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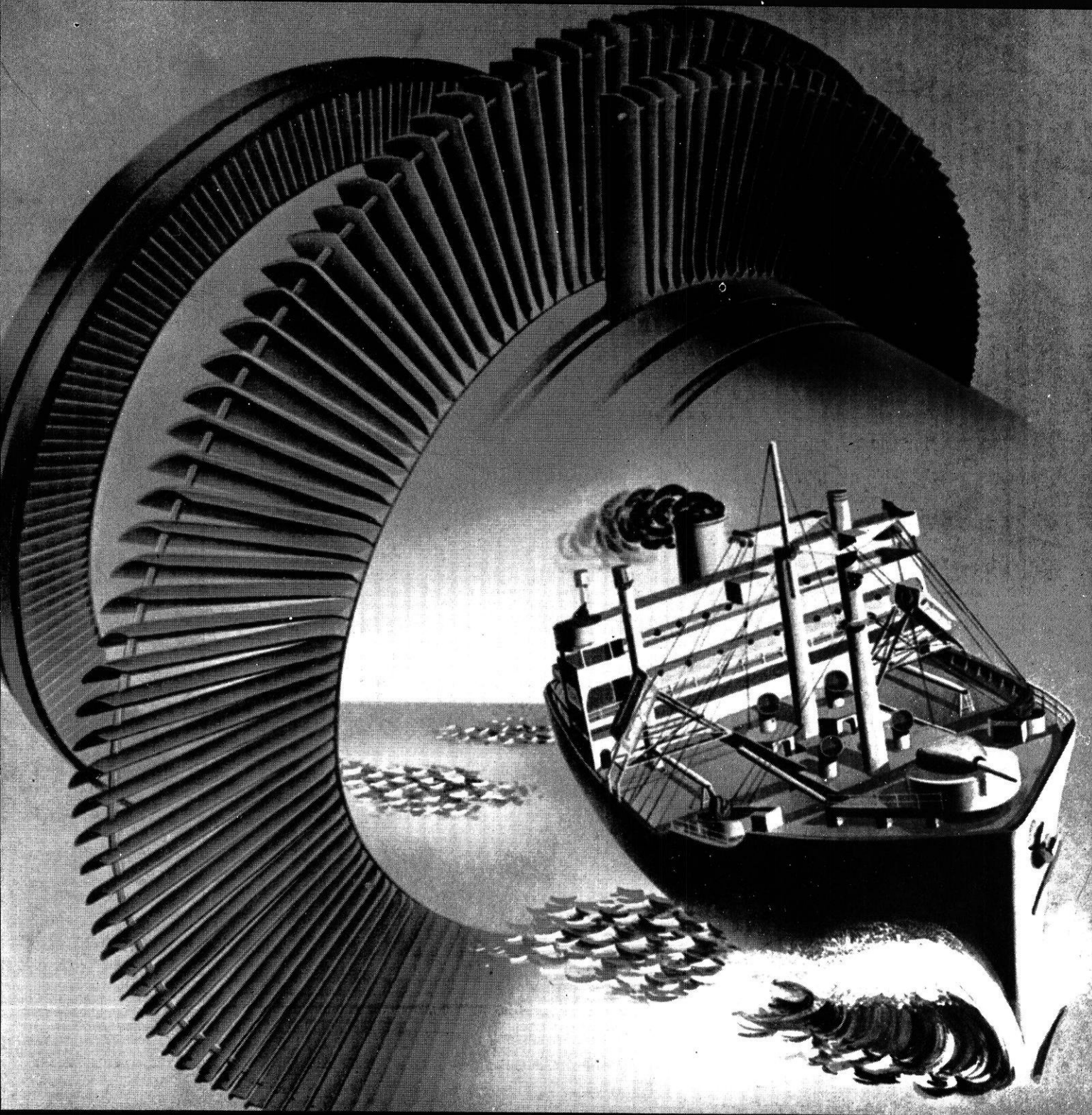
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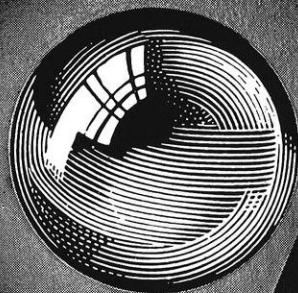
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# WISCONSIN ENGINEER



But how  
do they  
make 'em  
so ROUND?

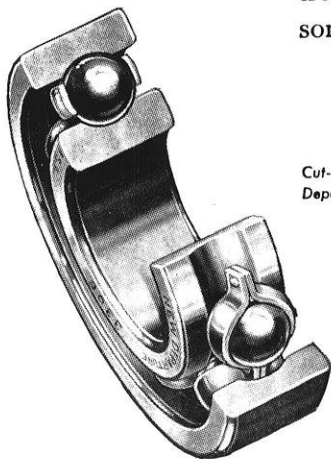


While the steel ball is but one little part of a ball bearing, it's a most important part—and making it "round" is a most important and interesting process.

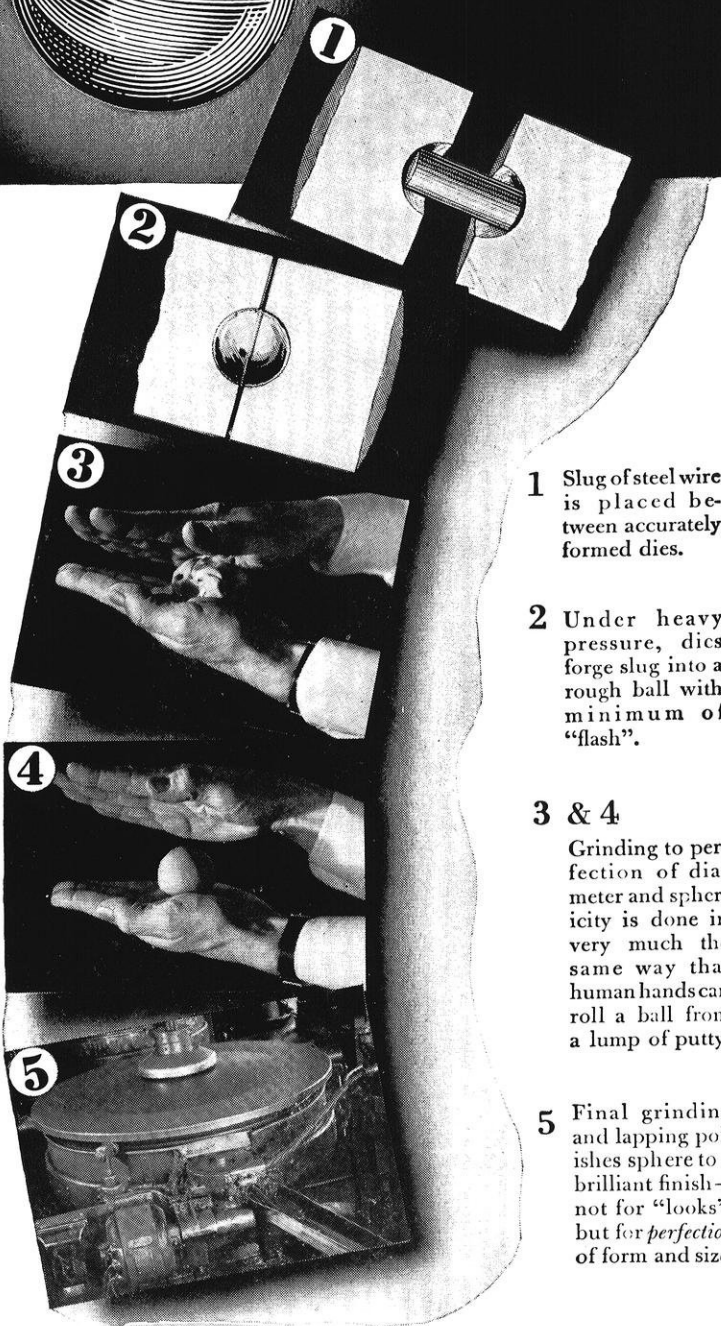
The extreme precision limits obtained (such as diameter within *two one-hundred-thousandths of an inch*) and interesting facts regarding the wonderful strength of the steel ball, are among the subjects covered in our little Booklet "BM".

We will be delighted to send you one for the asking.

Meanwhile, remember that every mechanical device that helps make our civilization possible, has ball bearings in its family tree—somewhere—somehow!



Cut-away view of New Departure Ball Bearing



1 Slug of steel wire is placed between accurately formed dies.

2 Under heavy pressure, dies forge slug into a rough ball with minimum of "flash".

3 & 4 Grinding to perfection of diameter and sphericity is done in very much the same way that human hands can roll a ball from a lump of putty.

5 Final grinding and lapping polishes sphere to a brilliant finish—not for "looks", but for *perfection* of form and size.

nothing rolls like a ball  
**NEW DEPARTURE**  
BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT

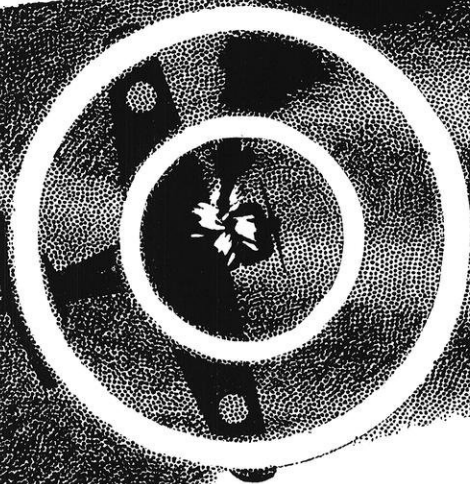
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# CURIOUS FACTS ABOUT LIGHTING

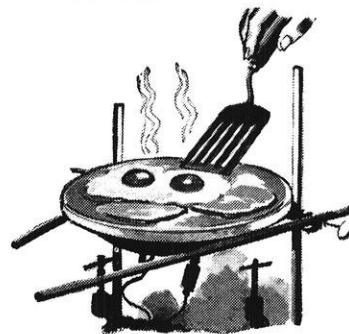


**LIKE SHOOTING FISH IN A BARREL . . .** There was a time when Jap Zeros could "sit in the sun" and come in with guns blazing—protected from our gunners by blinding sunlight. Not long ago, they had an unpleasant surprise. U. S. Army and Navy gunners now have a new Westinghouse gunsight lamp that lets them fire with deadly accuracy—directly into the sun. Formerly, our gunners could aim within only 15 degrees of the sun, leaving a dreaded "blind spot". This has now been removed—and, with it, a lot of Japs.

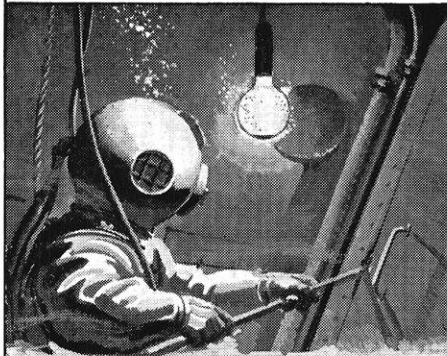
Lamps of 10,000 different types, using from 1/10th to 10,000 watts—incandescent, fluorescent, infrared, ultraviolet lamps, produced at the rate of about 1,000,000 units daily—lamps for seeing, for heating, for fighting disease—wherever you see the Westinghouse Mazda Trade Mark, you'll find top quality!



