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WISCONSIN ENGINEER

March, 1944

EMBER ENGINEERING COLLEGE MAGAZINES ASSOCIATED

KEEPING UP WITH *Electricity*

1000 REVOLUTIONS PER SECOND! That's the speed of newest Westinghouse motor, producing a tool surface speed of 7,000 feet per minute. This 4 horsepower induction motor has a rotor only 2 inches long, diameter 1¾ inches. Westinghouse engineers are now developing a motor to go *twice as fast.*

B'R'R'R'R'R . . . A polar bear would be right at home at 20° below zero in the Westinghouse "igloo" at East Pittsburgh. This cold chamber is 1500 times as large as the average electric home refrigerator. Here, Westinghouse engineers test ice-coated circuit breakers and other electrical switching equipment, to guarantee operation under worst winter conditions.

HIGH LIFE IS HARD on carbon generator brushes in high-flying bombers. They used to wear down to the pigtails in an hour or two, at 30,000 feet. Now Westinghouse engineers have developed a chemical treatment that keeps the brush face lubricated at substratosphere heights. Result: *fifty-fold* increase in brush life . . . enough for a dozen raids over Berlin.

EVER SEE A MILLIONTH of an inch? Probably you never will—but the Electrigage can *feel* as little as twelve millionths. Developed by Westinghouse and Sheffield Corporation, it can measure with a precision equal to finding an error of three-quarters of an inch in a mile. Infinitesimal movement of gauging stylus induces a tiny current, which is amplified 10,000 times.

AIR IS HEAVY STUFF when you start pushing it around at 400 miles an hour. That's why U. S. Army needed a 40,000 horsepower electric motor to create a man-made hurricane, for testing airplanes in Wright Field wind tunnel. It is the world's largest wound-rotor induction motor, designed and built by Westinghouse engineers.

• • •

The above items are condensed excerpts from articles in the WESTINGHOUSE ENGINEER, a bi-monthly engineering review. Regular subscription price—$2.00 a year. *Special price to students—50¢.*

Chemical analyses—*right now!*

Above is the laboratory model of the Westinghouse mass spectrometer, which sorts out dissimilar molecules according to their mass, and does it almost as fast as you can snap your fingers.

The mass spectrometer provides a new way to get the quick, accurate analyses that are needed to maintain precise process control. Take the synthetic rubber industry, for example. Formerly, five men took as long as three days to complete necessary chemical tests in the processing of artificial rubber—which meant that the results were often too late to be useful.

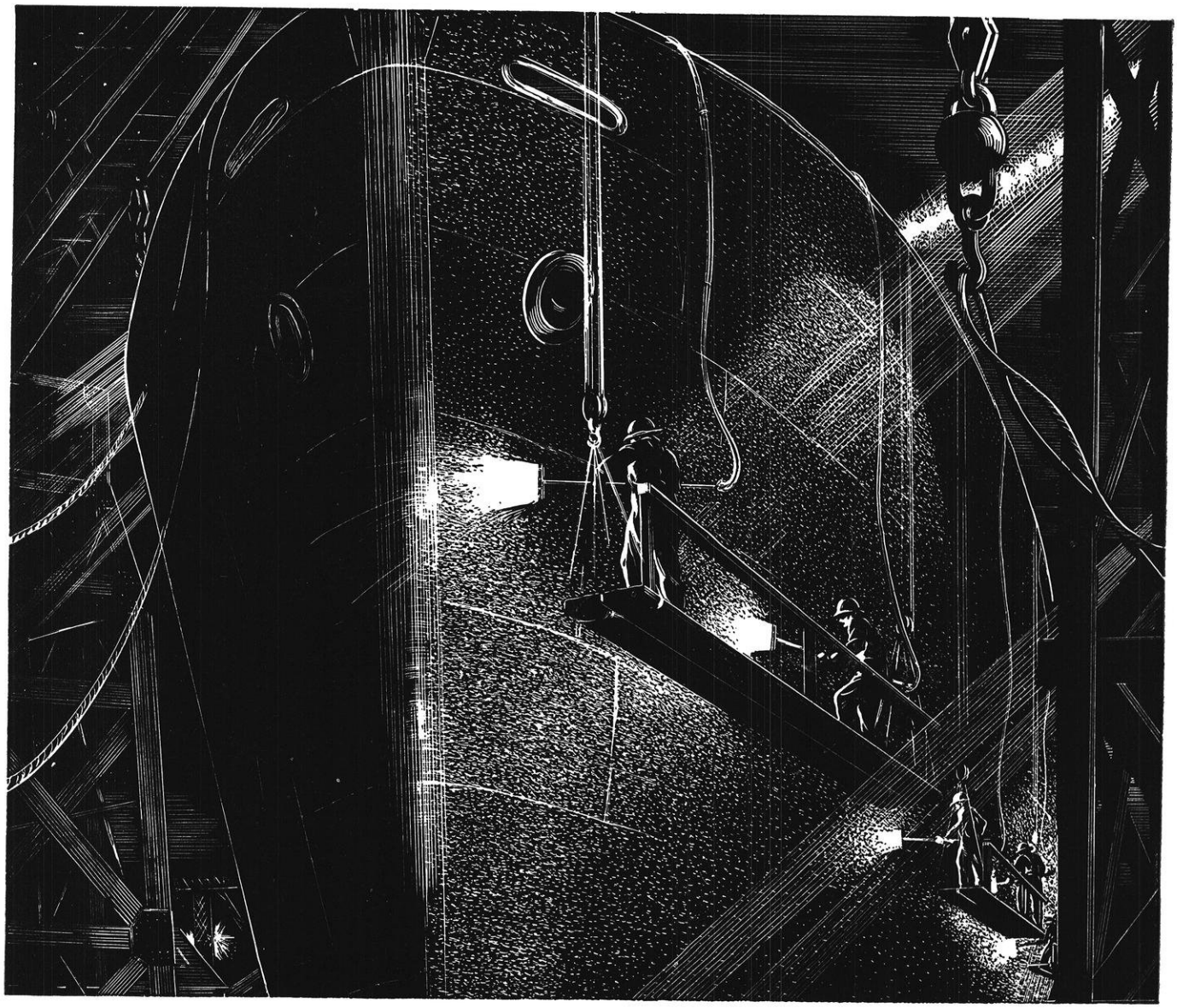
The new electronic "chemist," the Westinghouse mass spectrometer, now makes these tests in about 15 minutes.

For leadership in the electrical solution of industry's problems, look to Westinghouse. *Westinghouse Electric & Manufacturing Company, Pittsburgh 30, Pennsylvania.*

Tune in John Charles Thomas, NBC, Sundays, 2:30 p.m., E.W.T.

Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE



Scrubbing Steel Ships with Brushes of Flame

Painting a big modern cargo or troop ship is an expensive and important finishing operation. To assure the longest possible paint life, many large ships are first thoroughly cleaned with "brushes" of oxyacetylene flame — a steel-conditioning treatment that produces a clean, smooth surface unblemished by rust or scale.

Moreover, this modern steel-cleansing method drives occluded moisture from the steel, thus making it more receptive to paint and making paint jobs last longer. As a result, repainting becomes a much less frequent necessity...maintenance costs are considerably reduced.

In addition to cleaning steel, the oxyacetylene flame has many other uses. It cuts metals into any shape quickly...surface hardens them at points of wear... welds them into strong parts. With the electric arc, it constitutes a remarkably fast, versatile metal-fabricating team.

If you would like to receive our informative publication "Airco in the News," we shall be glad to send a free copy. Write to Mr. G. Van Alstyne, Dept. C. P., Air Reduction, 60 East 42nd Street, New York 17, N. Y.

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INTRODUCTION . . .

THIS is the first issue of a new semester and is put out by a practically brand new staff. We hope that you enjoy it and find something in it to interest you—besides the Static.

The first article is on the shrink fit of metals. The author is Harold May, new Assistant Editor. If you find the time, you can read a small digest of his short, but eventful life in the back of the magazine.

Next comes the St. Pat's Candidates, an interview article by Ed Brenner. Ed, a new staff member, is a senior Chemical.

"Standards Lab" is written by John Tanghe, a senior EE. This is a fine description of the work done on an almost unknown part of the campus.

Following this, John's regular column—Campus Notes. Included in the write-up is a chronological description of the happenings of St. Pat's week. Not included, however, is the description of some of the individual clashes between engine men and shysters. Two members of the staff received broken noses when attacked by the deranged lawyers.

Walt Graham does a commendable job in his "Mathematical Morsels." It is his hobby to gather sidelights upon the science of numbers.

Arnold Ericsen's Alumni Notes come next. Arne, a senior ChE, is termed a woman hater—a phenomenon that we can't figure out. Anyone who knows the cure for this odd and curious ailment will be given one small herring if he can bring forth a change in the lad.

The Static (humor) is written by a couple of seniors—Dave Scheets and Lee Evans. They figure they have nothing to lose, like getting kicked out of school. About five pages of material were turned in by these two "funny men," but about three were of a type that couldn't be told to an old maid aunt. The remains will be found scattered between the better articles.

The final part of the magazine is an obituary (or is it biography?) of the new staff. Included with the written material are a couple of pin-up pictures.

You may wonder what has become of the staff. Most of them have graduated and one of the Assistant Editors—namely Gene Daniels—has decided to take a small vacation from the brutal labors of the University. However, we hope to have an article by our intellectual EE in a later issue.

Two new members of the staff are Tom Lee and June Hartnell, a couple of EE's. Tom hails from Fox Point, a large metropolis about three miles east of Milwaukee. June, one of the few coeds in Engineering, really knows what it is all about as she is in the upper ten per cent of her class.

Those of you readers who would be interested in joining the staff, contact any of the staff members and I can assure you that you will be welcome.

On to the magazine.

—GLENN JACOBSON

The promise of plastics, in the after-war years, holds so much for manufacturers and consumers alike that perhaps we should learn a little more about the nature of these new materials.

