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wisconsin engineer

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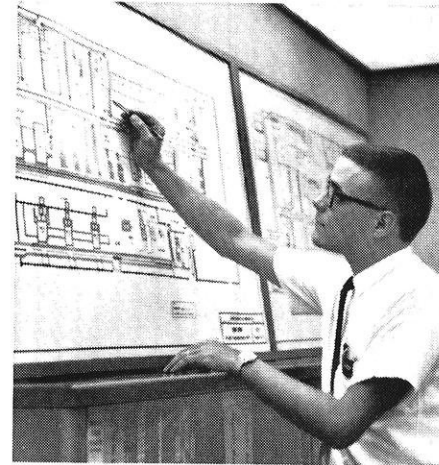
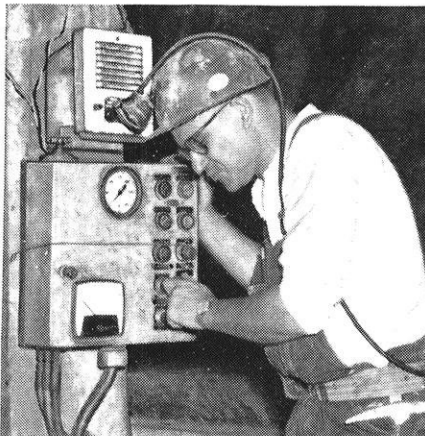
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Top: LUIS LOZANO (BS Met. E., Brooklyn Poly. '61) is research metallurgist at Anaconda American Brass Company's research and technical center.



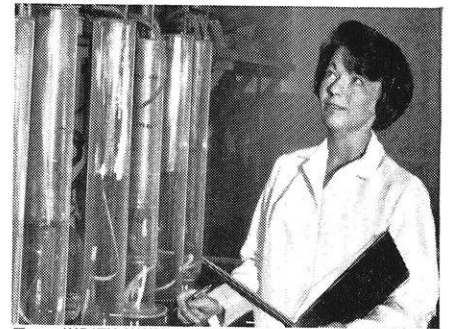
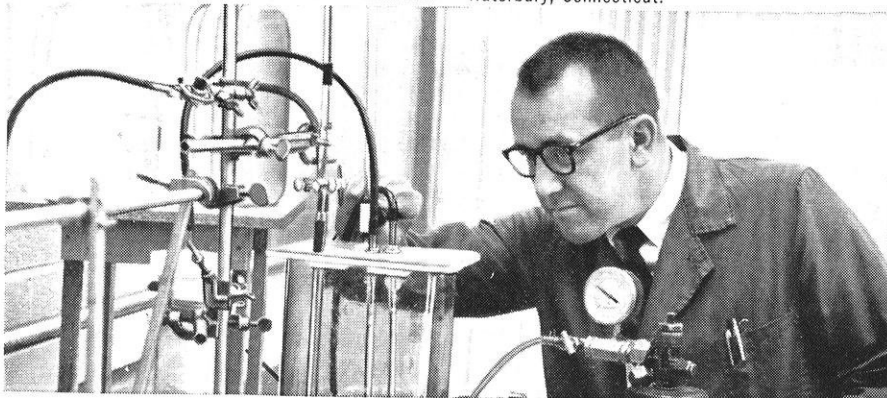
Top: GEOFFREY IRELAND (BSME, U. of Louisville '63) is assistant plant engineer at Louisville works of Anaconda Aluminum Company.

Below: ROBERT SWIRBUL (BS Bus. Ad., U. of Tampa '58), center, district manager of Dallas sales office of Anaconda Wire and Cable Company, reviews cable specifications with power utility personnel.

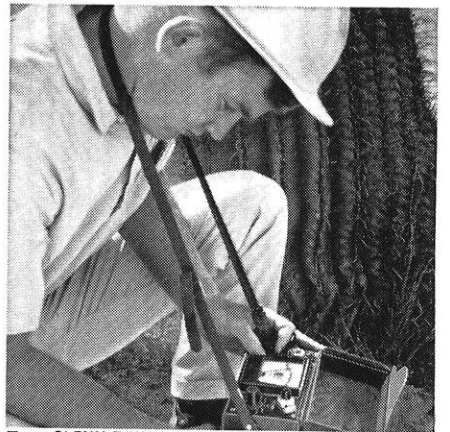


Left: PETRUS DUTOIT (BS Mining Engrg., Montana Tech., '56), mining engineer, at the controls of a raise boring machine in the Mountain Con mine. This mine has the latest in underground mining equipment.

Below: LAWRENCE KENAUSIS (BS Chem., Holy Cross '53; MS Chem., Boston College '55; PhD Chem., U. of Penn. '61) is senior research metallurgist at Anaconda research and technical center in Waterbury, Connecticut.

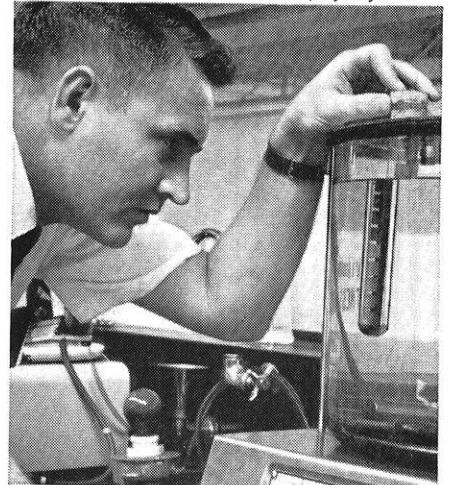


Top: JUDITH HIHNALA (BS Bact., Montana State '63) studies bacterial leaching of copper and zinc ore and concentrates in extractive metallurgical research laboratory.



Top: GLENN ZINN (BS Geol. E., Mich Tech. '66), geophysicist with the geophysical department's southwest office in Tucson, Arizona, is studying toward a master's degree in geophysics at University of Arizona.

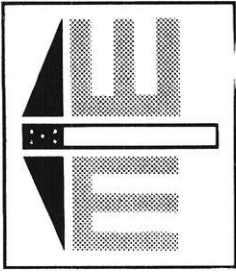
Below: FRANKLIN ANDREWS (BS Math., Northern Ill U. '62), manager—quality assurance at Sycamore plant of Anaconda Wire and Cable Company, checks environmental stress crack test of polyethylene.



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

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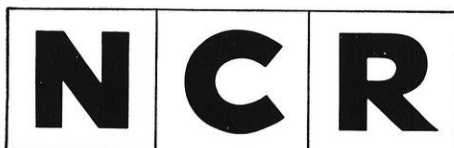
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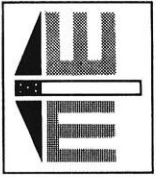
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THE SYNTHETIC DIAMOND

AUTHOR UNKNOWN

THE recent production of the synthetic diamond culminated over a hundred years of attempts, some of which claimed to be successful. It is not surprising that the history of science is full of attempts to convert graphite—a form of carbon, worth a few cents a pound—to diamond, worth thousands of dollars a pound. However, a countless number of investigators over the years have learned, to their own dismay, that mother nature did not intend to have one of her greatest achievements easily accomplished by man.

The object of this article is to give the reader a general knowledge of the production of diamonds. The factors that are concerned with the production, such as high temperature and high pressure and the crystalline structure, will be discussed as well as the many methods of production that are possible.

HISTORY OF SYNTHETIC DIAMOND ATTEMPTS

It is of interest to survey some of the highlights of the history of the long endeavor to manufacture diamonds. Those engaged in it have ranged from first-rate scientists to down-right muckers and charlatans. The dream has generated extensive literature in technical journals, and many accounts in the popular press based on rumors later proved false.

The beginning of a foundation

for scientific attack on the problem was laid in 1797, when the Englishman, Smithson Tennant, showed that diamond is a form of elementary carbon. This may be proved by burning diamond in an atmosphere of pure oxygen: it burns to carbon dioxide with no residue.

J. B. Hannay

One of the most discussed earlier attempts to make diamonds was by J. B. Hannay. He mixed hydrocarbons, bone oil and lithium, sealed the mixture in a wrought iron tube and heated it to redness in a forge. All but three of 80 tubes exploded. The pressure inside was no more than one or two atmospheres. In the residue of the unexploded tubes it was said that diamonds of density of 3.5 were found. The claim was accepted at its face value, but subsequent attempts by a number of other experimenters failed to reproduce the results.

Claim is doubted. The matter of the Hannay diamonds was reopened in 1943, by the discovery, in a forgotten corner of the British Museum, of a small exhibit labeled "Hannay's diamonds." They were analyzed with X-rays by F. D. Bannister and Kathleen Lousdale and found to be diamonds, and of a somewhat rare type at that. On the theory that it was unlikely that diamonds fraudulently inserted would be of this type, the claim

might have been genuine, but there were also known instances of bad faith on Hannay's part. With no positive answer, the claim can not be proven false.

Henri Moissan

In 1890, Henri Moissan made a major attempt by dissolving large quantities of carbon in cast iron. He heated the crucible containing the carbon and cast iron to a white hot temperature and plunged it into water. The metal on the outside cooled and solidified first and put pressure on the contents in the middle by contracting. It is now known that the pressure developed could not have been high enough. After it cooled, the contents were dissolved by acid and other chemical methods. There was a small residue left that Moissan claimed to be diamond. It could not be proven conclusively because of the small quantity left.

Claim was refuted. Although Moissan said the residue was diamond, most people claimed it was not because the pressure was not high enough. It turned out later, according to P. W. Bridgeman, Moissan had been the victim of fraud by one of his assistants. It was said that one of his assistants had introduced diamond fragments into the crucible in order to please the "Old Man."

Willard Gibbs

At the turn of the 19th century, Willard Gibbs worked on the

thermodynamic theory of the problem. He made it possible to say, theoretically, under what conditions carbon might take the form of diamond in preference to graphite. Gibbs' studies made it clear that graphite could not turn into diamond unless the thermodynamic potential of diamond was less than that of graphite. He showed how to calculate the potential in terms of the specific heat, the thermal expansion, and other properties of materials.

Practical application. However, there was a catch when it came to using these considerations to predict what will actually happen. Although we can tell when a transformation can occur, we can not tell whether or not a transformation will occur. The mathematical expression for the thermodynamic potential showed that when the pressure was raised to 20,000 atms, graphite would transfer to diamond even at ordinary temperatures. It has now been shown by experimental evidence that there must be a high temperature applied also.

General Electric's Success

In 1941, General Electric, the Carburundum Company, and Norton Company agreed on a five year combined experiment to solve the problems of producing synthetic diamonds. They constructed apparatus and used values for temperature that were never before used.

First attempt. On their first attempt, the graphite was heated outside the press to 3,000 degrees C and then quickly put into a hydraulic press capable of pressures of 30,000 atms. The technique had to be changed because the graphite cooled too much before it was put in the press. 3,000 degrees C was then tried, but still there was no success, and it was thought that the pressure was not high enough. At this time the five year agreement had terminated.

General Electric's success. In 1951, General Electric, alone, tried again. It was found, theoretically, that the transformation rate would probably not change as simply as had been thought, so the estimate of the pressure required had to be revised upward. Four years later, physicists F. P. Bundy, H. T. Hall,

H. M. Strong, and Robert Wentorf were successful in producing the first authentic synthetic diamond. A detailed description of the process will be given in the section on methods of production.