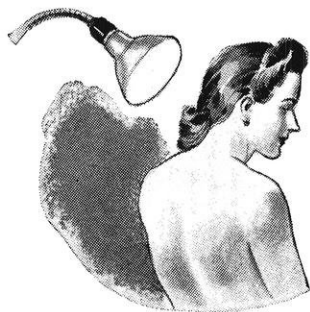
**CEILING, 2000 . . .** Vital "ceiling" information is provided for American fliers by alidade sighting device, which "draws a bead" on a cloud—illuminated by giant Westinghouse searchlight. Height is read directly in hundreds of feet.



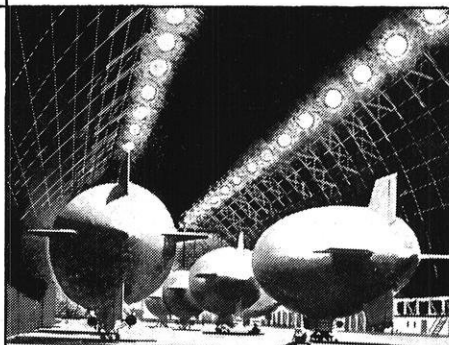
**HAM AN' . . .** New sealed-beam landing lights for army bombers are so powerful that a Westinghouse engineer actually cooked a meal on the surface of an up-turned lens. Infrared rays did the trick.



**DAVY JONES** could find good use for this 1000-watt sea salvage lamp. Inside are loose grains of tungsten which the diver can whirl against the glass—to scour off clouding particles emitted by the filament.



**SELF-CONTAINED SUN LAMP**, developed by Westinghouse, produces comfortable warmth with infrared, as well as beneficial ultraviolet rays. Mercury vapor, electrodes, reflector, and incandescent filament are sealed in a reflector bulb of special glass, which screws into any lamp socket.



**MAXIMUM "SEE-ABILITY"** is provided by Westinghouse 3-kilowatt mercury lamps—in blimp hangars, airplane factories, steel mills, etc. These lamps produce 120,000 lumens of light.

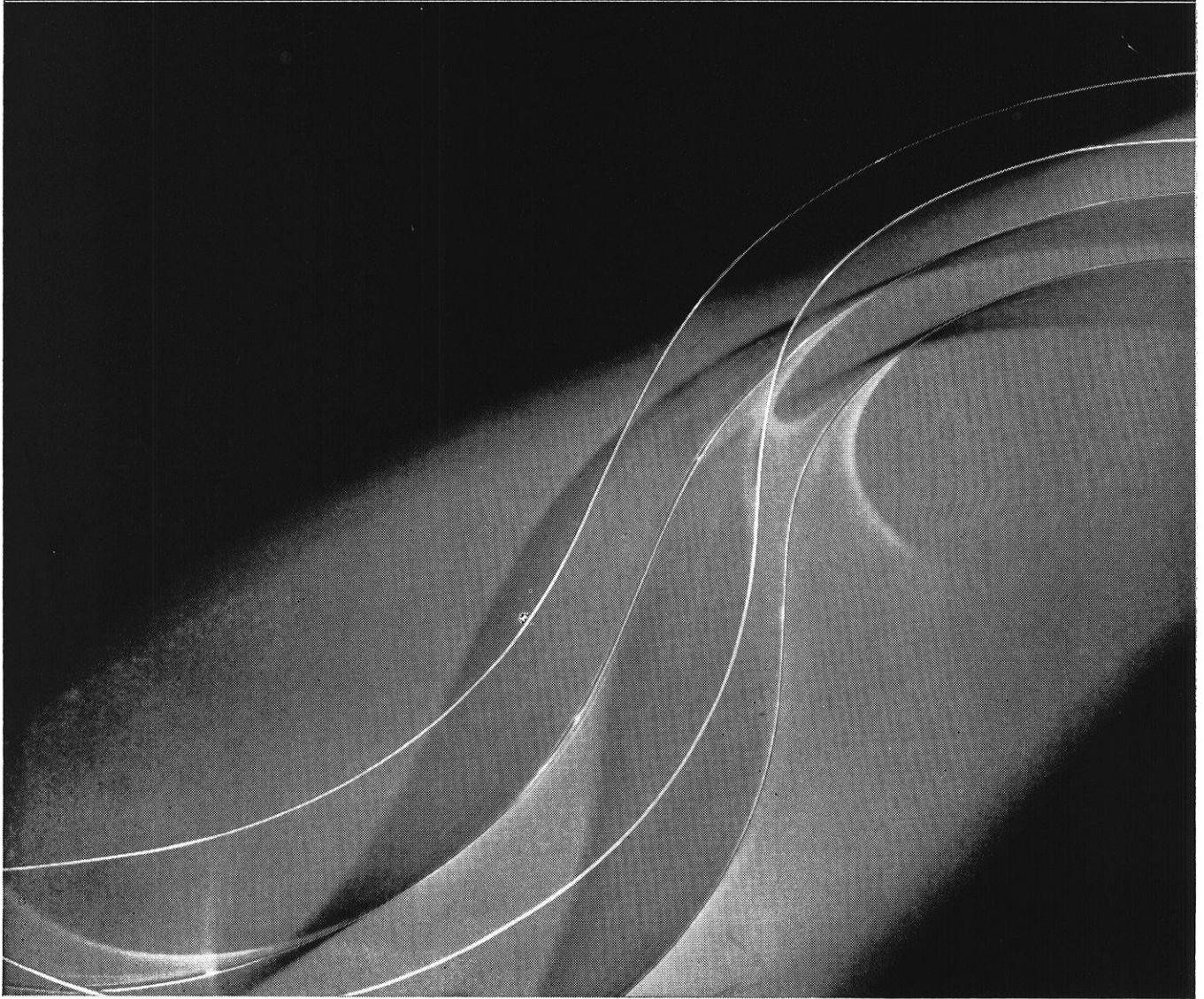
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JOHN CHARLES THOMAS  
Sunday, 2:30 pm, EWT, NBC

**Westinghouse**  
PLANTS IN 25 CITIES OFFICES EVERYWHERE

Tune in: TED MALONE  
Mon. Wed. Fri. 10:15 pm, EWT,  
Blue Network



# Glass like ribbon candy...




WHAT do you think of this?" said the research physicist, hauling out a longwide flexible ribbon of glass as thin as paper. He shook it and it bent and rattled like rain on a roof.

"What's it for?" said the fellow who writes these ads. "Well," said the physicist, "it may have a lot of uses. We haven't had time to explore them all yet. But one we've already found is in wartime radio equipment."

This interesting new type of glass is just one of the many contributions of glass research to the war. For the glass indus-

try has thrown its entire accumulated experience, engineering and research facilities, into the job of putting glass on the fighting and industrial fronts where it can hurt our enemies most.

War and Corning research have put glass in a lot of strange places. For instance, there was a time when almost all piping in chemical plants was alloy of one kind or another. Now chemical people have discovered that glass piping is better for many purposes, and Corning has even developed a method for welding it into continuous lengths. 

What about the business *you* choose to follow? Perhaps someday glass can replace metals, speed production, improve products for you. It has for others, and Corning knows how to apply glass to many different problems. Keep it in mind. Corning Glass Works, Corning, N. Y.

**CORNING**  
— *means* —  
**Research in Glass**

THE WISCONSIN ENGINEER

# Lessons Learned

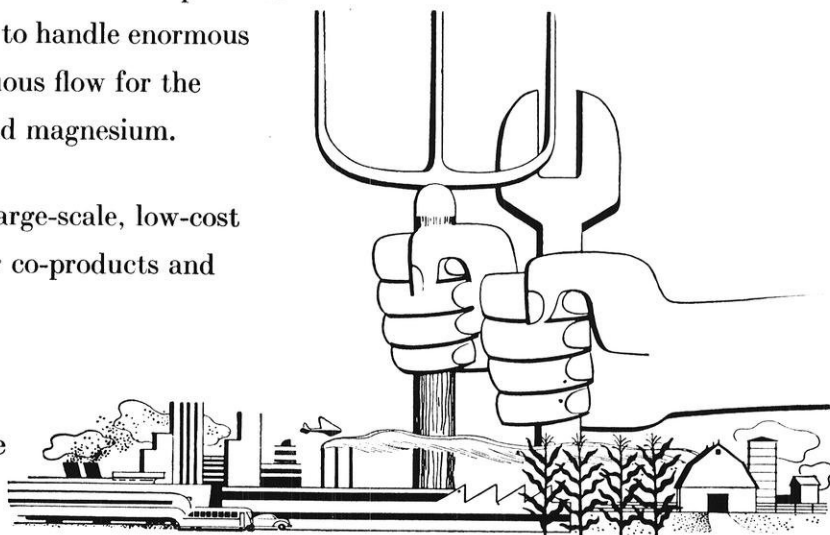
by The Dow Chemical Company for the advancement of industry

College students majoring in chemistry and other technical subjects find special interest in Dow developments. Here are some of the things Dow has learned how to do as producer of more than 500 chemicals essential to industry:

How to specialize in the chemistry of brine by recovering bromine, chlorine, magnesium and other chemicals from a prehistoric salt sea imprisoned far below the surface of the earth—how to handle enormous volumes of ocean water in continuous flow for the recovery of both bromine and magnesium.

How to develop original processes for large-scale, low-cost production of these chemicals, their co-products and related materials.

How to develop plastic materials—Ethocel, Styron, Saran—with distinctive properties of varied usefulness.

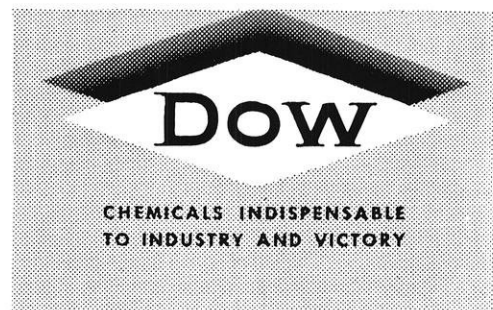


How to develop Dowmetal Magnesium Alloys to give the lightest of structural metals strength, ductility and other essential qualities.

How to fabricate magnesium, aptly called the Metal of Motion.

Such constructive tasks for the advancement of industry provide a fascinating field for men interested in industrial chemistry as a life work. Dow draws heavily on college men to recruit its large staff of technicians and technically trained service and sales employees.

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# WISCONSIN ENGINEER

Founded 1896

Volume 49

JANUARY, 1945

Number 5

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Entered as second class matter September 26, 1910, at the Post Office at Madison, Wisconsin, under the Act of March 3, 1879. Acceptance for mailing at a special rate of postage provided for in Section 1103, Act of Oct. 3, 1917, authorized Oct. 21, 1918.