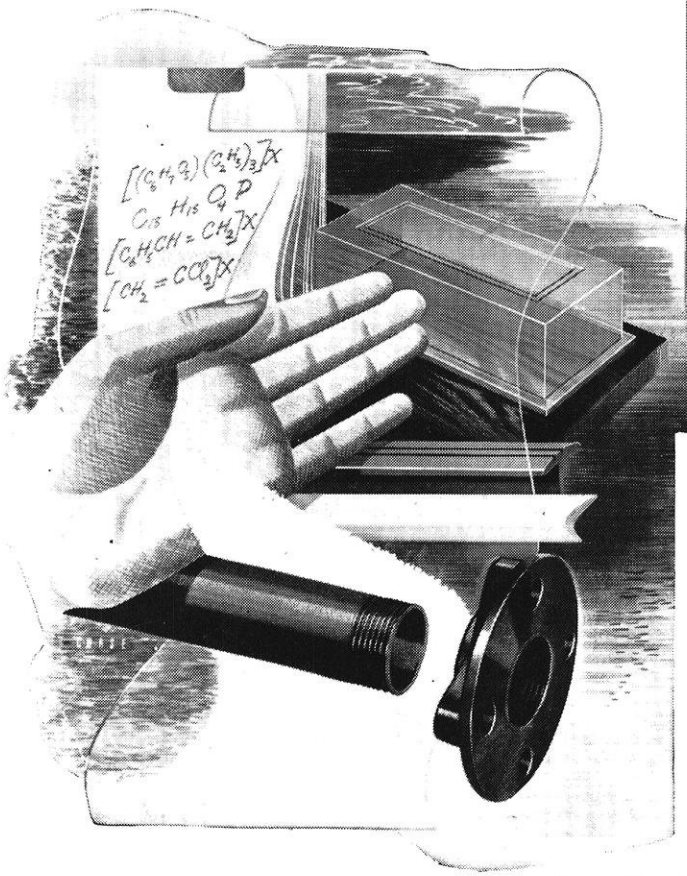
Of prime significance, chemically made plastics are unlike any structural material we have had to work with in the past.

Plastics are the product of chemistry. They are one of the outstanding examples of the chemist's ability to produce—out of coal, petroleum, air, salt, and other basic elements —totally new substances.

Important to an understanding of plastics is that they differ widely in their property characteristics.

For example, some plastics are extremely tough and withstand rough usage. This is true of Ethocel—one of the Dow plastics. Other types are pliable. Some have almost optical qualities in their clarity. Others possess excellent electrical insulating value. Some withstand heat and others extreme cold.

Among Dow plastics possessing some of these properties to a high degree is Styron—a plastic especially valuable as an electrical insulator and having many other uses where lustrous beauty or resistance to acids and alkalis are factors of importance. Saran, on the other hand, is notable for its tensile strength and flexibility, which make it widely used for such products as tubing, woven fabrics and rope. Ethocel, in a special formula, is especially strong and tough at extremely low temperatures.



JUST WHAT ARE "PLASTICS"?

The important point to remember is that the science of plastics is progressing rapidly. Already there exist many specialized plastics for specific applications. As our knowledge of both plastic compositions and the techniques for handling them increases, these new materials will undoubtedly become even more widely used than is now planned.

Dow Plastics include
Styron, Saran, Saran Film, Ethocel and Ethocel Sheeting

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York Boston Philadelphia Washington Cleveland Detroit Chicago St. Louis Houston San Francisco Los Angeles Seattle

DOW

CHEMICALS PLASTICS MAGNESIUM

INDISPENSABLE TO INDUSTRY AND VICTORY

WISCONSIN ENGINEER

Founded 1896

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In This Issue . . .

ON THE COVER . . .

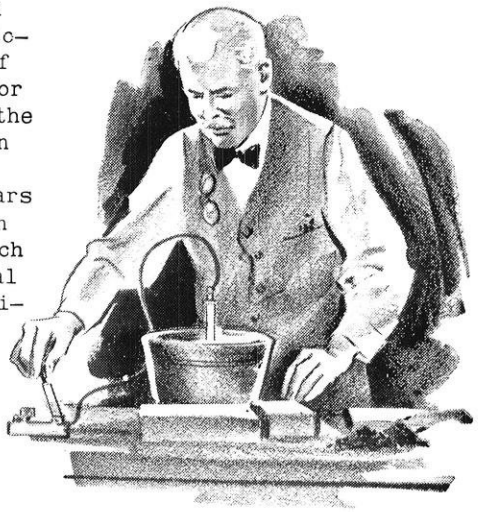
Grumman Avengers, Aircraft Torpedo Bombers, fly in formation . . . Courtesy Westinghouse.

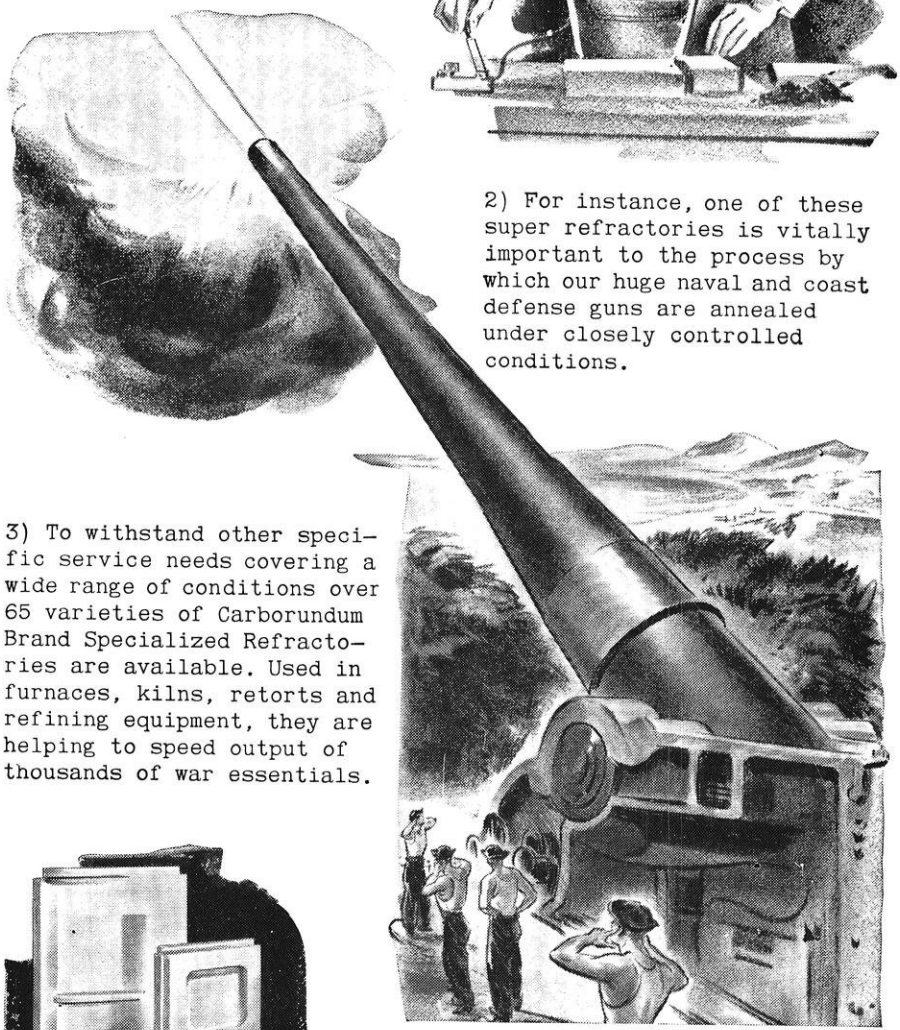
FRONTISPIECE . . .

Silhouetting the evening sky, these high power transmission towers transmit power for our vast war industries, as well as that for the comfort of our homes . . . Courtesy Westinghouse.

Looking at the future through a little iron bowl!

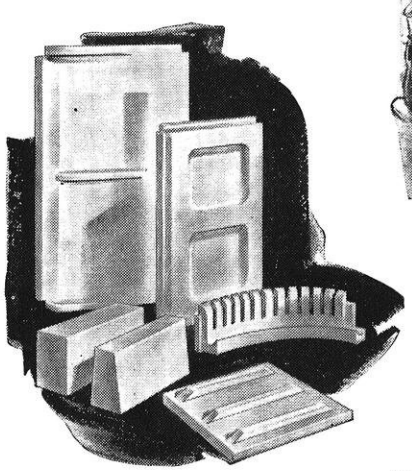
1) This little iron bowl helped shape the pattern of industry today; it holds the key to much of the progress that is to come. For in it Dr. E. G. Acheson created the first man-made abrasive, silicon carbide, to which he gave the trade name "Carborundum"—52 years ago. From that discovery in turn came the super refractories which opened the way for the economical development of modern metallurgical processes.





2) For instance, one of these super refractories is vitally important to the process by which our huge naval and coast defense guns are annealed under closely controlled conditions.

3) To withstand other specific service needs covering a wide range of conditions over 65 varieties of Carborundum Brand Specialized Refractories are available. Used in furnaces, kilns, retorts and refining equipment, they are helping to speed output of thousands of war essentials.



4) After the war, these super refractories will help produce new and better materials. When you encounter a refractory problem in the field, remember Carborundum Refractory Specialists stand ready to help you solve it. The Carborundum Company, Perth Amboy, New Jersey.

