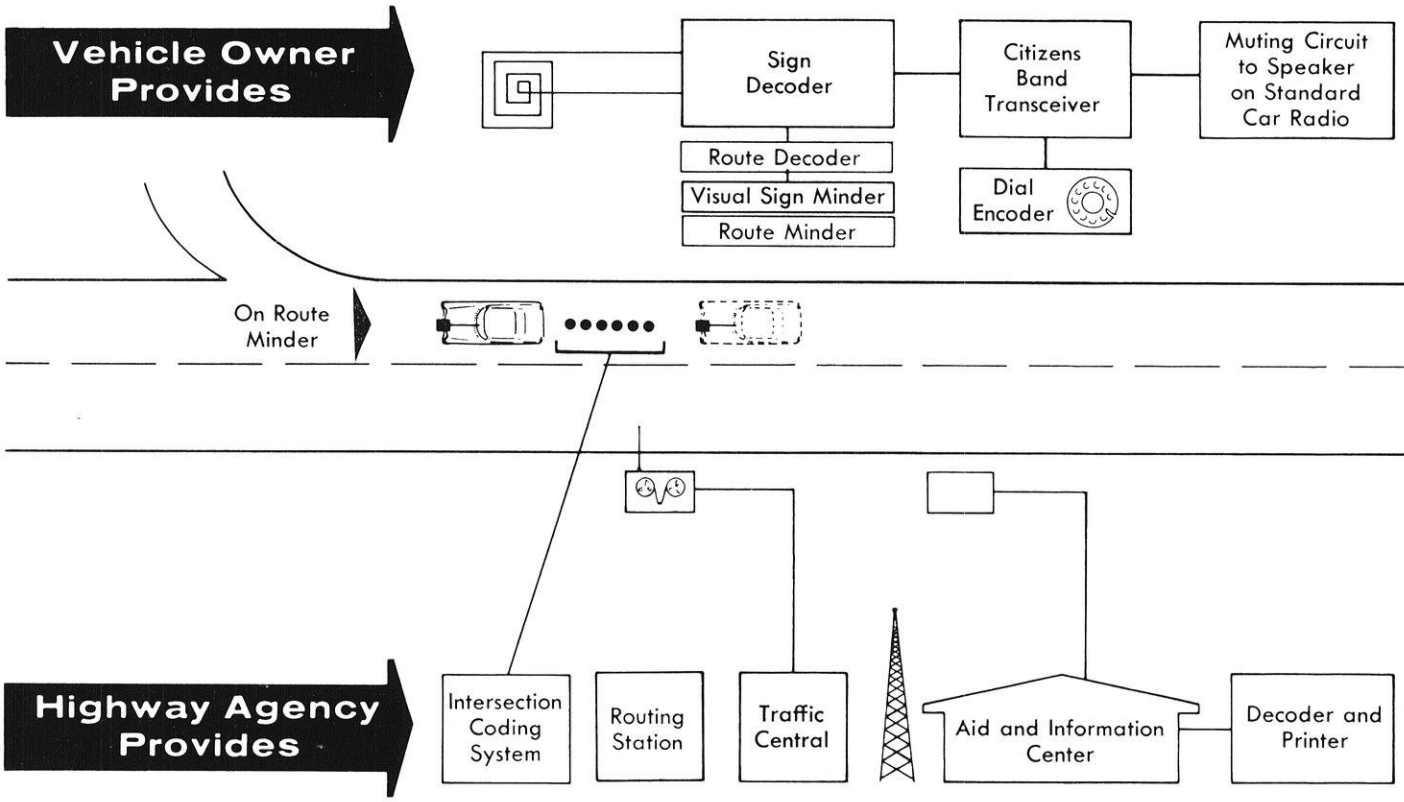
In addition to performing the automatic functions, of course, the Citizens Band transceiver in the car can be operated in the regular manner for voice communication.

Audio Signs

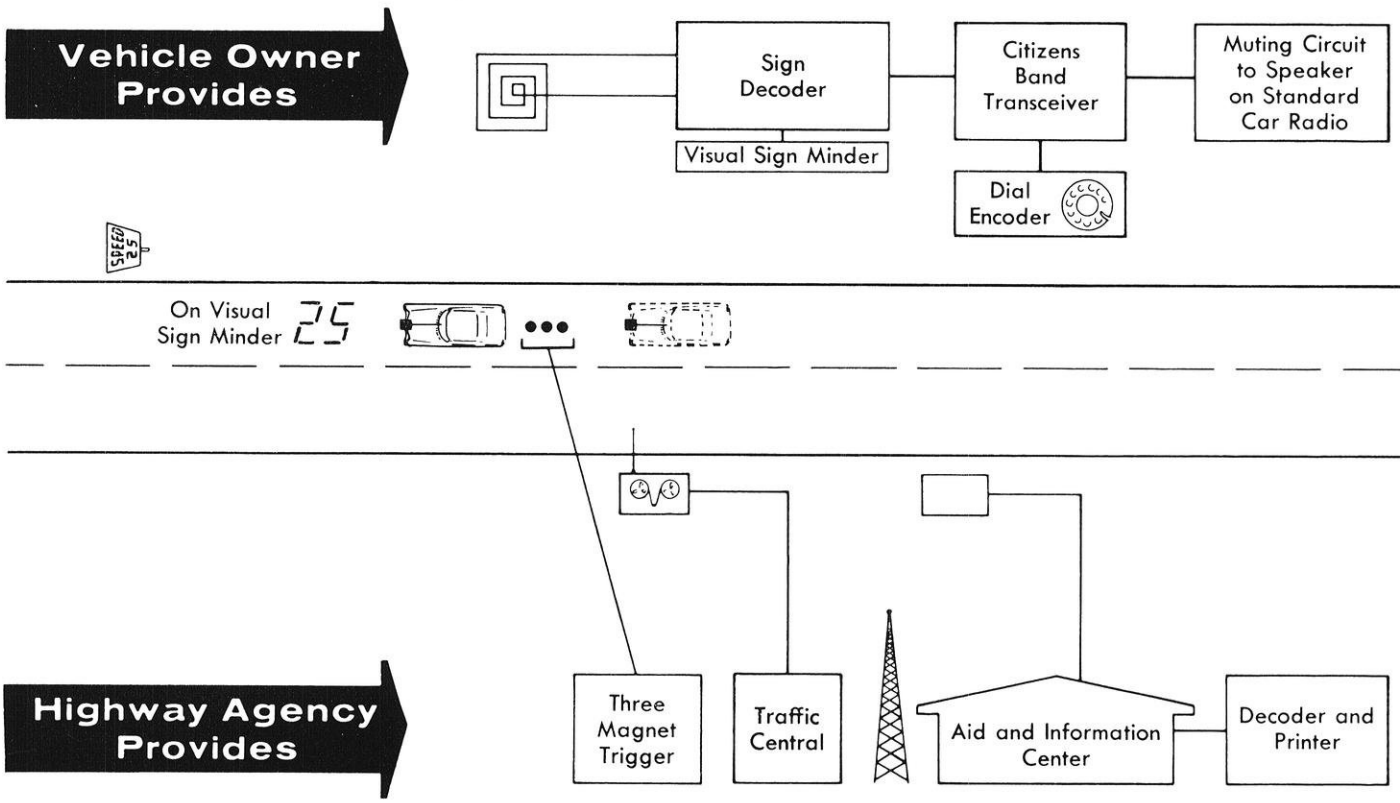
The audio signs operate on one of two proposed highway safety channels in the Citizens Band. Permanent magnets are buried in the pavement, and these excite pulses in a loop antenna on the vehicle frame as a car passes over. The car's Citizens Band receiver is triggered on for six to ten seconds to permit message reception, and then cuts off automatically until another zone is entered. Because they don't pass over the magnets, and hence because their receivers are not activated, vehicles in the opposite lanes don't receive messages.