FACTORS CONCERNED WITH DIAMOND PRODUCTION

The task of converting graphite to diamond is, in concept, simple. Diamond is composed of precisely the same carbon atoms that have been squeezed together to achieve substantially uniform inter-atomic distances. Theoretically, the task is simple, but tremendous pressures and temperature must be exerted to achieve this.

Pressure

High pressure research has revealed that very high pressures have to be used to compress the graphite structure. Theoretical calculations using the principle of thermodynamic potential revealed that pressure of 20,000 atms would change graphite into diamond. However, the lowest pressure ever used was 35,000 atms, and this was used with tantalum as a catalyst. General Electric used about 100,000 atms when they manufactured diamonds without a catalyst.

Temperature

A minimum of 2,000 degrees C is thought to be the lower limit for the graphite to diamond transformation, although synthetic diamonds were produced at 1,600 degrees C, with the use of a catalyst. The method of production General Electric uses now utilizes a temperature of about 5,000 degrees C.

Time

Various amounts of time have been used, from split seconds to many hours. Using the explosion methods the high temperature and pressure were obtained for a fraction of a second. With the use of a catalyst, General Electric made synthetic diamonds in ten minutes. Without the catalyst several hours are needed.

EXPLANATION OF THE DIAMOND STRUCTURE

Graphite can be transformed into diamond with the compression of its atomic arrangement. But countless investigators have

learned, to their agonizing dismay, mother nature did not intend her own achievement—probably performed at unexplored depths far below the surface of the earth—to be easily accomplished by man.

Structure

The diamond has a density of 3.51, against 2.25 for graphite. Modern X-ray analysis has disclosed the reason for the difference of density and structure. The main difference is between layers of atoms; in diamond it is 1.42 Å while in graphite it is 3.4 Å.

Diamond. Carbon has six electrons—two in the "K" shell and four in the unfilled "L" shell. Because the "L" shell is not full, carbon can form homopolar (covalent) bonds with other carbon atoms. This is what happens in the diamond crystal. Each carbon atom shares its four electrons in the "L" shell with four other atoms. Therefore, diamond crystallizes in a cubic system, with each atom symmetrically surrounded by four others, all at the same distances, arranged at the corners of a regular tetrahedron. It is the even distribution of bonds in space, together with the strength of the pure covalent bond, that gives diamond its great hardness and perfect crystalline structure.

Carbon. Graphite crystallizes in the hexagonal system with the atoms arranged in alternate networks, so that the repeat distance is twice the layer distance as shown in the preceding figure. The atoms are arranged in a honeycomb-like manner so that each carbon atom is linked to three others. The binding of the atoms in these sheets is stronger than if there were only one covalent bond between each pair of atoms. This extra binding results from the effect of the electron which forms the fourth homopolar bond in diamond. These extra electrons serve as a general binding, holding the rings closer together, and so they cannot be attributed to any one pair of atoms in particular. The only great difference between the diamond and the graphite structure is the distance between the layers of atoms. This distance is comparatively large in graphite, and the graphite owes its lubricating properties to

the slippage of one layer over another. The only forces between the layers are weak Van der Waals forces, due to dipoles caused by the random movement of the electrons.

METHODS OF PRODUCTION

Throughout the search for the synthetic diamond, all conceivable methods have been tried. The use of huge hydraulic presses and instantaneous very high temperatures seem to produce the diamonds most efficiently.

Solidification of Molten Graphite

The solidification of molten graphite to make diamonds has been tried, but it was never successful. Some scientists were convinced that if graphite could be melted, it would solidify to diamond. The reason for this conviction is not easy to see; it is because graphite is hard to melt at atmospheric pressure. Graphite, when heated, passes directly from the solid state to the gaseous phase without melting, just so solidified carbon dioxide does. It has been learned that great pressures have to be exerted to accomplish the transformation.

Explosive Method

Many attempts were made by using the explosive or dynamic shock technique. They were all based on very high temperatures and pressures over a period of only a few millionths of a second. These methods were never very successful because, with the time so short, tremendously high pressures had to be available.

Use of Catalyst

Catalysts have almost always been used in the non-explosive methods of production. The types of catalyst have been quite varied—from lithium and metallic oxides to tantalum and nickel. The catalyst is used as a stepping stone in the transformation from graphite to diamond. The catalyst speeds up the production and lowers the required amounts of temperature, pressure and time.

In 1955 General Electric was successful in producing synthetic diamond, for the first time on a large scale.

Equipment. The conditions of extremely high pressure and temperature required the use of a particularly well designed "melting furnace" made from selected materials. In the process, only part of the pressure is generated by means of a high pressure press, the rest being achieved by raising the temperature of the mass to be melted.

Belt-Press. The high temperature and pressure apparatus may be compared in principle to an autoclave, which is an apparatus using superheated steam under pressure. The cavity receiving the graphite is formed in three parts made from a special carbon steel. One of these parts consists of an annular pressure chamber surrounded by steel belts formed of rings—from which it gets the name Belt-Press. The remaining two parts are fitted anvils, which form bottom and roof of the cavity or recess. The latter, thus, represents a saucer of a few centimeters, which is provided with efficient thermal insulation as a protection against the hot molten sample.

Insulation material. In the initial stages of development, considerable difficulty was experienced in finding a suitable insulating material, but finally a material called pyrophyllite provided the ideal solution. The substance was not only an excellent thermal and electrical insulator, even when at extreme temperature, but was also a good sealing agent for the joints between the pressure chamber and the closing anvil. Heat protection was needed because operating temperature was near 5,000 degrees C.

Operation. A small cylinder of graphite is inserted into the middle of the belt and in between the two anvils. This assembly is subjected to high pressure by means of hydraulic press and heated by means of an electric current. Although refractory materials are used to surround the graphite specimens, the temperature reached is so high the transient heating is used to minimize melting of the wall materials. The electric current is provided by a large electrolytic capacitor. Because of the transient effect of the capacitor,

the material is subjected to heat for only a few fractions of a second.

A few points should be made concerning the value of the diamond and some of its uses. Diamond has only one unique property—hardness—and this property is fundamental to its industrial usage, as well as its usefulness as a gem.

Abrasives and Cutting Tools

The usefulness of the industrial diamond reduces, in most cases, to its ability to retain sharp corners under conditions of wear. Diamond wheels are used to cut the hardest and strongest metals and alloys. Diamond drills are used for cutting through rock in oil drilling.

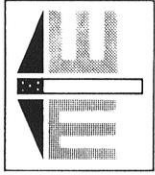
For some purposes, it is desirable to produce friable crystals, so that fresh cutting surfaces will be exposed during use. For other purposes the ideal crystal would be an octahedron of the correct size. The man-made diamond has certain advantages over the natural diamond because it can be grown under controlled conditions to get certain properties.

Importance of the uses. Industrial usefulness of hard and strong materials depend upon the availability of diamond for cutting these materials during manufacture. With the production of synthetic diamonds, America, for the first time, has become an independent source of industrial diamonds—a material which is very important to the industrial economy and is absolutely vital in key defense industries. The assurance of a steady supply of industrial diamonds has also encouraged broader uses in these areas.

Super Diamond

Theoretically speaking, it is possible to achieve a far harder substance than diamond. Diamond is arranged in the unit crystal with a packing factor of 8—the packing factor is the number of equidistant neighbors. If the packing factor could be increased to 12, the highest number possible, by pushing the carbon atoms still closer together, a new substance could be made that would possess qualities that would surpass those of diamond.





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I am confident that both you and I fully realize what this present "jet age" has contributed to the moral decay of increasing numbers of our youth, i.e., movies, television, music and fashions.

Indications all point to a very possible, 20th Century, "Sodom and Gomorrah."

We must never permit this to happen . . . NEVER . . . NEVER!

What can be done???

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As an incentive to our youth, as something to be proud of, and look up to, we are founding a "NO SEX BEFORE MARRIAGE" club, and furnishing, for the small sum of \$1.00, a lovely certificate, 8 by 11 and suitable for framing, showing membership in this club, with his or her name, or the name of a group, organization, etc., inscribed thereon. In addition, we are also furnishing buttons, and wallet size cards.

We are parents ourselves, and we regret the charge of \$1.00, yet this is necessary to cover the costs of printing, postage and handling.

We desire nothing for ourselves; save the realization that perhaps our small effort will, in some way, help guide our youth on the only true path to happiness and salvation . . . the path of righteousness.

As I stated above, these certificates, we think, are very lovely, and in addition to greatly aiding one's self in time of trial and temptation, you might as a special project, purchase these certificates in volume, and distribute them among many, for whatever amount you would decide upon, giving the proceeds to your favorite charity.

Please let us hear from you. (You may send cash, check, or money order.)

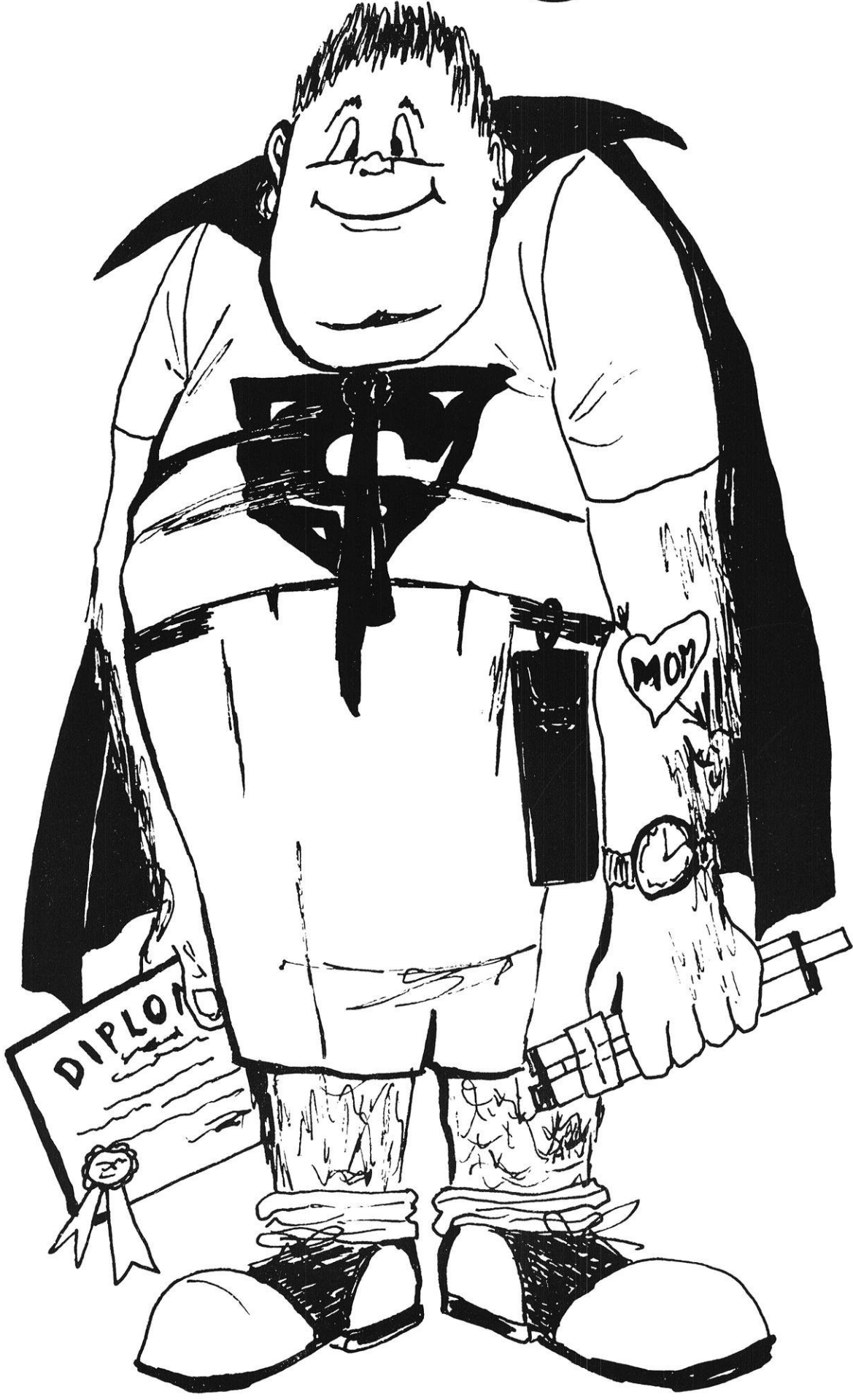
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It's trade-in time for tired old myths.