*Published monthly except July and October by the Wisconsin Engineering Journal Association, 356 Mechanical Engineering Building, Madison 6.*

### Subscription Prices

\$1.25 PER YEAR . SINGLE COPY 15c

## In This Issue . . .

### COVER . . .

*The artist depicts the dependence of the merchant marine upon the steam turbine, as appeared on the cover of September, 1944, WESTINGHOUSE ENGINEER.*

### FRONTISPIECE . . .

*KDKA radio antenna at Allison Park . . . Courtesy Westinghouse.*

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# WOMEN

# WAR

# WORKERS

—Fran Tennis, me'46

**I**N ancient times the armies of the world were practically self sufficient, but today a modern army is more dependent than ever before on the produce and supplies from the "men behind the men behind the gun". In this war there aren't enough of these men, and to keep our fighting forces fully equipped requires the labor of tens of thousands of women.

Because of the excessive demands by the Army and Navy for manpower, the ranks of the laboring man were greatly depleted and in order to supply these men a new source of labor had to be sought. We have imported "Indies Men," Mexicans, war prisoners, but the women of America make up by far the greatest percentage of this new source,—and what surprises me is they are doing remarkably well. Today we find women invading almost every job that was formerly held exclusively by men. They are on the assembly bench; they are on the inspection bench; in machine shops; in ship yards; in foundries; in pattern works; the shipping and receiving rooms; they are even in the "engineers office", and supervise work, besides all their adapted jobs such as nursing, teaching, stenography, and raising a family.

Between semesters I had the opportunity to visit several war plants in the Milwaukee area, and the work women were doing greatly impressed me, so I thought it would be interesting to make a survey to get an idea of what their reactions were and also those of their "foremen", "forewomen", and the men working beside them about "Women War Workers". This survey is by no means complete nor official yet I think it gives a general idea of what the average Mr. and Mrs. John Doe think of W.W.W. It represents the unbiased opinion of 450 women along with judgments passed on to me by "fellow male workers" and shop foremen.

The first question asked:

Do you think that W.W.W. do the non muscular job as good or better than men?

Answered yes—410 —91%

Answered no — 40 —09%

It can be seen that the majority of the women really be-

lieve they can do a man sized job and do it well, yet, every foreman and fellow male workers agreed 100% on the yes answer, saying that W.W.W. were more easily adjusted to tedious monotonous jobs than man and thus at times out produced him.

The second question:

When the war is over do you think W.W.W. should be retained?

Answered yes—222 —49.4%

Answered no —228 —49.6%

The answer here indicates that the women now employed are split as to whether or not they should work after the war. An interesting fact was that most married women answered yes, while all the single girls answered no—what does this mean???

The third question:

Do you think that W.W.W. should be replaced by men and returning veterans after this war?

Answered yes—374 —83%

Answered no — 76 —17%

It appears that the majority of the W.W.W. are willing to give jobs up to returning veterans, yet there are some who can not agree to this because they feel they are doing their jobs as well as any man could. The foremen and male workers agree 100% to replace W.W.W. by returning veterans. There might be some controversy about this after the war.

The fourth question:

Do you think the average woman is as adaptable to running machines as the average man?

Answered yes—410 —91.3%

Answered no — 40 —08.7%

The opinion of the men was a confession that W.W.W. can run a machine and "stick to it" better than a man. They all suggested that a woman can run a monotonous "set-up" job and be much more contented than a man, but that women lack the initiative and foresight to "set-up" machines and assume jobs of great responsibility compared to man. It was also pointed out that the simpler a job was the more content were the women, while a man usually

wishes to assume more responsibility and jobs requiring more strenuous thinking.

The fifth question:

Do you favor a policy of both men and women working together in the same defense plant.

Answered yes—212 —47%

Answered no —238 —53%

The answer, here, was somewhat divided and rightly so??? Those answering yes, claimed it was inspiring to have the opposite sex around and time seemed to "fly faster". While those answering no, said too many acquaintances occurred that resulted in intimacies of man and woman other than their own wife or husband. The men all seemed to favor a segregation of women from men, but I have a feeling that many were enjoying the atmosphere of women and not wishing to say so!

The sixth and last question:

Do you think there is a real spirit of cooperation among women as exhibited among men?

Answered yes—28 —06.4%

Answered no —422 —93.6%

This is perhaps the most interesting question and also has the most interesting answer. I have a feeling it was answered in all sincerity.

The ladies by their own admission said that women "just don't have the right spirit to cooperate" and get along with each other. They said most women were catty and admitted "they" were, implying they were terribly jealous of each other about the affections of the male workers, foremen, jobs, job advancement, wages, machines and particularly over a sweater wearing pretty girl. All were agreed that cattishness and jealousy didn't slow production but insisted that it made them all work that much harder to show "who was better than who".

Some of you might think that these statistics fail to give enough credit to our war working women who are really doing an excellent job. I'm inclined to agree with that, but the statistics also point out that W.W.W. are superior to men in some types of work and being like other men I just hate to admit it.



## A Co-ed Looks

### At An Engineer

—Elizabeth Lean, ch c'47

WITH present ratio of 3 to 1, engineers on the campus have become Objective A in the hearts and minds of some 4,000 co-eds. However, 9 of these engineers are envied because, as women, they can boast of classes with more than 10 fellows. Yes, they do have advantages.

Of course, there was one little freshman who queried, "Who are all those sailor boys with the long orange boxes — are they radio school men?" Madison police may well investigate the disappearance of this girl in connection with the unsolved murder perpetrated this summer. But don't worry, fellows, most of us can spot slide rule cases at 100 yards.

Most females manage to exist through a man-less week by looking forward to a weekend date with an engineer. Comes the big night, and all he is interested in is application of mathematical formulae or the effect of certain physical laws; sometimes, though, he does talk about electrical turbines. There is always the chance, too, that the V-12 engineer will call up on Saturday noon and recite his tale of woe because he was a naughty boy that week. It seems that one of the more lively barracks applied the principle that a lighted match plus firecrackers equals restriction for the weekend at a crucial time this summer.

Some of the "boys" have been accused of standing around and laughing at the poor girls who flop on the icy walks. If they had true love for humanity, they would not spend their extra time constructing these icy slides for the unsuspecting women. Just wait, the girls will fool you and wear slacks for the rest of the winter.

The lake road and hill between E.W. and the carillon tower seem to have a peculiar fascination for engineers carrying steel tapes and other surveying instruments. No doubt fully 99.99% of them are quite familiar with the intricacies of the terrain when provided with entirely different equipment and lighting. Has anyone included the size of the SP stationed on the E.W. pier in his surveying report this far??

We'll let you stay boys: We still love you.





# TRAINING for METHODS

The purpose of methods engineering is to increase productivity of a plant. This is done: first, by analyzing and improving production methods; second, by standardizing methods, tools and equipment; and third, by applying good time-standards to serve as a control on established methods and provide a means for the workers to increase their earnings through their own skill and effort. Any of these steps can increase production, but it is only when all three are co-ordinated that maximum benefits are obtained.

In order to meet the demand for new engineers, the Westinghouse Time and Motion Study Section established a program for intensive and thorough training of prospective methods engineers. It was realized that the program would have to cover instruction in operation analysis and time study procedures, company organization, policies, wage incentive administration, and all other phases of the work.

For more than a year, this training program has supplied men for use in the various plants and divisions. During the period the system has been in use, approximately 200 men have been successfully trained. Thus far each one selected for training has borne out the indications of pre-hiring interviews and aptitude tests.

## SELECTED FOR QUICK ABSORPTION

A successful methods engineer must be above average in experience, intelligence and personality. To set up a quick yet thorough program for training men who will be satisfactory in this work, care must be taken in the selection of men who are able to absorb the material quickly and intelligently and who have the personality to sell their work.

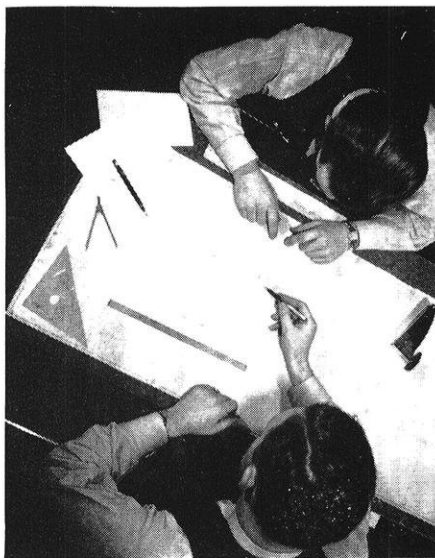
The following procedure has been accepted by our Time and Motion Study Section:

If the record of the applicant indicates previous experience or education which would be helpful in this field, or if he desires work of this nature because of the work itself and not merely for a job, he is granted an interview. The interview is conducted by a trained supervisor who rates the applicant's general appearance and personality and gets a detailed picture of his aims, abilities, and experience through intelligent questioning. If the applicant measures up to our standard, he is given three tests to confirm the impression obtained in the interview.

The tests given are a mental aptitude test, an arithmetical reasoning test devised by the Time and Motion Study Section, and a personality test. If the results of these tests



Tests given to the student include a mental aptitude, a personality, and a mathematical reasoning test.



During the course, the student applies his material to practical and actual case problems.

# PROGRAM ENGINEERS

—*J. L. Schwab*

Industrial Methods Engineer,  
Westinghouse Electric and Manufacturing Company  
East Pittsburgh, Pa.

indicate that the applicant has possibilities, he is hired and admitted to the training group.

In developing a training program one major consideration arose from the necessity for handling only a few, or possibly one, trainee at a time. As soon as an industrial methods analyst or engineer is requested by a division, a man who meets the qualifications is chosen and admitted to the training center. As a result, the entire student group at any one time could conceivably be made up of persons studying subjects in various stages of progression. This eliminates using regular classroom techniques.

The problem this presented was solved by adopting suitable test material. The course enables the student to gain a maximum of knowledge with a minimum of personal instruction on specific cases. It also provides practical tests for each section, whereby the student applies the material studied to actual case problems.

Thus the instructors can devote their time to general lectures and discussions of the broader phases of the work. By correcting the tests, the instructors can determine the points which are not clear in the student's mind and discuss them individually with him.

## BASIC TRAINING INCLUDES TOOLS AND PRINCIPLES

Perhaps the best way to explain the training program is to cite the progress of a student taking Basic Course II, a course designed for training a man unfamiliar with time and motion study principles but with the required amount of industrial and machine shop experience.

After he is hired, the student is taken to the Training Center's classroom where he is introduced to his new vocation through a brief talk with the Training Supervisor. In this talk, a description of the work and its importance to industry is given, followed by a schedule of assignments for the entire course. Each textbook is reviewed and explained, and any questions he may ask concerning the course are answered. He is assigned a desk and begins his course of study.

