The Wisconsin engineer. Volume 51, Number 8 May 1947

Madison, Wisconsin: Wisconsin Engineering Journal Association, [s.d.]

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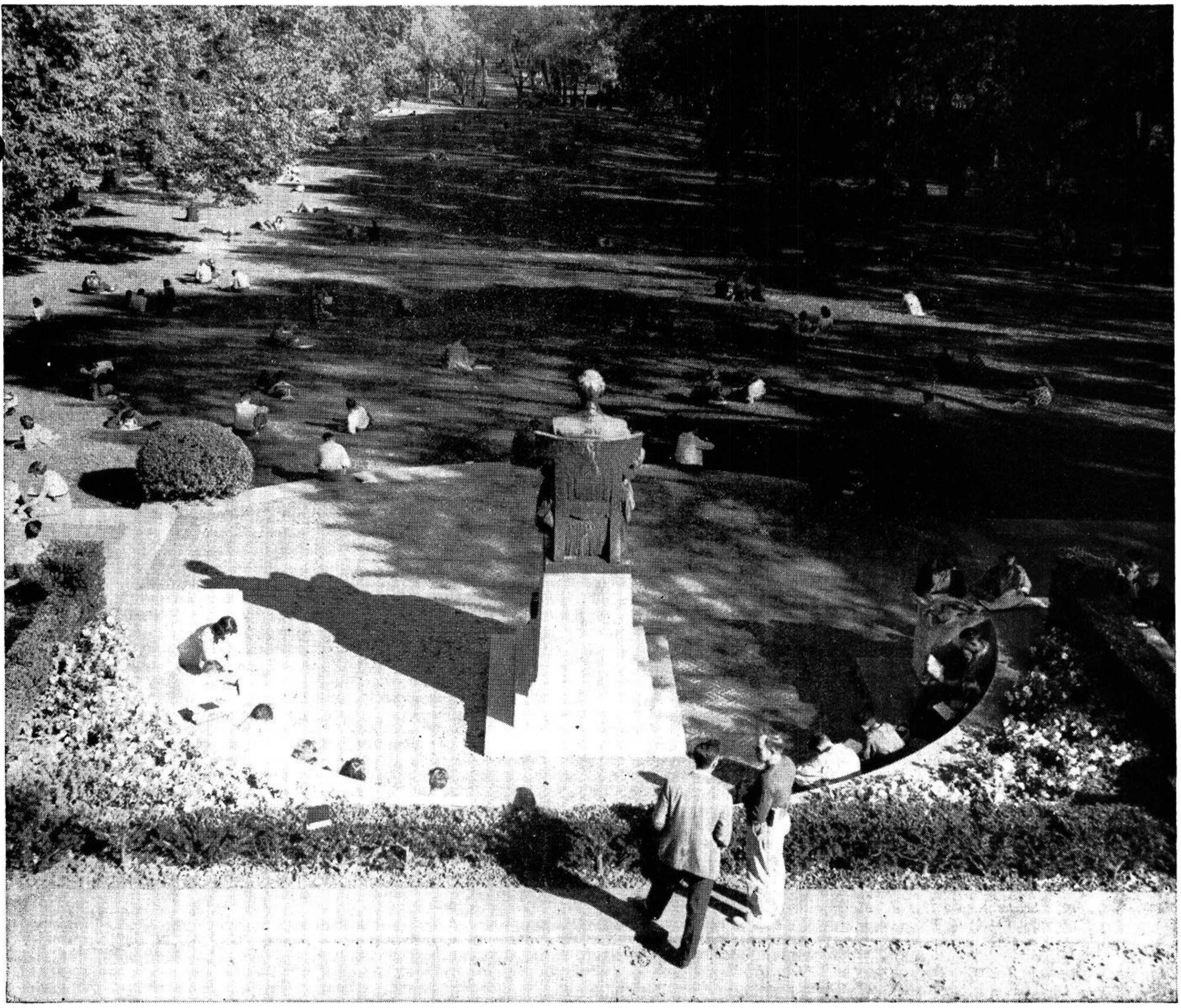
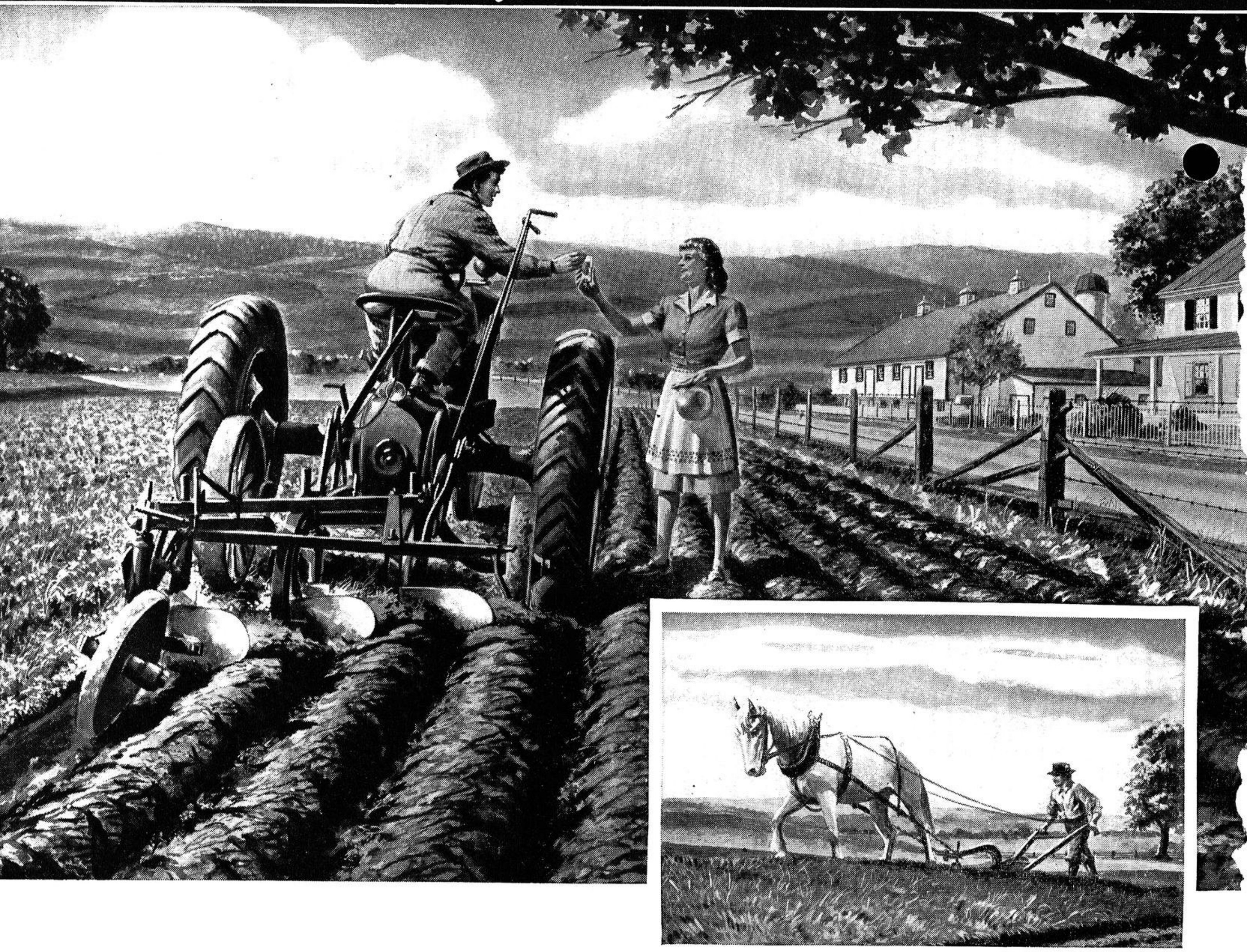


May, 1947

the WISCONSIN ENGINEER



Why some things get better all the time

HEALTH, strength and zest for life—of youngsters, of workers, of all of us—depend on food. Food produced by the millions of tons yearly. And each year our farmers have *more efficient means* to do their tremendous job.

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ALL-ELECTRONIC COLOR TELEVISION

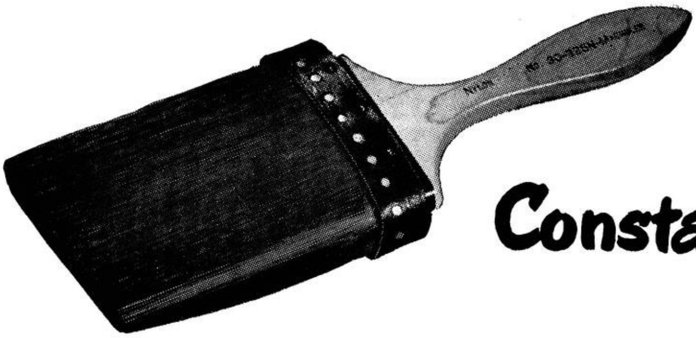
Electronic color television pictures, produced by all-electronic means, were demonstrated publicly for the first time on October 30, 1946, and again on January 29, 1947, by Radio Corporation of America at RCA Laboratories, Princeton, N.J.