Like the one about business. Especially big business. That it is beyond the rugged individualist's wildest daydream to enter this holy of holies because he'll lose something that's very sacred — like his independence.

Sure, it can happen. If a guy or gal *wants* to hide, or just get by, or not accept responsibility, or challenges.

We're not omniscient enough or stupid enough to speak for all business, but at a company like Western Electric, bright ideas are not only welcome, they are encouraged. And no door is shut. Create a little stir, go ahead, upset an old appletart (we replace shibboleths at a terrific pace — we have to as manufacturing and supply unit of the Bell System — in order to provide your Bell telephone company with equipment it needs to serve you.)

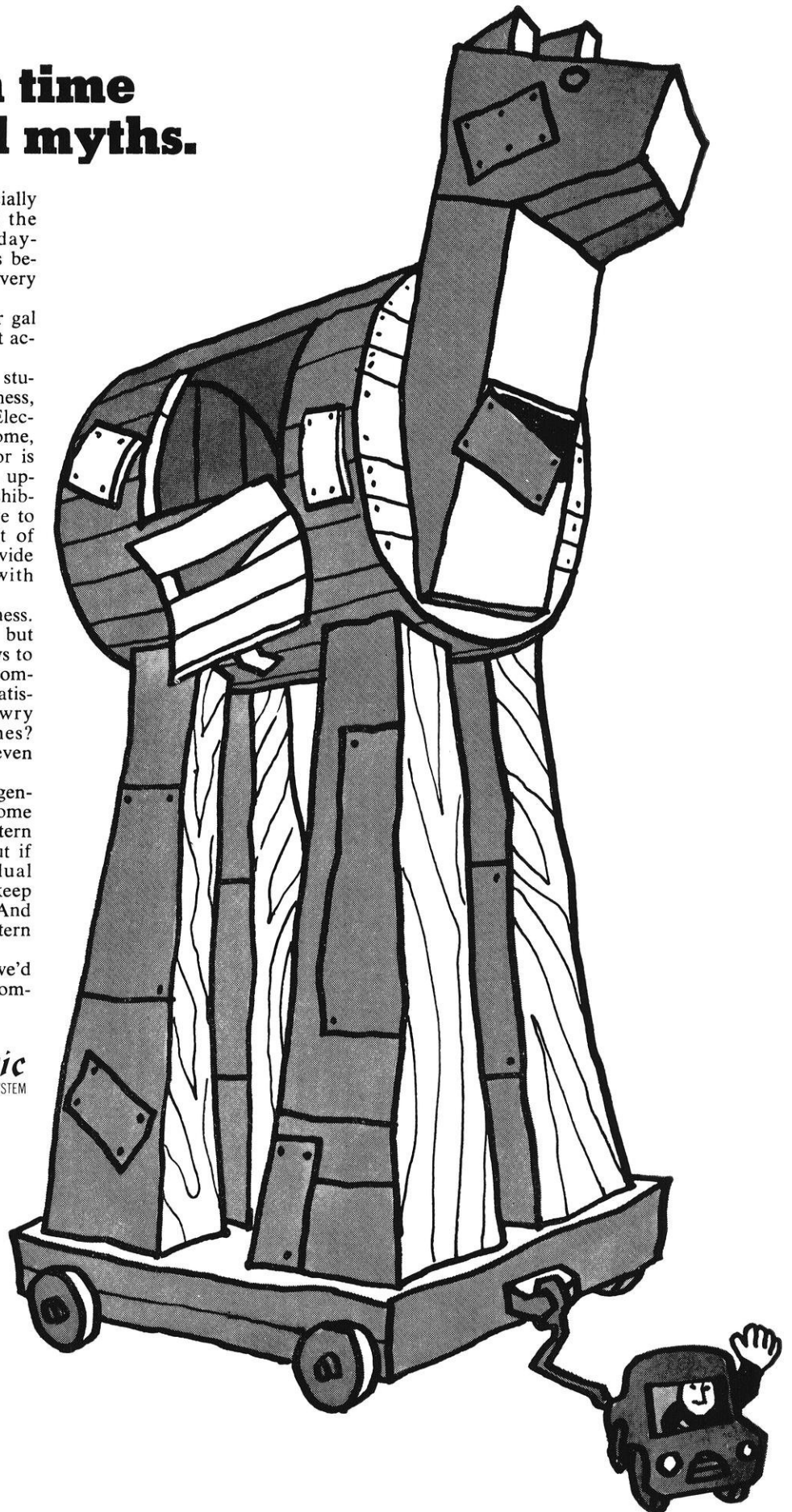
There's an excitement in business. True, we're in it to make a profit, but working to find new and better ways to make things that help people communicate is very rewarding and satisfying. Did you ever hear these wry words of Oliver Wendell Holmes? "Never trust a generality — not even this one."

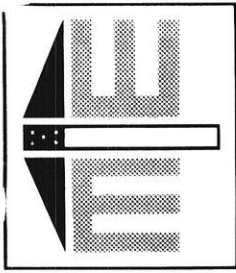
That's how we feel about the generality that claims you'll just become a little cog in a company like Western Electric. You *might*, of course, but if you consider yourself an individual *now*, odds are 10 to 1 that you'll keep your individuality. And cherish it. And watch it grow. Even at big, big Western Electric.

You know, that's the only way we'd want you to feel. If you feel like coming in with us.



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Licenses	19

SUPER engineer

BUNG STARTERS

Bloody Mary	keeper of the sugar cubes
Bob Smith	ex-head cretin
Chug it Malotke	ass't drunk and keg tapper
Super Shell	wizard
Mother	Abby Trueblood
Doug Dang Doodles	scribbler
"ATJ" Swerdlowe	New York influence
Suhm Zoom	Carthusian Monk
Gary Mueller	Larry
Action Al	Moe
Little Richard	Curly
Chris Peterson	She

BAGMEN

Richard Friede	veri dead richerf
Wonderful White Winged Wade	crime and/or evil dept.
The Incredible D. C.	cosa nostra torpedo
Normal Fraternalizer	playboy representative

BABYSITTERS

Georgy Boy Seal	top growl
Papa San Schweby Baby	bottle warmer
Trucks Mac	big wheel
Papa San Dicky H.	big bird
Chuck Fish	kingfish
Wayne Picket Stopper	diaper changer
C. A. Rannos	sandal dept.
R. Essssssss	paint dept.

Dear Mom,

mom in her
working clothes



The following questions have drifted into my office throughout the year, and now, acting with the very kind help of fellow staff members, I will attempt to give my profound advice to all those frustrated people who wrote in.—A.T.

Q.—Whenever my fiance and I are at a party together and he gets drunk, he always ends up “moon-ing” the guests. I find this very embarrassing, and he is always very apologetic about it, but I wish that he would break this habit. What should I do about it?

A.—Mooning isn’t bad—everyone should have the experience of either doing it or being on the receiving end. It is, however, unfortunate if one happens to fall out of a second story window while doing it and then end up pressing ham on the people below (may be considered a pun—not the first, but I didn’t tell you about the rest of them—you might check though—some of them are filthy). My advice to you is that since mooning is a sign of frustration, you would be wise to relieve his anxieties in other ways, like giving him a life subscription to Playboy.

Q.—The girl I have been dating and I are both skin-diving enthusiasts. We have had several dates of a skin-diving nature and I have been perplexed as to whether or not I am expected to help my date in and out of her wetsuit. Does etiquette require that I do this, or am I right in assuming that she can do it herself?

A.—Your question is an interesting one. Emily Post has nothing to say on the matter, mainly because she is a little behind the times and probably never heard of a wetsuit, or perhaps she thinks it is used to keep baby’s crib dry. We did, however, consult with such authorities as Esqueer, Playbuoy, Saturday Evening Polack, and Mc Call’s, and we reached the following conclusion: You are not required to help your date with her wetsuit, but you may do so and benefit from it. Think of it as an educational matter—especially the helping her off with the wetsuit—and who knows what may develop from it?

Q.—Can you give me the recipe for an exciting new drink, guaranteed to get my date drunk fast?

A.—The following recipe is one that my husband and I are both fond of . . . as a matter of fact, that’s how we got engaged and, I think, why we have seven and five-ninths healthy children. The recipe is as follows: 2-3 gallons of cheap (under \$2.00) wine, grain alcohol (the kind that medical students sell is the best), a fifth each of brandy, bourbon, vodka, gin, and vermouth, and one small can of grapefruit drink. The recipe can be increased for parties of more than two.

Q.—To what does the term “fire up” refer? It sounded like a proposition to me, but, judging by the slap I got, I guess it wasn’t.

A.—"Fire up" is an esoteric term, commonly used in the great midwestern area of our country. It simply means to have some drinks to loosen you up and, depending upon how many drinks you give your date, "fire up" can give all sorts of interesting secondary meanings.

Q.—Whenever my date and I ride on my scooter, my hands get cold. What should I do?

A.—Switch off every once in awhile and let her drive. Then you can warm your hands and let her do the driving—and it could do a lot for your drive!

Q.—What is the acceptable method for picking up a woman in a bar?

A.—This is a hard one to answer because it really depends on the bar. Answers range from "by the handles" (an in-joke) to "with a front end loader", if you happen to be in the Three Bells (also an in-joke, but harder for the out of staters to grasp).

Q.—My fifteen year old daughter recently asked me about the most effective means of birth control. While there is really no doubt in my mind that she isn't planning on using it herself, I do worry. Do you think that I should ask her for the facts or let it go?