The roadside equipment is a

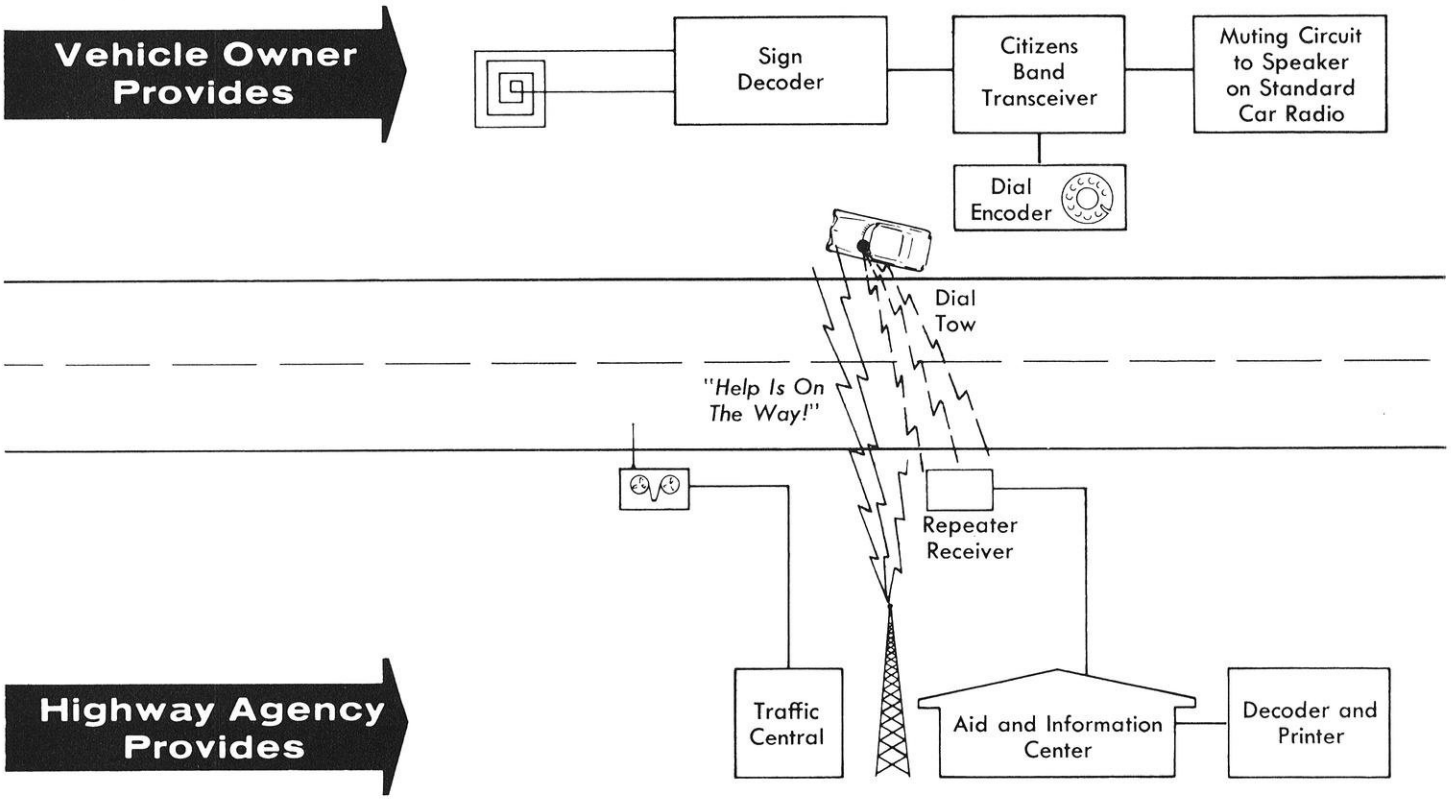
To Add Route Minder



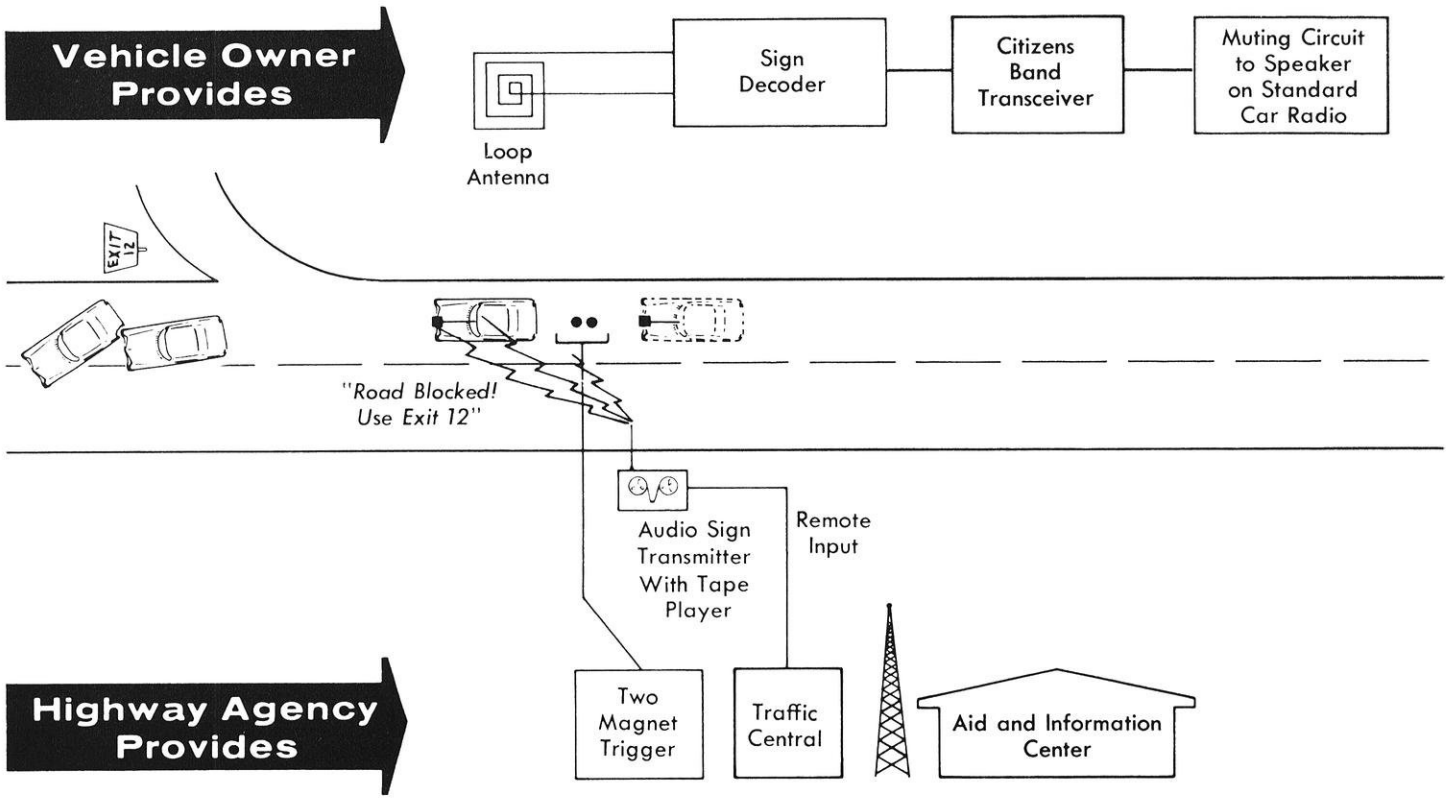
To Add Visual Sign Minder



To Add Coded Communications



To Add Audio Signs



low-power transmitter (about 50 milliwatts) which can be modulated by a tape message repeater or by voice from a "traffic central" control station, set up at existing highway agency or law enforcement facilities. The repeater currently being tested can contain up to eight messages suited to local conditions, and any one may be switched into operation by remote control. Typical taped messages deal with road conditions, accommodations, and service facilities. Live messages would be used for special instructions and emergencies.

Mounted in line with the driver's vision, the display panel for the visual sign minder flashes a selected message when the automobile passes over a series of magnets in a coded order (north pole up or south pole up). Two norths and a south, for example, could represent a "stop" code to the equipment in the car. The signal is received by the same loop antenna used for audio signs and the route minder. A "beep" directs the driver's attention to the display cluster.

Designed to supplement—rather than replace—existing traffic signs, the system repeats posted speed limits, and such traffic signs as Stop, Yield, Railroad Crossing, and Curve on the display panel.

The sign minder could be particularly useful in high-volume applications where "road-active" systems requiring operating power are not economically feasible. Maintenance is negligible after the magnets are buried in the pavement.

Route Minder

Like to take a trip without diverting your attention to maps and route signs? DAIR's routing system makes it easy.

Suppose a motorist wants to drive to a distant city. His first stop is a nearby routing station, where he selects a route and receives a punched card for his destination. The card fits a slot in the car's DAIR console. From this point on, whenever the drive approaches a major intersection, a panel light will indicate a right turn, left turn, or straight through.

Buried magnets, coded to identify each individual intersection, activate the routing equipment being tested at GM research. The magnetic signal is picked up by the car's loop antenna and fed into the decoding circuitry, where it is compared with the instructions punched on the card for a specific intersection.

The triggering system for audio signs, the visual sign minder, and the route minder represents a new approach to equipment control. Three permanent magnets compose the trigger for the sign minder and the audio signs, and are arranged to send eight different codes (eight combinations of north and south poles; one combination activates the audio sign receiver and six combinations are used for repeating traffic signs. The eighth combination is reserved for use when routing information alone is available. Routing triggers have three additional magnets added to the first three employed in each single combination.

Bits of information from the magnetic triggers are processed in the car by digital magnetic logic. The logic circuits, developed by GMR, use toroidal ferrite cores.

Oliver J. Meyer, Jr.

Oliver Meyer & Sons Construction Co.
New Orleans, Louisiana

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"Urethane has the highest load-bearing capacity of any material used in a factory-made joint. This is important because it means joints resist any permanent change in dimension. The joints are tight, all the way around the pipe... and remain that way. And that's the only way to really solve the infiltration problem in sewers."

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Last year, thousands of lawyers, bankers, accountants, engineers, doctors and businessmen went back to college.