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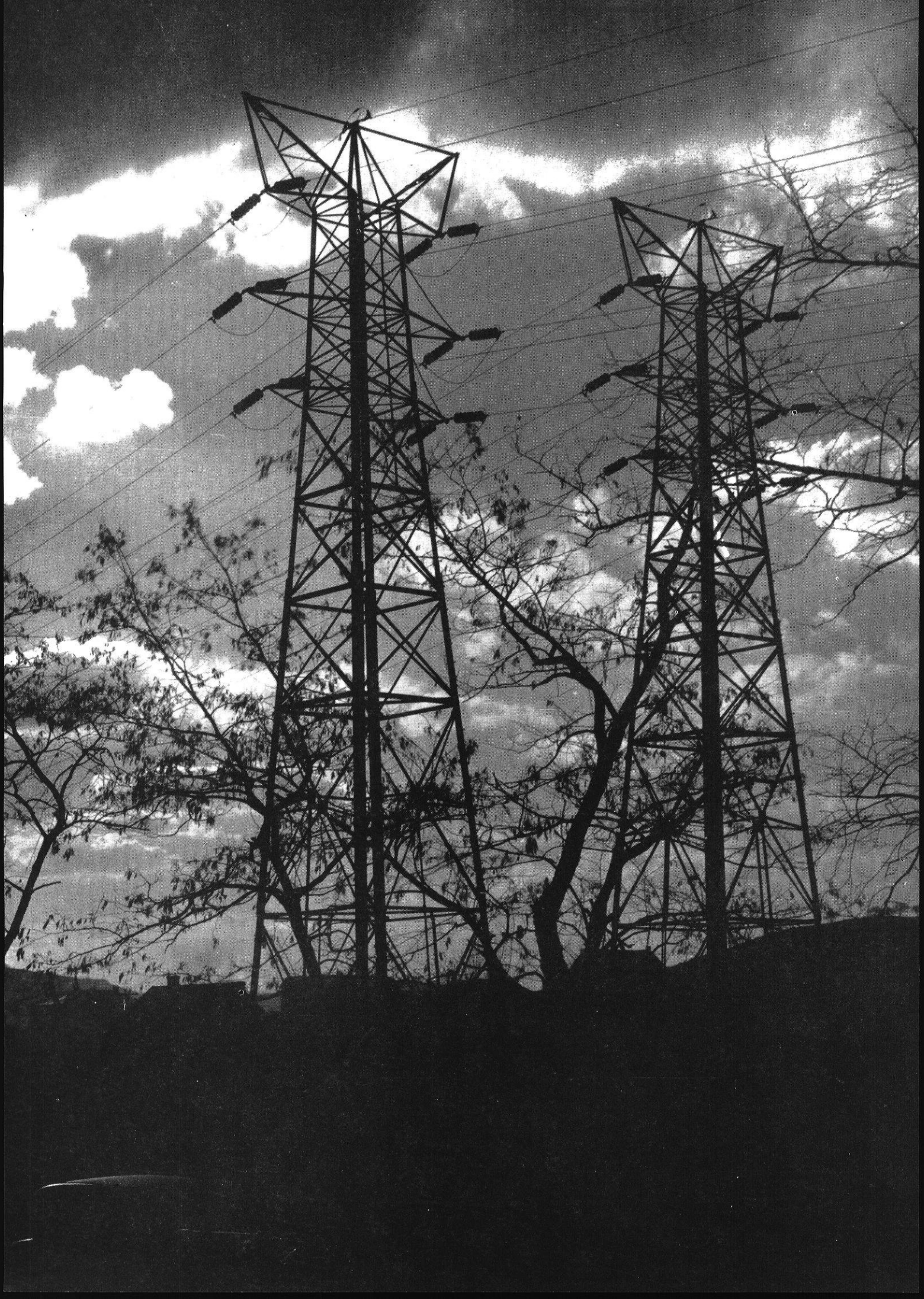


Shrink Fitting of Metals

by Harold May, me'44

COOLING the male or internal member of mating metal machine parts so as to obtain sufficient shrink to allow assembly with little or no pressure application. This might easily be termed as industries jump out of the frying pan into the refrigerator. Heretofore, the important method of assembling such parts was by expanding the external or female part by the application of heat to produce sufficient expansion for easy assembly. Upon cooling the two parts are firmly held together as one. Perhaps one of the earliest applications of this method was the shrinking of the rim on a railroad wheel. Another method of assembly was that of applying pressure to force parts together for the required assembly. In either case a negative clearance on the parts before assembly gave a firm friction grip afterwards.

Neither of these methods have been suddenly dropped by industry; as a matter of fact they are probably the more important methods in use today, but the stimulus of war and the searching for faster and better methods of assembly has brought out the use of refrigeration in mating parts with negative clearance. This method was not brought into use overnight, but it has had its greatest development in the last year or so. Perhaps the first reason for the search for new methods was the tendency for change in metallic structure and properties, if heated to sufficient temperature to produce the expansion desired. At the same time such temperatures often caused warping and scaling, giving an uneven bearing surface when assembled. In force or press fits such troubles were not encountered, but it was found difficult to make extremely tight fits without tapering the pin, and even under these conditions distortion and scoring are almost inevitable.

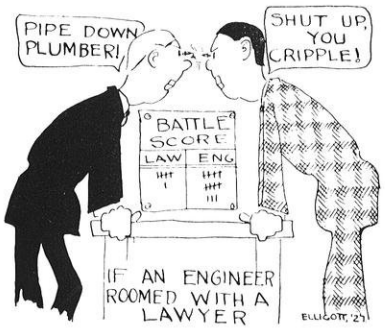
It was such difficulties as these which led to the work in freezing or shrinking before assembly. With a room temperature of about 70° F. and assuming reasonable negative temperatures, the amount of shrink could be easily calculated by means of temperature coefficients. "Dry ice" was perhaps the first freezing method used. The temperature of "dry ice" is approximately −110° F., but as it was difficult to obtain results when in solid form, it was necessary to immerse in kerosene or alcohol to produce a liquid form. Under such conditions a covering of CO_2 gas often formed around the dry particles, thus reducing their effective working temperature to about −90° F. With a room temperature of 70° this gives a temperature differential of about 160° F., which except in the case of small parts was not sufficient to produce the required contraction, so a combination of heating the external and freezing the internal part was used. In this way a much lower heat was necessary, greatly reducing many of the previous heating difficulties involved, but at the same time the necessity of the two operations introduced new problems, both in cost and time, so experimenting continued. Liquid air at a temperature of −297° F. gave sufficient temperature differential in most cases, provided the metal was actually placed in the liquid, which again brought out new problems. The liquid air caused chemical action on certain metals and when the metal was removed from the liquid into air, it immediately produced a frost coating, undesirable for assembly. Keeping the metal from actual contact with the liquid eliminated most of these difficulties, but the required low temperature was not obtainable under these circumstances. Liquid nitrogen with a temperature of −320° F. seemed to be the most adaptable for varying conditions, and therefore the logical freezant for continued experimentation. Keeping the metal from direct contact eliminated chemical action somewhat and yet produced sufficient temperature differential for most conditions, so apparently this was the answer to the problem.

This liquid, or one of the others, has been and is still used extensively in such operations, but it did not mean the end of experimentation with other methods. The chief difficulty with these methods seemed to be in cost and speed. It was found difficult to find containers of sufficient quantity to work on a mass production basis without too great a loss by radiation and evaporation. Small parts could be forced through tubes which are immersed in the coolant, coming out on the other end with proper shrink, but this was hardly possible with larger parts.

Such difficulties led to experiments with, and final development of, mechanical deep-freeze units which are in popular use today. These mechanical units, which are yet in their experimental stage, are capable of producing temperatures of −150° F. or perhaps below with unbelievable efficiency. It is this greater efficiency, and thus reduced operating cost, as well as its convenience, ease

(continued on page 18)

ST. PAT WAS

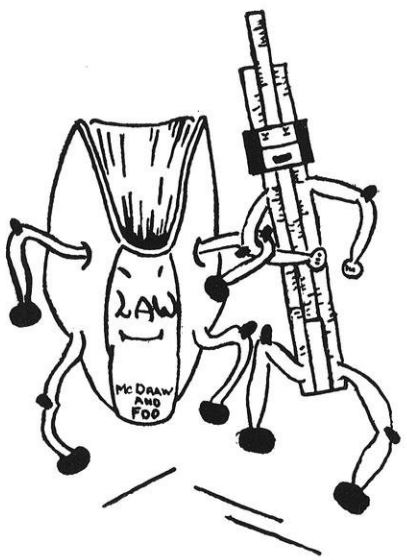


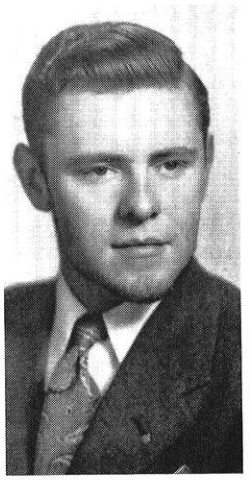
Only a week or two ago most of the engineering school was busy paying fitting homage to St. Patrick (the engineer of all engineers), as has been custom at Wisconsin since 1912. Behind these annual St. Pat activities lies a history colored with parades, rotten-egg fights with lawyers, public kissing of the blarney stone, etc., etc.

Polygon board, made up of representatives from the engineering societies, plans and controls all official St. Pat activities, including the rules governing the election of "St. Pat." The candidates who compete for this title each year are elected by the various engineering societies, one candidate from each group. The societies, led by the respective candidates, then sell given quotas of St. Pat buttons, the quotas being determined by the enrollment in the various schools. After these are sold the societies vie against each other in selling tickets to the St. Pat dance. The candidate representing the society which obtains the greatest number of points by selling tickets and buttons is then officially declared "St. Pat" at the dance. This year the honor went to Arleigh Larson, mechanical engineer.

Beard-growing contests are also held along with the St. Pat elections every year. All engineers are eligible for this contest, the only requirement being the growth of a beard. The candidate with the most artistic beard in the eyes of the judges is picked at the dance. This year's best beard was that of George Zuehlke, civil engineer.

Below we present brief descriptions of the St. Pat contestants for 1944:





ARLEIGH LARSON

Arleigh came to the University of Wisconsin from Oshkosh Teachers College where he received two years of schooling. His home is in Wautoma, Wisconsin. Arleigh has spent his recent summer vacation working on a farm and in a canning factory.

His yearn for stamp collecting has been superseded by photography since attending university. He owns several cameras and other photographic equipment.

In high school Arleigh participated in track, dramatics, and advertising. While going to Oshkosh State Teachers College he became a member of the Men's Association and Lyceum. Now attending the University of Wisconsin he is at present vice-president of Triangle having held the office of president previously. He is a member of M.E.S.W.

Arleigh has accepted a position with Western Electric in Chicago for whom he plans to work upon graduation. At present he is en-

AN ENGINEER

gaged in research work in the mechanical engineering department.

OTTO SCHREIBER

The A.I.E.E. candidate for St. Pat is Otto Schreiber who comes from Suring, Wisconsin. However, Otto spent the summer vacation of 1942 at Pontiac, Michigan, where he worked in the anti-aircraft division of the Pontiac Motor Company helping to make those important fighting weapons for the armed forces. Being a good electrical engineer he is enthusiastic about radio and spends his spare time learning more about that fascinating science.

Unusually active in high school, Otto won letters in football, basketball, and track as well as engaging in forensics. He was president and valedictorian of his graduating class.

Otto attended Valparaiso University in Indiana for one year before coming to the University of Wisconsin. He is a member of A.I.E.E., Eta Kappa Nu, and Kappa Eta Kappa, of which he is at present vice-president. Otto plans to work for General Electric when he graduates this year.

Otto Schreiber

RICHARD FEIN

Dick hails from Milwaukee and is a senior in chemical engineering, having attended the University of Wisconsin for three years.