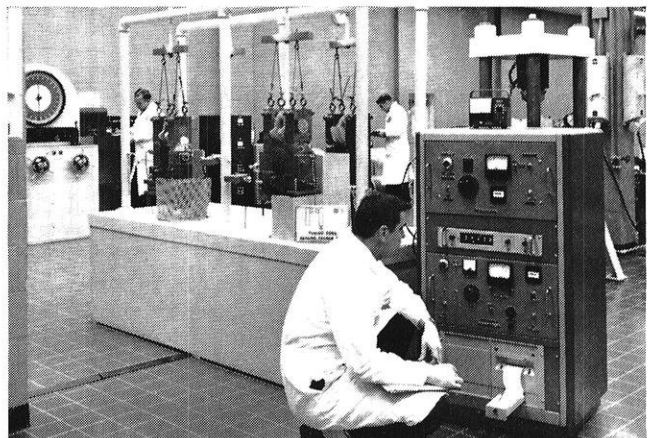
A.—Frankly, you have more confidence in your daughter than I do. Unless you want a grandchild before you were expecting one, I would suggest that you give her the word on birth control. If, however, she is a member of the Pepsi generation, your advice will not be necessary (I'm loaded with in-jokes today). (Pepsi, by the way, comes with applicator—economical!)

Q.—My girlfriend and I are planning on getting married this summer after living together for two years. Everyone we know well knows this, and we have made no attempt to hide the fact. However, my fiancée is now insisting upon wearing white at the wedding. I say that this is absurd. What do you think?

A.—To keep peace in the family, we suggest that you let your bride wear white. After all—did you get the pun in the beginning?—tradition is tradition. Think of it this way: she has never been married before.

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.

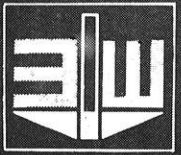
Take a hard look at a career in the Malleable castings industry. Malleable foundries are of a size where you will have the opportunity to put your top skills to use almost immediately. It's a growing industry,

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.

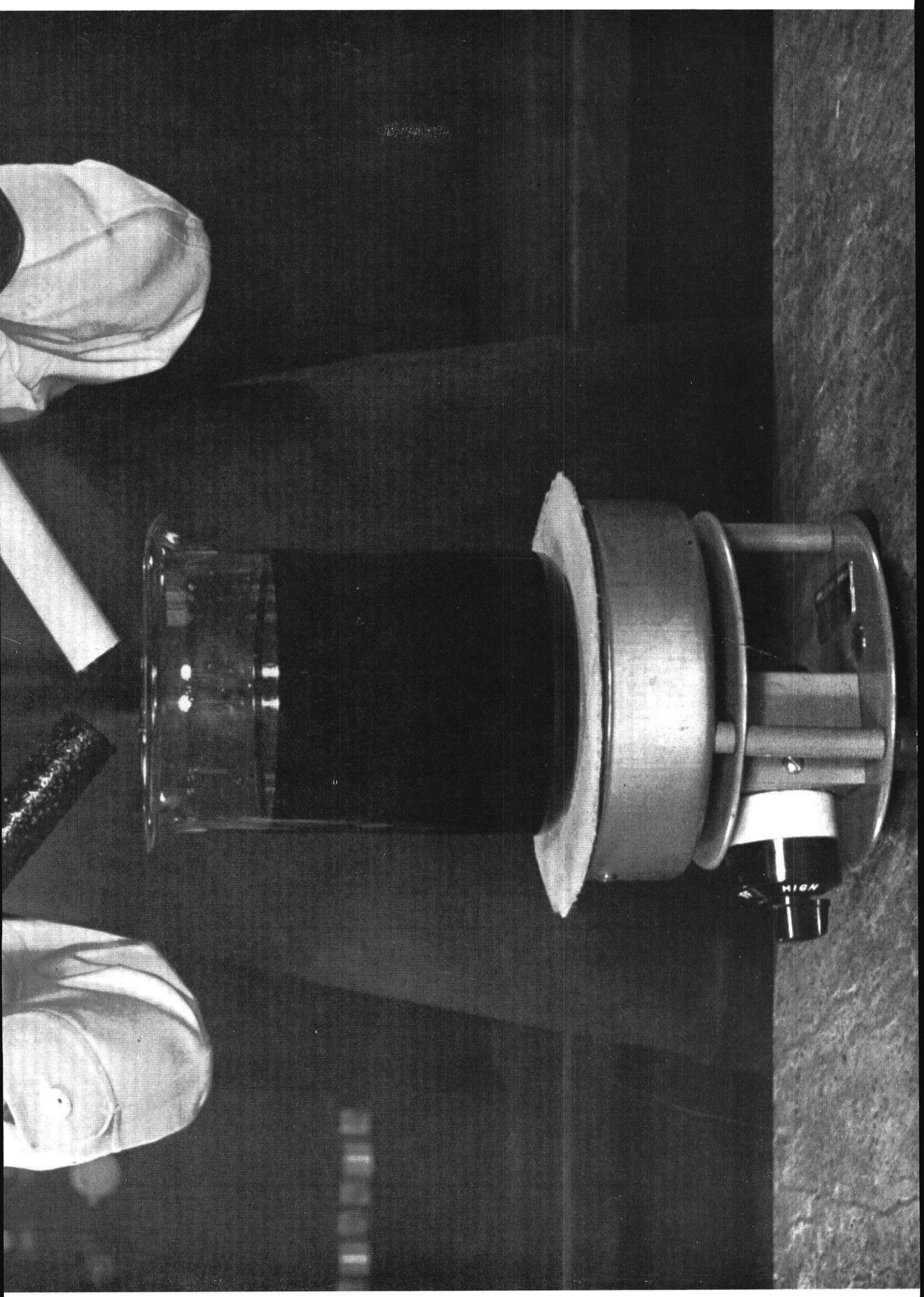
MALLEABLE FOUNDERS SOCIETY • UNION COMMERCE BUILDING
CLEVELAND, OHIO 44115





HANG-UP OF THE MONTH





**Welcome
to the cold,
cruel world.**

Of course, if your father's a millionaire, or you're about to marry an heiress, then you have no problems. But, if not, then there's only one sensible thing to do. Come to work at Allison Division of General Motors.

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There's more. And you can be part of it. Take your time. Check them all. But don't forget Allison. Remember: life can be beautiful . . . even without an heiress.

For the complete story, send for Allison's new brochure: Destination Tomorrow. Write Ken Friedlein, Scientific Placement, Dept. 400, Allison Division of General Motors, Indianapolis, Indiana 46206.



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LICENSES

CHARGE-A-DATE PLAN, MEMBERSHIP CLUB
 PLAY NOW **Call Girl Credit Card** SIGN
 - PAY - AND -
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-----	--------	---------	---------	----------

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LICENSE NUMBER
 20-20 4U 2C
 The Bureau Already Has Your Number. But We've Assigned This One To You Anyway!

BULLSHIPPING LICENSE

NAME _____
 ADDRESS _____ PRINT IN FULL
 CITY _____ STATE _____

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DATE ISSUED 1960-70 ISSUED BY: *Lotta Tonnoro*
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LICENSE NUMBER
 13
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SPECIAL LICENSE
 To "Take Out The Garbage"

NAME _____
 HAS APPEARED BEFORE A SPECIAL BOARD OF IN-LAWS AND QUALIFIED FAMILY MEMBERS AND HAS ON THIS DATE _____
 BEEN DEEMED QUALIFIED FOR THIS SPECIAL LICENSE

PLACE PHOTOGRAPH HERE

Owner of this license promises to perform duties regularly and never to drop one stinkin' piece of garbage on the floor!

Not Valid Unless Signed

STATE OF NERVOUSNESS DEPARTMENT OF FIDGETS BUREAU OF NUISANCES

LICENSE NUMBER
 THE COMMISSIONER ALREADY HAS YOUR NUMBER

BACK SEAT DRIVER'S LICENSE

EXPIRES WHEN REGULAR DRIVER'S LICENSE IS ISSUED
 SPACES BELOW TO BE FILLED IN BY APPLICANT

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City or Post Office _____ Zone No. _____ State _____

Sign Your Name in Full—Not Initials

This is to certify that the person herein named has passed all tests for nervousness and has been licensed to irritate, annoy, criticize, and otherwise disturb the operator of the car.

G. Izzy Nervous
 Commissioner of Jalopies

Twenty-five hundred dollars in cash awards to engineering and metallurgy students.

The Forging Industry Educational and Research Foundation announces a \$2,500 award competition for the best paper on the subject "How Mechanical and Physical Properties of Impression Die Forgings Are Best Utilized in Designing Forgings for New Applications." First prize, \$1,000, plus eight other awards totaling \$1,500.

Competition is open to senior and graduate engineering and metallurgy students. Length of the paper, 3,000 to 3,500 words. Deadline for completed paper: May 10, 1967.

Winner and his faculty advisor will also receive an all-expense-paid trip to White Sulphur Springs, West Virginia, where the award presentation will be made at the 1967 meeting of the Foundation.

For full details fill in and mail the coupon or write:

The President

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New hardbound 520-page *FORGING INDUSTRY HANDBOOK*, describing forging design, applications and technology, is available to students at special low price of \$2.50. Write, enclosing check or money order, to Forging Industry Association, 55 Public Square, Cleveland, Ohio 44113.



16-millimeter sound and color film, *TO BE FORGED*, describes forging process and design considerations. Length 18 minutes. Sponsored by Forging Industry Association, available on loan free from regional film libraries of Modern Talking Picture Service, Inc., 1212 Avenue of the Americas, New York, N.Y. 10036.

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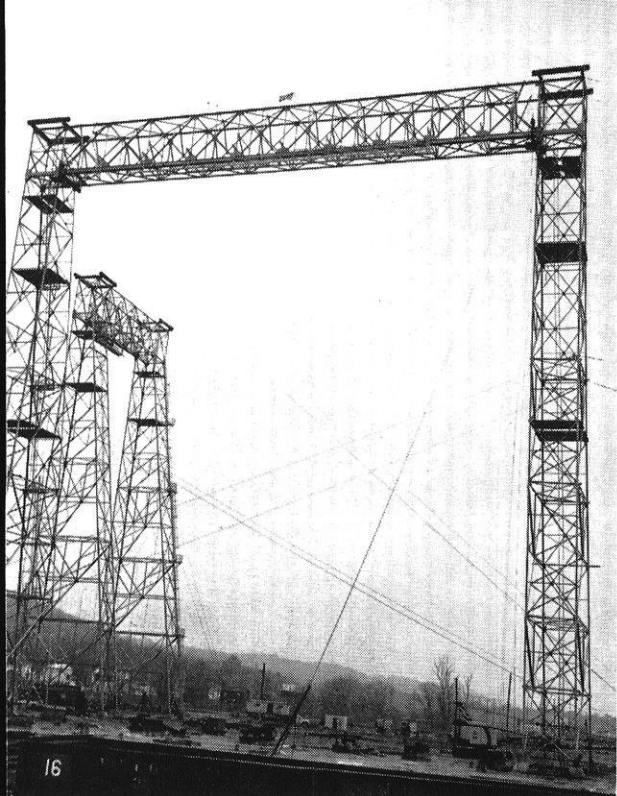
PRESS SERVICE Please Advise The News Service You Prefer . . . All Other Cameras Will Be Smashed and Reporters Slugged. Advance Release Prepared For Your Approval 30-Days Prior To Spontaneous Demonstration.

EVERYBODY'S FIGHTING SOMETHING . . . WHY AREN'T YOU? . . . WE GUARANTEE TO CONFUSE THE ISSUE SO NOBODY CAN ARRIVE AT A SOLUTION!