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We'd like to clear up what appears to be a misunderstanding. It is somewhat popular on campus to decry a business career on the grounds that you stop learning once you start working for Cliché Nuts & Bolts.

That idea is groundless.

We can't speak for Cliché, but we can for ourselves – Western Electric, the manufacturing and supply unit of the Bell System. 6 out of 10 college graduates who have joined us over the past 10 years, for example, have continued their higher education.

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You get the idea. We're for more learning in our business. After all, Western Electric doesn't make buggy whips. We make advanced communications equipment. And the Bell telephone network will need even more sophisticated devices by the time your fifth reunion rolls around. The state of the art, never static, is where the action is.

At Western Electric, what's happening is the excitement and satisfaction of continued doing and learning. If this happens to appeal to you, no matter what degree you're aiming for, check us out. And grab a piece of the action.

Western Electric
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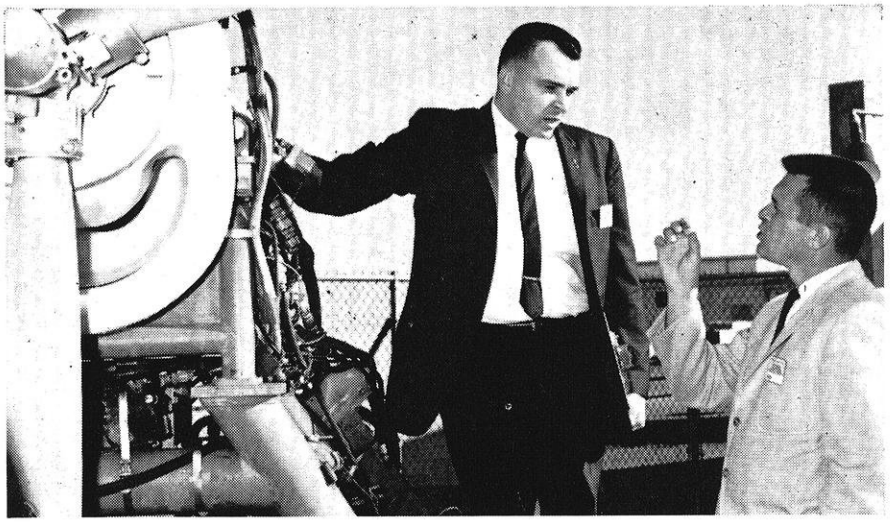
What kind of engineer will you be... preliminary design, design, development? At AiResearch Phoenix, you work as all three before you decide.



Your future as an engineer is strongly influenced by your first assignment. What that assignment will be, should be, is an important decision.

At Garrett you control that decision. During an eight-month orientation program, you work with experienced engineers on a variety of assignments in different areas. Your permanent assignment depends on your own aptitude and interest.

In preliminary design you may work on gas turbine engines, jet engine starters, or advanced power systems for space vehicles. Analysis is the key – and the emphasis is on thermodynamics, fluids, vibration, heat transfer, and math to solve today's problems.

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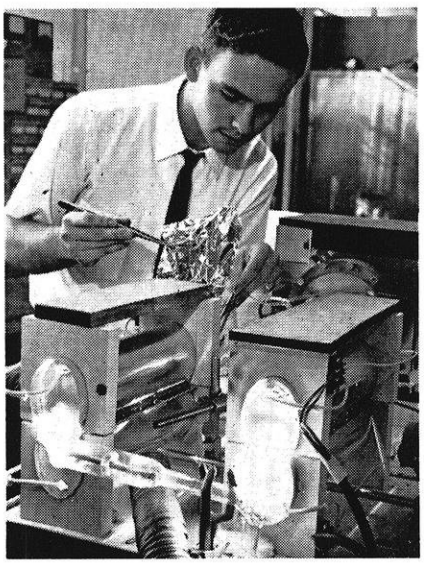
Your career at AiResearch Phoenix can be stimulating and rewarding. You can work in all three important areas of engineering on diverse aerospace products. You can use your total education, learn more on top of it, and take part in a wide variety of advanced engineering.



At AiResearch Phoenix, the product lines include gas turbines for auxiliary power, turboprop engines for business and military aircraft, secondary power equipment for aircraft, advanced space vehicle nuclear power systems, pneumatic and hydraulic control systems, as well as a variety of related equipment for aerospace, ground, and undersea applications.

Find out the whole story in our new booklet, Your Future at Garrett. Get it from your campus placement office, or write AiResearch Manufacturing Division, 402 South 36th Street, Phoenix, Arizona 85034.

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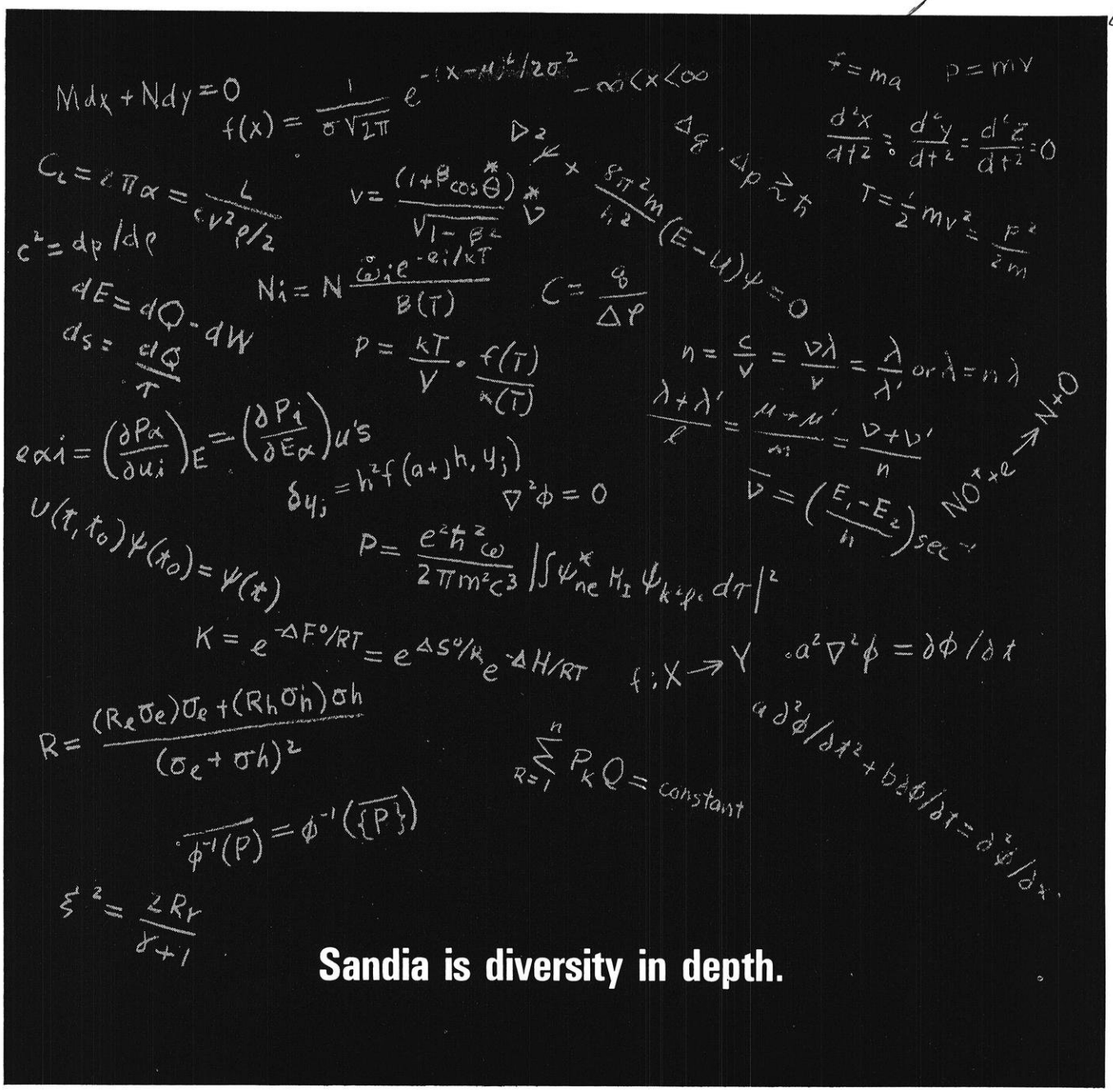