The first ten days of the course are spent in studying the social, economic and practical aspects of time study and methods engineering, and in becoming familiar with the use of the stop watch and the making of process charts and simple operation analysis. During the first week, the student is taken on a shop tour to see the wide variety of operations upon which he may be called to work.

After learning the procedure of taking time studies, he  
(next page, please)



Demonstrations of equipment  
are made to the student.



Talks are supplemented by sound  
and silent motion pictures adding to  
the visual education of the student.

# SIDELIGHT —



Aerial view of the engineering campus soon after the "M.E." building was completed.

## METHODS ENGINEERS . . .

(continued from page 9)

begins taking actual studies by taking a study of an operation shown on a screen by a slow motion film. As he becomes more adept, the speed is gradually increased to normal. These studies are carefully checked and the student is informed of any errors in his procedure.

Next he spends two hours daily in the Apprentice Department taking time studies of all types of machining operations. The remainder of the day is spent in further study of his Methods Engineering course, learning motion study, industrial photography, and the installation and administration of new methods and wage incentive plans.

Each week, ten meetings are held by the training group. Such subjects as Westinghouse Company policies for administration of the incentive system, the use of the various Company forms, and machine shop practice or methods improvements are discussed by the supervisor or by guest speakers who are familiar with the various subjects. Each meeting is followed by a round table discussion of points brought out during the lecture. Students' questions are then discussed and explained. Talks are supplemented by sound and silent motion pictures.

At the end of five weeks' training, the student is given an assignment in one of the East Pittsburgh divisions. If he has been "earmarked" for a definite assignment, the work in the section in which he is placed is similar or identical to the department where he will later be permanently

assigned. On this temporary assignment, the student works as a regular methods analyst handling the everyday problems of the shop under the guidance of the methods engineering supervisor of the division in which he is receiving his training.

### PROGRESS REPORTS SUGGEST NEED FOR CONCENTRATED INSTRUCTION

During this period, a close contact is maintained between the Training Department and the Methods Engineering Supervisor under whom the student is serving his apprenticeship. Regular progress reports are made by the supervisor and sent with criticisms and recommendations to the training center.

The sectional assignment in a division or department may later be supplanted by a special assignment. For example, three students recently were assigned the job of analyzing and improving methods and then installing a complete incentive system in one plant of our Company, a job which they accomplished in a highly satisfactory manner. Other assignments performed by students were surveys of expense labor, development of time value formula on repair welding, saw cutting, electrical testing and the like, and research work for the advancement of methods engineering.

When the courses are completed, the progress reports and test grades of the student are analyzed and if found satisfactory, the student is given a permanent assignment in that division or department where he is most needed and best suited.



# ELECTRONICS

## IN INDUSTRY

(The second of two articles on electronics)

—June Hartnell, ee'46

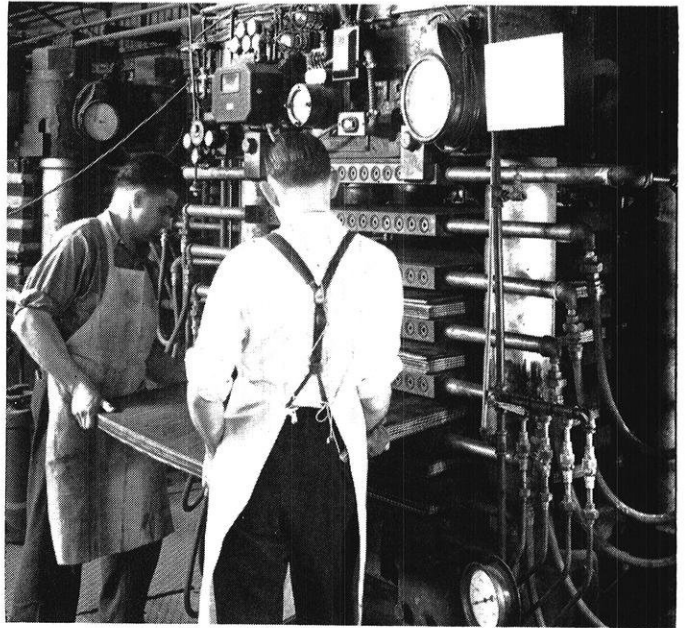
Wherever there is industry there is electronics, in mines, oil refineries, subways, power stations. Today there is scarcely a single industrial field that does not know the efficiency, the quality, the economy of electronic equipment. In 1943, more than 25 billion kilowatt hours—that is about 10% of the electric energy generated in this country, passed through electronic rectifiers.

The following is a brief description of some of the electronic applications in the field of industry. There are, however, many more.

One of the most widely used electric-devices is the time-delay relay. Its purpose is to measure increments of time accurately. The solution has often been approached by mechanical methods. This, however, invariably led to the introduction of many complicated parts. With the invention of the electronic timer, the process was made much simpler, it led to longer life of the timer, and the cost of maintenance was much lower. The timer consists essentially of a single electronic tube, a control relay, a small transformer, and a potentiometer which adjusts the time interval. The timer has been used in mid-western aircraft plants as a riveting timer. When a rivet has been satisfactorily produced, the machine is shut off by the timer. Here the timer and a solenoid-operated valve are applied to the riveting gun to control the number of blows. It has also been used to stamp U.S. army blankets; it controls a stamping trimmer by controlling the air pressure, now tediously operated by foot; it times injection molding.

Electronic heating is the application of high frequency current. This can be of two types: the induction heating of conductors and the dielectric heating of non-conductors. This makes possible better and uniform products, the molding of plastics, uniform heating, and much faster heating. In induction heating, the piece to be heated is placed in or next to a cooled induction coil carrying a high frequency alternating current. The magnetic field set up induces a current in the surface and simultaneously heat is produced due to resistances losses. In dielectric heating the material is placed between two plates, forming a capacitor. Voltage is applied at such high frequencies as from 1,000,000 to 100,000,000 cycles. Some loss always occurs in capacitors and so power in the form of heat is lost to the material, especially if it is of high-loss dielectric material. The big advantage in dielectric heating is that

the material is heated uniformly. Induction heating is advantageous because (1) it is economical—low initial cost and a low maintenance cost, (2) the operation is very simple—it can be performed rapidly by a very unskilled person, and (3) heaters are built very sturdily to last a long time.



Plywood of unusual thickness can be "bonded" in minutes instead of days.

Electronics also increases and betters lighting and lighting control. The red, yellow, blue, green lights that flash across New York's Radio City Music Hall, the Metropolitan Opera House, and hundreds of other theater stages are all electronically controlled. This electronic control also makes possible the automatic switching on of lights in offices and plants when it grows dark outside and the switching off of them when it is light again and no artificial light is necessary. This same principle is useful in maintaining the same degree of illumination all the time, thus protecting the eyes of thousands of workers. Sodium-vapor lights now in use on many highways and intersections reduce the glare so objectionable to motorists and thus

(next page, please)

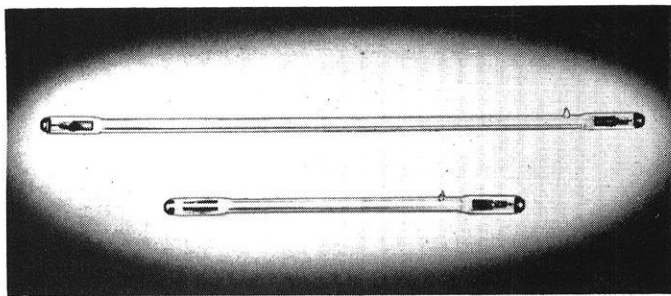
## ELECTRONICS IN INDUSTRY . . .

(from preceding page)

prevent hundreds of traffic accidents. Mercury-vapor lighting has now come into its own in many factories—giving from 20 - 80 footcandles of illumination compared with the 3 footcandles as averaged a few years ago in most plants. The photolight is a high speed flash unit and can "stop" the flight of a bullet. It can give a flash less than  $4/1,000,000$  of a second. Ordinary flash bulbs can give only a few thousands of a second. Thus faults in high speed precision machinery can be easily and quickly found. The lighting of landing lanes for clippers that have to make safe night landings has been accomplished by remote electronic control. Fluorescent lights that are battery powered are supported in rubber floats which protect them from waves. The light switching can be controlled by radio, providing the safe lanes when a plane lands and then be switched off immediately.

Another electronic application in the field of industry is to resistance welding control. Resistance welding is used to unite metals by application of heat. To the outside surfaces of the metals to be joined, pressure is applied through suitable electrodes. An electric current through them for a certain period of time then heats them to the proper temperature and when the current is stopped, the metals become "frozen" together. The electronic control speeds the process up greatly by controlling the amount of current and the timing—thus delivering high quality welds of uniform strength. A weld recorder can also be used which will register on a chart all current applications—when and if excessive variations of current occur, a bell sounds and the machine shuts down automatically.

Surfaces of products in any stage can now be protected from any sort of contamination by the use of sterilamps. The sterilamp is a long slender electronic tube, the prin-

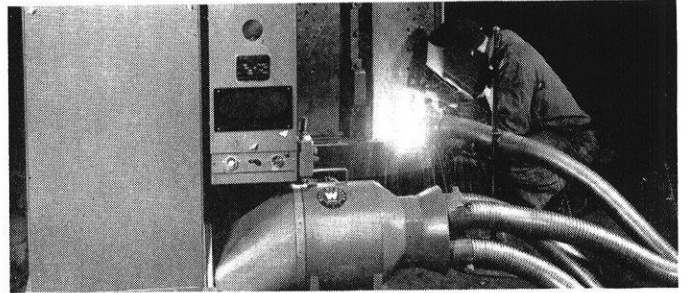


Sterilamps are long, slender electronic tubes, operating on the gaseous discharge principle. Over 80% of the energy given off is bactericidal.

ciple of which is the same as gaseous discharge. About 80% of the energy given off is bactericidal, thus these

lamps are used widely in industries where perishable foods, medical supplies, etc., are prepared, wrapped, or stored.

Electronic means also operate electric air cleaners by means of which air-borne dust particles can be removed from the air. Such a cleaner can remove particles as small



Removing welding smoke and oil mists in industrial plants is an important application of electronics.

as  $1/250,000$  of an inch—thus dust is kept out of machines, highly finished surfaces are not marred by unseen dust particles, and welding smoke and oil can be removed from the air.

Not only is electronics of use in heating but it will be found in temperature control. In many industries, exact and close control of temperature is a necessity. Again with electronic control this is a possibility. One of these controls consists of a temperature control instrument which measures the temperature inside the furnace by means of a thermocouple. A small original voltage is then transmitted to the panel, this transmission varying according to the temperature. The panel consists of electronic tubes and provides direct current—regulated according to the incoming transmission. This in turn causes a core reactor to vary furnace voltage keeping the temperature desired. The core reactor which is in series with the control instrument, the panel, and the furnace heating unit, can vary the power input to the furnace by varying the voltage across the heating units. A small change in the D.C. power causes a subsequent greater change in A.C. furnace power. This has been applied to electric air heaters, annealing of precision instruments and lenses, electric ovens and many others.