The demonstration, revealing a revolutionary development in radio science, proved that flickerless, all-electronic color television is practical without rotating discs or other moving parts.

A new color slide television camera, developed by RCA and used in the demonstration, produces signals from 35 mm. Kodacrome slides. Transmission of the picture on the slide is achieved in natural colors when a light beam from a kinescope is focused through the slide and separated into component colors by a system of mirrors and photo-electric cells.

Each of the three transmitted images—red, blue and green—is of the same number of lines, that is 525; also the same horizontal scanning rate and the same picture repetition rate of 30 pictures a second as in present commercial television broadcasting.

The receiving set is equipped with three 3-inch kinescopes, which separately received the signals representing red, blue and green. This trio of kinescopes is called a Trinoscope. From it the three color images are optically projected into a brilliant composite picture which appears on a 15 x 20-inch screen in natural color, free from any flicker, color fringes or break-up of color.



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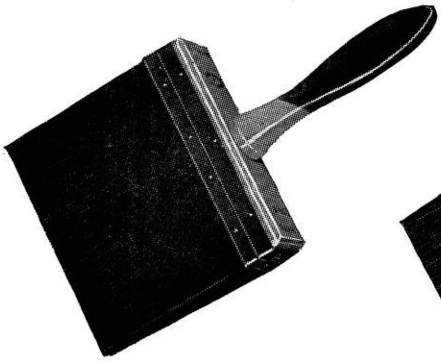

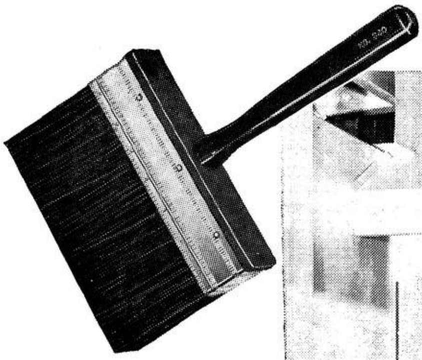

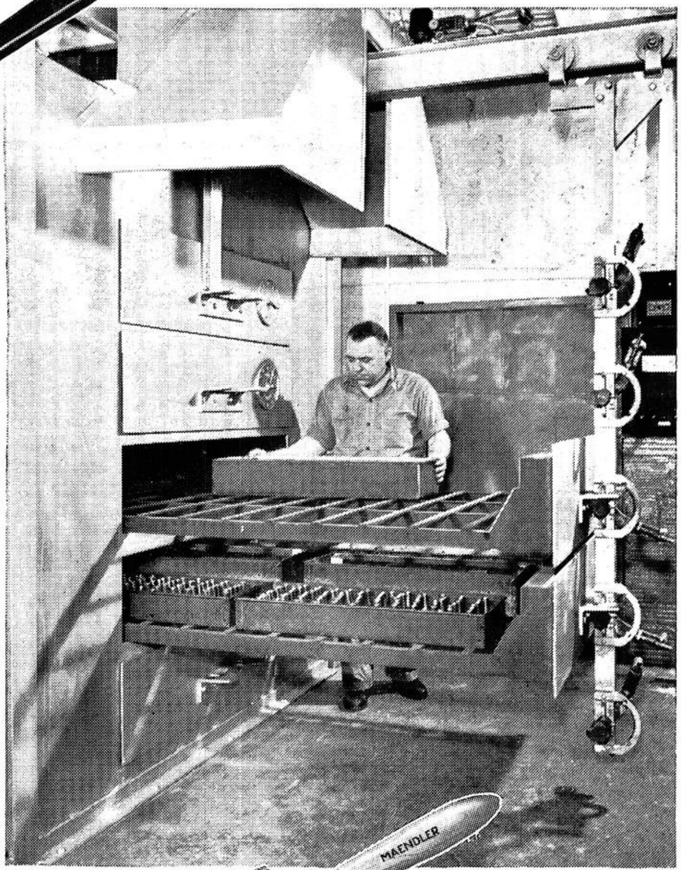

Uniform heat, at precise temperatures, assures the constant high quality of Maendler paint brushes. Three automatic, clock-controlled vulcanizing ovens guarantee the exact time-temperature relationship for sealing set-in-rubber bristles; GAS, dependable heat source for toughest industrial heating problems, insures uniform oven temperatures.

The controllability of GAS proved an asset to production at the Maendler plant. By charging the ovens at the end of the normal working day, one extra vulcanizing cycle can be completed after-hours . . . with automatic time and safety controls substituting for the operator.

Efficiency of Gas-Fired Equipment, and economy of GAS for industrial heating, have been demonstrated in thousands of applications as unusual and interesting as this vulcanizing process.

Photo by DESPATCH OVEN COMPANY
Minneapolis, Minnesota

Brushes by MAENDLER BRUSH MANUFACTURING COMPANY, INC., *St. Paul, Minnesota*

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVE., NEW YORK 17, N. Y.

MORE AND MORE...
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FOR ALL INDUSTRIAL HEATING

WISCONSIN ENGINEER

Founded 1896

Volume 51 MAY, 1947 *Number 8*

MEMBER OF ENGINEERING COLLEGE MAGAZINES ASSOCIATED

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605 N. Michigan Ave., Chicago

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 from October to May inclusive by the Wisconsin Engineering Journal Association, 356 Mechanical Engineering Building, Madison 6.

Subscription Price

$1.00 PER YEAR . SINGLE COPY 15c

In This Issue . . .

COVER:

Looking down "The Hill" with Lincoln presiding over all.
Photograph by Art Rezin

FRONTISPIECE:

Testing to assure that the porcelains will withstand the specified voltages before permitting arcs, and also that flash-overs as shown here leave no impairment of dielectric qualities.
—Courtesy Westinghouse

Index for 1946-47 on detachable pages in center of magazine.

How our research engineers grow plants

The growing of plants is one of Standard of Indiana's chief concerns, and it keeps our engineers up to their necks constantly in big league problems. For ours is a business of change—it never stands still. Always there are new methods, new processes, new products and improvements.

New structures are required, new units, often entirely new plants. From the time a new plant is an idea in a designer's mind until after it is finally junked, the research engineer has a vital part.

It is up to him to develop any needed new materials to meet new operating conditions. Temperatures may be as low as the −320° F. of liquid nitrogen or as high as the 2300° F. of a gas generator. Pressures may be high or low and corrosion is usually a problem of major importance.

The stresses in complicated structures required for new equipment frequently cannot be calculated by conventional methods of analysis. Research engineers, trained in mechanics, must develop, experimentally and theoretically, new methods to apply to such structures.

Prior to the construction of the plant, research engineers, trained in mechanical and electrical engineering, must study in the laboratory such problems as heat transfer, fluid flow, power reduction, and noise elimination. Later, they will check their theories and experiments by tests in the plant itself.

For checking the physical parts of the plant, new inspection methods—including such glamorous ones as the x-ray and ultra-sonics—will be required. Our physicists will develop them.

And with the plant in operation, there comes the battle against deterioration—into which corrosion engineers throw their full weight. It's a fight not only to lengthen the life of plants in operation but also to discover—even after a plant is junked—how succeeding ones can be built to last longer.

Research engineering is of prime importance to Standard Oil of Indiana. That is why a magnificently equipped Engineering Laboratory will be part of our new Research Center, now under construction close to the Whiting, Indiana, refinery, near Chicago.