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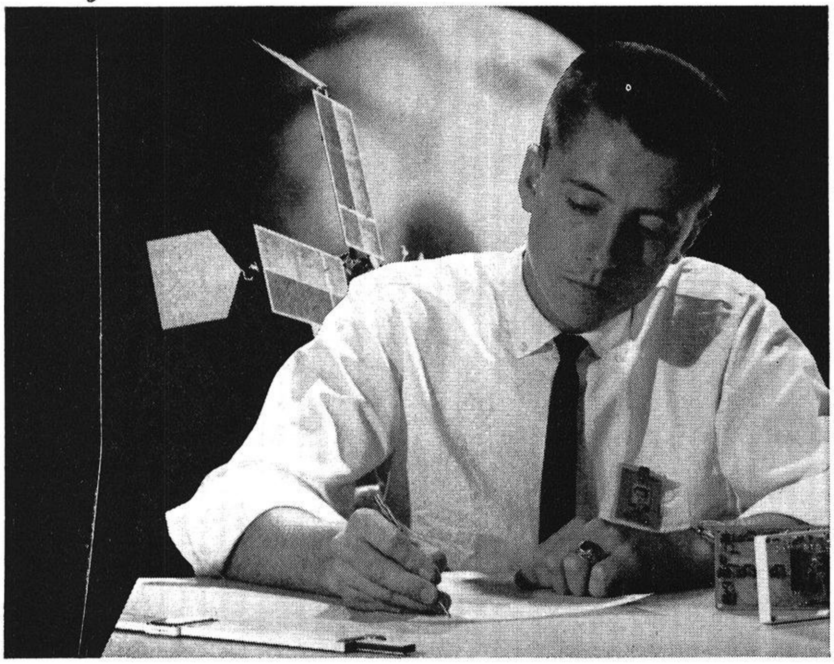

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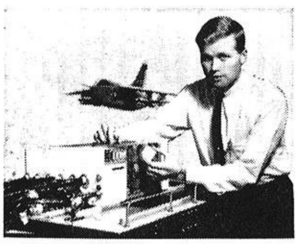
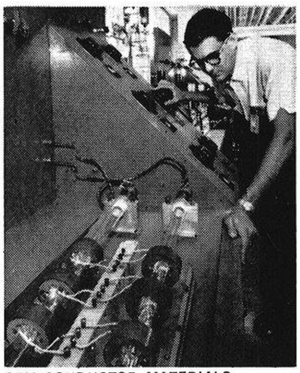


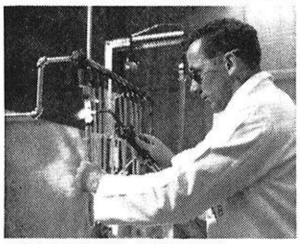
DIGITAL SYSTEMS

SIGNAL PROCESSING

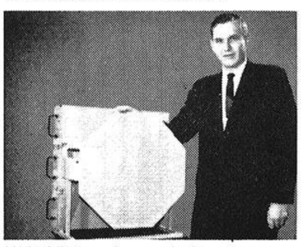
SEMICONDUCTOR INTEGRATED CIRCUITS



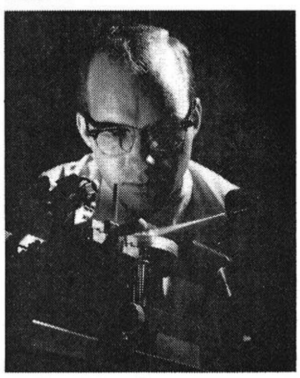
SEMICONDUCTOR MATERIALS



METALLURGICAL MATERIALS



MICROELECTRONIC RADAR



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A pictorial analysis of a revolution in highway safety—along with the cause behind it.

IS IT SAFE?

By R. J. SMITH

WHEN the 1967 automobiles appeared in the showrooms a few months ago, the public was exposed to a new advertising pitch from the mass media. Auto magazines had been predicting the revolution all along, but the consumer was taking a wait-and-see attitude. A great many new or improved safety devices being provided on the "'67's," caused mixed public reaction. Some observers thought that Ralph Nader had made his point, while others thought only of the previously announced price increase.

In the following paragraphs a cursory analysis of

The mechanism pictured above is designed to keep the back of folding seats in place should they be hit by a rear-seat passenger thrown forward by the impact of an accident. Note the accessible, easily operated catch, designed for easy entry and exit.

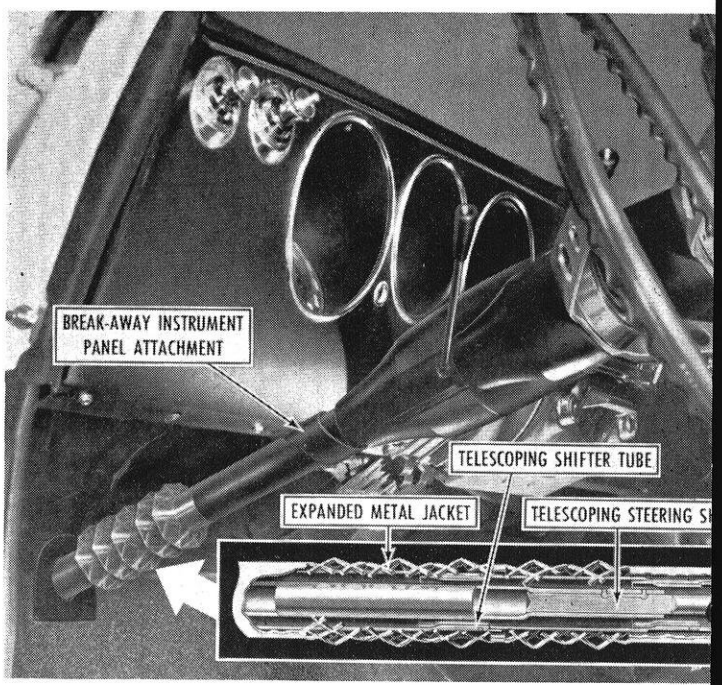
It has been proven that seat belts save lives—well, shoulder harnesses can save more lives. Manufacturers are presently providing anchorages for the harnesses. It might be noted that Wisconsin was the first state in the nation to require all new cars to be equipped with seat belts. However, only one of four drivers use a seat belt.

the facts behind the safer cars of 1967 will be made. The many illustrations accompanying this article have their commentary printed beneath them.

Background

It is easily understood that there have been some "lemons" produced during the history of the auto industry. The automobile spawned the mass production process. To have "zero-defects" would be a miracle.

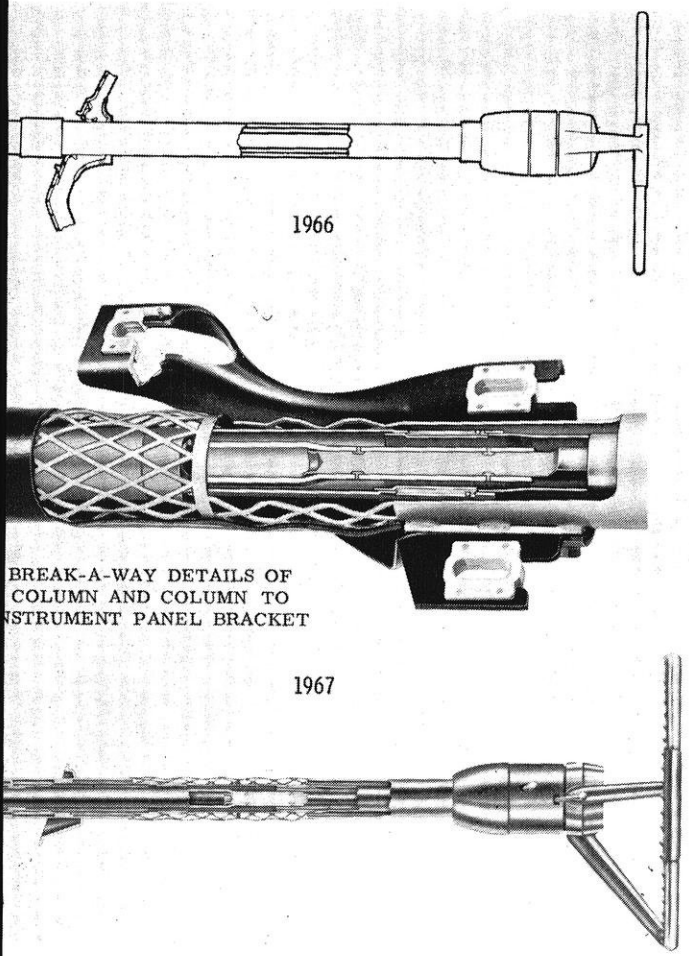
Also, there are certain flaws in the design of autos that are not discovered on the drawing boards or even on the test track. Not until thousands of cars are out on the road do some very serious problems manifest themselves.



One of the more widely publicized safety features on the 1967 model automobiles is the energy-absorbing steering column. This General Motors model will telescope nearly 9 inches. The valuable feature is that energy is absorbed at a controlled rate—the column does not simply collapse and form a new rigid barrier.

Both of the cases described above contribute in some way to car accidents. "Mechanical defect or failure" the accident report would read. These problems have always been with us and probably always will be to some degree.

You probably have heard of Ralph Nader, or perhaps you have read his best-selling *Unsafe At Any Speed*. Nader is a young Washington, D.C. attorney who recently took the auto industry to task for building unsafe cars. One of the most publicized aspects of Nader's crusade dealt with the Chevrolet Corvair. Several large lawsuits were filed against GM's Chevrolet Division, charging that negligence in design had caused the death or injury of Corvair drivers. Simultaneously with the height of the Corvair dispute our daily papers started reporting that large numbers of various makes and models of cars were being called back to dealers for the correction of mechanical de-



the industry into making the 1967 cars what they are. In 1964 Congress gave the G.S.A. (General Services Administration—the government's procurement agency) authority to specify requirements for the 60,000 sedans and station wagons it purchases annually. GSA soon issued a list of 17 features that it would require on all 1967 cars it purchased. The results can be seen in any brochure at your dealers. Thus it took the power of the Federal Government to force Detroit into building safer cars. (GSA recently tacitly acknowledged that cars are getting better mechanically—up to now GSA vehicles were disposed of after 50–60,000 miles. Last month the limit was raised to 70,000 miles.)