These are but a few of the applications of electronics in industry. More could be written about each of the forementioned applications. Electronics has found its place in industry today—tomorrow it will hold an even greater place.

—Cuts Courtesy Westinghouse

# Meet the "Profs"

*with Don Hyzer, me'46*

**P**ROFESSORS are strange people, not only do they like to talk in class, but also out of class as interviewing them brought out. They are good men to know if you have them for classes or not. Here are the results of interviews taken of three of our engineering professors so you may get better acquainted with them.



Professor Shiels

This ex-Navy man of the last war is now trying to teach the ABC's of drawing to Navy students of this war. Before you go to meet Professor Kenneth G. Shiels personally, buy a drawing board, T-square, 4H pencil, etc.

Originally from Baraboo, Wisconsin, he attended high school in Madison. Professor Shiels then came to the University of Wisconsin where he received Bachelors and Masters Degrees in Mechanical Engineering. Since 1920 he has been trying to drive home the principles of mechanical drawing and descriptive geometry to engineering students here.

Professor Shiels uses his spare time developing the art of fishing, a field in which he has had considerable success as some pictures he has prove. He also spends some afternoons on the golf course.

Like the two other professors interviewed he seemed to have no objections as to having girls in the engineering profession, which may come from the fact that all are married and want to keep peaceful relations in the home.

As is shown by forty lines in "Who's Who In America", Professor G. L. Larson has really gotten around. The best way to see this very busy man is to be an M.E. and take courses in heating and ventilating, and thermodynamics.

This story started back in Sweden in 1881 where Professor Larson was born. His parents brought him to this country when he was eight years old and they lived in the Idaho mining district. He attended the Prep school of the University of Idaho and later the university. Distinction in athletics came when he became captain of the football team in his senior year.

After graduating in 1907, Professor Larson worked for General Electric for a couple of years. He was then a professor at his alma mater until 1914 when he came to the University of Wisconsin. In 1915 he was granted the Degree of Mechanical Engineering by the University of Wisconsin. He has held many positions on the staff such as head of the M.E. department, and consulting engineer of the university.



Professor Larson

His office has so many books on heating and ventilating in it that the air in it seems to have the correct temperature, moisture content, and circulation. After being in his office it is not surprising to find that he has worked out the heating, ventilating and air conditioning systems

(please turn to page 26)



# They came out of

TO DO A "NEXT-T



**A DELICATE JOB!** Some parts of superchargers travel faster than the speed of sound. Every part must be perfectly balanced and fitted.

**SUPERCHARGER**

**SUPERCHARGER**

**SUPERCHARGER**

**SUPERCHARGER**

**EVERY FORTRESS NEEDS FOUR . . .** to feed air to oxygen-hungry motors at high altitudes.

**"ENGINEERING THAT AIDS ALL INDUSTRY  
FURTHERS AMERICAN GOOD LIVING"**



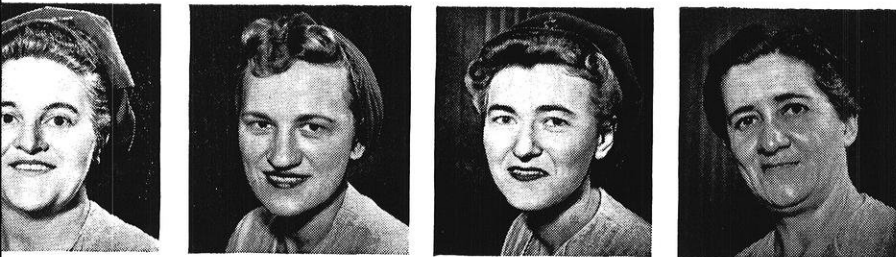
OVER 1600

PRODUCTS

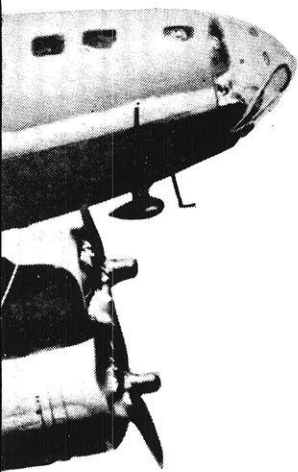
*— Supplying the World*

# ALLIS

# he Kitchen— "IMPOSSIBLE" WAR JOB!



How Allis-Chalmers Engineering put women  
to work Mass-Producing what had been virtually  
a Master Machinist's Product—  
**FLYING FORTRESS SUPERCHARGERS!**



**N**O PLANT! Not enough men! All Allis-Chalmers had when it undertook the "impossible" job of mass-producing precision-built Fortress superchargers was a plot of land and engineering *imagination* and *experience* gained from supplying the world's largest line of major industrial equipment.

Yet, within 8 months, this "know-how" built a new, efficient plant—simplified many difficult jobs—helped thousands of women become machine operators, inspectors, testers! Today, this plant (with 60% women employees) is turning out superchargers in great quantity!

### What will YOU want to build?

We're adding daily to the broadest industrial engineering experience in the world . . . are adding such things as the revolutionary gas turbine to our list of 1600 products. No matter what your manufacturing problem—it will pay you to consult Allis-Chalmers!

ALLIS-CHALMERS MANUFACTURING CO., MILWAUKEE, WIS.

## VICTORY NEWS

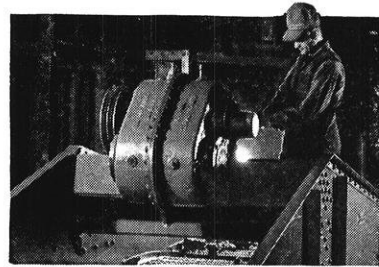
### How to Train Women Workers!

In conjunction with the U. S. Air Forces, Allis-Chalmers has produced an educational movie, "Woman Power," showing how women with no previous training or experience, were taught to perform all of the intricate jobs at Allis-Chalmers' new supercharger plant.

The movie shows how to train women war workers, how to provide for their comfort, health and happiness in a factory job. It will be loaned to management and supervisory groups faced with the necessity of adapting woman power to manpower shortages. Write or wire Allis-Chalmers, Milwaukee, Wis.

### More Help For "Sink-Float" Plants:

To facilitate wet screening and dewatering, Allis-Chalmers has designed a new End-Tension Deck for Low-Head Vibrating Screens.



New deck construction assures uniform depth of product and maximum use of screen surface for more efficient operation. Write for Bulletin B-6321.

**Electronic Giant By A-C:** Big factor in breaking the aluminum bottleneck after Pearl Harbor was the Mercury Arc Rectifier—the world's biggest electronic device—introduced to America in practical form by Allis-Chalmers.

In one simple operation, the A-C Mercury Arc Rectifier converts alternating to direct current, the electric power needed for mass processing of aluminum, other vital war metals. Helps keep U. S. plane production on schedule!

### FOR VICTORY

Buy United States War Bonds

*Largest Line of Major Industrial Equipment*

# CHALMERS

# Campus Notes

—Mae Zimmerman, ch'46

## BONG . . . .

And it's 1945. Yours truly just got used to writing 1944 in December, and now she has to struggle with '45.

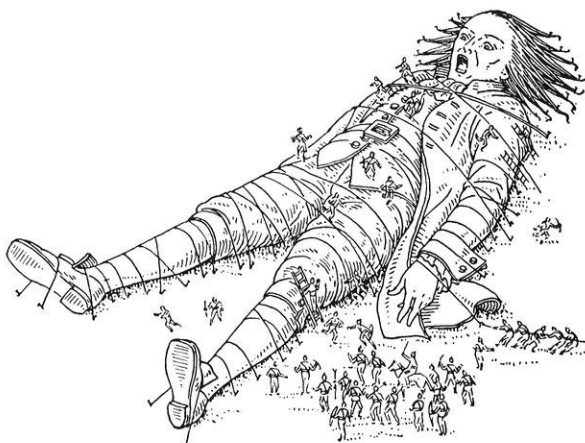
It's rumored that a certain HARRY HANSON is not troubled by the cigarette shortage in the least. What we want to know is WHERE do you get them, Harry?

## FRIENDS STILL HERE . . . .

Although John Houmes — and we have heard of another name for him but censorship does not permit publication — is stationed at Great Lakes, his Madison friendships certainly haven't been forgotten. Reports have it that the Post Office department and Bell Telephone Co. have been working overtime to keep up with his numerous letters and phone calls to certain members of the fairer sex — and without time and a half . . . .

## TRAVELER . . . .

The trains between Madison and Great Lakes have had a steady passenger since one Frank Hyland graduated from the U. and has been in the Navy. June Hartnell, ee'46, and editor of this magazine, has been making the trip quite frequently. Ever since June was a little girl she has had a mad fascination for train rides.



When exams tie us down—

A lot of the V-12's were unable to spend Christmas at home this year because of train connections, etc. We know of one in particular — he's taking organic this semester, who divided his time among three girls. One in Minneapolis, one in Chicago, and we've forgotten the third city, but we know he did have a "super" vacation.

Sort of a dead week and weekend for the boys the 15th-21st. L&S exams and then all the girls going home to recuperate.

## AND THEN . . .

Our exams less than a month away.

## TORU IURA . . .

Business manager, leaving when Uncle Sam's call came. Best of luck, Toru.

## ED DAUB . . .

Taking over Toru's spot. You'll need it, so best of luck, too.

AND THE TIME CLOCK STILL NEVER FAILS US BY STOPPING OR GOING WRONG SOMETIME DURING THE GAME.

## NEW YEAR'S EVE . . . .

Was celebrated quietly this year in the navy barracks, breaking many a girl's heart.

## THE V-12's AGAIN . . . .

And they're really having their troubles with Prom this year. First of all, "Eddie" was not permitted to run for the chairmanship. Next "Lefty" was defeated — nice trying anyway, "Lefty", and last a certain girl was chosen Prom Queen. Better luck next year, fellows. You were well represented at Pre-Prom, and Ken, a dozen roses to you for the swell job you did.

And now is the time to tell a bed time story . . . .



## A WELCOME HAND TO BELL SYSTEM WAR VETERANS

Some day we shall have the pleasure of welcoming back to the Bell System the men and women who are now in the armed forces.

We shall be glad to see them personally, glad of their skill and energy for the big tasks which face the Bell System in the future.

Trained men and women of vision and energy will always be required to build and maintain this country's nation-wide telephone system — and to provide the best telephone service in the world.

**BELL TELEPHONE SYSTEM**



*"Service to the Nation in Peace and War"*



# ALUMNI NOTES

—Mel Sater, ch'45  
Ralph Watson, m&m'45

## Civils

**PINNEY, JAMES C.**, c'e'10, dean of the College of Engineering at Marquette University from 1917 to 1924, and later with the U. S. Reclamation Bureau, died in Denver on December 2.

**GRANT, EUGENE L.**, c'17, professor of economics of engineering at Stanford University, was awarded the Thomas Fitch Rowland prize for his paper on "Fundamental Aspects of the Depreciation Problem — Relationship to Competitive Industry."