STANDARD OIL COMPANY (Indiana)
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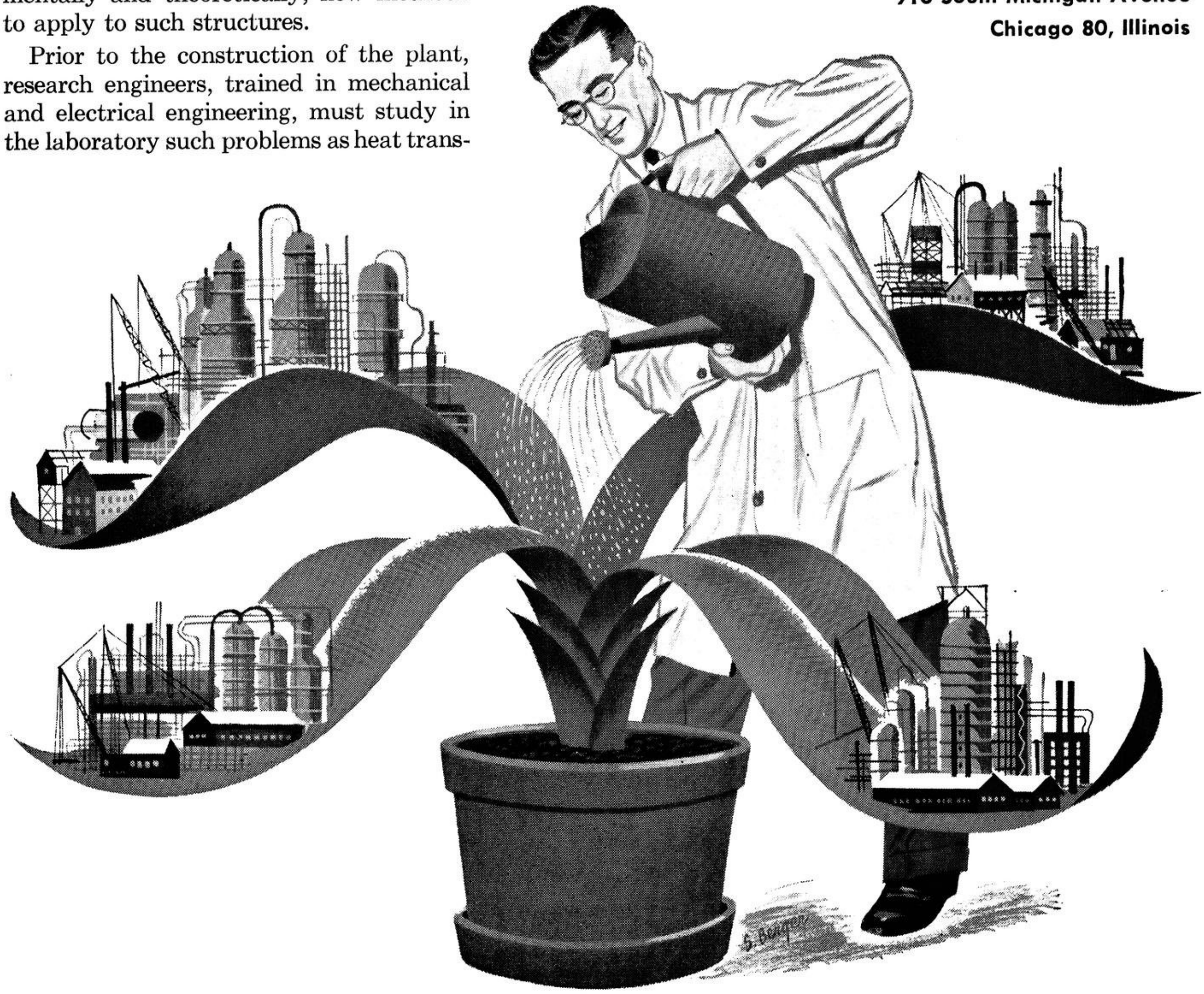
Chicago 80, Illinois



So You Want To Be An Engineer

Miss Mary O'Keefe and Mr. K. G. Shiels

by Miss M. O'Keefe
Mr. K. G. Shiels
Assistants to the Dean

IN HIS endeavor to find his real interest in life and to determine the type of training he should pursue in reaching his final goal, the high school student seeking information on engineering as a career has no doubt found in the reading room of his high school library the University of Wisconsin pamphlet entitled "The Engineer —His Preparation and Work." In this booklet he has read that engineering may be defined as the application of the principles of science to the development of natural resources, the design and erection of structures, the construction and operation of machines and ways of transportation and communications, and the devising and controlling of physical and chemical process of manufacture, especially those involving the use of machinery.

Without question, the average high school student with a genuine interest in engineering has carried on sufficient research to determine whether he will train for chemical, civil, mechanical, electrical, mining, or metallurgical engineering, and that he has a fair knowledge of their functional divisions. If he wishes further information in determining his particular course, I would suggest that he send ten cents to Engineers' Council for Professional Development, 29 West Thirty-Ninth Street, New York, New York, for a copy of "Engineering as a Career."

The profession of engineering should not be confused with the work of the skilled workman or artisan, nor should the prospective engineering student think that manual dexterity or an interest in things electrical or mechanical necessarily indicate engineering ability. A better measure of probable success in engineering is his aptitude in science and mathematics. The student whose grades in high school have ranked him consistently in the upper third of his classes, particularly in science and mathematics courses, probably has the capacity for engineering training. Coupled with this should be a liking for science as far as he has studied it, and a lasting curiosity about the reasons which underlie methods and results. He should find mathematics easy to understand for it is the engineer's most valuable tool.

To assist the prospective engineering student to make the best possible start in his college course, I can give no better advice than to review his algebra this summer in such a manner that he has the fundamentals well mastered. Mathematics 51, the first engineering mathematics course, requires one and one-half years algebra and one year plane geometry. Some high school students may not have taken their third semester of high school algebra, in which case it would be profitable for them to take the course (Mathematics 50) by correspondence this summer with the University Extension Division. At the beginning of their first semester all freshman engineers, after a few days review, are given an algebra test. Those who do not pass the test are required to take Mathematics 50 (sub-freshman mathematics), thus falling one semester behind in the regular mathematics courses. Those who are behind in mathematics at the close of their freshman year should plan to take mathematics in the summer session. Otherwise, their sequence of technical subjects which have mathematics as a prerequisite will be interrupted.

In their freshman year all engineers carry chemistry, drawing, English, and mathematics, in addition to a one or two credit course in speech, surveying, or shop, as the particular course may require, making it possible for a student to change his particular branch of engineering without loss of credit at the close of his freshman year. While in the sophomore year, physics and mathematics are common to all engineering courses, it is advisable that a student entering his sophomore year should have determined his real engineering interest in order to avoid any loss of credit in case he transfers.

When you enter college, organize your time, allowing approximately thirty hours per week for study outside the class room, and remember that a good start leads to a successful completion. At the University of Wisconsin you will find yourself one of many students. However, your advisers and your instructors are willing to confer with you and to help you, if you but give them the opportunity. Determined application, systematic study habits, frequent reviews, and the will to do your best will bring you well on your way to your chosen profession of engineering. The life of a successful engineer offers unlimited opportunity for constructive achievement, and engineers are more and more taking an active part in the business and public affairs of the world at large.

Book Review

by W. M. Haas

BASIC ENGINEERING DRAWING

By H. D. ORTH, R. R. WORSENCROFT, H. B. DOKE

THIS book does not pretend to be a complete drawing encyclopedia, but it is a very thorough and detailed presentation of the theory and basic practice of engineering drawing. A book written for the student, "Basic Engineering Drawing" satisfies its objective of explaining the theory and manual skills of drawing in a correct, clear and definite manner.

The liberal use of illustrations is the outstanding feature of this text. Orthographic projection is explained with the aid of sketches in perspective. The type is large and easy to read, and bold-face sub-titles make reference easy.

Basic fundamentals are emphasized throughout the book. The chapter on lettering presents an analysis of letter-shape combinations, then applies this analysis to the proper spacing of letters. Methods of making geometrical constructions are carefully presented.

The text discusses many of the procedures used in industry. It explains drafting room organization and the part the engineer, designer, detail draftsman, and tracer each has in producing the finished drawing. Current industrial practice in drafting is reflected in the discussion of printing from pencil lines instead of from ink. A chapter on shop methods gives the student an insight into how his drawing will be employed in making the actual machine or machine part. Therefore, the student will keep in mind economy, practicability, and ease of manufacture.

Enough work of specialized nature is brought in to round out the fundamental material. A comprehensive chapter discusses graphs and charts, and shows their relation to the statistical data or empirical formula being presented. Various schemes of pictorial representation are described, as well as the theory of perspective drawing. An outline to use when checking drawings is suggested. The latest standards of conventional representation are illustrated. The appendix contains many useful tables of nationally accepted standards.

Professor H. D. Orth, chairman of the Mechanical Drawing department.

GAS TURBINES IN AVIATION

by H. J. Clyman, Baldwin Locomotive Works

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TO OBTAIN an idea of how the development of gas turbines came about we must first look at the work done by Air Commodore Whittle of the RAF, who started the gas turbine development in England in 1930. We must give him credit for his original thinking, which as it has developed, started the gas turbine on its way in both Great Britain and the United States.

As you know, the U. S. now has at least three airplanes that have become well known to the public, the P-59, Bell airplane; the P-80, Lockheed airplane, and the XFR-1 Ryan airplane all using the jet engine for either its main source of power or as a booster engine. These airplanes have proven the worth of this new type of power plant.

It is also interesting to note that the Germans started their development in 1936 and flew a turbo-jet propelled airplane in August 1939. These German engines were, of course, limited in the amount of alloying elements which could be used in their construction. Even so, the airplanes powered by these engines did a rather good job during the war.

On December 8, 1941, the Bureau of Aeronautics asked the Westinghouse Electric Corp. to build a jet engine. This job was given to the Development Engineering Department of the Steam Division, which at that time consisted of approximately 15 engineers. These men gathered together all of their steam turbine experience in the design of steam turbines and blowers, their vast background in the field of thermodynamics and metallurgy to design the first American jet propulsion engine. Since that time, however, this activity has expanded to such an extent that a new division in Westinghouse was formed, the Aviation Gas Turbine Division, which is to develop and manufacture this new type of power plant called the Gas Turbine.

Gas Turbines for aircraft use may be broken down into two general classes according to the way the thrust is obtained by accelerating a mass of gases through the engine; the second of which is the gas turbine propeller drive where the thrust is obtained for the most part from a propeller to which power is supplied by the turbine.