Any immediate effects of the potpourri of design improvements will be difficult to detect and evaluate, for there are so many near-vintage chariots rattling around college campuses and across back roads. One step has been made in the right direction however.

Any highway travel situation has three variables: The road, the driver, and the vehicle. At present it appears that we have made the most progress with the road. If the safety revolution of 1967 continues, vehicles will become much safer. As usual the most variable of the variables is the driver. Let us not be fooled into thinking that a good road, a good car, and a mediocre driver make for a safe situation.

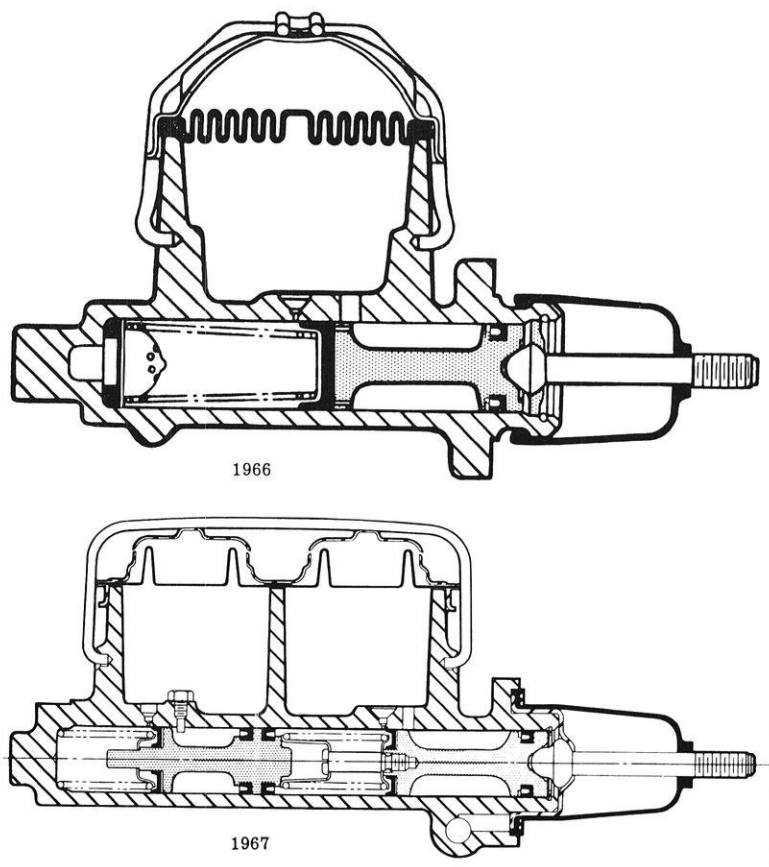
END

Drawing at left compares the design of last year's steering column assembly to that of 1967 models. Note that there are three points of yield in this year's design: Steering wheel, steering column, and instrument panel support.

fects. The public was given the impression that their new cars were being carelessly built. Congressional hearings were convened. There was a mild uproar throughout the nation. Something had to be done! Here began the fallacy of thinking that the public had made the 1967 cars safer than ever before. Not that they are not safer—they undoubtedly are. The fallacy is that all things being equal, the manufacture of a machine like an automobile probably doesn't change significantly in one model year. As mentioned at the beginning of this article, a small percentage of defects in mass-produced items is the norm. Manufacturers strive to keep quality at its utmost, but a few bugs are bound to get in a car occasionally. That the auto makers do call cars back is to their credit. The revolution is in design.

In the accompanying illustrations are shown just a few of the many safety items introduced as standard equipment on the 1967 models. But was it the public indignation towards Detroit that caused them all to be? No. Was it the manufacturers themselves? Partially, perhaps.

To get an automobile from drawing board to showroom takes about three years. From this it can be inferred that something happened in 1964 that levered



What a difference a year makes! 1967 autos have two independent braking systems, each alone capable of providing full braking power. Failure in any part of the system activates auxiliary system. The driver is informed of the situation by an indicator light on his instrument panel.

Nov. '65: Esteban Ruiz faced ruin. Then Union Carbide started the Managua Airlift.

Esteban Ruiz Garcia grows cotton in Tipitapa, Nicaragua. In a good year, his 25 acres produce about 55 bales. Enough to support Esteban, his wife, five of his children and seven of his grandchildren. Not in luxury, but in independence.

In November 1965, an invading army threatened Esteban's land. Bollworms. By the millions. Eating five times their own weight every day.

Esteban needed help, and so did his neighbors. And 2,000 miles away, Union Carbide started it moving. 50 tons of Sevin insecticide were flown to Managua. 225 tons followed by sea. Sevin saved the Nicaraguan cotton crop, as it has saved many other kinds of crops all over the world.

This wasn't the first airlift of Sevin. Often no other insecticide will do the job. Discovered by Union Carbide in 1953, Sevin takes over where DDT leaves off. It won't show up in meat or milk. And on many crops you can use it right up to the day you harvest.

Someday, Union Carbide's researchers may come up with an even better insecticide than Sevin. We never stop trying. And there's precious little we don't get into.

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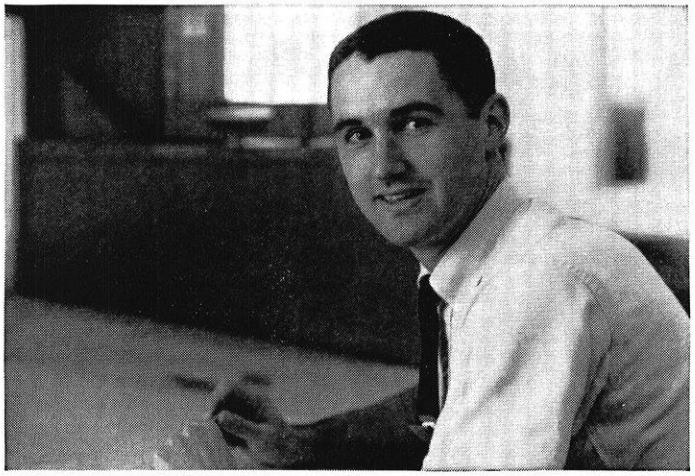
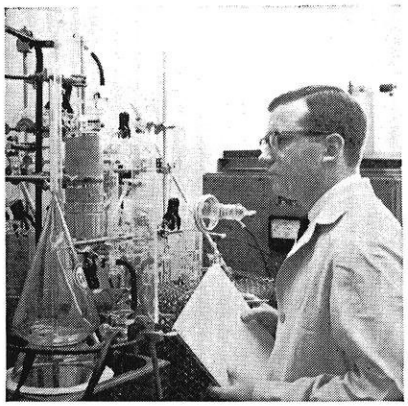


DICK FOWLER, MECHANICAL ENGINEER
M.E., University of California (Berkeley) '64

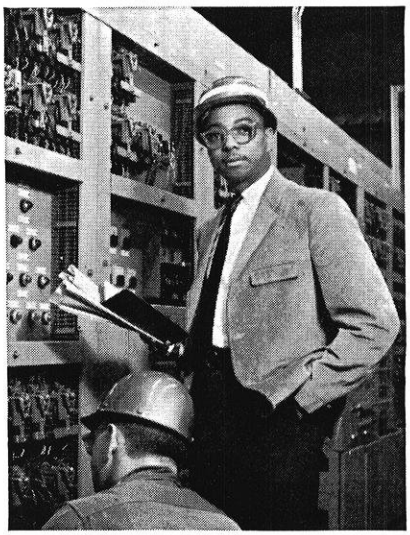
BILL RHONE, SYSTEMS ENGINEER
Ch.E., Bucknell University '63

They're on the move at Bethlehem Steel

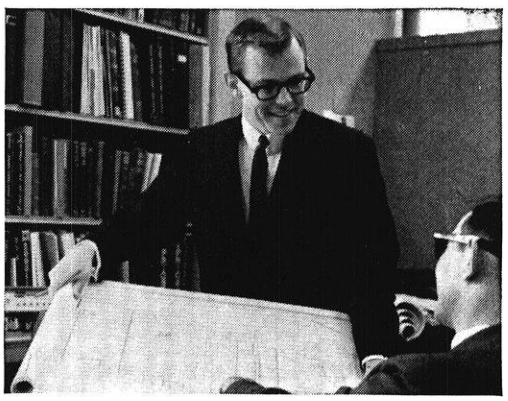
BETHLEHEM STEEL



TOM PFEIFFER, RESEARCH ENGINEER
B.S. (Physics), Villanova College '62



BOB SIMS, ELECTRICAL ENGINEER
E.E., Tennessee A & I '65



STEW EASTERBY, SALES ENGINEER
B.S.C.E., University of Mississippi; M.S., University of Missouri '64