"I like the 'good old summertime' best," says Dick . . . and when you find out that swimming and fishing are his favorite pastimes you can readily see why he prefers the balmy months. In fact he has spent the past several summers as lifeguard at Bradford beach on Lake Michigan at Milwaukee.

In high school, the A.I.Ch.E. candidate became a member of the National Honor Society. He also found time to do some splashing for the swimming team plus working hard on the school Annual.

Since coming to our university, Dick has participated in a variety of activities. When he was a freshman, he became a member of Phi Eta Sigma and Pershing Rifles as well as pulling an oar for the freshman crew. This past semester he was elected to Tau Beta Pi and Pi Mu Epsilon. He is the present refreshment chairman for A.I.Ch.E.

Upon graduation Dick plans to join the United States Navy (a perfect selection for a man who likes rowing, swimming, women and beer).

GEORGE ZUEHLKE

George's home is at Antigo, Wisconsin. Since coming to the University he has built his life around engineering. At present he is more interested in his profession, civil engineering, than in other activities. He is a member of A.S.C.E. and is the present president of the organization.

Last summer, the A. S. C. E.'s best bearded engineer attended summer school as did most of his fellow engineers. He worked as a carpenter at Truax Field during its construction during the summer vacation of 1942.

Upon graduation George plans on enlisting in the Seabees where he can put his services to good use for Uncle Sam.

Standards Lab

by John Tanghe, e'44

TYPICAL of those organizations that work silently and faithfully for the public with little thanks or recognition is the University's Electrical Standards Laboratory. Judging from its out-of-the-way location (second and third floors of the Electrical Laboratory Building) and its quiet atmosphere, one would hardly guess that in this laboratory are carried out some of the finest and most delicate tests and calibrations made in the state and country.

The Electrical Standards Laboratory was founded about 1908. It is operated jointly by the University and the Public Service Commission of Wisconsin to serve the utilities and industries throughout the state in the precise calibration of electrical instruments and meters. To do this, use is made of standards certified by the Bureau of Standards in Washington, D. C., and measurements are accurate to the nearest 0.05% to 0.1%.

A typical example of the type of work done by the laboratory is the periodic checking of watthour meters, wattmeters, voltmeters, standard cells, resistances, etc., for various electric utilities. These companies are required by law to have their equipment calibrated frequently, and this laboratory, operated on a non-competitive self-supporting basis, is the only one within a fairly large radius of Madison having adequate facilities to do such work. The following samples of work done during 1943 illustrate in part the numerical extent of such work:

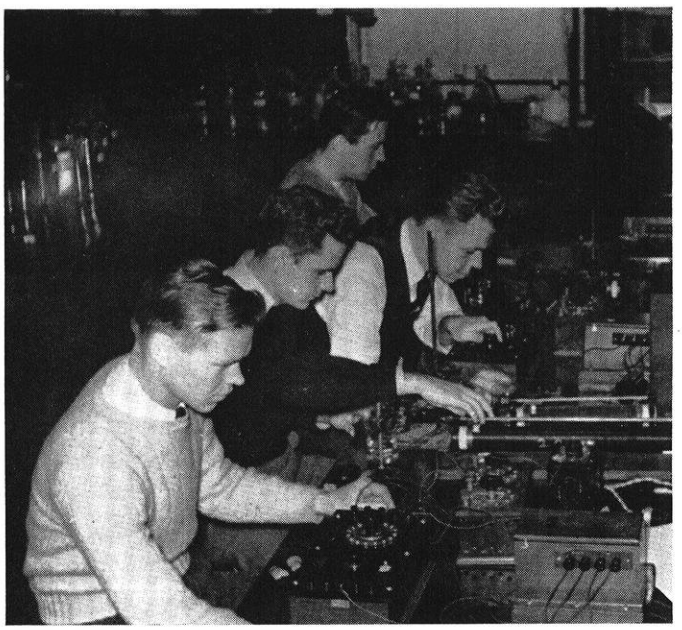
Apparatus	Number Tested
Linemen's rubber gloves and blankets	1437
Portable watthour meters	47
Instruments, instrument transformers, etc.	87
Electric fence controllers	21
State institution projects, spec's.	9

etc., etc.

Electric fence controllers are tested for the Industrial Commission to determine if safe for human beings. Such tests require the use of an oscillograph in observing the time of shock, peak current, total charge, etc. Such tests often require a week to obtain data and another week or two to prepare the report.

Much credit is due Professor Royce E. Johnson who expanded the work of the laboratory for several years prior to 1943. Mr. Johnson accepted opportunity to work for the Barber-Colman Co. at Rockford, Illinois, on Jan. 1, 1943. He is their chief electrical engineer, development section. Professor Ludvig C. Larson "inherited" the job from Professor Johnson and has carried on the work for the past 14 months.

Part of the work of the laboratory is done by a small group of electrical engineering students employed by the laboratory under the supervision of Professor Larson. At present six students are so employed: Clarence Riederer (EE 3), Joseph Marsh (EE 4), Otto Schreiber (EE 4), Gerald Keppert (EE 2), and Alvin Vick (ME 2). Correspondence, filing, and secretarial duties are handled by Miss Dareen Goetsch (BA 2). Besides the financial aid derived from such work, these students gain valuable knowledge and experience which, as has often happened in the past, forms a basis for their future work in industry.



The accuracy of instruments such as these are maintained by the Standards Lab.

The laboratory has a policy of calling upon other members in the department of electrical engineering when tests call for the services which can best be given by those whose major field is, say, high voltage testing, testing of dielectrics, radio equipment, and power apparatus.

The director of the laboratory is required to teach students, and ordinarily gives courses in electrical measure-

(continued on page 18)

Campus Notes...

by John Tanghe, e'44

Lawyer-Engineer Feud!

We present here a summary of the "unofficial" highlights of the recent St. Pat's activities:

Wed., March 8—Engineers erected "Oscar," the steam man, on Bascom Hill.

Sat., March 11—Lawyers stole the pipe man during the night.

Sun., March 12 — Engineers from Triangle and Theta Delta Chi found "Oscar" beside Lake Monona after a half-day search. That night a group of unidentified engineers placed a jalopy on the steps of the Law School, and painted the windows and puttied the keyholes of said building.

Tues., March 14—Wayne Marcouiller, Polygon prexy, issued statement to Daily Cardinal frowning on retaliatory activities of the engineers.

Wed., March 15—Engineers put steam man back up at 7 a.m. At noon group of lawyers made off with "Oscar" in a truck.

Thur., March 16—"Engineer" sign appeared on new part of Law Building late in evening. Group of engineers surrounded lawyers' house on Monroe Street as part of attempt to regain "Oscar."

Fri., March 17 (St. Pat's Day)—Lawyers removed stench-bomb from building and sawed through locked trap door to remove "Engineer" sign on outside. Subtle propaganda leaflets "exposing" the law students were passed out on the campus by engineers. Lawyers passed out similar counter-propaganda. George Robbins thrown in jail for his supposed activities of the previous night, but released when proved innocent. Elwood Buffa, MESW president, and Bob Jirucha kidnapped by "shysters." Bob escaped, but Elwood was carted about the campus locked up in a cage. St. Pat's celebration was climaxed with a banquet for the candidates and chairmen, followed by a really swell dance.

By now you know that

Arleigh Larson, president of Triangle, was elected St. Pat of 1944, representing the mechanical engineers. His competitors were: Otto Schreiber, electricals; George Zuehlke, civils; and Dick Fein, chemicals. The beard-growing contest was won by George Zuehlke, closely followed by Schreiber and Fein. The dance Saturday night was M-C'd by Roland Wetzel, V-12 ChE, while Ed Daub, also a V-12 ChE, wowed the audience with his interpretation of "Casey at the Bat."

We sympathize with

Bill Wendt, ME 3. Poor boy, he's done gone and got himself engaged! The poor girl? Hazel Friedrich, BA 2.

The roles of Frank Sinatra and Bing Crosby,

respectively, are now being taken by Joe Thoma and Art Sarris, ME 3's. These fellows use Joe's recording set to make mock records of the famous singing stars.

Off the record—

Profs. K. Wendt and B. Elliott recalling fond memories of past St. Pat parades at the St. Pat banquet and telling how shillelahs were once sold instead of buttons.

Harvey Nienow (ME 4) and Will Schaumberg (EE 4) confusing friends by calling each other "Pop" and "Son."

George Shampo defying the cold of Kappa Eta Kappa's new sleeping porch by wearing the following attire to bed: red flannels, sweat shirt, sweat socks, seven blankets on the bed.

Norman Kohlhardt (EE 4) and date crashing the formal short-course prom in plaid shirts.

Two girls warming themselves by "Oscar's" steam at one o'clock in the morning. Engineers kicking themselves for not placing the steam man directly in front of Abe Lincoln's statue.

Theta Chi, Triangle, and Theta Delta Chi being largely responsible for the fun and success of the St. Pat's activities.

Dave Knoerr (CE 4) falling prey to pranksters and unconsciously using stale beer for hair tonic.

Joe Hammersly meeting with defiant resistance from both students and Dean Johnson after attempting to arrest three engineers for smoking in the M.E. building.

Theta Chi and Theta Delta Chi,

composed almost entirely of engineers, have proved within the last few weeks that engineers can put on some really good parties. The hard-time party at the latter and the informal radio party (with two nice fireplaces) at the former were plenty O.K., they tell us.

Members of Kappa Eta Kappa,

now settled down in their new house, are planning their semester's social program. First event will be a blind-date exchange get-together with Sigma Lambda, art sorority, on March 31 . . . oh boy!

Radio remote-control

for their flying model airplane is being worked out by

(continued on page 16)

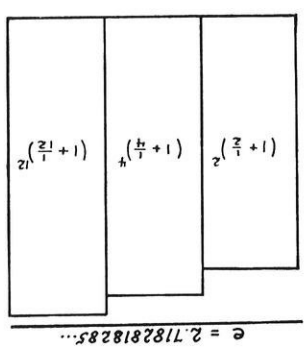
Mathematical Morsels

by Walt Graham, me'44

HERE and there there's pure amusement in mathematics. Usually it's there but here it's here.