**LENSCHOW, HENRY J.**, c'30, is an assistant engineer with the Milwaukee Road, with headquarters at La Crosse.

**SHEERAR, LEWIS L.**, c'38, ensign in the USNR, has been recovering from shrapnel wounds at the Naval Hospital at Great Lakes. He visited Madison on December 20.

**WERNER, BENJAMIN F., JR.**, c'40, who has been with Boeing Aircraft since graduation, is a field service engineer (from Boeing) assigned to the 3rd Air Force, now at MacDill Field, Fla.

**FLUCK, PAUL G.**, c'41, former instructor at this university, is an ensign in the USNR and is taking a course in naval architecture at the University of Michigan.

**ITZKOWITZ, NATHAN S.**, c'41, former staff member on the Wisconsin Engineer and now an ensign in the USNR, took part in the invasion of Normandy with a naval combat demolition unit. He is at present in the hospital at Great Lakes recovering from shrapnel wounds. He reports the birth of a daughter, Elaine Carol, on August 21.

**POLLACK, MAX**, c'41, a lieutenant (jg) with the Seabees, is reported to be somewhere in the Southwest Pacific.

**WERREN, FRED**, c'41, Lt., USNR, Bureau of Ships, completed a course in naval architecture at the University of Michigan in October and was retained there to assist with the training program until June, 1945.

**ELLIOTT, JOHN F.**, c'42, Lt. with the 111th USNC Bn., was in Madison on December 15 with his wife. He had several months overseas, during which he took part in landing troops and supplies during the invasion of Normandy. He expects to be transferred to the Pacific theater of war.

**GREEN, RICHARD C.**, c'42, who has been with the McDonnell Aircraft Corp. at St. Louis, volunteered for induction in the Navy last September and is now in training for radio work.

**MILAEGER, RALPH E.**, c'42, a Lt. in the Seabees, who was wounded while in action at Munda and spent some months in the Great Lakes hospital, is

now "cognizant officer" at the Navy Spare Parts Warehouse at Joliet. His address is PO Box 1133, Joliet, Ill.

**RESNICK, SOL D.**, c'42, is a private in Co. D, 53rd Bn., 11th Regt. at Camp Flannin, Texas.

**BUNTROCK, HARVEY A.**, c'43, Ensign in the USNR, Bureau of Ships, completed a course in naval architecture at the University of Michigan in October and was sent to the Boston Navy Yard.

**MAAS, EARL R.**, c'43, Ensign in the Seabees, is at Camp Parks, Shoemaker, Calif., awaiting overseas orders.

**SAEMANN, JESSE C.**, c'43, Ensign, USNR, Bureau of Ships, completed a course in naval architecture at the University of Michigan in October, ranking number one in a class of eighty men. He was sent to the Salvage and Diving School at Pier 88, N. Y.

**SERDAHELY, STEVEN G.**, c'43, is stress analyst with the United Aircraft and is living in Glastonbury, Conn. He has a son, Scott, born Feb. 25, 1943 in Fort Worth, Texas.



The Old Earth

## Chemicals

**BROWN, ORLO E., JR.**, ch'28, ch e'34, is now engaged in the control, modification, and application of chemical reactions at the Virginia Lincoln Corp., as chief project engineer. Prior to March of 1944, Brown was, from September 1938 to August 1942, assistant Prof. of Chemical engineering at West Virginia University, in charge of metallurgy. During the summers, he had worked with Bell and Howell and with Curtiss Wright. From June of 1942 to February, 1944, he was at the Lockheed Aircraft Corp. as Product Design Engineer and Chief Metallurgist of the Lockheed Factory "A" (Vega).

**KIEWEG, HOMER E.**, ch'29, is superintendent of the penicillin plant of Commercial Solvents, Terre Haute, Ind.

At the November meeting of the American Institute of Chemical Engineers in St. Louis, a paper on penicillin production, written by Mr. Kieweg, was on the program. Due to the fact that Mr. Kieweg was in England on business pertaining to penicillin production, he was unable to present the paper in person. It was presented by one of his associates.

**WUSTRACK, OTTO H.**, ch'34, formerly worked for the Hoover and Mason Phosphate Co., of Mt. Pleasant, Tenn., and is now with Pfaudler Company, Rochester, N. Y., as Design Engineer. Writing a series of articles in "Rock Products" on "Tennessee Phosphate Production Problems", the first number appeared in the November 1944 issue.

**FONG, T. C. DR.**, BS'39, PhD'43, is at present working for Shell Oil Co., Los Angeles, California. He recently was appointed Associate Professor of Chemical Engineering at National Tsing Hua University of Kunming, China. As soon as war conditions permit, he will leave for China to assume his new post.

**DATES, LT. WILLIAM E.**, '43, recently stopped for a visit while on furlough. He is located at the University of Akron, in the rubber research laboratory operated by the federal government.

## Electricals

**GOLDBERG, HAROLD**, ee, has left the employ of the Stromberg-Carlson Co., to take a position with the Research and Development Dept. of the Bendix Radio Division of Bendix Aviation Corp., Baltimore, Md.

**HOEBEL, H. F.**, ee, after nineteen years with the Cities Service Co., at Toledo, is now with the consulting engineering organization, Ebasco Services of New York. He is at present studying distribution problems of the city of Portland, Oregon.

## Mining and Metallurgicals

**HORTON, WILLIAM H.**, min'35, has recently returned to the U. S. with his family to accept a position with the Shell Petroleum Co., at Tulsa, Oklahoma. He was previously employed in the Patino tin district at La Paz, Bolivia.

**GIESE, WALTER R.**, met'41, has been placed in charge of the Spectographic department of the Nash-Kelvinator Corp., Racine, Wis.

**MOLINE, EUGENE**, met'41, is now employed by the Sperry Gyroscope Co., in their Electronics plant in New York.

**WRIGHT, RICHARD**, m-me'43, unexpectedly met Carl Krecklow (m-me'44)

in London after an unusual escape via the Underground. He had been bombing Germany from an English base and was shot down over Belgium while returning from a mission. The Belgians and French Underground kept him in hiding and after "D" day arranged for his escape to the American bridgehead. He later met Krecklow in London before returning home for a rest.

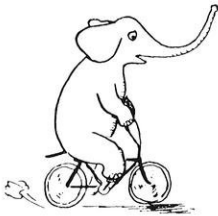
**FRISKE, WARREN, m-me'44**, having received his commission as Ensign, USNR, is now stationed at the Miami, Florida, naval station.

**HENRY, ROBERT A., min'44**, now a B-29 bomber pilot in the Pacific theater, may be among those punching the Japs where it hurts the most.

**KRECKLOW, CARL, m-me'44**, on returning home on furlough from a bomber base in England, expressed his desire "to finish that dirty business over there and return to school." He had completed the required number of bombing missions including two missions on "D" day.

**PAZIK, GEORGE J., m-me'44**, has been transferred to a replacement center after completion of basic infantry training.

**ZOBEL, LT. JOHN, m-me'44**, fighter pilot in the U. S. Army, is now in France.



SMITH

### Mechanicals

**KUTCHERA, ENSIGN HARVEY W., (D) L. USNR, me'39**, recently completed an instructor's course at the USNR midshipman's school at Northwestern University.

**LOKKEN, ALDEN V., me'43**, and Miss Julia M. Holmen of Rigeon Falls, Wisconsin, were married December 28 at Osseo, Wisconsin. They are now living at 137 Danbury St. SW, Washington, D. C.

**TROWBRIDGE, RICHARD L., me'43**, who was unfortunately stricken with polymebitis shortly after taking a position with a Michigan spark plug manufacturer, has been moved to St. Nicholas' hospital in Sheboygan. He was previously under treatment at the Wisconsin General Hospital for nearly a year.

**WESTMONT, L. GEORGE A.,** who entered the service in September, 1943, before completing his course here, has completed his training at the Army's Aberdeen, Md., proving grounds and has been appointed to the faculty there.

## To protect your product against costly failures due to



Nowhere else can you obtain *all* of these benefits, to enhance the salability, performance, and reputation of your product:

- 1 Distinctive properties of resistance to wear, impact, fatigue, corrosion.
- 2 A series of engineered alloys—with physical properties to fit your application.
- 3 Quality control to hold these properties within narrow limits.
- 4 Diversified production facilities, coordinating in one place all the commonly used metalworking processes.
- 5 Engineering and production "know-how" to give you a practical manufacturing program.
- 6 A nation-wide organization of field engineers to assist you.
- 7 A record of proved performance in hundreds of leading makes of equipment.
- 8 A national reputation that makes Ampco Metal parts a sales asset.

Send us your prints when you are ready to consider materials. Write for bulletins.  
**Ampco Metal, Inc., Dept. WE-1, Milwaukee, Wisconsin.**

Ampco Field Offices in Principal Cities.



# SHORT CIRCUITS

—*Fran Tennis, me'46*  
*Bob Clayton, me'46*

## DEDICATION:

This column we dedicate to the new title — may it live long and prosper always.

A motorist had just crashed into a telegraph post. Wire, pole, and everything came down around his ears. They found him unconscious in the wreckage, but as they were untying him, he reached out feebly, fingered the wires, and murmured: "Thank heaven I led a clean life — they've given me a harp."

## Most Non-College People Believe —

1. That professors wear goatees and are absent minded.
  2. That football players get 200 dollars a month and live in luxury.
  3. That college women neck or don't have dates.
  4. That college men never wear hats, garters, or long woolies.
  5. That college students drink more than any other group.
  6. That fraternity men lie awake all night trying to peek across the alley at the neighboring sorority houses.
  7. That hell week is like the Spanish Inquisition.
  8. That college professors give athletes a break to keep them eligible.
  9. That coaches have protruding jaws, fighting hearts, and give pep talks between duck shoots.
- The funny part about it is that they may be right.



The Big Boy Himself

"Who ya bringin' to the dance?"

"Well, I like Helen's figure, Alice's lips, Betty's legs, Peg's arms, Virginia's dancing, and Kay's . . . Kay's . . . I guess I'll bring Kay."

"He asked me to marry him and make him happy."  
"Which did you decide to do?"

•  
She was the type that could best be described as having a wonderful profile all the way down.

•  
Wolf: "I'm crazy about your sister."

Brother: "You mean the one without a nose?"

Wolf: "No."

Brother: "Do you mean the one with the seven Adam's apples?"

Wolf: "No."

Brother: "Oh, you must mean the homely one!"

•  
It seems that God and the Devil were in the midst of an argument. During the course of the disagreement, the Devil resorted to uncomplimentary language, and God threatened to sue him for libel. "You can't do that," said the Devil, "I've got all the lawyers down here."

•  
Sick Man: "I feel wretched, Doctor, I think it's my heart."

Doc: "Well, cheer up. We'll soon give you something to stop that."

•  
First Crook: "Quick, jump out the window, here come the cops."

Second Crook: "Hell no. It's thirteen floors to the ground."

First Crook: "This is a swell time to be superstitious."