JAKE REED, METALLURGICAL ENGINEER
Met.E., Pennsylvania State University '63

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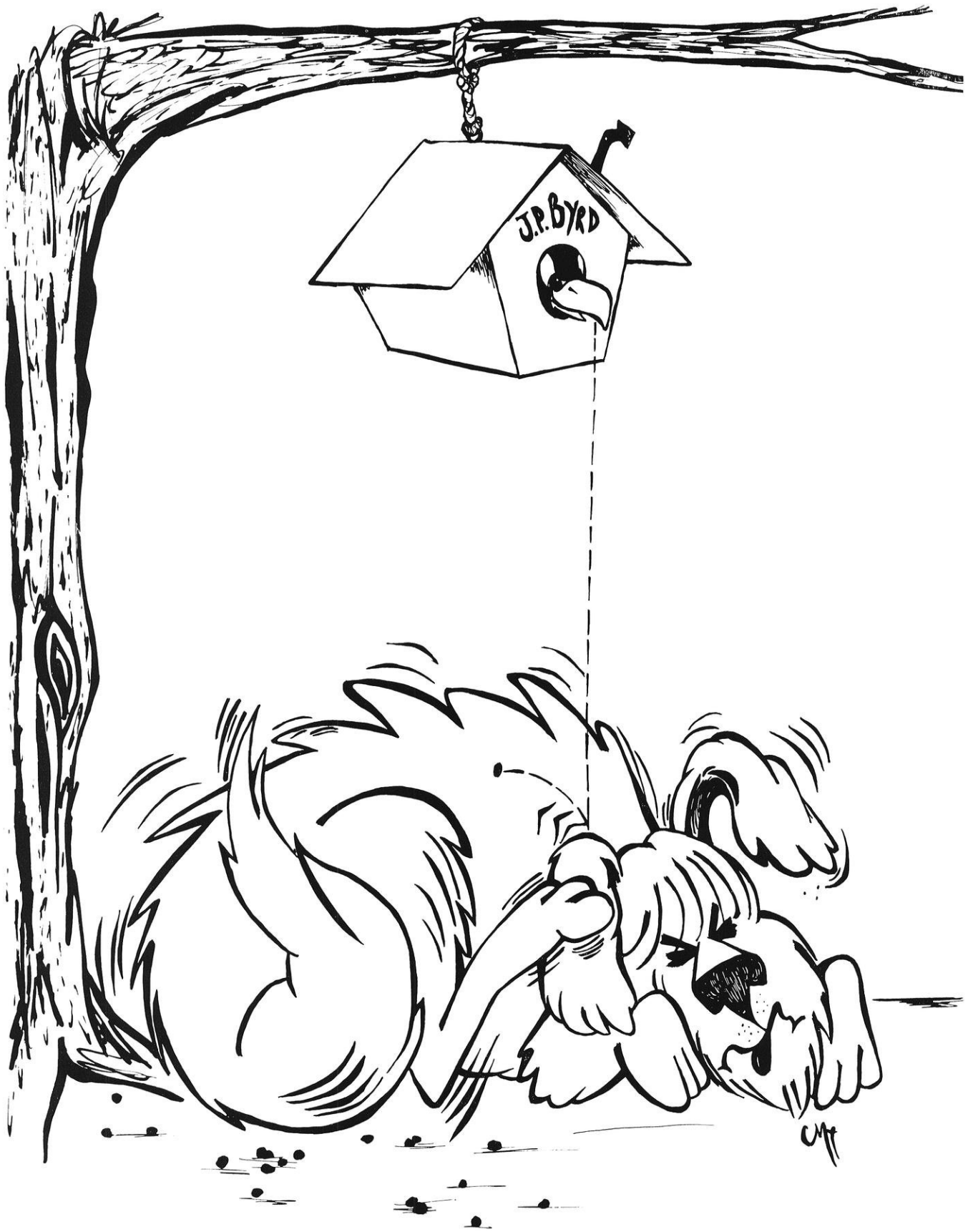


(How's your byrd?)

TEASERS:

10

THE BYRD
B.S. '69

"how's your byrd?"

With only a month before finals and all that studying to do, the Byrd sympathizes with you. Realizing how hard you readers are going to study over Christmas vacation, the Byrd has spotted some real puzzlers to relax you between study breaks.

* * *

Not wishing to add to the number of frustrated college students, the Byrd has consented to reveal the solution to one of last month's brainticklers.

* * *

Robbins is not the fireman because Robbins beat the fireman in billiards. Mr. Buckholtz is not the brakeman's neighbor because $10,000 is not exactly divisible by 3. If the brakeman's neighbor is not Mr. Buckholtz and if Mr. Finn lives in Detroit, Mr. Buckholtz must live in Chicago. The brakeman has the same last name as the Chicago passenger, so the brakeman is Buckholtz. Robbins is not the fireman so he must be the engineer.

* * *

From what *two* locations in the world is it possible to walk one mile south, one mile east, and one mile north and arrive at the place from which you started? One place is easy to find but old Sneedly wagers that you'll have to think to find the second.

* * *

That great ME, G. R. Pieterzohn was contracted to build a fence around the earth at the equator to separate the northern and southern hemispheres. His employer in this venture was the world-famous heat expert I. N. Grid. Griddy, it sems, wanted to put all the snakes in the world south of the equator and keep them there. (He had been frightened by a garter snake as a boy). G. R. designed the fence carefully, making sure it was high enough and strong enough to repel the slinky snakes.

To do the actual construction work G. R. employed William "Wild Bill" Malenski. "Wild Bill" had some truoble with figures and when he had completed the herculean task it was found that he had the fence 10 ft. too long. G. R. grrred and gnashed his teeth with disgust declaring that ten feet would have to be cut off from the fence. "Wild Bill," however, said that 10 ft. in 25,000 miles would not make any difference and claimed that the fence could be put up as it was. The Byrd was called in to settle the dispute. The question was this: How high off the ground will the fence be after it is erected, assuming it is an equal distance above the earth all the way around.

* * *

Still confused (won't those frosh ever learn) Charlie Klug set out for his Freshman Forum. When but a mere three blocks from his dorm he became hopelessly lost. He spotted three Wisconsin engineering students and stopped to ask directions. Charlie knew that only Electrical Engineers told the truth and that all other engineers always lied. Charlie wanted to find out whether any of the men were Electrical Enginers so that he could get correct directions. He asked the first man if he was an EE and got an incoherent reply, so he asked the second man what the first man had said. The second man said, "He said he's not an EE, he's a civil engineer. Whereupon the third man said that the second man was lying. Can you tell which if any of the three are EE's?

* * *

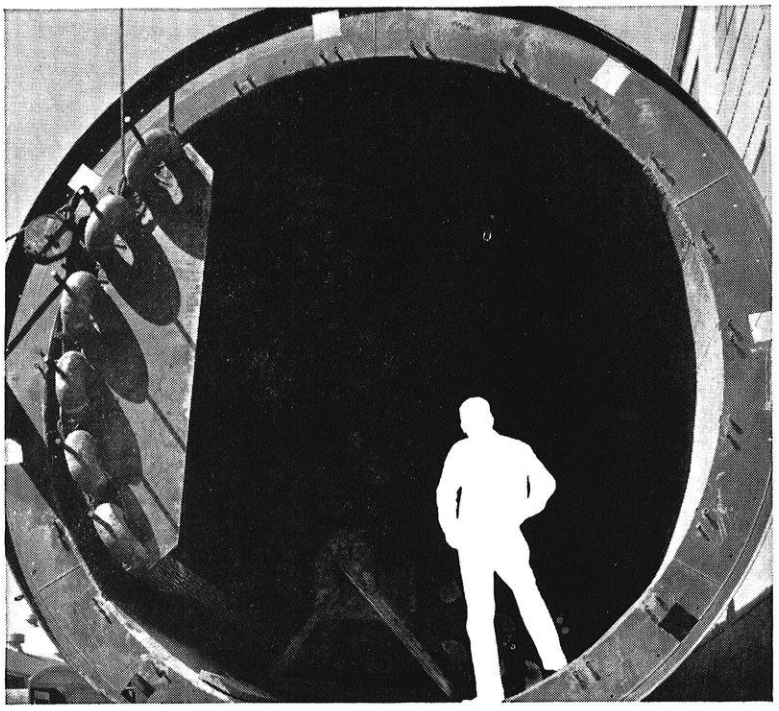
Suppose a passenger rocket leaves Earth for Planet X every day at noon. At precisely the same time a rocket leaves Planet X for Earth. Each trip lasts exactly 132 hours (six days). How many rockets from Planet X will each rocket from Earth meet? Start counting from the instant before the Earth rocket takes off until the instant after it lands on planet X.

* * *

Every Sleer is just like every other Sleer. Every Usagle is just like every other Usagle. A Usagle is 20 per cent larger than a Sleer.

One Sleer and one Usagle can combine to form something different, a Broch Gowd. However, every Broch Gowd must be surrounded with at least two Sleer and one Usagle in order to exist. These Sleers and Usagles can act as surroundants for at most two Broch Gowds.