Nothing appeals to us like pie, or let's drop the "e" since it is the "natural" thing to do; let's say we've a reasonable interest in pi. That the circumference of a circle bore a direct relationship to the diameter was known before we were freshmen. In the Book of Kings and in the Chronicles its value is given as 3. Later the Egyptians had it as 3.16. Archimedes (about 250 B.C.) narrowed pi between 3 1/7 and 3 10/71. In the time of Claudius Ptomely (150 A.D.) the constant, for all practical purposes, had its present value. Archimedes' method was very interesting. Drawing a circle, he inscribed and circumscribed it with squares. Letting the diameter be unity, pi was then a value between the perimeters of the two squares. He then "bent" the sides of the inner squares in the middle to form an inscribed octagon and cut off the corners of the circumscribed square to form another octagon. Pi was then between the closer limits of the new perimeters. Archimedes continued this process until he had polygons of 96 sides with which to obtain his value. With the innovation of calculus, however, the sugar was added to the pi and its calculation made much simpler. In 1699 pi was evaluated to 71 places, in 1824 to 200 places, in 1854 to 500 places, and in 1873 to 707 places, which is its present status. It is estimated that even with the most rapidly converging series of today it would take about ten years to find pi to 1,000 places. Let's look at something else!

It is interesting that **probe** and **probability** have the same Latin "root," so why not probe into probability?



Graphically Solved?

When you paddled down through the province of Oudh on the river Ganges and into Benares, the sacred city of the Buddhists and Hindus, you no doubt noted the wondrous mosque on the hill. Within this shrine is a brass plaque in which three diamond pins are imbedded, upon one of which at the time of the creation Buddha placed sixty-four gold disks, each smaller than the one beneath it. The priests of the temple were charged to move these disks eternally from one pin to another, moving only one at a time and placing no disk so that a smaller lies beneath it, until all the disks had been transferred to another of the pins. When this is completed the temple is to crumble and the earth to vanish. If the priests moved the disks at the rate of 20,000 a day, and have been doing so for a million years, an interesting solution awaits you.

For Gamblers Only

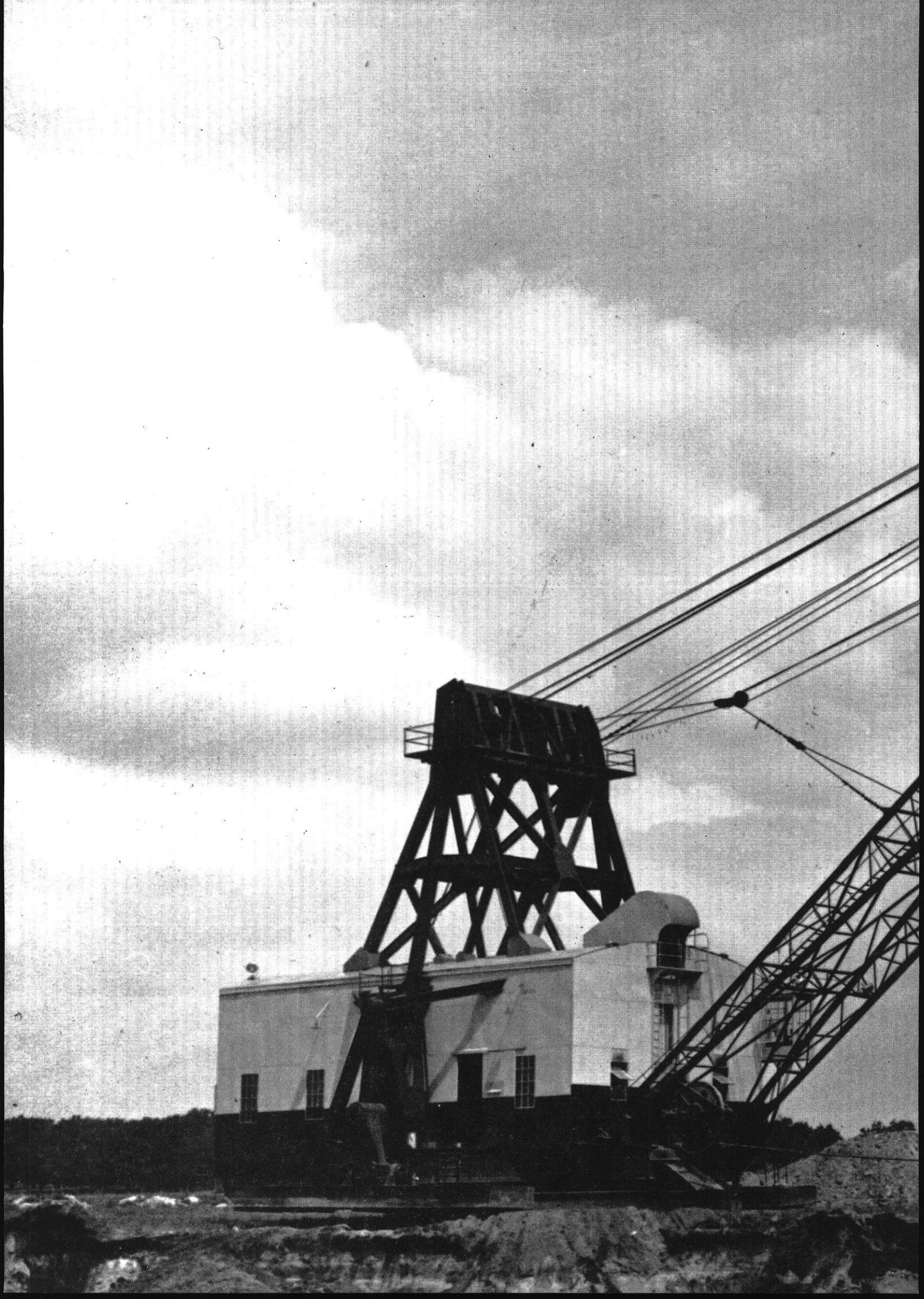
Probably you are more interested in gambling than discovering when the world will end—even if it is tomorrow. However, you are warned that the results are disheartening.

My slide rule, please!

If you stake some given fraction of your fortune, not a big percentage if you like, on each play of a game in which the chances of winning and losing are equal and continue to bet the same fraction of your new fortune on each successive play, you will always lose in the long run. If you are riding the horses when the dominos gallop, look out! The odds are 251 to 244 against you (neglecting the pair in your pocket).

If you are skeptical, witness the case of our good French friend (and gambler), Monsieur Chevalier De Mere. Mere would bet even money that he could roll a six in one out of every four throws with a die. (Investigation

(continued on page 20)




MARION

CAMPUS NOTES . . .

(continued from page 11)

Clyde Meerdink (EE 4) and a friend. According to Clyde, the motor-driven model will have controls enabling complete manipulation of the plane's flight from the ground.

•

SOCIETY MEETINGS

A.I.Ch.E.

At the meeting of the A.I.Ch.E. held on Wednesday, March 15, in the Top Flight of the Union a very interesting talk on the various phases of research being carried on at the university was given by Prof. O. A. Hougen.

Preparations were made for the coming membership campaign. In connection with membership it was decided that those persons who have been members for three years would be given free membership during their fourth year.

A request was made for information regarding the location of "Oscar" and before the evening's end "Oscar" was reported to be at places from Middleton to West Allis.

Refreshments were served in the Chemical Engineering Auditorium after the evening's business was concluded.

—Richard Novotny

A.I.E.E.

On Tuesday evening, March 21, Mr. Nevin Funk, national president of A.I.E.E., addressed members at a joint meeting of the Madison section, Rock River Valley sub-section, and student branch of A.I.E.E. Mr. Funk, now on his annual tour of the branches throughout the country, spoke on "Modern Frontiers" at a dinner meeting at the Heidleberg Hofbrau. Mr. Funk, who holds the rank of "fellow" in A.I.E.E., has had wide experience as an operating and executive engineer with the Philadelphia Electric Co. and several utilities.

•

Among the professors—

Several members of the engineering faculty left the university at the close of last semester:

Instructor T. C. Fong, Chinese member of the chemical engineering faculty, left the university to work for Shell Development Co. Mr. Fong, who received his Ph.D. degree here in 1943, has been a member of the staff ever since then. He hopes to spend several years in industry getting experience and then wants to return to China.

Mr. D. N. Hanson, also a chemical engineering instructor, is likewise going with the Shell Development Co. Mr. Hanson obtained his doctor's degree here in May, 1943, and taught for two semesters.

Mr. E. H. Scheibe, instructor in electrical engineering, left at the end of the semester to work for the Jansky and Bailey Co., consulting radio engineers in Washington, D.C. Mr. Scheibe was a student at Wisconsin from 1936 to 1940. Since that time he taught in the math, physics, and E.E. departments. He was a member of Eta Kappa Nu, Pi Mu Epsilon, Tau Beta Pi, and Sigma Psi.

STATIC . . .

(continued from page 20)

"Is my face dirty or is it my imagination?"

"Well, your face is clean, but I don't know about your imagination."

o o o

Kodiak, the Eskimo, was sitting on a cake of ice telling a story. He finished and got up.

"My tale is told," he said.

o o o

Anyone can play bridge, but it takes a cannibal to throw up a good hand.

o o o

"This is a splendid fit," said the tailor as he carried the epileptic out of the shop.

o o o

The hen in the basement was laying in a supply of coal.

o o o

Pledge (at dinner table): "Must I eat this egg?"
Brother: "Yer damn right!"
Silence . . . . .
Pledge: "The beak, too?"

o o o

POME

I used to think that calculus
Was something to bewilder us.
I simply could not understand
Those weird looking integrands.
Coordinates, polar and Cartesian,
Were things not given to my reason.
The formulas with sine and cos'n
To use with polar axis chosen,
Were bad enough, and yet I saw
For revolution, Pappus' Law.
And what is done, in all creation,
With double or triple integration?
Except to find what's in the void
Of an hyperbolic paraboloid
(That funny shape, that was, perchance,
The mold for Uncle Willie's pants.)
I'll never have affinity
For functions at infinity,
And therefore ever must be wary
Of limits come imaginary.
And further still my brain it wearies,
When coming to the power series.
Those long and troublesome equations
For finding logarithmic relations.
And so it goes from fall to spring
With calculus and everything.
Math's hard at first, but when applied,
Is a handy weapon at my side.
To master calculus this year
Will help me be an engineer.

—By Cal Knoke, CE 2.

Hands that Command the Nation

THE TECHNICAL KNOWLEDGE, the ingenuity and the resources of America are at the disposal of our skilled medical officers on the fighting fronts of the world. They command every aid the nation can supply. That is one reason why a wounded man's chances of survival are greater today than they have been in any other war.

Among the materials that are helping medical men in their fight to save lives are the *stainless steels*. Used in operating tables, surgical instruments and in other medical equipment, stainless steels are serving in hospitals in this country and overseas.