Let us examine the jet propulsion engine first. It can be seen by comparing the Westinghouse design and the Whittle design that all the main components are present but that one uses an axial flow type of compressor and the other a centrifugal compressor. Early in the development of these engines it became apparent that a jet engine would only be effective in very high speed airplanes, thus it became important to keep the diameter as small as possible and to allow the air to travel in a straight path to reduce the losses inherent in turning the air.

The Westinghouse model 19A jet propulsion engine, now superseded by later developments, is a good example of an axial flow gas turbine. The "19" refers to the diameter of the combustion chamber and gives a good indication of the size of an engine which produces approximately 1300 horsepower at modern flight speeds. This engine was the first one Westinghouse designed and built and was attached to an FG-1 airplane as a booster engine which was purely an experimental installation to determine the operational characteristics in flight. A longitudinal section of this engine shows a six stage axial flow compressor, a straight through combustion chamber, a turbine and an exhaust nozzle. In this particular engine all the accessories were housed in the inlet to the engine. The shaft between the compressor and turbine is rigidly connected and is supported on three sleeve bearings. The compressor raises 30 lbs. of air per second to a pressure of about 2.8 atmospheres, and requires 3500 hp at sea

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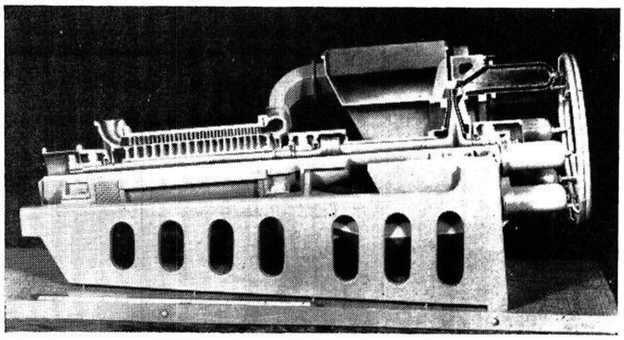


Modern design has reduced size of gas turbines.

A Future for Engineers; TECHNICAL

TECHNICAL men having the proper qualifications will find many lucrative opportunities beckoning them in the publicity field during the postwar era.

Today, a capable engineer-publicist can market his services in nine out of ten plants with only a short, convincing sales talk. However, before you rush out to grab one of these new jobs—stop and analyze your own characteristics.

1. Do you like to write—or do you think such a task is worse than taking medicine?

2. Do you like to mingle with people and share their problems—or do you prefer seclusion?

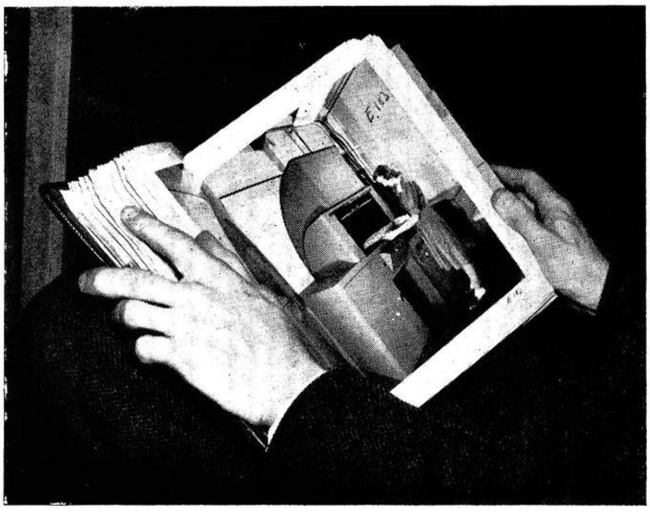
3. Do you like to have a LITTLE to do with MANY things—or would it please you more to be an expert on one or two subjects?

4. Can you keep your tongue in cheek when one of your contributors insists on using the original version of a story you've spent two nights editing at home—or would you "blow up" under such circumstances?

5. Are you a salesman at least to the extent that you can assemble facts to justify various phases of your operations—or would you be completely stumped if management questioned whether you are worth your keep?

6. Can you adopt a pace and devise short cuts quickly so as to do two normal days work in one when the occasion arises—or would the situation upset you?

7. Do you get a "kick" out of seeing your company's name in the press—or do you think manpower spent in getting such material printed is wasted?



"Locate a good news photographer"

If your answers to all of these queries are affirmative, your chances to succeed as a publicist are excellent. If you score five "yeses", your prospects are good. Nevertheless, you still need some actual experience, and working with an established publicity organization is the only way to acquire this essential know-how. Try to connect with a large old-established company or advertising agency—you'll get your feet on the ground and gain self-confidence for the day you establish a new department on virgin soil.

Initiating such a new setup is a venture that calls for considerable courage. Many new and perplexing problems—never encountered during your apprenticeship—will confront you. Above all, you will need the tools and "stick-to-it-iveness" of a good salesman. During the first year, you must sell yourself and your program constantly. If you do a thorough job during this trial period, you will be firmly rooted in management's plans for future years.

At this point, let me hoist the red flag. Spend the first few weeks planning and putting into operation systematic methods for expediting every phase of your program. If you don't, you'll find yourself going around in circles and management will soon notice that your production is not up to expectations.

Here are some of the matters that should have your immediate attention:

1. Gather together all available photo negatives and prints. Establish a filing system so you will never be embarrassed due to lack of this important material when you're ready to send out a release.

2. Establish a method for filing and exhibiting clippings. Large scrap books are convenient for this purpose and provide a neat method. Don't miss an oppor-

PUBLICITY

by V. W. Palen e'25

tunity to show these books to everyone who will spend the time to examine them. They go a long way toward furnishing the proof of the publicity pudding.

3. Set up a system for recording titles and for assigning key numbers to all releases. Make it a strict policy to file a folder (with number) for each project at the moment initial steps are taken.

4. Design a flexible mailing method. Today, there are upwards of 1,800 business and technical magazines in the U. S. Under various circumstances, it may be desirable to circularize certain selected groups of them. A master list, keyed to some sort of check sheet, will enable you to quickly indicate to the mailing organization which publications are to receive the release.

5. Make up suitable forms (mimeo or printed) to cover such routines as monthly, quarterly, and annual reports; to cover approvals; to get signatures of individuals granting permission to use photos in which they appear; to notify authors when and where their articles are published.

6. Engage the services of one or two clipping agencies. It is good to have one newspaper agency and one magazine agency for this work since such organizations usually specialize in one field or the other.

7. Locate a good news photographer. Get him to understand your company and your specific problems, and place the responsibility for good photos directly on his shoulders. If he is willing and capable, on occasion you may wish to turn him loose in the plant to find and bring in shots that he considers outstanding.

8. Set up a daily reminder file to guarantee prompt attention for all projects at the proper time. Thus, it is easy for your stenographer to bring the material from a particular day's compartment to your attention as the first order of business each morning.

9. Provide a fund from which authors can be paid—this is to cover situations where an editor fails to send the usual check. Contributor's good will can be retained only through fair and equal treatment for all. Don't forget that your success depends on making

V. W. PALEN e'25 is now employed by North American Philips Company, Inc., as a publicist. The system of publicity now in use and operating very efficiently was set up by Palen in March of 1944 when he took over his present position. Previous to his present position he has had several different engineering positions but was writing on technical matters off and on ever since graduation, having an imposing list of papers published throughout the period.

friends and keeping them. Then, too, you will be agreeably surprised to see how the first check stimulates an author to write a second article.

Once the machinery is installed, you're ready for production. Remember, in the technical publicity field, your most important function involves keeping your editors well supplied with signed articles. Of course, this type of material is hardest to produce but it is the real backbone of your operation. Many times these articles are suitable for reprinting and in this form they provide a valuable source of customer literature. You announce the availability of this literature through a release, and these items —small though they are—all add up into column-inches of publicity in your favor.

Editors' Valuable Aid

Keep in close contact with editors and plant personnel. By this means you learn the needs of various publications and the capacity of your engineers to supply them. Take an editor through your plant every chance you get. Invariably, he will uncover a good story or two during his talks with department employes.

Occasionally, you will find it advantageous to help an author write his article. This should be avoided if possible since your time pays bigger publicity dividends when spent in getting others to write. You'll have to edit and

(continued on page 14)

GAS

(continued from page 9)

level conditions. The flame in the combustion chamber is started by means of a spark and once combustion has started it maintains itself, and the temperature of the gases entering the turbine nozzle is approximately 1500° F. maximum. The turbine uses approximately two-thirds of the available energy of the hot gases in supplying the power to the compressor and the rest of the energy is used in expanding the gas through the exhaust nozzle at about acoustic velocity. Some small fraction of the power is supplied to drive the accessories.