All Jellex contain Usagles. A Jellex is smaller than a Wry Tibbit. Twenty-five Sleer can just fill a Wry Tibbit. If the contents of a Wry Tibbit are combined with the contents of a Jellex, what is the maximum number of Broch Gowds in the final mixture?



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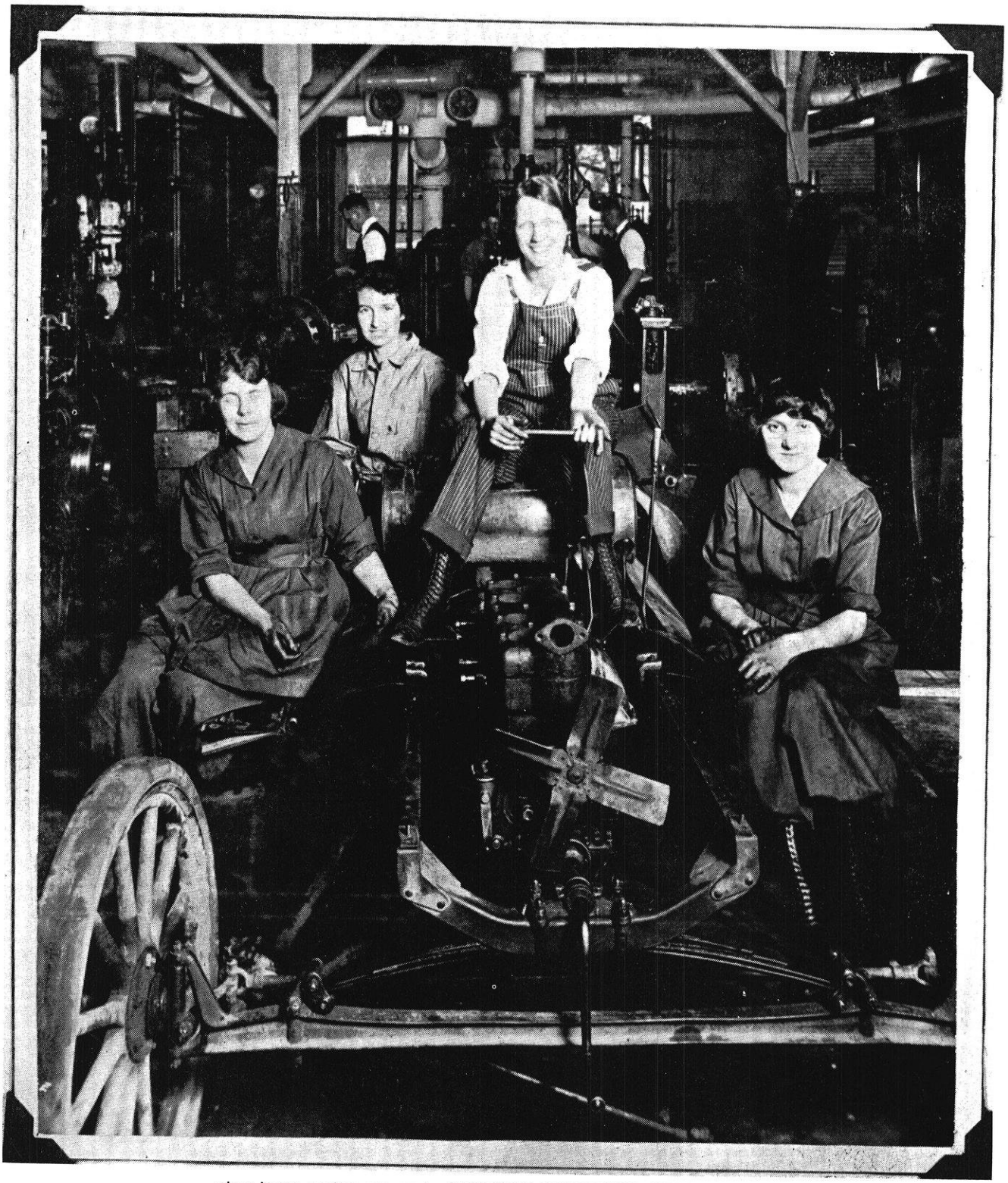
PICTORIAL:

10

wisconsin's album



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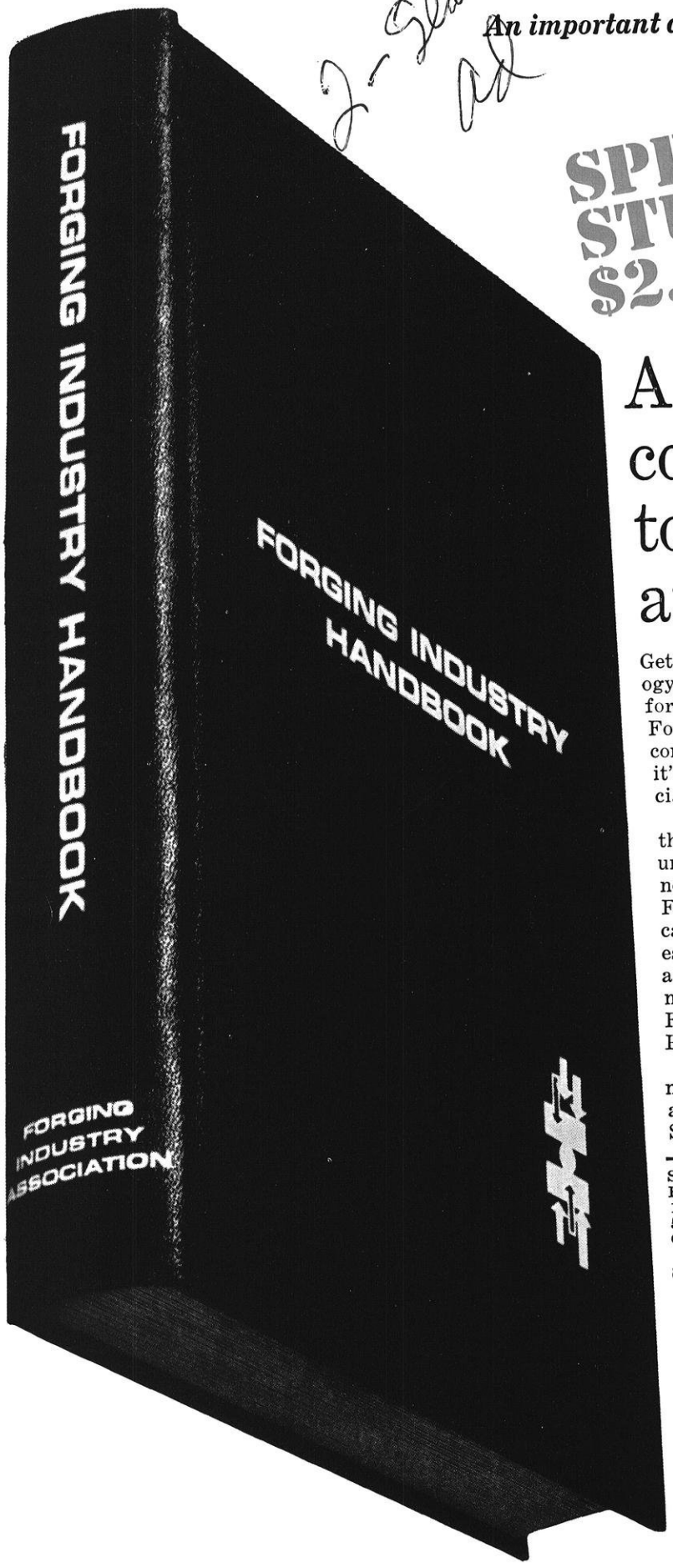

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HUMOR:

2 Pages 10

FILEABLES CONTINUED . . .

A fugitive scientist from a Boris Karloff horror picture dreamed up a serum that would bring inanimate objects to life. He surreptitiously tried it out on the statue of a great general in Central Park. Sure enough, the statue gave a quiver and a moment later the general, creaking a bit in the joints, climbed down from the pedestal. The scientist was overjoyed. . . .

"I have given you life," he exulted. "Now tell me, general, what is the first thing you are going to do with it?"

"That's easy," rasped the general, ripping a gun from his holster. "I'm going to shoot about two million pigeons."

* * *

"Beg your pardon, but aren't you an engineering student?"

"No, it's just that I couldn't find my suspenders this morning, my razor blades were gone, and a bus ran over my hat."

* * *

Dr. ..... was lecturing to his 9:00 o'clock class on the virtues of being awake.

"I've found that the best way to start a day is to exercise for five minutes after arising, breathe deeply, and finish with a cold shower. Then I feel rosy all over."

Just then a sleepy voice was heard to mutter from the back of the room. "Tell us more about Rosy."

* * *

M.E., walking up to coed: "How many drinks does it take to make you dizzy?"

Coed: "Two, and the name is Daisy."

If it's funny enough to tell, it's been told; if it hasn't been told, it's too clean; and if it's dirty enough to interest an engineer, the editor gets kicked out of school.