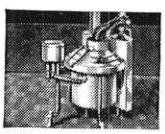
Frequent sterilization with high temperature steam or strong disinfectants will not injure stainless steels. Their smooth, hard surface is easily kept free from germs that can cause fatal infection. Even in the damp tropics, stainless steels do not rust. Tough and durable, free from the possibility of chipping, stainless steels can withstand the rigors of wartime use.

On the home front, too, stainless steels are making their contribution to the health of the nation. Because they are easier to clean and keep clean than other metals, they are widely used in equipment necessary to the processing, preparing and serving of foods. They keep their bright finish, impart no flavor to food, and resist food chemicals. They will be used increasingly in restaurants, in the home, and in many industries where their unique properties are so desirable.

Stainless steels are "stainless" because they contain more than 12 per cent chromium. Low-carbon ferrochromium, a research development of ELECTRO METALLURGICAL COMPANY, a Unit of UCC, is the essential ingredient in the large-scale production of stainless steel. Units of UCC do not make steel of any kind. They do make available to steelmakers many alloys which, like ferrochromium, improve the quality of steel. The basic research of these Units means useful new metallurgical information—and better metals to supply the needs and improve the welfare of mankind.

▼

Members of the medical profession, architects and designers are invited to send for booklet P-3, "THE USE OF STAINLESS STEELS IN HOSPITALS." *There is no obligation.*



CARBON FOR HEALTH. Research by a UCC Unit has resulted in different forms of carbon used in milk irradiators, "sun" lamps, gas masks—and in air conditioning installations.

GASES FOR HEALTH. LINDE oxygen U.S.P. made by a Unit of UCC is used by the sick in hospitals and at home—and it contributes to the safety of our high flying aviators.

CHEMICALS FOR HEALTH. Synthetic organic chemicals, developed by a Unit of UCC, mean better anesthetics, more plentiful sulfa drugs, vitamins and other pharmaceuticals.

PLASTICS FOR HEALTH. BAKELITE and VINYLITE plastics, produced by UCC Units, mean sanitary paints, floor coverings, sheeting, "burn sleeves" and other essentials.

BUY UNITED STATES WAR BONDS AND STAMPS

UNION CARBIDE AND CARBON CORPORATION

30 East 42nd Street UCC **New York 17, N. Y.**

Principal Units in the United States and their Products

ALLOYS AND METALS
Electro Metallurgical Company
Haynes Stellite Company
United States Vanadium Corporation

CHEMICALS
Carbide and Carbon Chemicals Corporation

ELECTRODES, CARBONS AND BATTERIES
National Carbon Company, Inc.

INDUSTRIAL GASES AND CARBIDE
The Linde Air Products Company
The Oxweld Railroad Service Company
The Prest-O-Lite Company, Inc.

PLASTICS
Bakelite Corporation
Plastics Division of Carbide and Carbon Chemicals Corporation

STANDARDS LAB . . .

(continued from page 10)

ments, illumination, photometry, and some of the fundamental required courses. Professor Larson also often prepares specifications and plans for large state institutions. This work has been assumed by the laboratory in order to keep abreast of the practice in wiring large public buildings. The work is done under the direction of Mr. Charles A. Halbert, State Chief Engineer, and Mr. Roger C. Kirchhoff, State Architect. The specification work includes illumination design, signal systems of all kinds, as well as the regular systems for power. Current examples include the electrical layouts for a 300-bed hospital at King, Wisconsin, and design of control mechanism circuits at the Waupun state prison.

In spite of the achievements of the laboratory, the laboratory itself presents many handicaps and "headaches." Crowded conditions and lack of fireproofing offer a constant hazard to the $20,000 worth of equipment, and lack of sufficient help is slowing up the work. Air-conditioning is another urgently needed improvement to keep delicate equipment and parts free from the dust and dirt in the air.

The University, and the engineering school in particular, may rightfully be proud of the splendid work the Electric Standards Laboratory is doing. The value of such service to scientific and public advancement goes unquestioned.

SHRINK FITS . . .

(continued from page 7)

of operation and adaptability to mass production, which has made it the more important method in use today.

A very illustrative example of experimentation with refrigerants is in the Dodge Division of Chrysler Corp., in Detroit, where shrink fits were first practiced with the use of dry ice back in 1932. Today Dodge reports that deep-freeze units are used entirely, at a reduced operating cost of 17 to 1. That is, $175 spent for electric current will do the same as $3,000 formerly spent for dry ice.* Apparently this does not take into account the higher initial cost of the freezer unit, but it is quite obvious that this cost would soon be offset by the reduction in operating costs. The Ford Motor Co., on the other hand, reports that shrink fitting valve seats in cylinder blocks has been a standard operation for 10 years, and they apparently use liquid air as the refrigerant with satisfactory cost reports.*

Examples such as these only go to show that shrink fits are still in their experimental stage. Only a few companies had done much work along this line before the war, but today the majority of companies in war industries are employing this method, either singly, or in some few cases along with expansion by heating. It is from the reports of these companies that this information has been gathered, and it is only reasonable that the methods in use are based chiefly on a few experiments, or satisfactory results, rather than thorough experimentation. These facts lead one to believe that the method of tomorrow will be an efficient refinement of the methods in use today.

Finally may I summarize some of the advantages and disadvantages of shrink fitting as compared to expansion and press or drive fitting. First, in the case of shrink vs. expansion, we note that negative temperatures do not involve the danger of change in metallic structure, nor the chances of warping and scaling found in higher temperatures. At the same time the newer designs in mechanical refrigerators enables automatic devices for feeding and removing parts from the machine, without large furnaces and heated working condition. In the case of press fits, the mechanical strains and fatigue failure often produced by pressing or driving are reduced to a minimum, at the same time reducing bending, springing, and scoring troubles almost entirely. The cost factors, at present, are about on even terms, with the future pointing in the direction of the mechanical freezing unit. The chief difficulties center around the rate of cooling, the temperature differential necessary and obtainable, and the high rate of expansion involved the minute the metal is exposed to room temperatures. Precautions must also be taken against flesh burns, as these are as bad if not worse than those obtained from high temperatures.

*Metals & Alloys, July 1943.

STATIC . . .

(continued from page 26)

"Yes, she's married to a lawyer, and a good honest fellow, too."

"Bigamist!"

o o o

Some doctors direct their patients to lie always on the right side, declaring that it is injurious to the health to lie on both sides. Yet, lawyers as a class enjoy good health.

o o o

There is nothing strange about saying that the modern girl is a "live wire." She carries practically no insulation.

o o o

I once had a classmate named Jessar
Whose knowledge grew lesser and lesser;
It at last grew so small—
He knew nothing at all—
And now he's an engineering professor.

o o o

Maryann: "Are you in town for good?"
Henry K.: "Naw, I'm in the Navy."

o o o

"What's the matter with your finger?"

"Oh, I was downtown getting some cigarettes yesterday and some clumsy fool stepped on my hand."

o o o

Sign in library: "Only low talk permitted here."

MATH MORSELS . . .

(continued from page 12)

will show that the correct number of throws for equal chances of winning and losing is 3.8 and therein his advantage.) However, to make his game more attractive he decided to use two dice and bet that he could roll "box cars" in one out of 24 throws. Mere claimed that if he won with one die betting on four throws, with two dice and therefore just six times the possible number of results, he should win in 24 throws. He didn't and wrote scandalously concerning the inconsistency of mathematics. He addressed his friend, Pascal, who further wrote Fermat, and he was shown that the number of throws for equal chance was 24.605. Therein lay his difficulty.

There is no more fitting way to close than with free beer. In a small Mexican border town the currencies of both countries are used. But an American dollar is worth only ninety Mexican cents and vice versa. An American went to the Mexican side of town and bought a ten-cent beer with a Mexican dollar and got an American dollar, worth only ninety cents, in change. He then went to the American end of town and bought another ten-cent beer with the American dollar and got a Mexican dollar, again worth ninety cents, in change. This continued. Question: Who paid for the beer? Answer: Who cares—let's go!

If every boy in the United States could read every girl's mind, the gasoline consumption would drop off fifty per cent.

o o o

Two old maid school teachers, spending their sabbatical year exploring western Canada, stopped at a small old-fashioned hotel. One of the pair could not rest until she had made a tour of the corridors to hunt out exits in case of fire.

Unfortunately, the first door she opened turned out to be the public bath, occupied at the moment by an elderly gentleman taking a shower.

"Oh, excuse me," stammered the lady. "I'm looking for the fire escape." And she backed out hurriedly.

To her dismay, she hadn't progressed far along the corridor when she heard a shout. There was the old gentleman, garbed only in a towel, running madly after her with the frantic cry:

"Where's the fire?"

o o o

"Young man, I understand that you have made advances to my daughter."

"Yes, sir, I wasn't going to say anything about it but now that you have, I wish you could get her to pay me back."

o o o

There was a little dachshund once,
So long he had no notion
How long it took to notify
His tail of his emotion,
And so it was that while his eyes
Were filled with woe and sadness,
His little tail kept wagging on
Because of previous gladness.

o o o

A date with a modern girl is an open and shut proposition: she's always eating.

o o o

Roommate: "Hey, wake up! There's a guy in here stealing your clothes!"

Awakened: "What do you want me to get up for? You two just fight it out between yourselves."

o o o

Did you hear about the moron who transferred from Wisconsin to Minnesota and raised the I.Q. of both colleges?

o o o

"Aren't you the little girl who used to shrink from my embrace?"

"I don't recoil at the moment."

o o o

Doctor: "You must avoid all forms of excitement."

Engineer: "Gee, Doc, can't I even look at them on the street?"

o o o

Preacher: "I had a very enjoyable trip to the Adirondacks. The first day I shot two bucks."

The Sport (absently): "Win anything, parson?"

Sand in Adolf's eye...

THIS man is a glass chemist. And the sand he's working with is going to get into Adolf Hitler's eyes and hurt.

Here's how. Glass, basically is made from sand. And glass in this war, in the skilled hands of American glass makers, is a potent weapon. It replaces metals on many jobs, metals needed for killing Huns and Japs.

In bombsights and fire control instruments glass helps to rain accurate death on the enemy. In heavy industries, such as the explosive industry, its characteristic resistance to corrosion speeds powder output. Glass in medical and laboratory fields puts us and our allies ahead in hospital treatment and in vital laboratory developments.