WRITE TODAY Reference furnished upon request . . . CHECK TODAY'S NEWSPAPER FOR CURRENT ADDRESS.

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Organized Confusion is Best!



... the new University Avenue Skywalk!

Wouldst Thou Believe?



... these European toilets!



... we've spotted the wonderful white-winged weekend warrior sitting on the starboard wing!

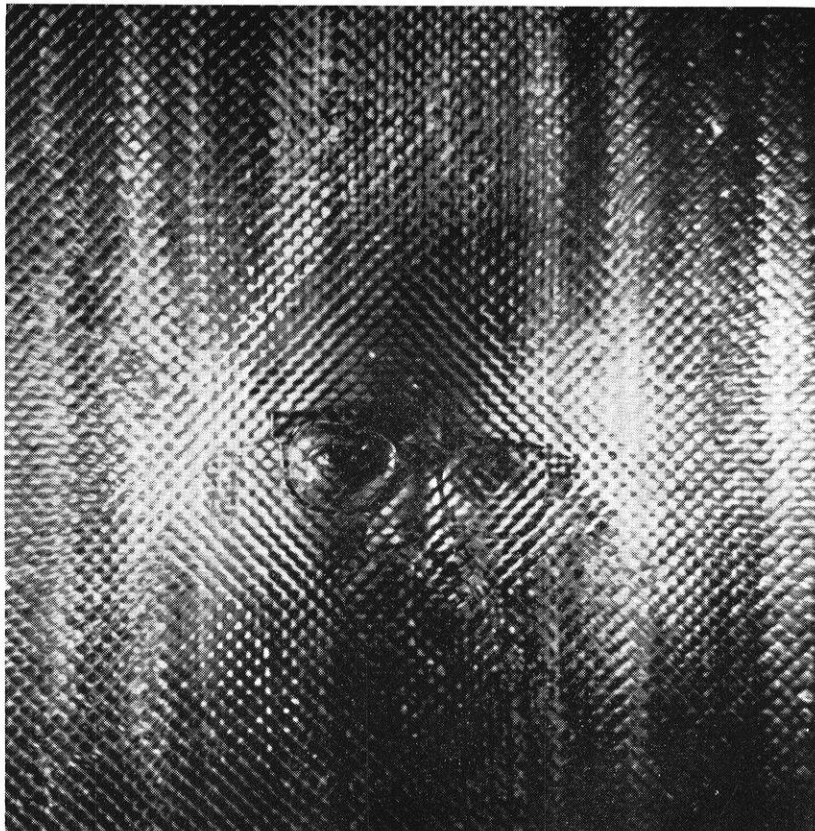


Yes, Mr. President. Hubert just left.

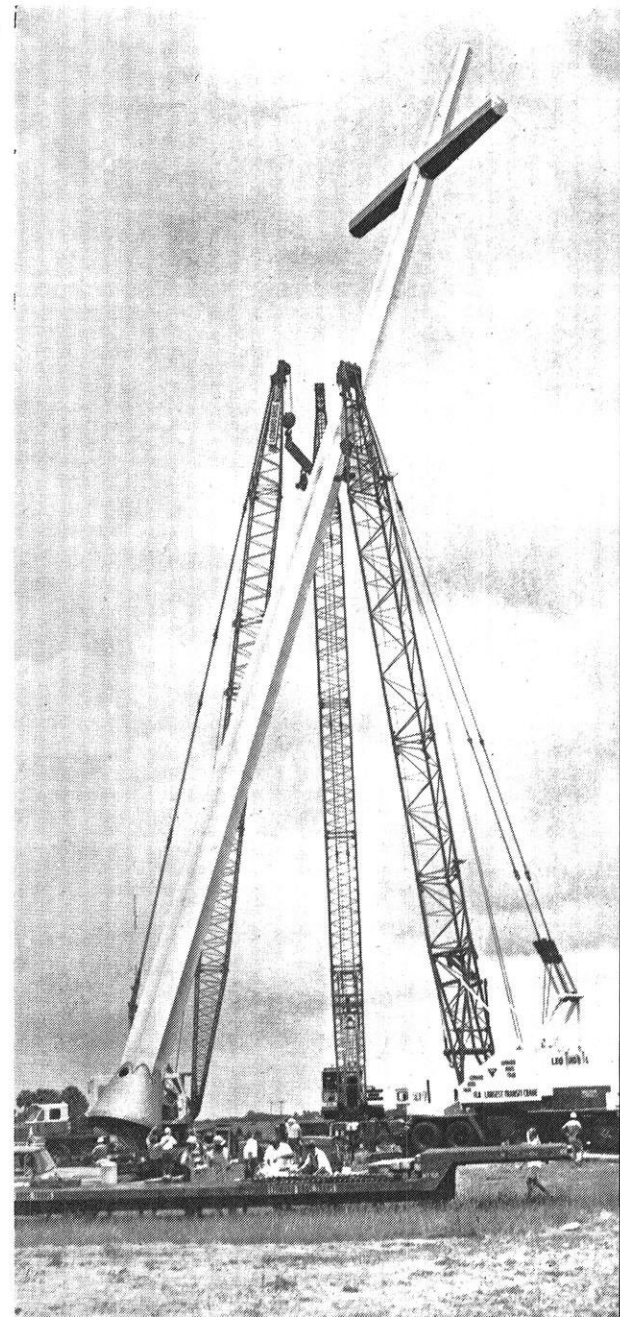


See! It isn't your time!

Those KKK rallies are getting bigger every year. ▶



Having a wonderful trip. Wish you were here.—T. Leary



JOIN LOSER'S CLUB

Are you in the great majority that always loses the consolation prize? Girls, do boys always take your phone number and never call? Guys, are you always getting shot down?

Here, at last, is an organization tailor-made to handle your particular problem. Originally devised by a group of miserable flops like yourself, it tries to give help to those who need it. One of the remarkable accomplishments of this organization is that the very success of its founders in promoting this program caused them to be expelled. How many other groups can make this claim?

Our selection committees represent every field of human endeavor. The Political Committee is still in a trauma over the 1964 election. The chairman of the Social Committee is a social pariah whose mere presence at a party means catastrophe. And for those of you whose love-lives read like a 1930 stock report, there's the Romance Committee.

All we need to join is money. We don't encourage creativity; just use what the government makes for that purpose. Simply drop it in a mailbox, but try to remember to put the proper address on it. We know you're probably out of stamps, so we'll pay the postage. Of course, all our selections will be delivered to you with postage due.

Every dark of the moon, when depression is at its lowest, we'll send out a book, pamphlet, or other stirring notice. Our inspirational selections are taken from the following list of books—an assembly of the thoughts and scribbings of the greatest collection of has-beens and never-weres of our time.

10. **The Manipulation of Power** Nikita Krushchev discusses Sukarno, Raul Castro, Che Guevara, and others.
11. **Our Troubled Youth** General Hershey proposes an unusual solution to the college crush.
12. **Winning Baseball** Casey Stengel
13. **Obscenity Is Fun** Bill Killeen
14. **Playing the Market** Billie Sol Estes
15. **How to Get Back Into Politics** Richard M. Nixon
16. **What to Do When You Get There** Hubert Humphrey
18. **Gubernatorial TV** Ronald Reagan
20. **A Primer for Primaries** Haydon Burns
21. **Tolerating Your Student Publications** J. Wayne Reitz addresses despots everywhere.
22. **Glamour Secrets and Beauty Tips** Lynda Bird Johnson
24. **The Failure of the Law of Averages** Harold Stassen

25. **The Making of a Monarch** Charles De Gaulle rambles on and on.
26. **How to Get Rich and Stay Poor** Jimmy Hoffa discusses his relations with the Internal Revenue Service.
28. **The Growth of Empire** A noted French author discusses his nation's foreign policy.
30. **Our Foreign Image** Clippings from leading papers in Egypt, Cambodia, Pakistan, and France compiled by Dean Rusk.
35. **Restaurants I Avoid** Duncan Hines discusses Bennerohm's at length.
37. **Let My People Go** Malcom X
38. **By All Means, Yes** Martin Luther King
39. **In Your Heart You Know I'm Right** George Lincoln Rockwell
42. **The Art of Articulation** Everett Dirksen
45. **How to Dodge the Draft** George Hamilton
50. **Popular Mechanics** "How-to's" by James Lewis

SPECIAL OFFER . . . For the first 100 subscribers whose checks don't bounce, we give FREE a carefully selected recording of great inspirational value: John Lennon singing "Jesus Loves Me."

I ran for of
office organization

and was crushed by a majority of

On the average, I get shot down times a week.

At last count girls/boys hate my guts.