The performance of a jet engine is measured in pounds of thrust that it produces and is obtained by multiplying the mass flow of air (W/g) and the difference between the

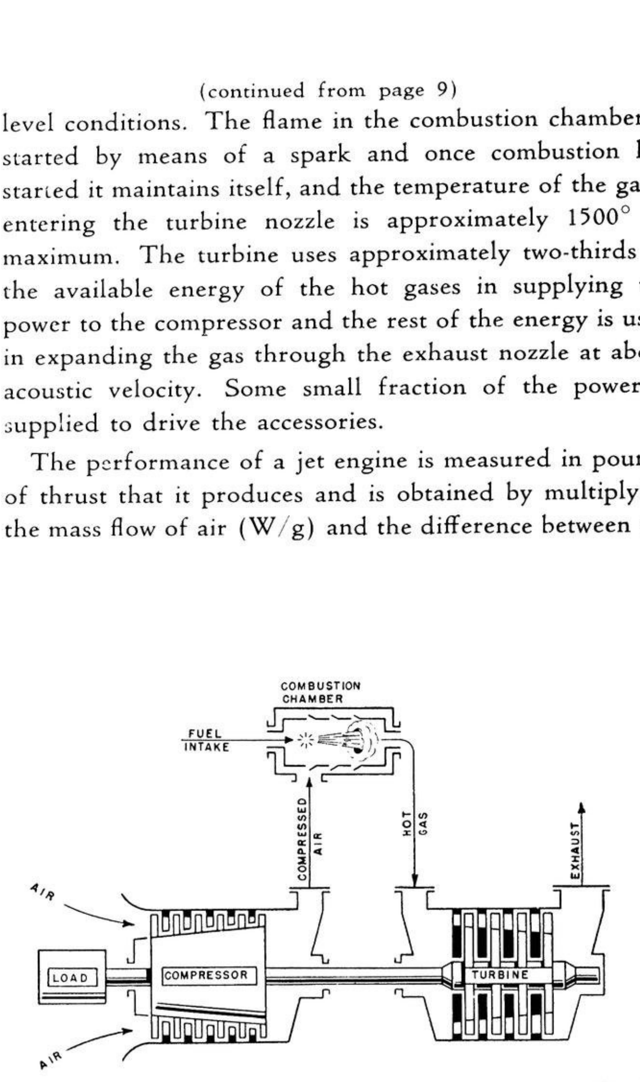


FIG. 1
SIMPLE GAS TURBINE CYCLE

GENERAL ELECTRIC CO.
SCHENECTADY, N.Y.
DRAWN BY
H-8220394

velocity of the air at the inlet and the exhaust (v_2—v_1) or $F=W/g\ (v_2 - v_1)$. In flight, at a given altitude, the mass flow of air forced through the engine is slightly increased with an increase in flight velocity and the difference between jet and flight velocity decreases with an increase in flight velocity so that the product of these two variables results in a fairly constant thrust at most flight speeds.

Let us now look at a comparison between an adjustable pitch propeller which is capable of converting shaft power into thrust horsepower efficiently over a fairly wide range of speed, and a jet engine. It can be seen that the jet engine efficiency does not equal propeller efficiency until speeds of around 500 mph are reached. Below this speed jet efficiency consequently fuel economy is inferior. It should be pointed out that at these high speeds compressibility effects impose critical aircraft design limitations so much aerodynamics research must be carried out before jet propulsion can be utilized to its best advantage.

To compare a jet engine with an up and down engine, we must go back to the fact mentioned previously that the performance of a jet engine is expressed in pounds of thrust which the engine develops and it is necessary to consider the relationship which exists between the thrust of a jet engine and the normal brake horsepower which a reciprocating engine develops. The relationship is:

$$\text{Equivalent bhp} = \frac{\text{thrust x aircraft velocity}}{\text{375 x propeller efficiency}}$$

This leads to a result that a 300 mph forward speed 1 lb. of thrust equals 1 bhp if the propeller efficiency is 80%, which is a reasonable assumption to make at the given speed. At 600 mph 1 lb. of thrust is equal to 2 bhp if the propeller efficiency remains the same (that is, 80%), but at that speed compressibility effects on the blade tips reduces the propeller efficiency to about 53% then we have the result that 1 lb. of thrust is equal to 3 bhp. Using these values let us look at the advantages obtained by using a jet engine at high speeds.

Let us consider a fighter airplane with a 1000 hp piston engine. Such a machine, if of the Spitfire size and drag will have a sea level speed of 300 mph. Consequently, since at this speed 1 bhp 1 lb. of thrust the thrust on the airplane will be 1000 lbs. and the fuel consumption will be .51 lbs. bhp or per pound of thrust per hour. A jet engine of 1000 lbs. thrust will also drive the airplane at 300 mph but the fuel consumption will be about 1.2 lbs. of fuel per lb. of thrust per hour or more than twice that needed by the piston engine.

Let us now consider what we must do to give this airplane a sea level speed of 600 mph. Since the power required varies as the cube of the speed, we will need 8000 hp if the propeller efficiency remains at 80%, but we have said previously that an efficiency of 53% is more probable at this speed so that means that the power required will be 12,000 hp and such a piston engine will weigh roughly 12 times the weight of the original 1000 hp en-

•TURBINE

gine because piston engines tend to have a constant specific weight per bhp.

On the other hand, the thrust required to double the speed of the airplane is only four times as great, hence, the jet engine will only weigh four times the weight of the 1000 lb. thrust engine because jet engines tend to have a constant weight per unit thrust.

Now if we compare fuel consumption of the two engines at 600 mph, the "up and down" 12,000 hp engine at .5 lbs. of fuel per hour per bhp uses 6000 lbs. of fuel per hour to produce 4000 lbs. of thrust so its fuel consumption is 1.5 lbs. of fuel per hour per lb. of thrust whereas the jet engine fuel rate should be 1.4 lbs. of fuel per hour per lb. of thrust.

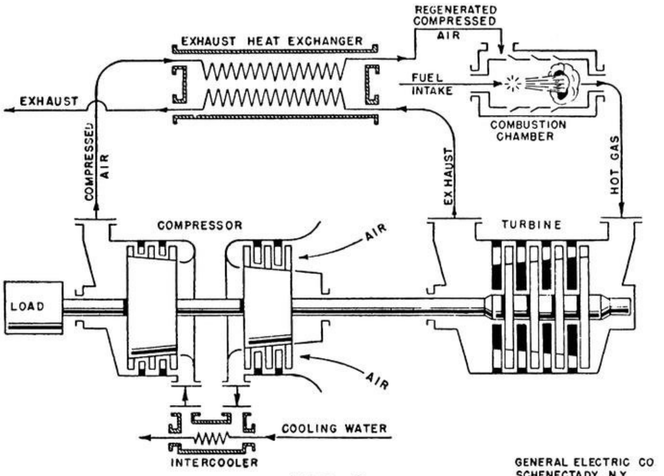
In other words, there is now very little difference in the fuel consumption of the two engines and there is a tremendous advantage in size and weight with the jet engine. In fact, the 12,000 hp engine would weigh approximately 20,000 lbs. installed and would be too large for a Spitfire airplane. The jet engine would not weigh more than 2000 lbs. and could probably be accommodated in an airplane of the Spitfire size.

This example gives part of the story very effectively, but let us look at some items besides speed, weight, and consumption. If we make two installations, one jet engine and the other reciprocating engine each favoring the respective engine we find that the jet plane will excel in maximum speed, altitude ceiling and best cruising speed, but the conventional airplane will excel in length of take off run, maximum rate of climb air range. By increasing the thrust of the jet engine by 50 to 70%, the take off run would be reduced to about the same as the conventional fighter, the climb and ceiling would be greatly increased, and the cruising speed and maximum speed would be increased slightly, all at the expense of the heavier power plant and a further serious reduction in range.

Thus, we can see that the jet engine is going to be used for high speed military fighter interceptor airplanes for quite some time unless speed becomes attractive enough to airline operators to sacrifice some economy of slower speed, lower power equipment.

Let us now turn to the gas turbine propeller drive engine which is basically a jet engine in that it has the same components with the addition of suitable gearing and a propeller.

The "prop drive" engine is longer due to the fact that more stages are used in the compressor for a high pressure ratio and greater efficiency where weight can be added to achieve greater overall efficiency than is practicable in a jet engine where it is necessary to get the lightest weight engine for a given thrust. The power available for driving the propeller is the difference between the power supplied by the turbine and that required by the compressor and the accessories.



GENERAL ELECTRIC CO
SCHENECTADY, N.Y.
DRAWN BY

FIG. 2
INTERCOOLED & REGENERATED GAS TURBINE CYCLE H-8220395

The diameter of a geared gas turbine will be less than half that of an up and down engine of comparable power. This enables the airplane designer to better conceal this type of engine in a wing and the gas turbine will present a small frontal area. To compare a reciprocating engine with a gas turbine propeller drive engine it is necessary to make the comparison on the basis of finished airplanes designed to best fit the characteristics of their particular power plants. **Test and fuel consumption rates are a** good measuring stick between engines of similar types, but should not be used as a primary figure of merit in comparing different engine types. The size, weight and cooling requirements of an engine, together with the efficiency in converting energy into thrust horsepower and the ease

(continued on page 16)

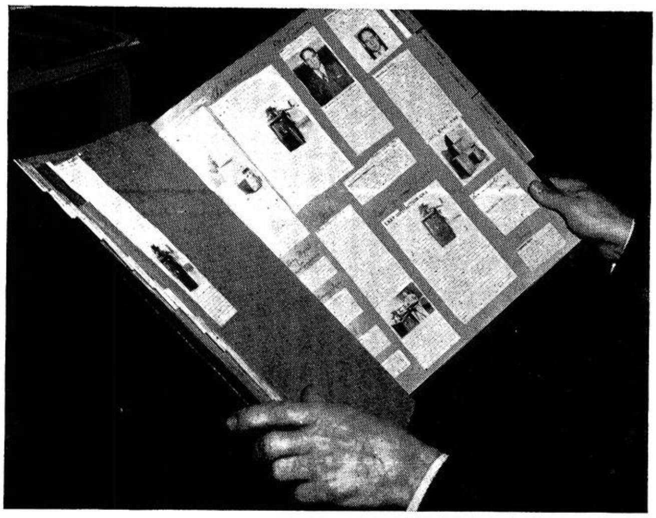
Technical Publicity

(continued from page 11)

rearrange the stories when they arrive. You'll have to get photos and illustrations. More important, you'll have to get the article published.