The U.S. is lucky in having a well established glass industry and not having to lean upon any part of the outside world for this essential material. Glass was ready for war, and was able to contribute to the speed records set by other industries such as gasoline and synthetic rubber.

It took a lot of research to make American glass the best in the world. At Corning way back in peacetime, more than 200 laboratory men were working steadily on new forms of glass and new uses for this amazing material. More than 25,000 formulae for glass were developed. Today around 250 different types of glass are in production under the "E" pennant at Corning's main plant.

There are glasses for example that withstand corrosive chemicals, that cannot be harmed by heat, that have high electrical insulating qualities, that are extremely resistant to mechanical breakage. And these are only a few of the reasons that engineers, too, consider glass the material with endless possibilities for the future. Corning Glass Works, Corning, New York.

CORNING
means
Research in Glass

Alumni Notes...

by Arnold Ericsen, ChE'44

Mining and Metallurgicals

EASTWOOD, L. W., min '29, ms '30, Phb '31 is now Vice President of the Maryland Sanitary Manufacturing Corp. and is in charge of the Magnesium foundry at Baltimore.

GIBBENS, DAVID, min '42 is a mining engineer working for the Oliver Iron Mining Company at the Richelieu Mountain Iron and Fayal Mines, located at Virginia, Minnesota.

GIBBENS, JOHN, J. '41 is an army meteorologist stationed in New Guinea. Previously, he had been located in Australia.

HENDY, ROBERT, has been promoted to a first Lieutenant in the Army, and is in charge of heavy bomber maintenance at the army air base located at Alexandria, Louisiana.

Mechanicals

BLOEDORN, CHARLES W. '34, recently spoke at the meeting of Engineers Society of Milwaukee. For the past ten years he has been with Allis-Chalmers Mfg. Company where he has worked on the selection of, installation, and efficiencies of turbines in operation throughout the world.

KOMMERS, ENSIGN WILLIAM J., whose engagement to Miss Janet Jordan was recently announced, is now stationed at Princeton, N. J., serving in the Naval Reserve.

SOGARD, RALPH H., '26 is in charge of Flight engineering for the Goodyear Aircraft Corp. at Atkron, Ohio.

Civils

PLOTZ, R. S., '30 is working with the Bell Telephone Laboratories Inc. as a member of their technical staff. His work has been in the supervision and administrative work in connection with the development and design of instruments of warfare.

Chemicals

BLISS, WILLIAM D., '13 has recently been appointed dean of the Marquette University college of engineering. He was largely responsible for the introduction of the cooperative plan of education at Marquette whereby upperclassmen divided their time between classrooms and work in Milwaukee industrial plants.

BROWN, JOHN M., '43 has received his commission from midshipman's school and has recently been transferred to Diesel school.

BURSTEIN, V. S., '40 is at present working on his Ph.D. Thesis at the Institute of Paper Chemistry located at Appleton, Wis. His work concerns an investigation of the drying of paper.

HENSEL, WALTER E., '43 was married on the twelfth of February to Miss Katherine Koenecke.

ILTIS, CHARLES, '43 was recently commissioned an ensign and will instruct in electrical engineering on the "Prairie State" ship located in New York harbor.

ISBERNER, W. P., '40 has recently changed jobs, and is now employed by the Minnesota Mining and Manufacturing Company as a Chemical engineer in Synthetic resins.

MORBECK, ROBERT C., '43 was recently married to Miss Virginia Shaw. He is employed as a Chemical engineer for the Standard Oil Development Co., at Linden, N. J.

OATES, LT. WILLIAM E., '43 was married to Mary Jo Norton on March 6, 1944.

PARKER, JOHN, '41 is designing and following through the development stage into production of bullet sealing tanks for all types of military airplanes at the Goodyear Tire and Rubber Co. at Akron, Ohio.

STUEBER, GRANT E., '42 is doing experimental development work on synthetic rubber-like polymers for the B. F. Goodrich Co. of Akron, Ohio.

TOMLINSON, CHARLES W., '44 was married to Florence Fox of Madison on February 27, 1944. "Chuck," who was former Alumni Notes Editor on the ENGINEER staff, is now working for Abbott laboratories near Chicago.

WENGER, DR. H. A. E., '31 has been commissioned a first lieutenant in the army and is now stationed at Camp Barkeley, Texas.

Electricals

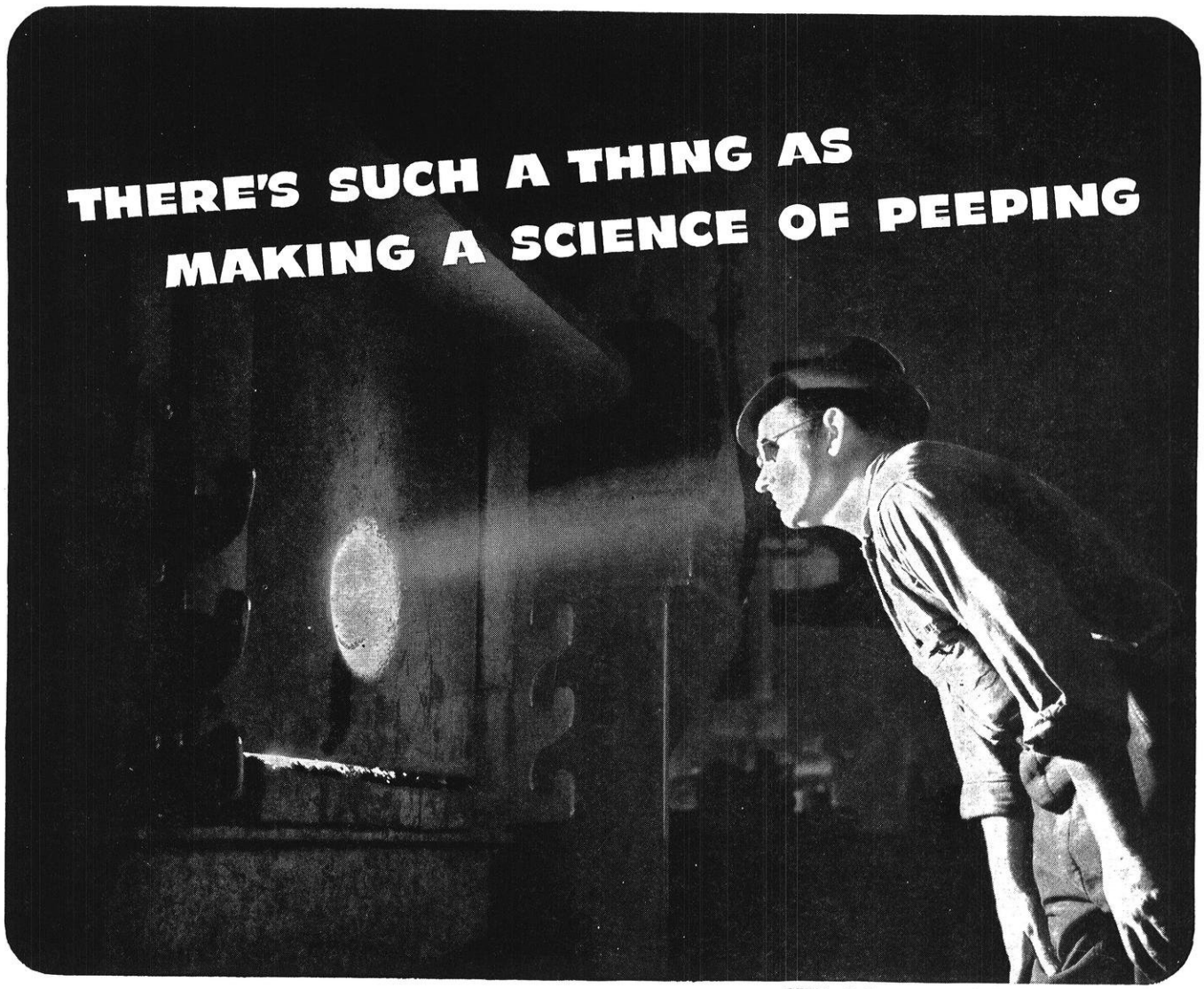
RICE, ENSIGN CLARENCE, '43 is studying at the General Ordnance School located at the Navy Yard, Washington, D. C.

SALAY, JOSEPH, '43 has been transferred to the Bureau of Ships in Washington, D. C.

The following men have recently been transferred from the ASTP unit stationed at the University of Wisconsin to the Signal Corps Officer's Candidate School at Fort Monmouth, N. J.:

AULT, DANIEL

HELFRECHT, DONALD '44



OWI by Palmer, in an Allegheny Ludlum Plant.

WITH this melter, studying the action of some 35 tons of alloy steel in an Allegheny Ludlum electric furnace, peeping is resolved into a science.

His job is one of the earliest in a long series of operations which bring a melt of Allegheny Ludlum stainless, electrical or other alloy steel to its final form, rigidly true to specifications. His experience determines whether the molten mass within the furnace is progressing at the proper rate, and dictates any adjustments necessary to produce the quality of steel specified. His judgment is double checked, of course, by thousands of dollars worth of amazingly accurate testing equipment, built for analyzing with hairline precision.

For, in wartime especially, the properties of alloy steels must be maintained with the utmost consistency. Lives of men—even the outcome of battles depends upon this uniformity, because the place of alloy steels is always in the vital heart of a war mechanism.

Lives and battles depend upon other things in this war, too—matters that come home to every household. Buying bonds, conserving food, fuel, gasoline, rubber, waste fats and scrap metal—all these have to do with how soon the war will be won, and at what price. They are *everyone's* jobs. Have you done —are you doing—*all* you can?

AL
STEEL FOR THE NATION'S WELFARE

Allegheny Ludlum
STEEL CORPORATION
BRACKENRIDGE, PENNSYLVANIA

A-8841 . . . W & D

STATIC . . .

compiled by

Dave Scheets, e'44 and Lee Evans, m'44

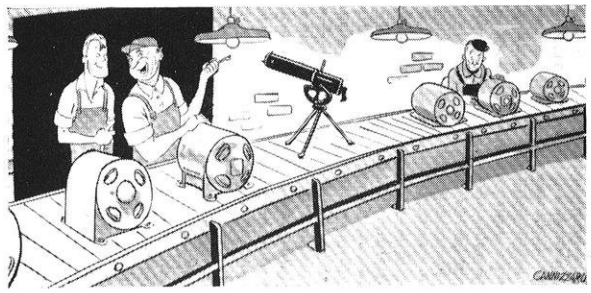
If it's funny enough to tell, it's been told;
If it hasn't been told, it's too clean; and
If it's dirty enough to interest an Engineer,
The editor gets kicked out of school.

o o o

Hammersly: "Lady, there's no red light on your car."
Blonde: "No sir. It's not that kind of car."

o o o

The little moron's watch had stopped ticking and he tried to find the trouble. Finally he took the back off it and went into the works. He found a little dead bug. "No wonder it doesn't work," he said, "the engineer's dead!"