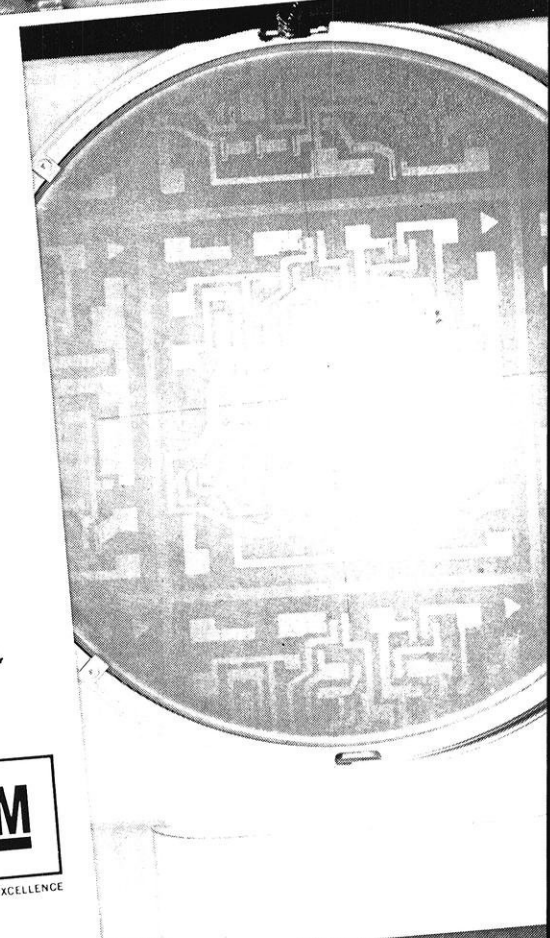
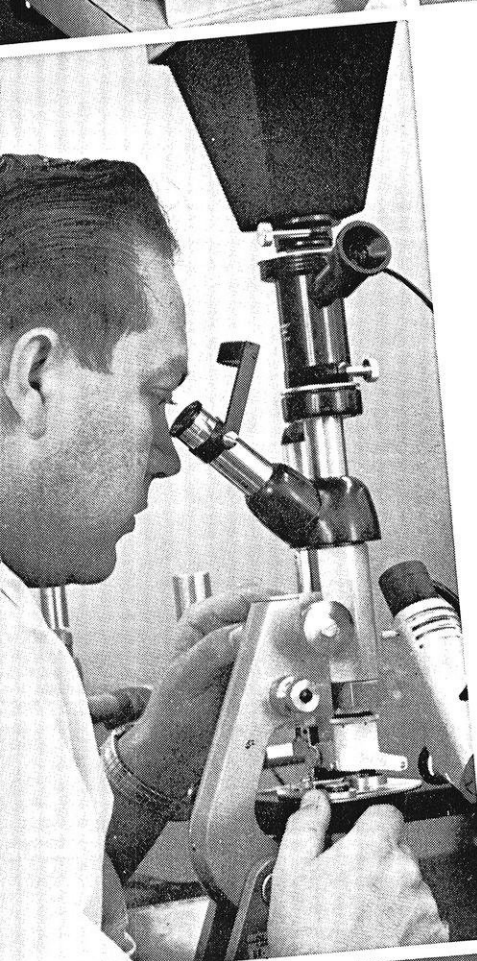
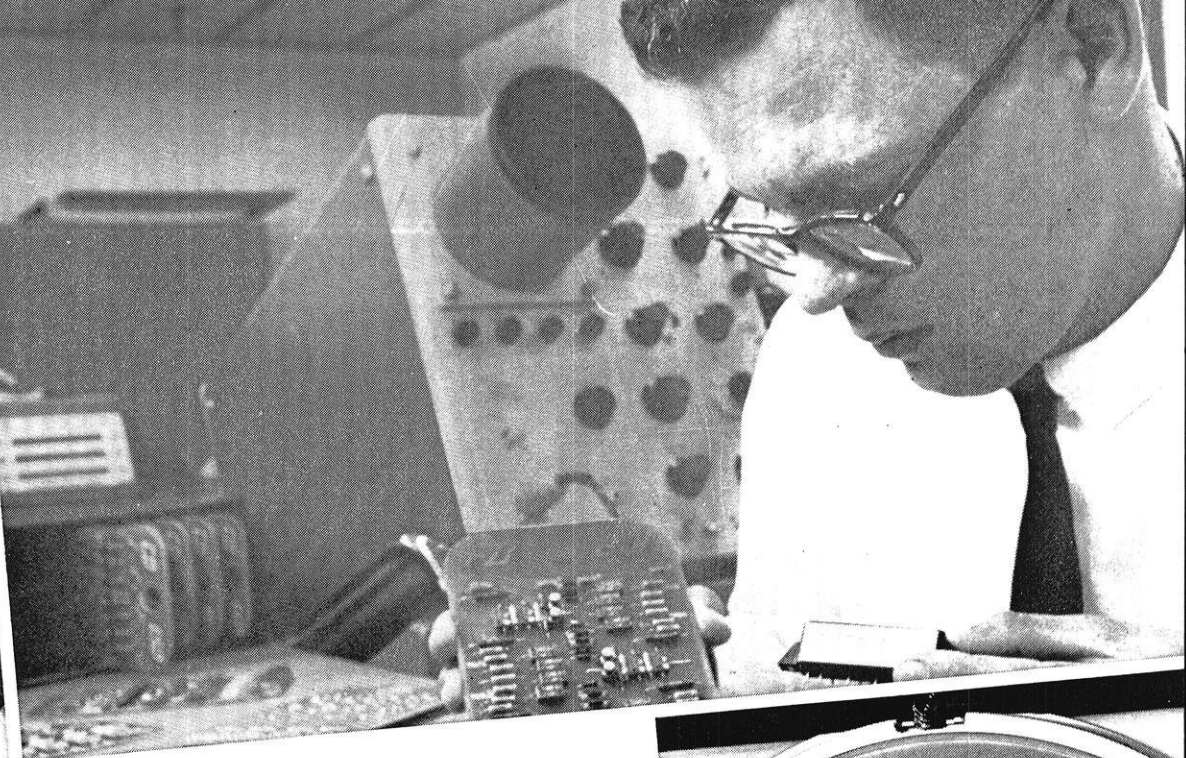
Circle here if rejected by Datamate.

Complete in fifty pessamistic words or less: I consider myself hopeless because . . .

Signed

By filling out this form, I acknowledge myself to be an utter incompetant in the game of life. I also acknowledge my total inability to succeed in anything really important, having suffered many let-downs.

—Reprinted from Florida State Smoke Signals.



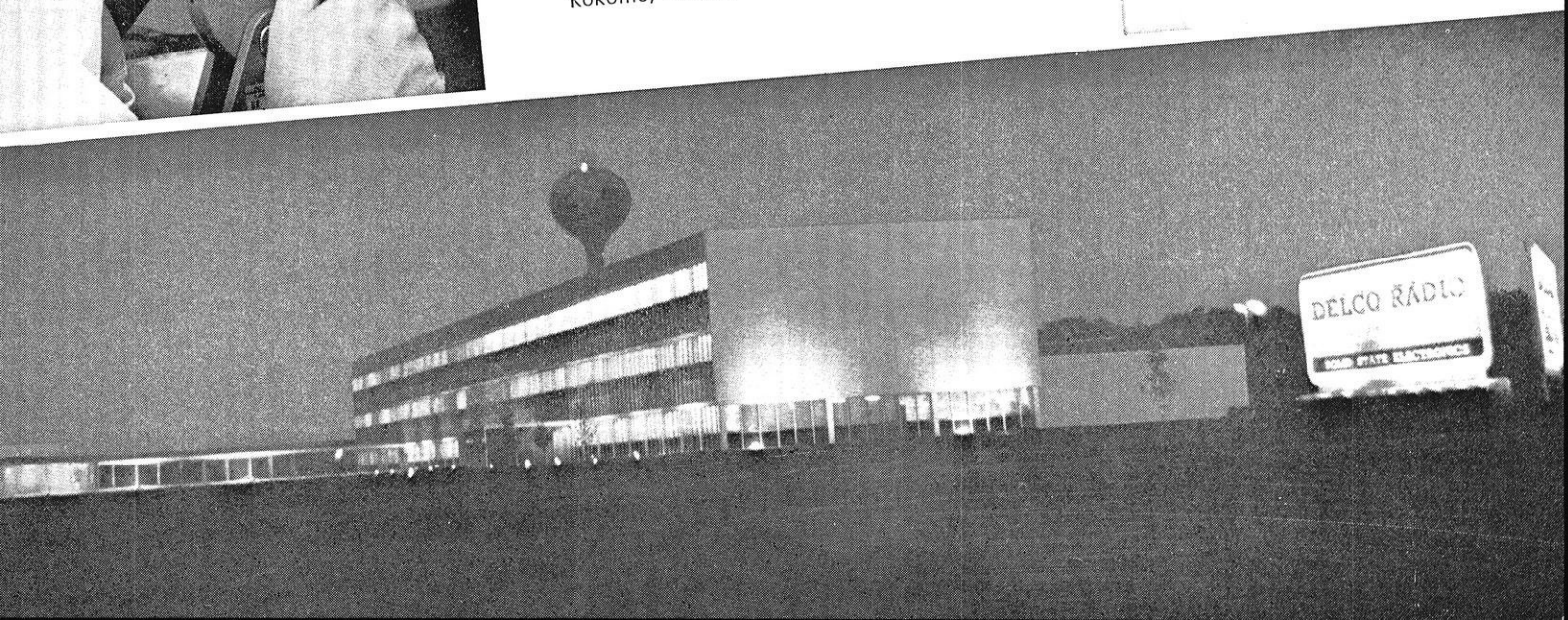
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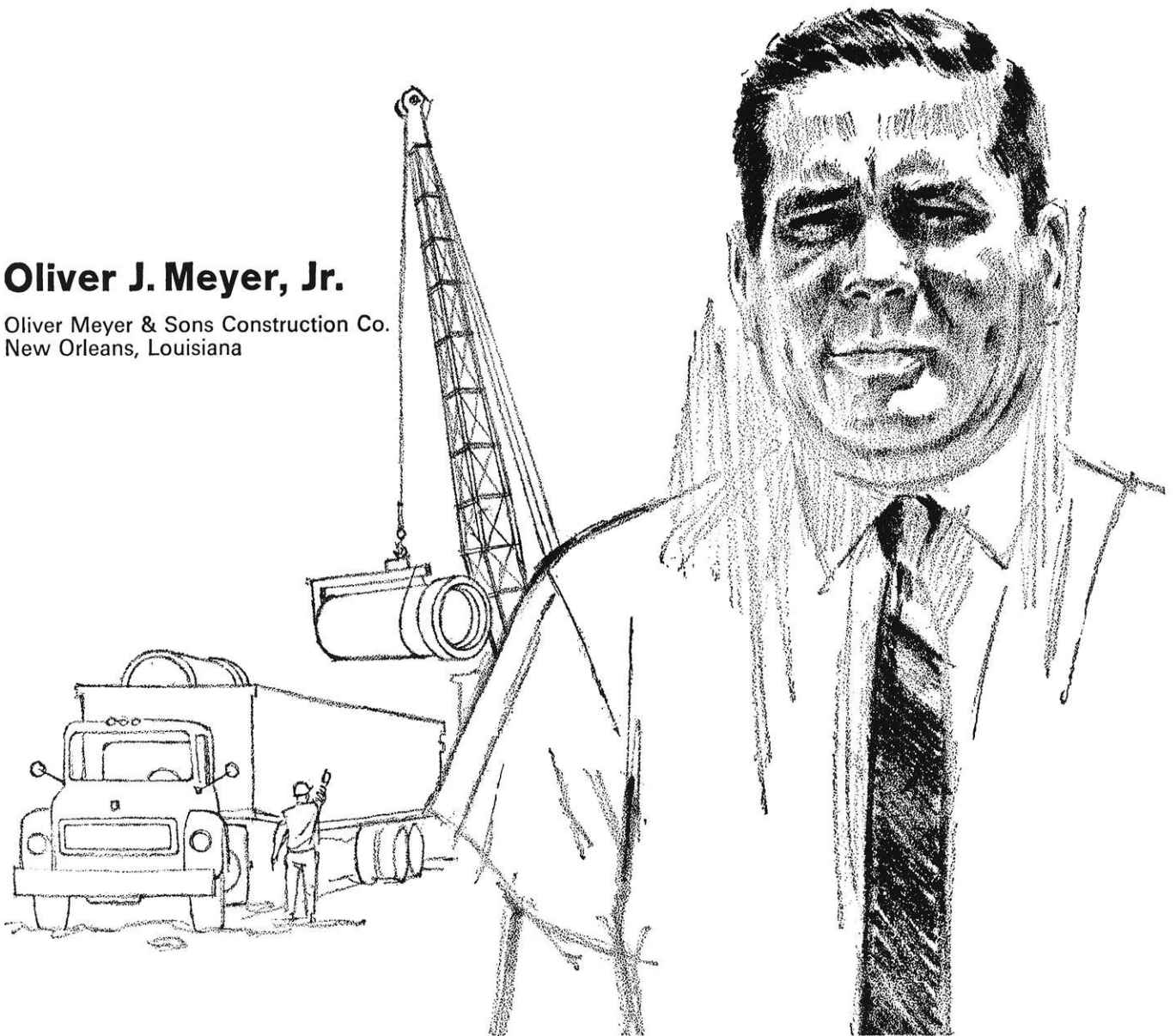
DELCO RADIO

Division of General Motors,
Kokomo, Indiana



Oliver J. Meyer, Jr.