As a publicist, you will be on the lookout constantly for information concerning new equipment and new products. You'll get this through contacts with department heads. You'll obtain data on special events, personnel changes, financial and production reports from the same sources.

Periodically, you should spend a day with a photographer getting a dozen or more good production close-ups in the plant. Captions are then prepared and after they are approved, you have pictorial stock from which to send out a weekly or monthly photo release. Many of your syndicated photos will be published. Even if they do not get into print, they knock on the editor's door regularly to remind him that you are on the job ready to serve him.



"Scrap book convenient for filing and exhibiting clippings"

Another form of activity the publicist can cash in on involves organization of a speakers' bureau. Make a list of your best orators and their subjects and let it be known far and wide that they're available. When your man is scheduled to appear before some society, send out announcements to the press before and after the event.

Press parties usually are the best space getters but costly. They are staged only when you have something big and important to announce. Study the situation carefully and confer with other experienced publicists before going ahead on a press party luncheon or afternoon cocktail party. Once the stage is set, get your best company men to put on the show. A few of your jobs will include:

1. Sending out invitations.
2. Preparing releases and photos to hand out at the party.
3. Mixing with your guests at the party to offer your services.
4. Sending advance copies of release material to editors who cannot attend your press party. Plan such mailings so the absent editor gets the data on time.

Various forms used by the author are shown as illustrations. They may prove of considerable value to a publicist who is struggling to get a new organization under way. A few of these forms need explanation.

Mailing Data Filed

The check lists for expediting mailing and proper distribution of releases are very important. Complete mailing data is kept in a set of four loose-leaf binders. Pages carry TP numbers which correspond to the classifications in INDUSTRIAL MARKETING'S MARKET DATA BOOK or Standard Rate & Data Service.

The running record for clippings is kept active for 30 additional days following termination of the month it covers. This is necessary because clippings are often delayed in arrival. For instance, the report for June is considered finished (and is typed) on or about July 31.

The monthly summary report provides no place for comparison of current results with those of the previous year. Recently, the writer has added these figures in the margin. Thus, for example, June, 1944, and June, 1945, data are compared for over-all and department totals.

The importance of making regular reports to management on publicity results cannot be over-emphasized. This is especially true during the first year which may be a probationary period. On your first six-months report, you may find it worth while to translate your publicity results into dollar values. Merely compute what equivalent advertising space would cost—this is usually a most convincing figure.

The primary purpose of this article is to arouse the interest of engineers in a new and most promising field of endeavor. If the expressed ideals aid only a few individuals to find an occupation for which they are best suited—then the story will have served its purpose.

Talking Lamp

by Fred Pitschke m'47

Existence of a "talking lamp," which emits infrared radiations enabling secret two-way conversation over an invisible searchlight beam, has been disclosed by the Westinghouse Lamp Division, Bloomfield, N. J.

The source of the unseen radiations is caesium vapor. **Although an efficient generator of infrared, caesium is a** poor visible illuminant, thereby qualifying it for confidential telephonic assignments. It is possible to transmit words practically instantaneously with true telephone quality and at normal conversational speed with this lamp.

The caesium vapor lamp was designed by Dr. Beese at the request of the United States Navy for convoy duty and for issuing troop landing directions. A feature particularly attractive to the Navy is that, unlike radio, there can be no eavesdropping or jamming of infrared "beamcasting." Jamming would require the use of a "shutter" device within the limited 25-degree beam as the message is restricted to listeners within the beam spread.

By V-J Day, about 3,500 of the 100-watt lamps had been shipped to the Navy but the auxiliary equipment was not obtained in time for use in combat. Suggesting peacetime uses, Dr. Beese said the lamp is expected to prove useful in confidential ship-to-shore communications where radio wavebands might be objectionable; in conveying messages among pilots flying through radio "blackouts" in close formation or a few miles apart; or in disaster areas where telephone lines are cut and climatic conditions make radio broadcasting impossible. Infrared beamcasting is unaffected by static and all weather except extremely soupy fog or smoke.

Filling a gap between radar and "walkie-talkie," infrared beamcasting is similar to radio broadcasting except that the sound is carried over ultra-short wave lengths rather than long wave lengths. The waves, transmitted over a carrier wave having a frequency 350 million times the normal broadcast band, have a distance or horizon limitation similar to that encountered in television.

The lamp itself serves as the transmitter. When mounted on a ship's mast in a parabolic searchlight-like reflector, it picks up words spoken into a microphone from the ship's pilothouse or deck and provides wings for the voice to reach the receiving station on another ship or a shore station. At the receiving station, a photoelectric cell mounted in another parabolic reflector picks up the infrared rays, and with suitable amplification converts them into a reproduction of the spoken words.

The key to broadcasting with light beams is the ability of the lamp to alternately dim and brighten, thousands of times a second, a requirement necessary in order to truly reproduce by wave lengths the varying tonal qualities of the human voice, which range in pitch, or frequency, up and down the musical scale.

In this characteristic, called modulability, the caesium vapor lamp has maximum efficiency, reaching a peak of 100 per cent at some points in the entire usable audio-frequency range of 200 to 3,000 cycles a second. By contrast, a 60-watt household lamp can be modulated to a maximum of only one-tenth per cent.

The "talking lamp" accepted by the Navy is 13 inches long overall and produces its radiation from an arc stream 3 inches long and 1¼ inches in diameter. It is filled with argon gas and caesium vapor. To conserve heat, the inner bulb is mounted within an outer bulb and the intervening space evacuated. The outer bulb, two inches in diameter, is banded with padded metal strips between two ridges in order to maintain accurate alignment and support.

Life tests show that the lamp can operate more than 100 hours without replacement. It burns on direct current electricity but the arc stream itself is modulated by alternating current, superimposed.

Active experimental work at Westinghouse on the caesium lamp started in April, 1944. A bulb was produced in a few months and experiments conducted at the Westinghouse Research Laboratories in East Pittsburgh showed it to be successful.

Some of the same lamps tested at East Pittsburgh were taken to the University of Michigan on August 15, 1944, for further tests. Other lamps were submitted to Northwestern University for laboratory experiments and for a test on Lake Michigan. Subsequent trials were made by the Bureau of Ships, the United States Navy and the Naval Research Laboratory.

The clinching test came in October, 1944, during a ship-to-shore demonstration by a Navy ship off Cape Henlopen, Del., carrying the Westinghouse lamp in Northwestern-built equipment.

Gas Turbine

(continued from page 13)

with which it is installed in clean, low drag airplanes, gives the full measure of its overall economy.

In the gas turbine propeller drive engine the cooling requirements are such that no large amounts of air are needed and consequently the cooling losses are small. The gas turbine can be designed with a predetermined amount of thrust being obtained in addition to shaft power for the propeller. This division is usually 80% shaft power and 20% jet thrust. Thus the very small nacelle drag and the propeller losses are just about cancelled out by the thrust obtained in this manner to make the total thrust of the geared gas turbine fairly constant over a wide range of speed. It can be stated that the shaft power output of the turbine approximately equals the net thrust HP available.

The best efficiency is obtained at peak load which points to its use in the high speed airplane. This peak efficiency is such that when the gas turbine is installed in a well designed airplane the specific fuel rates are very close to those obtainable by a reciprocating engine, particularly at higher altitudes where cool air is taken into the engine.

In determining the size of a gas turbine it is necessary to design for the altitude and speed requirements rather than sea level because of the rather rapid decrease of power with altitude. Thus, if a design is made for 5000 hp at 30,000 ft. there will be approximately 60% more horsepower available at sea level conditions. Under these conditions a greater load may be lifted into the air or a shorter runway may be used.

The reciprocating engine will undoubtedly continue to hold its present position in the field of low power and for planes of low speed. However, the gas turbine will come into its own both as a jet engine and as a propeller drive for high powered planes and for high speed flight. Of the three types of power planes the turbine-propeller drive is superior to the reciprocating engine in all speed ranges and over the jet engine in low and intermediate speeds. The jet engine is pre-eminent in the highest speed range.