Every once in a while some fellow down the line gets impatient making motors. (Westinghouse)

Two people were walking along a road together. One was a Langdon Hall girl, the other was a handsome young engineer. The engineer, working on a farm for the summer, was carrying a large pail on his back, holding a chicken in one hand, a cane in the other, and leading a goat. They came to a dark lane.

L. H. Girl: "I'm afraid to walk in here with you. You might try to kiss me."

Said the engineer: "How could I, with all these things I'm carrying?"

"Well, you might stick the cane in the ground, tie the goat to it, and put the chicken under the pail."

o o o

The man had just saved the little boy from drowning and was being questioned by the boy's father. "Are you the man who saved little Johnnie from drowning?"

"Yes, I am."

"Well, where the hell is his hat?"

o o o

She was only a miner's daughter, but oh! what natural resources.

Short dresses have the effect of making one look longer.

o o o

"Dearest, your stockings are wrinkled."
"You brute! I haven't any on."

o o o

"I'm not the happiest person in the world, but I'm next to the happiest," murmured the supreme egotist as he took the sweet young thing into his arms.

o o o

The three Chinese sisters who aren't married:

Tu-Yung-Tu
Tu-Dum-Tu
No-Yen-Tu

o o o

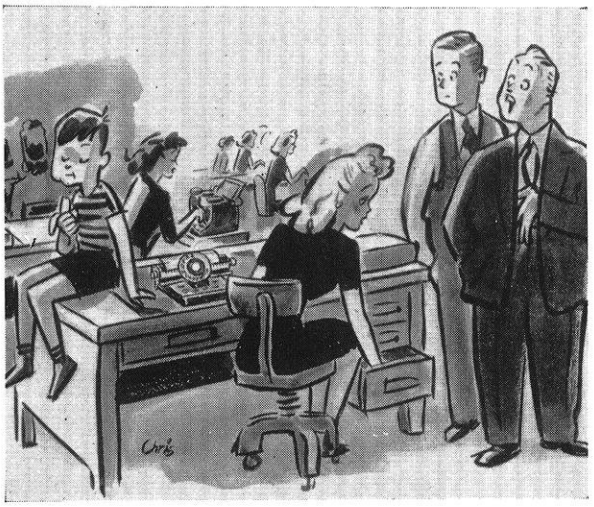
Recipe:

Mix 2 bottles of rum and 4 bottles of brandy. Pour in pitcher with generous supply of grapefruit and ice cubes. Stir, add bitters, sample.

Add 1 bottle of rum and 2 bottles of brandy. Pour in pitcher with grapefruit and ice cubes. Stir, sample.

Add 1 rum of two glasses and brandy. Pour in pitchers all over. Stir, steady, sample.

Add 1 sample, 2 ice cubes over bottle. Steady with stir, and sit.



We just had to have another typewriter, but the kid wouldn't let it out of his sight. (Westinghouse)

(continued on page 26)

"Sacrificial Corrosion"

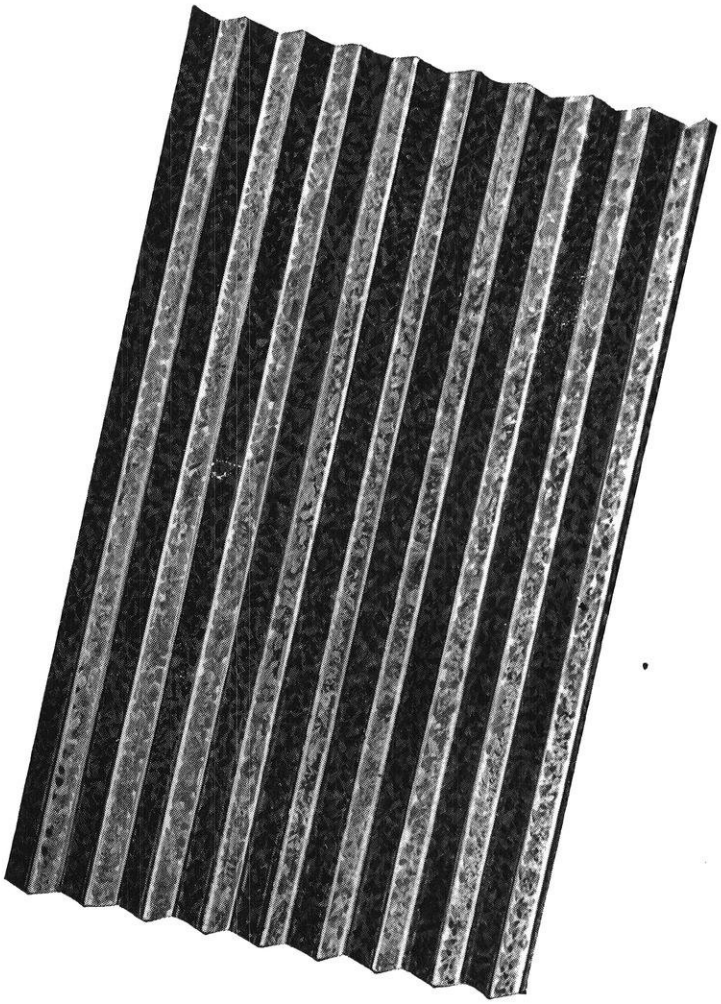
. . . . do you know what it means?

The zinc coating on galvanized sheets or other products protects the iron or steel underneath in two ways: 1, by simple coverage, with a sheath of rust-resistant metal; 2, by electrochemical action or "sacrificial corrosion". The first is clearly understandable, but the second is more complex.

When two metals are put into an acid solution or electrolyte, each will tend to oxidize and to cause an electric current to flow toward the other. The metal more chemically active will oxidize more rapidly and produce the stronger current, and will keep the other metal from oxidizing. This is known as "sacrificial corrosion".

Remember the old "door-bell battery", with the zinc and copper elements? How the zinc gradually oxidized, or corroded away, while the copper was practically unaffected? Here the zinc saved the copper by sacrificial corrosion.

Through an electrochemical action similar to this the zinc on galvanized sheets gives the second kind of protection to the iron or steel base metal: the moisture in the air acts as the electrolyte in microscopic electric cells formed by the zinc and any exposed base metal, and then by "sacrificial corrosion" the zinc keeps the iron or steel from rusting.



ZINC is "by far the Best"

Protective Metallic Coating for the Rust-Proofing of Iron and Steel

KEEP YOUR WAR EQUIPMENT FIT AND FIGHTING — FOOD FIGHTS for freedom

All sorts of buildings for the storage and processing of food are covered, roof and sides, with galvanized sheets. Certain steps can be taken which will make this material render better service and last almost indefinitely. These are described in the booklet "How to Make Galvanized Roofing Last Longer", which the Zinc Institute has prepared as part of its contribution to the "Food Fights for Freedom" campaign. It is a booklet worth having. Write for it—it's free.

American Zinc Institute
INCORPORATED
60 East 42nd Street, New York 17, N.Y.

STATIC . . .

(continued from page 24)

"Where are you going, my pretty maid? Why do you pass me by?"

"I'm on my way to gymnathtic thchool," she lithped as she heaved a thigh.

o o o

A male nurse in a mental hospital noticed a patient with his ear close to the wall, listening intently. The patient held up a finger as a warning for him to be very quiet; then beckoned him over and said: "You listen here."

The nurse put his ear to the wall and listened for some time, then turned to the patient and said: "I can't hear anything."

"No," said the patient, "and it's been like that all day."

o o o

Mother: "Billy, what are you reading?"

Billy: "Esquire, Momma."

Mother: "Oh, all right, dear. I was afraid you had gotten hold of a WISCONSIN ENGINEER."

o o o

There's an engineer on the campus who never takes a drink. You have to hand it to him.

o o o

First Frosh: "Did you see Jack's black eye?"

Second Frosh: "No, how did he get it?"

First Frosh: "He mistook his girl's asthma for passion."

o o o

"I would like to see some alligator shoes."

"What size shoes does your alligator wear?"

o o o

Mary had a little lamb,
Now listen, folks, don't laugh.
Why should we look at Mary's lamb,
When we can see her calf.

o o o

Movie Actress: "I'll endorse your cigarettes for no less than $50,000."

Cigarette Magnate: "I'll see you in-hale first."

o o o

He took her gently in his arms
And he pressed her to his breast,
The lovely color left her face
And lodged on his full dress.

o o o

Then, there is the moron who drank eight cokes and belched 7-Up.

o o o

"Of course you're the first girl I ever kissed," said the senior M.E. as he shifted gears with his foot.

o o o

There were two skeletons locked in a closet. Suddenly one said to the other:

"Say, Joe, if we had any guts we'd get out of here."

(continued on page 20)

NEW STAFF . . .

Harold May

Warren Friske

HAROLD MAY

Harold, our Assistant Editor, is the little fellow who works in the Library. Last semester, he took care of the column, "Profs in Who's Who." An article on shrink fitting by Harold is found in this issue.

In High School at Mineral Point, he worked on the school annual, participated in forensics and was a cheerleader for two years.

Harold has earned his way through school by working in the Library. During his spare time he has found time to become a member of MESW. He is acting president of Holy Name Society at St. Paul's Chapel, and former president of the Catholic Co-op eating club.

His plans for the future are not too certain. At present he is 1A, and he doesn't know whether he will graduate in 1945 or 1955.

WARREN FRISKE

Warren, the new Circulation Manager, is a M&ME who hails from Tomah, Wisconsin. In high school he majored in home economics. At least he says he got the highest grade in the class. If you want a good cook, call G. 6385.

Before coming to the U., he spent three years working about the country. During this time he picked cranberries, worked for the Army QMC at Camp McCoy and took a vacation in Florida.

Warren worked for a year and a half at Oscar Mayer where he belonged to the AMCBWNA (affiliated with the AFL). Upon graduation this June, he plans to get into some phase of Metallurgy—as yet he hasn't decided what company is going to be so fortunate as to have him as an employee.