Oliver Meyer & Sons Construction Co.
New Orleans, Louisiana



**“The joint on that Dickey pipe is urethane...
it’s the best I’ve found for building sewers.”**

Oliver Meyer has been a sewer contractor for 28 years and here’s what he says about the Dickey urethane Coupling: “The compression joint on clay pipe is a real improvement. But Dickey went one step further and made it with urethane. At first, I couldn’t see the difference. I do now... for one big reason.

“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.”

Mr. Meyer is stating facts... facts that are irrefutable. In addition to high load-bearing capacity, the

If it’s made of clay it’s good...

Dickey urethane Coupling offers many other advantages... assures retention of compression... resilient hardness stability... sustained flexibility... immunity to cold flow... resistance to acids, alkalis, sewer gas, industrial wastes normally found in sewers and immunity to attack by micro-organisms.

All of these add up to long life, low cost sewers. And remember, Dickey clay pipe lasts for generations, too. Don’t accept less.



DICKEY sanitary glazed clay pipe

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if it’s made by Dickey it’s better

JOKES

To err is human, but ain't it divine?

* * *

Bedtime Suggestion: "That was a great little party we went to tonight . . . what say we end it up with a bang?"

* * *

"I've just discovered the difference between boys and girls," said little Walter as he unbuttoned his pants, "Look Mama, no cavities."

* * *

They named the baby Onyx, 'cause it was onyx-pected.

* * *

Some day a girl will find a man who won't try to take advantage of her, but the tombstone will be too heavy to lift.

* * *

A fox is a guy who always gets what the wolf is after.

* * *

The Russians had the Sputnik, then the one with the dog called the Muttnik. Us Americans will soon have one carrying a boy and girl both, called the Picnic.

* * *

A man who makes love in the morning is an idiot. After all, you never know what may turn up later in the day.

* * *

Sounds in the night: "Daddy, if you'll get me a drink of water, I'll shake the bed for Mama."

* * *

Oh, June went larking with a lad,
A 'rolling in the clover
She got so wild June's now with child,
And busting out all over.

* * *

When her divorce came through, it made her feel like a new man.

* * *

Sign on the back of a shiny black Caddy at the Cattlemen's Convention: "FOR WHOM THE BULL TOLLS."

Some girls will scream at the sight of a mouse, and then climb right into a car with a wolf.

* * *

They arrested him for rape, but he pleaded insanity, because he was crazy about the stuff.

* * *

Her kisses send me, but I'm no dope, I don't go.

* * *

A gold digger is a girl who hates poverty worse than sin.

* * *

New son: She Was the Village Belle, But She Tolloed on Me.

* * *

The wind changed and the skunk said, "It all comes back to me now."

* * *

A man wandered into the B.T. and proceeded to order a drink. While consuming his liquid refreshment, he looked around the room, and noticed a woman in her late twenties seated at a booth in the rear, and with her, a large white duck. After a few minutes, he found himself unable to resist any longer and walked over to the booth and spoke. "Excuse me," he said, "but I just can't help but wondering—what are you doing with that pig?" The young woman looked at him coldly, and replied, "Pig? Are you blind or something? This isn't a pig—it's a duck." Our hero then returned her icy look tenfold, and replied in his most lofty manner, "I was *talking* to the duck."

* * *

In the new jet planes, you know you're moving faster than sound when the stewardess slaps your face before you can get a word out.

* * *

The GIs were searching a village just after a battle of WWII. Entering a large house they found a coffin in the middle of a room. Opening the coffin, they found an old grey haired man madly erasing a musical manuscript. When questioned who he was and what he was doing, the old man replied: "I'm Beethoven, and I'm decomposing."

* * *

Definition of a college man: One who can't count up to 70 without cracking a smile.



MORE

A little drunk staggered into the police station and confessed he had just pushed his wife out a tenth story window.

"Kill her?" asked the Sgt.
"Don't think sho. Thash why I wanna be locked up."

* * *

David's parents were divorced. He lived with his mother, who had remarried. Spending a brief vacation with his father, David was asked how he and his step-father were making out.

"Oh, fine," said David. "Every morning he rows me out to the middle of the lake, and I swim to shore."
"Ummm," meditated the parent. "Isn't that a rather long swim for a ten-year-old boy?"

"Not so bad," said David. "Worst part is getting out of the sack."

* * *

While visiting America, a lovely French maiden discovered both her visa and her money had vanished. She was in great despair until an enterprising young sailor came to her rescue.

"My ship is sailing tonight," he said. "I'll smuggle you aboard, hide you in the hold and provide you with food and blankets. All it will cost you is a little affection."

She consented and he carried out his promise, visiting her several times daily. This went on for several weeks until one day the captain of the ship discovered the sailor paying her a visit. After the sailor had gone, he confronted the girl and upon hearing her sad story mused, "I admire the young seaman's ingenuity. However, I feel it's only fair that I inform you this is the Staten Island Ferry."

* * *

Our favorite racing form is a good looking girl late for class.

* * *

Did you hear about the C.E. who called his 1967 XKE "The Mayflower" because so many Puritans had come across in it.

* * *

A charming gent of the old school had a date with a pretty chorus girl.

They strolled in the Park under the moonlight until they came to a secluded spot where he kissed her several times lightly on the cheek.

"That my dear," he said, "is called spooning."
"Spoonng may be all right for you," she said, "but I would rather shovel!"

A harassed father was trying to tell his son that there was to be an addition to the family.

"Son," he said, "Someday soon the stork is going to swoop down over our house."

The son thought carefully, then said, "Well, I hope he doesn't scare Mother. She's pregnant, you know."

* * *

Found on a fall registration card of a freshman card:
Name of parents—Mommy and Daddy.

* * *

"What do they call those guys who frequent those topless joints?"
"Chestnuts."

* * *

Physics Major: "What is it that keeps the moon from falling?"

Civil: "Must be the beams."

* * *

The height of bad luck: seasickness and lockjaw.

* * *

An then there was the freshman who thought a logarithm was a forester's song.

* * *

He took his little dreamboat out in the fog and mist.

* * *

SADIST—A person who locks the bathroom door on the night of a beer party.

* * *

Hill Student: A man who can get excited about ny-lons—even when they are empty!

* * *

A sad case is two dozen empties.

* * *

Little boy in woodshed: "Father, did grandpa spank you when you were a little boy?"

Father: "Yes."

Little Boy: "And did great-grandpa spank grandpa when he was a little boy?"

Father: "Yes."

Boy: "Well, don't you think with my help you could overcome this inherited sadism?"

* * *

M.E. Student: "Could you help me with this problem?"

M.E. Professor: "I could, but I don't think that it would be quite right."

M.E. Student: "Well go ahead and take a shot at it anyway."

JOKES.....

Falsie salesman, the Fuller bust man.

* * *

Virtue is just vice at rest.

* * *

"Hey, Sally," said the college man, "how come you're not wearing my fraternity pin?"

"But Bob, it was such a nuisance," the pretty coed pouted playfully. "All the fellows were complaining that it scratched their hands."

* * *

The guy was doing his best, leading a goat with one hand, carrying a cane with the other, and loaded down with a laundry basket on his back and a chicken under his arm.

His girl hesitated when they came to the woods, saying, "I'm afraid to walk with you in there. You might try to molest me."

"How could I?" the guy assured her. "Look at all the stuff I'm carrying."

"But you could put the chicken under the laundry basket, stick the cane in the ground, and tie the goat to it."

* * *

Two mumbling voices in the wee small hours, "Say there Steve, you'll never unlock that door with your cigar butt."

"Damn, I must have smoked the keys."

* * *

A drunk stumbled out of the H.T. last night and stuck a nickel in the parking meter. "Oh my God!" he screamed. "I've lost 90 pounds!"

* * *

This one-fingered picketpocket could only steal life savers.

* * *

"Say, Gerry, why are you drinking that beer?"

"Ran out of wine."

* * *

1st Drunk: "I gotta go to the little boys' room."

2nd Drunk: "Hey! Howsh 'bout goin' fer me, too?"

1st Drunk: "Sure, you're m'besht pal; shure, I'll go fer ya."

When he came back his inebriated friend asked: "Di'ja go fer me?"

1st Drunk: "I forgot, n' you're m' besht pal."

With that he wheeled around and made his way back to the washroom. Coming back, he planted himself in front of his chum, wagged his finger at him and said:

"Shay, whash the big idea of foolin' me? You di'nt have to go!"

The college psychology class was studying human reaction to sexual stimulus and of special interest was the frequency of amorous relations.

"How many students here," said the professor, "engage more than once a week?"

Five people raised their hands.

"And how many engage once a week?"

Ten hands went up.

"How many twice a month?"

Eight hands went up.

"Once a month?"

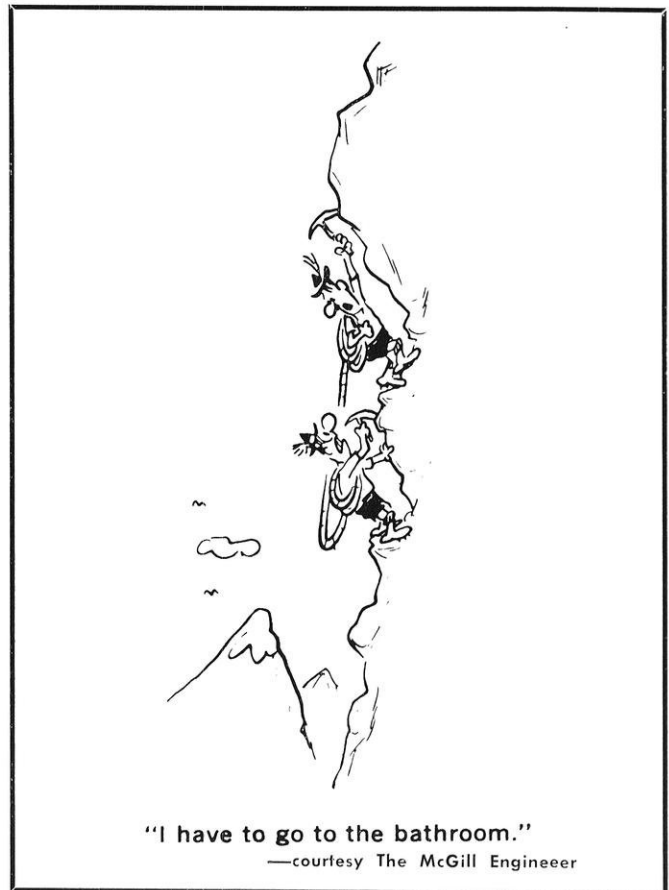
Four hands were raised.

"And how many once a year?"