The gas turbine propeller drive engine will be the first type of gas turbine to be used in commercial flights and in less than ten years the development of this type of engine will be sufficient to enable its use in all but the lower powered airplanes.

The jet engine will continue to be used for high speed flight for the most part in military airplanes.

Science Highlights

Super Dynamometer Tests Aircraft Engines

The most powerful power-absorbing equipment ever made by man, with a take-it ability of 20,000 horsepower for testing aircraft engines, has been supplied the Wright Aeronautical Corporation, Woodridge, N. J., by the General Electric Company, it has been announced.

Scheduled to be in operation by spring, the testing equipment will be used by the aircraft company to supply load for aircraft engines under development. The maximum load which may be carried by the equipment is 20,000 horsepower at variable speeds, which will be five times greater than the capacity of any similar equipment heretofore made by the company and the largest load ever carried by a motor-power testing machine.

Engineers pointed out the new equipment acts as a load or brake against the power generated by the engine on test, and compared it to a strong man using a weight lifting machine to determine his strength. They said no existing equipment was capable of testing the high-powered aircraft engines designed for extremely high speeds and horsepower, and G. E. was called on to develop the new equipment.

Ocean Bed Yields Oil

The geologic character of the Continental Shelf makes it reasonable to believe that this vast underwater plain possibly could yield at least 1,000 billion barrels of oil should it become necessary to tap its resources, according to Wallace E. Pratt, noted petroleum geologist.

He suggests three of the possible methods for extracting oil from the shelf, and says all are so costly they would be considered only should oil need make producing cost a secondary factor. One is the excavation of tunnels from the shore through the ocean floor to the vicinity of the oil sands.

Another proposal is the use of huge diving bells containing a derrick and a drilling rig. The bell would be anchored securely just above the ocean floor and float steadily below the zone of wave action to permit drilling a well straight down into the oil sand.

The third method calls for a large platform, of the type suggested during the war as a possible mid-ocean landing field. The platform would be supported above the maximum height of the waves by a group of great caissons floating below wave actions and anchored firmly in place.

S-t-a-t-i-c

by J. Woodburn m'47
J. Hinkley m'48

Seagull No. 1: "Who won that boat race below us, Harvard or Yale?"
Seagull No. 2: "Yale did."
Seagull No. 1: "And to think, I put everything I had on Harvard."

•

Little girls want all day suckers.
Big girls just want them for the evening.

•

Landlady (at the Rock): "I thought I saw you taking a gentleman up to your room last night, Miss Nelson."
Miss Nelson: "Yes, that's what I thought too."

•

Co-ed: "I'm going to quit dating engineers. They always leave blue prints on my neck."
Roommate: "Yes, but those lawyers are always contesting your will."

•

"Go, and never dampen my door again," said the old lady to the little pup.

•

Jean: "I'm knitting something that will make a certain engineer happy."
Peg: "A sweater for him?"
Jean: "No, a sweater for me."

•

She was only a janitor's daughter, but she knew how to turn on the heat.

•

Love makes the old world go round, but then, so does a good swallow of tobacco juice.

•

Co-ed: "Do you know what it feels like to be in love, to sit next to the man you adore, and feel your innermost soul vibrate?"
2nd: "Sure I do. I feel like that every time Bish takes me out on his motorcycle.

•

1st Engineer: "Why have you been sitting in your car in front of the ME Bldg. all afternoon?"
2nd Eng.: "I'm waiting for two students."
1st Eng.: "Who are they?"
2nd Eng.: "The one who owns the car in front of me and the one who owns the car behind me."

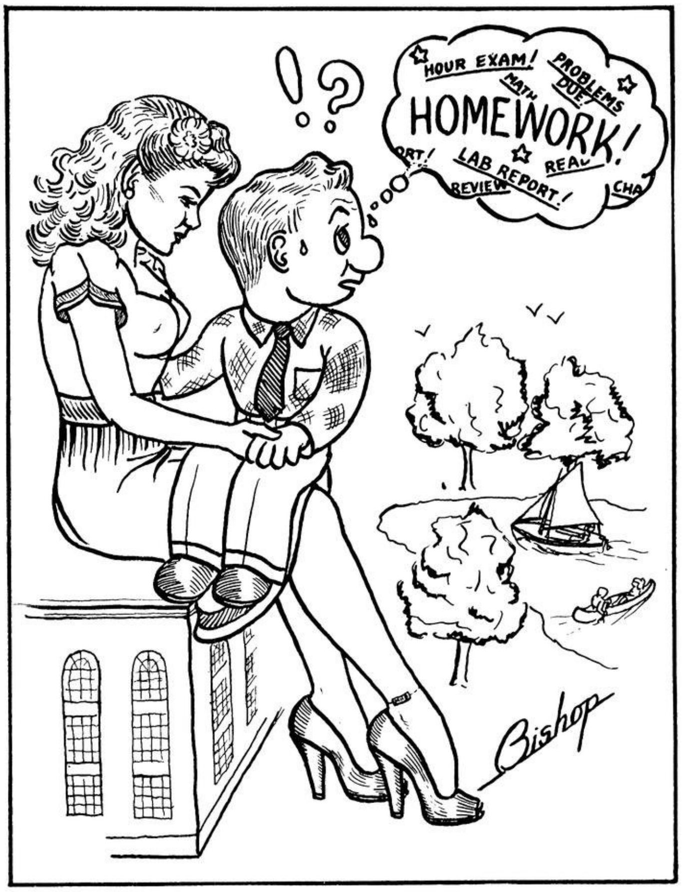
A lazy man is one who marries a widow with five children.

•

It was that sleepy time of the afternoon. The prof droned on and on; formulae, constants, and figures. An engineer, sitting in the second row, was unable to restrain himself any longer, and suddenly gave a tremendous yawn. Unfortunately, as he stretched out his arm he caught his neighbor squarely under the chin, knocking him to the floor. Horrified, he bent over the prostrate form just in time to hear a low murmer, "Hit me again, Sam, I can still hear him."

•

He who laughs last has found a double meaning that the censors missed.



(continued on page 28)

Editorially Speaking . . .

Let's Look Ahead

by H. L. May m'47

THE commencement ceremony will be held in the field house on Saturday morning May 24.

With this announcement comes the realization that another class, **the 94th here at Wisconsin, is graduating and joining the men of the previous 93 classes in carrying the** banner of Wisconsin in the field of their chosen vocation. To the senior this fact is obvious and has received considerable thought, but to the undergraduate, although graduation may seem distant perhaps this is a good time to take inventory of himself.

What has the University given to you? What are you absorbing, both in the classroom and out? Even more important, what are you going to contribute to a better world? As a college graduate certain standards of professional conduct will be expected of you. Your interests, your habits, and the principles cultivated in school are those which will be employed for the remainder of your career.

The age old golden rule of conduct, "Do unto others as you would that others shall do unto you", seems to have been changed in recent years to something like, "Do unto others before they have a chance to do unto you". This may seem to be a rather harsh statement, but with a little study it may not be so rash. I could remind you of some of the principles involved in World War II, the most destructive in history, or in National politics, or in present day labor-management disputes but, let us stay closer to home; right here at Wisconsin. In the classroom, for instance, grades are based upon competition, the same principle which has been responsible to a great extent in making the United States the great nation it is today. However, this does not mean that the all too prevalent grades obtained by means of crib notes on the cuffs of your sleeve will bring you knowledge to be used in the future. Leaving the classroom, may I mention another form of campus competition. Athletics are intended to develop good sportsmanship in competition, yet I doubt that any one at the recent N.C.A.A. boxing tournament would have known it from the sound of the field house on Saturday night. No it wasn't any of the men in the ring; they know what competition is, and they also know how to be good sports. It was the spectators, not all, but a large portion of whom were students. Disagreeing with decisions, and letting the judge know it, is your privilege and perhaps duty, but why take it out on the innocent victims, both the winner and loser who really are the victims in such cases. Those men went back to their respective schools carrying the impression that Wisconsin men are poor sports, forgetting about the real sports, the men in the ring.

I point these out not to be a fault finder, but as a reminder that it is time to take inventory of ourselves. If these are the principles which we are cultivating here in school, they are the same ones which will be used in the world we are to live in tomorrow.

We are not only going to be the people who make up the world of tomorrow, but we will also have to live in it. Now is the time to cultivate the mental and physical discipline necessary for the world of tomorrow. We are privileged to live in the United States of America, the greatest country in the world, one which got that way through competition, let us keep it that way, but at the same time remember that scientific advancement is of no avail if we can't live peacefully in the country we build.

Campus Highlights

by John Tanghe e'grad

THETA TAU INITIATES

AFTER an absence of eighteen years, Theta Tau, oldest national professional engineering fraternity, returned to the campus Saturday, March 22, 1947, when seventeen men were initiated at the Loraine Hotel during ceremonies re-activating Xi Chapter.

Theta Tau was founded on October 15, 1904, at the University of Minnesota. The Xi Chapter was founded January 13, 1923, and became inactive in 1929.