* * *

The liner had just sunk and one of the lifeboats was filled beyond capacity. The captain gravely announced the fact and jumped overboard himself.

Another passenger got up, said, "Vive la France," and jumped. A third said, "God save the queen," and repeated the deed. At that a burly Texan got slowly to his feet, exclaimed, "Remember the Alamo," and threw a Mexican overboard.

* * *

Here I sit and fuss and fret
While my seat is getting wet.
It's enough to make me fume;
Teacher, can't I leave the room?
Why delay me when you know
That I simply have to go?
Really teacher, I'm not feigning.
My car top's down and it is raining.

* * *

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

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

She called back, "But father, he is an engineer."

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

The teacher was explaining to the grammar school students the merits of owning a yearbook and having one's picture in it.

Years from now you can look in this annual and say, "There's Willie Jones; he's a judge now. And there's Sally White; she's a nurse. And there's . . .'"

"And there's teacher," came a voice from the back of the room. "She's dead."

* * *

Psychology Prof: "If I saw a man beating a mule with a stick and I stopped him, what would I be showing?"

Voice (from the rear of the room): "Brotherly love."

* * *

The little boy strayed away from his father at the zoo and got lost. A policeman found him, and the kid tearfully explained the situation.

"What's your father like?" asked the officer.

"Beer and women."

* * *

Give a man enough rope and he'll claim he's tied up at the office.

* * *

Lectures are like steer horns—a point here, a point there, and a lot of bull in between.

* * *

Definition of a brassiere: A garment used to minimize the effect of flutter and vibration.

During the aircraft carrier Princeton's 1958 Far East cruise, the consumption of fresh water was greater than the evaporators could keep pace with. The executive officer, trying every means to curb consumption, put the following the in plan-of-the-day:

"The U.S.S. Constitution (old Iron-Sides) as a combat vessel carried 48,600 gallons of fresh water for her crew of 475 men. This was sufficient to last six months of sustained operations. Total evaporators installed: None."

The next day the Princeton's daily news-letter quoted the statement, adding this historical note:

"On August 23, 1779, the U.S.S. Constitution set sail from Boston. She left with 475 officers and men, 48,600 gallons of fresh water, 7400 cannon shot, 11,600 rounds of black powder and 79,500 gallons of rum. Her mission—to destroy and harass English shipping.

"Making Jamaica on 6 October, she took 826 pounds of flour and 68,300 gallons of rum. Then she headed for the Azores, arriving there on 12 November. She provisioned with 550 pounds of beef and 64,300 gallons of Portuguese wine. On 18 November, she set sail for England.

In the ensuing days she defeated five British men-of-war and captured and scuttled twelve English merchant-men, salvaging only the rum. By 27 January, her powder and shot were exhausted.

"Unarmed, she made a night raid up the Firth of Clyde. Her landing party captured a whiskey distillery and transferred 40,000 gallons aboard by dawn. Then she returned home.

"U.S.S. Constitution arrived in Boston on 20 February, 1870 with no cannon, no shot, no food, no powder, no rum, no whiskey, and 48,600 gallons of stagnant water."

* * *

Prof.: "You missed 214 yesterday, didn't you?"

ME: "No, sir, not a bit."

* * *

"Tell me, sir, who was braver than Lancelot, wiser than Socrates, wittier than Mark Twain?"

"My wife's first husband."

The new watchman at the observatory was watching a professor using the big telescope. Just then a star fell.

"Begorra," he said to himself, "that fella sure is a crack shot."

* * *

A field engineer, traveling between locations, boarded the sleeper and pulled back the curtains to his berth. He was extremely surprised to find two most personable blondes ensconced there.

After checking his ticket to see that he wasn't wrong, he said, "I deeply regret this, ladies, but I am a married man . . . A man of respect and standing in my community. I couldn't afford to have any breath of scandal touch me, I'm sorry—but one of you will have to leave."

* * *

"Doctor," said the sick man, "the other doctors seem to differ from you in their diagnosis of the case."

"I know," replied the physician cheerfully, "but the postmortem will show that I was right."

* * *

Friend: What is your son going to be when he graduates?

Father: An old man.

* * *

"O.K. Moses, take out your tablet and number from one to ten, we're going to have a little quiz."

* * *

"Hello, is this the Salvation Army?"

"Yes, it is."

"Do you save bad women?"

"Yes, we do."

"Well, save me two or three for Saturday night."

* * *

Stealing a kiss may be petty larceny, but sometimes it's grand.

* * *

Beer is like the sun. It rises in the yeast and sets in the vest.

The scene is a train compartment in Hungary. The characters: A Russian officer, a Hungarian, an old lady, and an attractive girl.

The train enters a tunnel. The passengers hear first a kiss, then a vigorous slap.

The old lady thinks: "What a good girl she is, such good manners, such fine moral character!"

The girl thinks "Isn't it odd that the Russian tried to kiss the old lady and not me?"

The Russian thinks: "That Hungarian is a smart fellow; he steals a kiss and I get slapped."

The Hungarian thinks "Am I a smart fellow! I kiss the back of my hand, hit a Russian officer in the face, and get away with it."

* * *

"Say, you look like Helen Green."

"I know, but I look worse in pink."

* * *

An old Indian visited the big city the first time in his life. He entered a building and watched a little old lady step into a small room.

The doors closed behind her. Lights flashed and a dial above the door moved from one up to ten and back again. A bell tinkled. The door came open and a beautiful young girl stepped out.

Blinking in amazement, the Indian said, "Me should have brung um squaw."

* * *

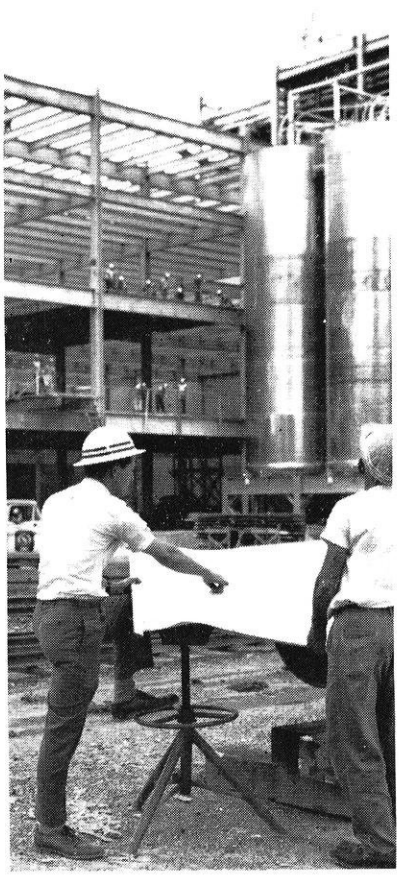
"Joshua, will you put down that blasted trumpet and fight like the rest of us."

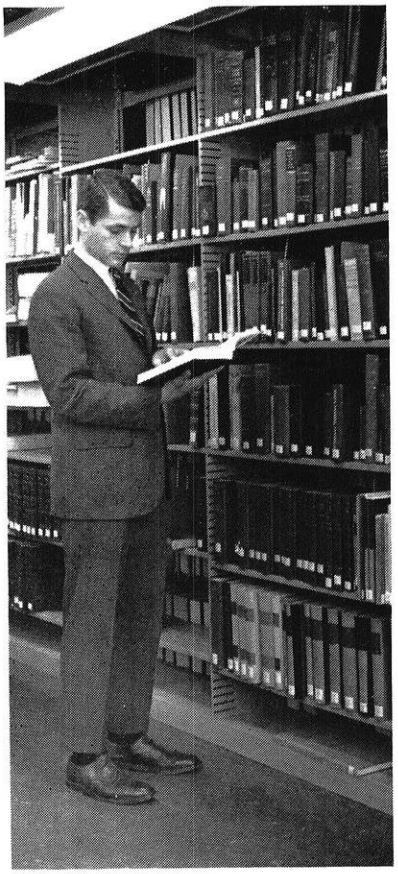
* * *

Staying at the office late to play poker with his friends, the meek little man suddenly realized it was 2 a.m. With a gleam of inspiration, he telephoned his wife and dramatically shouted: "Don't pay the ransom—I've escaped!"

* * *

Scoop! The "Daily Cardinal" gets its scoops from old issues of the "Wisconsin Engineer."





some engineers
prefer to work like this...

and some prefer it like this

—we'll promote them both

You can talk to some of our engineering bigwigs and come away with the impression that a man who has not yet forgotten everything he learned in freshman calculus is an impractical theorist and a shirker. (Your impression would be wrong. He doesn't mean that at all. Bessel functions were his meat at one time.)

Others of our boss engineers will sound as though it is no longer decent for an educated professional to look inside a reactor personally. (He neglects to tell you how hard it was to give up a grand time as an apprentice steamfitter to enter college.)

Observe, then, that both of these types have risen to bigwigdom. It takes all kinds to run an outfit like ours. The chap who applies new directions in the solid state theory of catalysts to knock a nickel off the tankwagon price of a monomer deserves reward comparable to that of the grimy one who cuts a plant's downtime in half by relocating the filters so that the pump motors quit burning out.

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