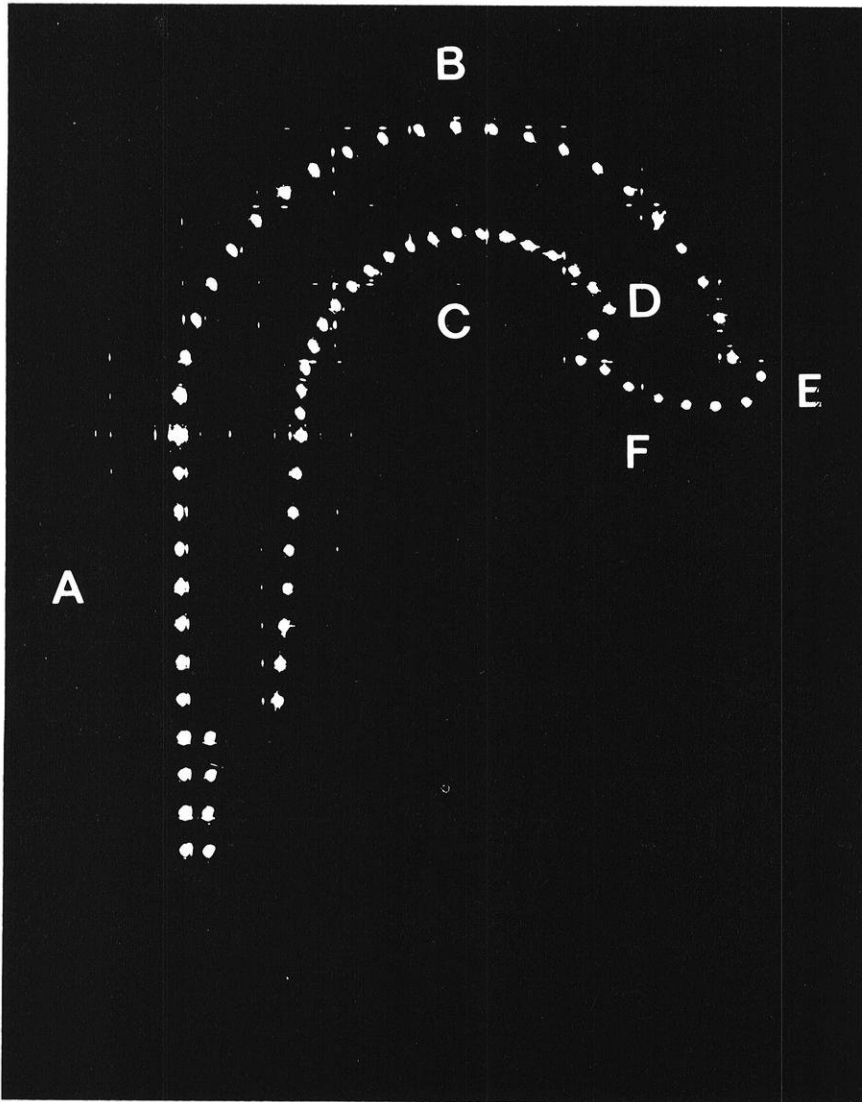
A little guy in the back waved his hand frantically and giggled hysterically.

"If you engage only once a year," said the professor, "I don't see what you're so overjoyed about."

Flushed with excitement, the little guy said, "Yeah, but tonight's the night!"



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Clue: (unscramble the following)

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Consolation Prize—Autographed Copy of Our Mystery Picture

MY NAME FOR THE PICTURE IS:

WHY:

NAME: ADDRESS:

.....

AGE: SEX:

MORE.....

This Polish priest had performed so many shotgun marriages that he called his church Winchester Cathedral.

* * *

Definition of gross ignorance: one hundred forty-four Polacks.

“Did you hear about the Polack who couldn’t spell? He spent the night in a warehouse.”

* * *

The best way to break up a Polack party is to flush the punch-bowl.

“What do you call 19 Polacks in a swimming pool?”

“The Bay of Pigs.”

* * *

It’s a sure sign of summer when the Polack throws out his Christmas tree.

Engineer’s Guide to Thesis Writing—

Say this . . .

“It has been long known that . . .”

“While it has not been possible to provide definite answers to these questions . . .”

“. . . accidentally strained during mounting.”

“. . . handled with extreme care throughout the experiments.”

“It is clear that much additional work will be required before a complete understanding . . .”

“Three of the samples were chosen for detailed study.”

“Typical results are shown.”

“It is generally believed that . . .”

“If facts do not conform to a theory, they must be disposed of.”

—N. R. F. Maier

. . . when you mean this.

I haven’t bothered to look up the original reference.

The experiments didn’t work out, but I figured I could at least get publication out of it.

. . . .dropped on the floor.

. . . not dropped on the floor.

I don’t understand it.

The results of the others didn’t make sense and were ignored.

The best results are shown.

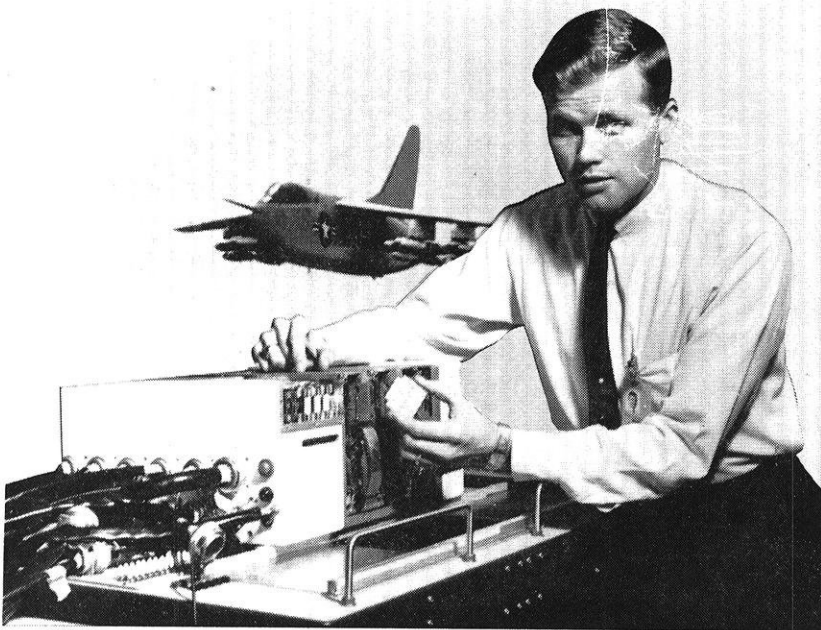
A couple of other guys think so too.

“Discovery, consists of seeing what everybody has seen and thinking what nobody has thought.”

—Szent-Gyorgyi

The recent survey on cigarettes found that 90% of the men who tried Camels . . . still prefer women!





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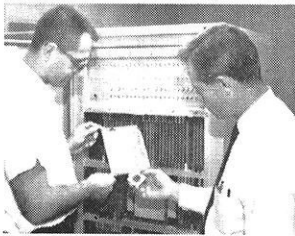
**TI ALSO MOVES AHEAD FAST
IN ...**



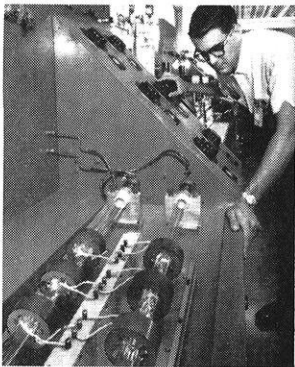
SPACE SYSTEMS



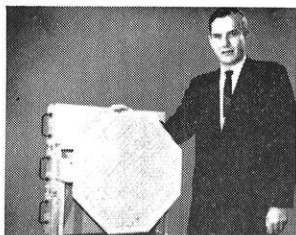
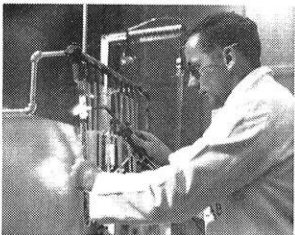
SIGNAL PROCESSING



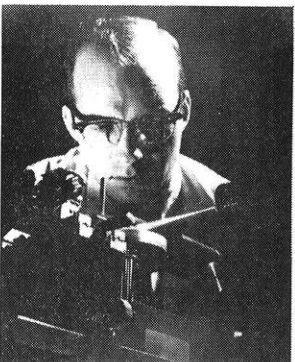
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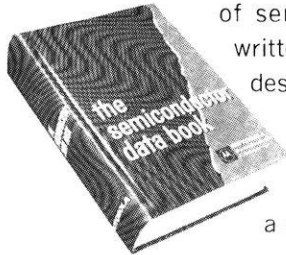


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written for a very specific audience—design engineers—and written with the knowledge that new advances will soon pace many out-of-date. To keep current is a challenge. Motorola welcomes it.

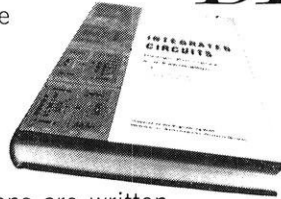
Today, semiconductor components and integrated circuitry are part and parcel of the modern engineer's way of doing things. Barely 10 years ago, most were items for theoreticians' drawing boards.



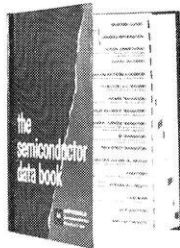
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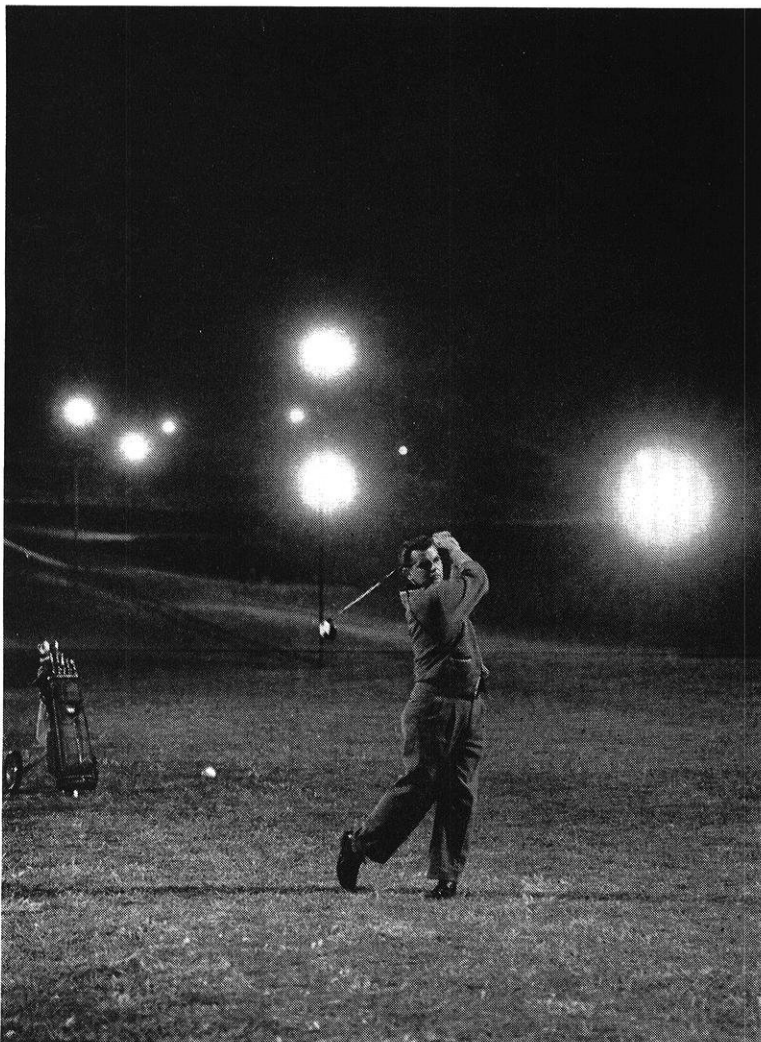


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