•  
From the paper —

J. Smith looked up the shaft at the Palace hotel this morning to see if the elevator was coming down. It was. Age 45.

•  
If you can stand it, there's more on page 22 . . .





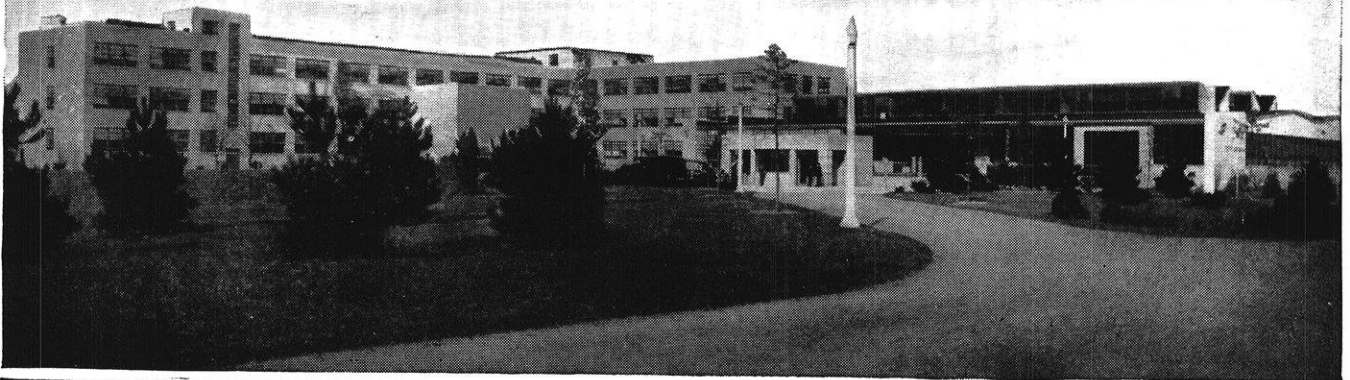
## Bringing New Worlds into Focus

• BACTERIOLOGISTS are able to watch the attack as penicillin comes in contact with clusters of disease-causing bacteria . . . Looking through the RCA electron microscope they see how the infectious germs vanish as the new wonder drug destroys them.

New RCA electron microscopes—including a desk-size model with the same power of magnification as the standard instrument—bring this super-eye within

reach of schools, hospitals, and laboratories at the same time extending its use in science and industry.

The electron microscope, acclaimed as one of the most important scientific tools of the Twentieth Century, makes possible magnifications of 100,000 diameters—50 to 100 times more powerful than the strongest optical microscope. Electronically it promises to make the peacetime world a happier, healthier place in which to live.



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## SHORT CIRCUITS . . .

(continued from page 20)

"Say, do you think it will be all right for me to ask June for a kiss tonight?"

"You don't order root beer in a saloon, do you?"

God gave us two ends

One to think with, and one to sit with

Our success in life depends on which we use the most.

Heads we win, tails we lose.



Bootiful, ain't it?

"I hear you and the leading lady are on the outs."

Electrician: "Yes, it was one of those quick change scenes with the stage all dark. She asked for her tights and I thought she said lights."

"I can let you have a cot in the ballroom," replied the clerk, "but there is a lady in the opposite corner, and if you are quiet, she'll be none the wiser."

"Fine," said the tired man, and into the ballroom he went.

Five minutes later he came running out to the clerk.

"Say," he cried, "that woman in there is dead!"

"I know it", was the answer, "but how did you find out?"

A farmer watched a man enter a revolving door. As the door swung around a pretty girl stepped out.

"Damn good trick," said the farmer, "but I don't see how that guy changed his clothes so fast."

"Do you believe in clubs for women?"

"Yes, but only after kindness fails."

"Everybody is crazy over me," said the inmate of the first floor of the insane asylum.

"There's a woman peddler at the door."

"Show him in, and tell him to bring his samples with him."

A little boy and a little girl lived next door to a nudist camp. One day they found a hole in the wall, and the little girl proceeded to peek through the opening.

"Are they men or women?" asked the boy anxiously.

"I can't tell", was the reply, "they haven't any clothes on."  
—Readers Digest

We would like to close this with a remark our good friend, Harry Meyer, passed when we asked him how he liked our last column.

Said Harry, "Boy, am I glad to hear it's your last!"

Teacher: "Phrase the word kiss."

Pupil: "This word is a noun, but is usually used as a conjunction. It is never declined, and more common than proper. It is not very singular, in that it is usually used in the plural. It agrees with me."

He: "Hello, baby."

She: "I'm nobody's baby, I'll have you know."

He: "Well, wouldn't you feel like hell at a family reunion?"

The night the marines landed in the Solomons, a marine sergeant was praising his corps to the skies. An army captain finally interrupted. "Don't forget," he said, "that when a marine goes into battle there are ten soldiers on one side of him and ten sailors on the other."

The marine raised himself to his full six feet one and came to attention.

"Sir," he retorted, "that's the proper proportion."

Army intelligence officers on Guadalcanal offered a bounty of \$100 each for live Japanese prisoners. Soon the soldiers began streaming in with so many prisoners that army funds neared exhaustion, and a colonel questioned a sergeant to find out how the Nipponese had been so easily captured. "Oh," said the sergeant, "that's easy. Those marines out in the bush haven't heard about this offer so we buy Japs from them for \$5 apiece."

This one's about a little chap of eight who recently went to Boston to visit Grandmother, making the train journey all alone in a day coach. When he arrived, he reported that the trip had been uneventful, except for a strange encounter with a sailor. It seems that Mother had put him on the train and then a nice lady had sat down beside him. He and the lady talked for a long time, and then the train stopped and lots and lots of sailors got on. Then they rode for a long time and pretty soon the train stopped and the nice lady got off. "And then," the child told his Grandmother, bewildered in his voice, "one of the sailors acted real mad. He came over and said to me, 'Listen, you little weasel, you might have told us that babe wasn't your mother'."



*Frank Dobson*

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**L**IGHTNING streaked through the ages, feared but unchallenged. Then to Benjamin Franklin it flashed the answer to a question that unlocked the future of electricity.

Technical plastics, Synthane, for example have already answered many \$1 to \$64 questions for people who make things. And may for you. The question, of course, should come before the answer—for only

you know, as *you* do, what your requirements are. If whatever you are working on suggests a material of excellent electrical insulating characteristics, resistance to corrosion, mechanical strength, stability at usual temperatures, easy machinability, or a variety of other inter-related properties, our type of technical plastics may readily be indicated. Our latchstring is always out to any inquiry.

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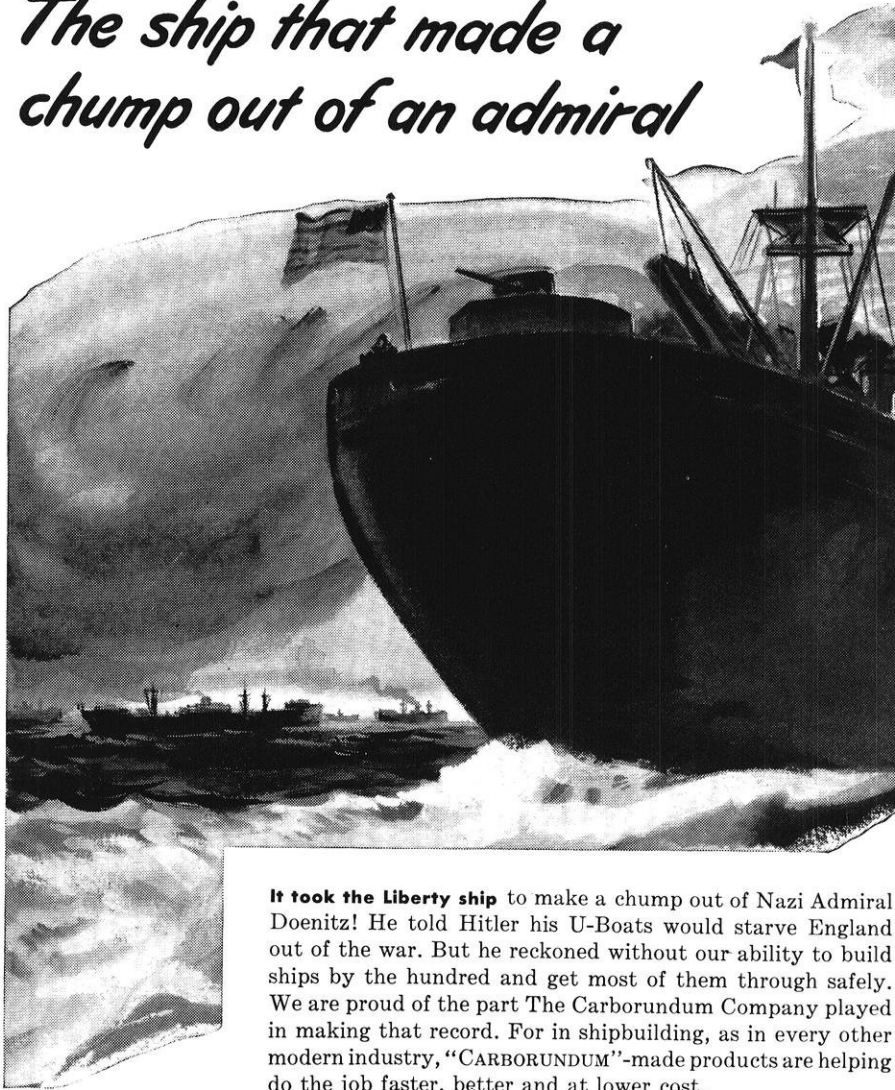
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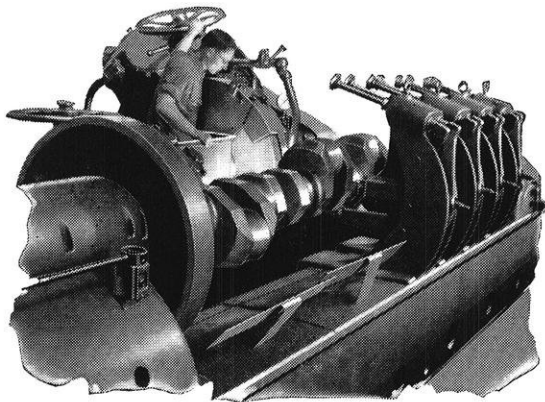


**It took the Liberty ship** to make a chump out of Nazi Admiral Doenitz! He told Hitler his U-Boats would starve England out of the war. But he reckoned without our ability to build ships by the hundred and get most of them through safely. We are proud of the part The Carborundum Company played in making that record. For in shipbuilding, as in every other modern industry, "CARBORUNDUM"-made products are helping do the job faster, better and at lower cost.

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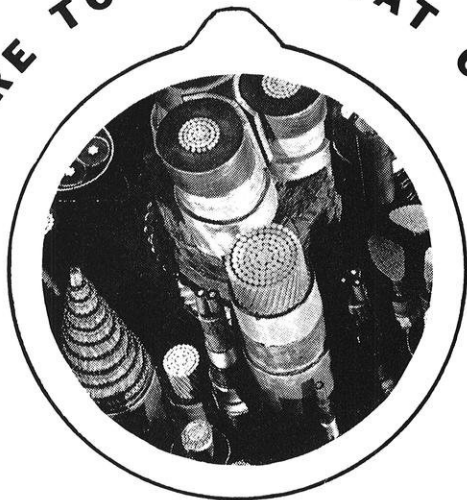


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*Okonite's* general catalog on wires and cables contains information on conductors and coverings, materials and fabrications, and a selector chart. Engineering students may obtain a free copy of this booklet by writing for Bulletin OK-1011. The Okonite Company, Passaic, New Jersey.

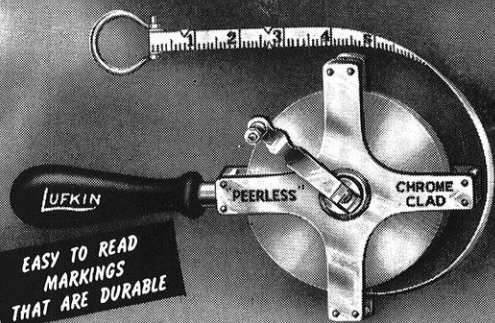
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MEET THE "PROFS" . . .

(continued from page 13)

in the Union, Field House, and many other buildings throughout Madison and the state.

Before the war Professor Larson could be found fishing and canoeing on the waters in Canada. Of course his recreation now, like ours, is work.

"Down in Missouri there was a small log hut on the Mussel Fork near Pee De, which had a store, a blacksmith shop, and a stump so one could mount a horse. The Chariton River branches there and there is the Black Fork, Middle Fork. . . Fork, well this is the Mussel Fork—you know what mussels are. . ." So spoke L.E.A. Kelso, Assistant Professor of Electrical Engineering, of the place he was born.

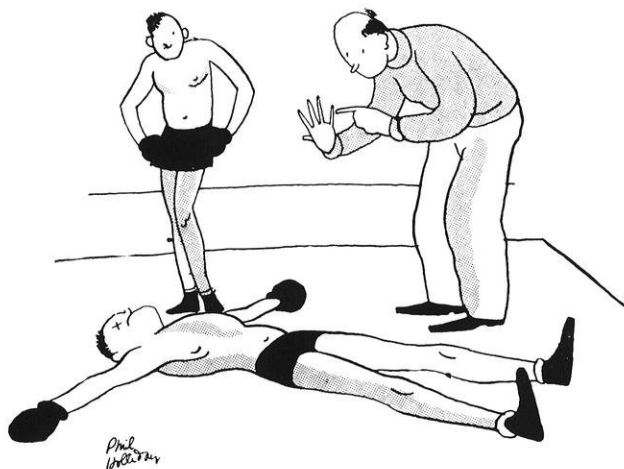
Oldham and later a new school, Possum Holler, were privileged with his attendance through the grades. After going to high school in Greenwich, Ohio, he mixed teaching with college and graduated from the University of Missouri in 1907 with a Bachelors of Science in Electrical Engineering. Professor Kelso worked with a power company before coming here in 1912.

Sundays are spent on picnics in the country with his wife. His hobby is walking a mile and a half to and from his office every day, a sport in which he originally got into shape for by playing football in high school.

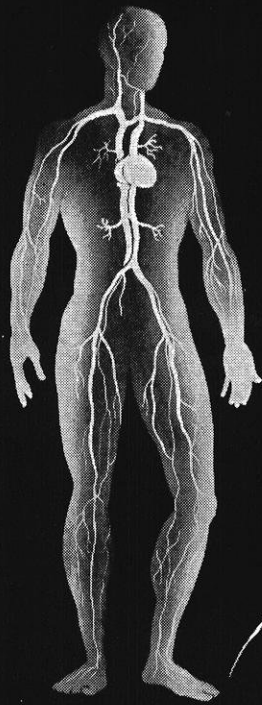
Professor Kelso has a pet peeve which is "the eternal carelessness of people." So any M.E.'s take note because he will teach you some E.E. courses.

In ending he said "The annals of a happy people are brief and I am happy".

We regret very much not being able to get a picture of Professor Kelso.



5-6—Pick up sticks.



## What is more vital to you than Food and Water?

**MEN HAVE LIVED** forty days without food—perhaps even longer. They have gone several days without water—and lived. But without sufficient oxygen, life is snuffed out in a matter of minutes.

Normally, a person obtains plenty of oxygen by breathing air. But following bomb blasts, shock from battle wounds, heart attacks, during severe cases of pneumonia, and after major operations, additional quantities of oxygen may be prescribed. The treatment is known as oxygen therapy.

The breathing of extra oxygen also is required by all flyers in the rarefied atmosphere of high altitudes. The study of this use is contributing important data to that which the medical profession's continuing research has made available

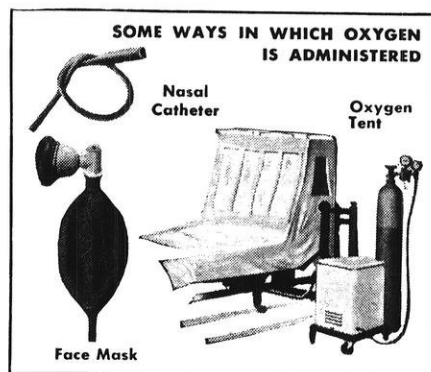
on the clinical use of oxygen.

The LINDE AIR PRODUCTS COMPANY, a Unit of UCC, is devoted to the production of oxygen. Every cylinder of Linde Oxygen, even Linde Oxygen for industry, conforms to the purity standards of the United States Pharmacopoeia—and is therefore suitable for human consumption.



*Oxygen therapy, once used as a last resort, is now routine early treatment. It should be welcomed by patient and family as an oxygen mask is welcomed by a flyer.*

*Civilian and military physicians and nurses and others are invited to send for booklet P-1, "Oxygen Therapy Handbook" which describes generally the types of equipment with which oxygen is administered.*



IN AN EMERGENCY Linde Oxygen U.S.P. can be obtained from garages, welding shops and industrial plants.



**IMPORTANT:** All U.S.P. oxygen must undergo extra drying procedures before it can be used for high altitude flying.

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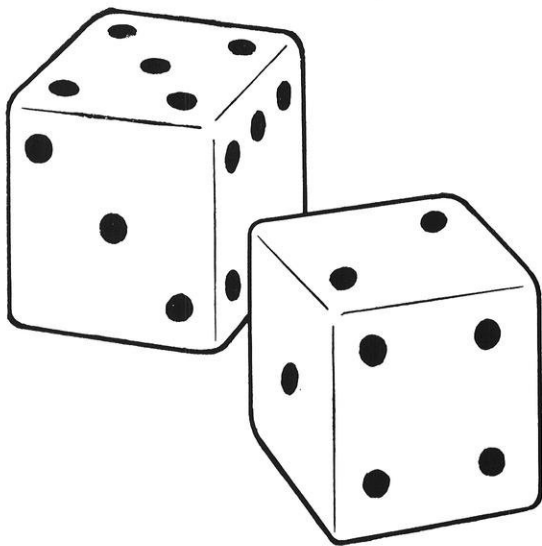
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## *to have Galvanized Roofing on Buildings*

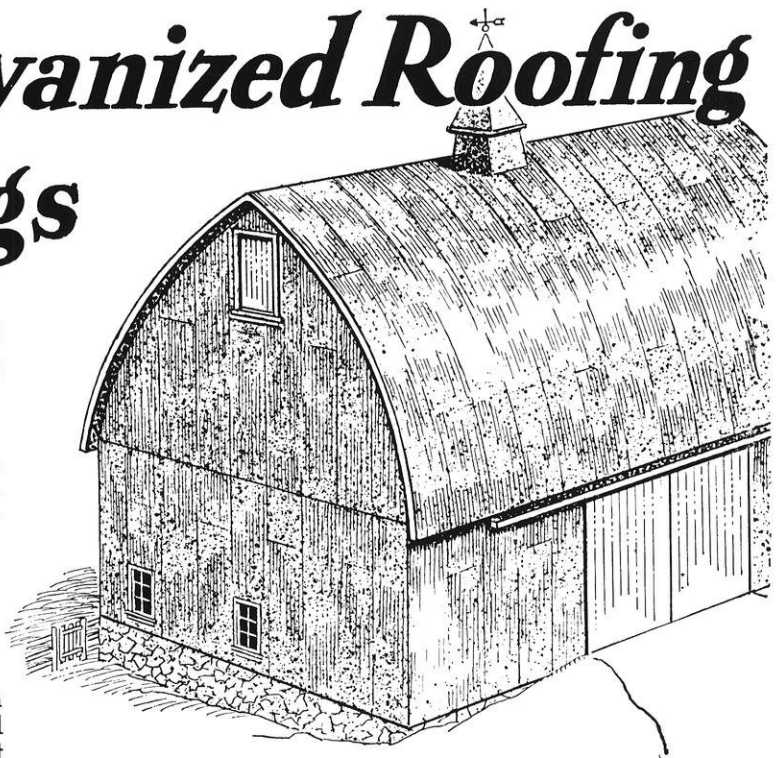
For in these days of material scarcities, galvanized roofing can be taken care of by simple, easy means and made to last a lifetime.

Galvanized roofing is zinc-coated roofing; and the U. S. Bureau of Standards states that zinc is "by far the best" protective metallic coating for iron or steel! Zinc in the form of galvanizing provides double protection:

*First*, by simple coverage, with a sheath of rust-resistant metal.

*Second*, by electro-chemical action or "sacrificial corrosion."

Galvanized roofing is used on more than a third of all the farm buildings in the United States — which proves that farmers are smart judges of roofing value!

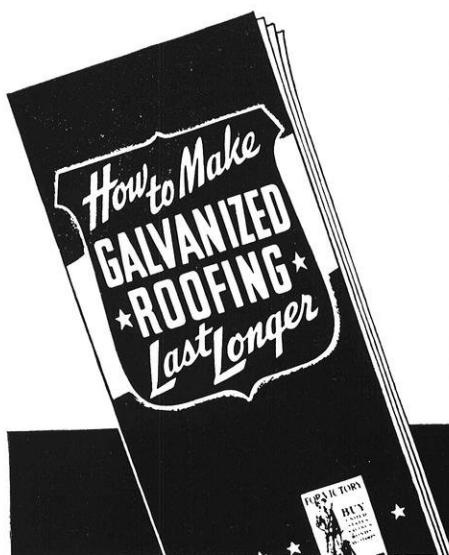


## **Take Care Of It!**

It's just good business to take good care of galvanized roofing. It is so easy to do it, too, that there's no excuse for neglect. With reasonable care, galvanized roofing can be made to give a lifetime of satisfactory service. Get a copy of the free booklet

### **"How to Make Galvanized Roofing Last Longer"**

and the few simple steps to take will be made completely clear. The booklet is valuable. It's free—write for it today.



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