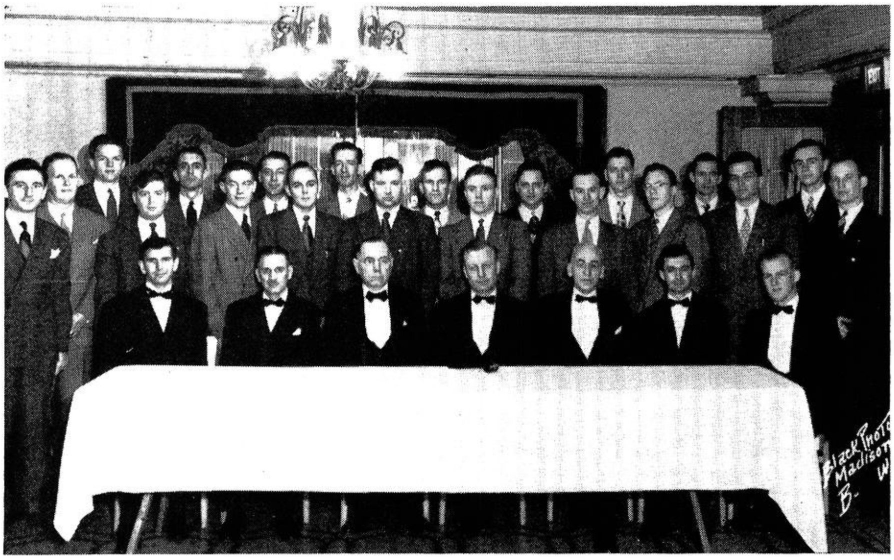
The new initiates organized last fall as Gamma Mu Epsilon was recognized by the University in November 1946. In December 1946 the National Headquarters of Theta Tau granted the request of this organization to re-activate the Wisconsin Chapter. John N. Pike, M. & M. E. 2, served as president of Gamma Mu Epsilon.

Those initiated were:

John N. Pike, M&ME
Norman J. Stickney, M&ME
William A. Hambly, Jr., M&ME
William H. Courson, EE
Roland D. Block, M&ME
Walter C. Borchers, ChE
Harold J. Enlow, ChE
Buford R. Everett, EE
James B. Geshay, M&ME
Keith E. Gilbert, M&ME, (Instructor)
Edward H. Jagmin, M&ME
David A. Mickelson, M&ME
Alex R. Mitka, ChE
Robert O. Schindelholz, CE
Alfred B. Scott, Jr., M&ME
Norman C. Sethne, ME
Joseph R. Vinette, M&ME

The following men were elected to office: Buford R. Everett, Regent; Harold J. Enlow, Vice Regent; David A. Mickelson, Scribe; William H. Courson, Treasurer; John N. Pike, Corresponding Secretary.

Keith E. Gilbert was named faculty advisor.



Standing, from left to right: G. A. Rohlick, Nu Chapter, F. F. Bowman, charter member of Xi Chapter, D. A. Mickelson, J. A. Jefferys, Beta Chapter, R. O. Schindelholz, R. D. Block, J. N. Pike, A. B. Scott, J. H. Enlow, K. E. Gilbert, N. C. Sethne, N. J. Stickney, E. H. Jagmin, J. R. Vinette, W. C. Borchers, W. A. Hambley, J. B. Geshay, W. H. Courson, A. R. Mitka, and B. R. Everett.

Seated, from left to right: W. C. Turnbull, Beta Chapter, J. Daniels, Past Grand Regent, J. Vawter, Grand Treasurer, R. Nusser, Grand Regent, H. H. Hopkins, Past Grand Regent, R. Biggs, Phi Chapter, and J. Duntley, Alpha Chapter.

•

The Big Sleep!

One of the job opportunities posted recently on the bulletin boards states that the City of Wausau is looking for a junior Civil Engineering student. The description of his duties reads: "Half time would be spent in field work, surveying; half time in office work, napping."

•

ASCE Membership Explained

The various degrees of membership in the national American Society of Civil Engineers were outlined at the April 3 meeting of the local student branch by Mr. George Salter, western representative of the national society. Mr. Salter explained that a graduate civil engineer of any accredited engineering school may qualify for the junior member standing. Upon completion of three years' experience after graduation he may apply for advancement to the associate membership rating. Three to five years additional experience is required before one becomes eligible for a position of full membership.

(continued on page 22)

Television gives you a choice seat at the game.

Television—a Season Pass to Baseball !

Every home game—day or night—played by the New York Giants, Yankees and Brooklyn Dodgers will be seen over television this season!

Owning a television receiver in the New York area will be like having a season pass for *all three ball clubs.* And in other cities, preparations for the future telecasting of baseball are being made.

When more than one home game is on the air, baseball fans can switch from one to the other—see the most exciting moments of each through television!

Those who own RCA Victor television receivers will enjoy *brighter, clearer, steadier* pictures through the RCA Victor Eye-Witness picture synchonizer that "locks" the receiver in tune with the sending station.

To witness baseball or any other event in the ever-growing range of television programs—you'll want the receiver that bears the most famous name in television today—RCA Victor.

When you buy an RCA Victor television receiver or radio, or Victrola radio-phonograph, or an RCA Victor record or a radio tube, you know you are getting one of the finest products of its kind science has achieved.

Radio Corporation of America, RCA Building, Radio City, New York 20. Listen to the RCA Victor Show, Sundays, 2 p.m., Eastern Daylight Time, NBC Network. "Victrola" T.M. Reg. U.S. Pat. Off.

Continue your education with pay—at RCA

Graduate Electrical Engineers: RCA Victor—one of the world's foremost manufacturers of radio and electronic products—offers you opportunity to gain valuable, well-rounded training and experience at a good salary with opportunities for advancement. Here are only five of the many projects which offer unusual promise:

- Development and design of radio receivers (including broadcast, short wave and FM circuits, television, and phonograph combinations).
- Advanced development and design of AM and FM broadcast transmitters, R-F induction heating, mobile communications equipment, relay systems.
- Design of component parts such as coils, loud-speakers, capacitors.
- Development and design of new recording and reproducing methods.
- Design of receiving, power, cathode ray, gas and photo tubes.

Write today to National Recruiting Division, RCA Victor, Camden, New Jersey.

Also many opportunities for Mechanical and Chemical Engineers and Physicists.

RADIO CORPORATION of AMERICA

Campus Highlights

(continued from page 20)

EKN Initiation

Theta Chapter of Eta Kappa Nu, national electrical engineering honor fraternity, initiated 11 men on Wednesday evening, April 2. Those received into the chapter were John E. Gemlo, Willard C. Petrie, Emil Kasum, Robert J. Keeler, John G. Hahn, Jr., Henry F. Blank, Robert G. Young, Melvin L. Griem, William R. Corzilius, Donald E. Procknow, and Alvin F. Loeffler, Jr.

Following the initiation ceremonies a banquet was held at the Wooden Bowl. After toastmaster Prof. H. A. Peterson's opening remarks, R. Ray Weeks, chapter president, welcomed the new initiates; the response to his welcome was given by John E. Gemlo. The principal address of the evening was given by Prof. M. L. Holt of the chemistry department.

"Microwaves in Action"

Members of the student chapter of AIEE who attended the meeting held Tuesday evening, April 9, heard Mr. F. B. Morgan of the Wisconsin Telephone Company speak on, and demonstrate, "Microwaves in Action." Mr. Truman Thompson, manager of the Madison Telephone Company, assisted Mr. Morgan with demonstrations of microwave generators, detectors, wave guides, etc. A semi-technical movie, "Echoes of Peace," was shown in conjunction with the talk.

Election of officers for the next calendar year were held. The following men were elected: Arthur Falk, chairman; Harry McMahon, vice-chairman; Robert Spink, secretary-treasurer; and Charles Cheney, representative to Polygon Board.

(continued on page 26)

Armature Spiders In The Home

by Henry Blank e'47

Editor's Note: This is the prize winning initiation paper submitted by initiates at the recent E.K.N. initiation.

Y WIFE insisted that we have a household pet, either a dog, a cat, or a canary, and the burden of shopping for it was placed upon me, so I dutifully or shall I say docilely browsed around town. Having a pet around the house was a nuisance so far as I was concerned because I well knew I would be walking it, shopping for its food, maintaining its abode, and doing all the other duties connected with a pet. So when I found the armature spider I was elated and immediately purchased it. I had my arguments well in mind as I expected a ten-round bout with my spouse when I arrived home, and as a final rehearsal I will relate them again.

Very few people know what a wonderful household pet a good armature spider can be. Completely hairless and arranged with an iron constitution, it is far superior to such usual pets as dogs and cats. It is my belief that once the qualities of this amazing creature are made known to the public the days of the cat and dog are gone forever. To enlighten the uninformed public, I will endeavor to describe the general appearance and the sterling qualities of an armature spider such as will be found in many of the better homes in the near future.

To begin with, the creature comes in various sizes and weights, from small to large, and from heavy to quite heavy, all sizes sporting a magnificent set of outstretched arms. The color usually is a dull rusty gray but can be improved with a little paint or painted to blend in with the color scheme of the home. The true armature spider has no teeth, but they can be furnished — they come in 360 deg. sets, that is, all-the-way-around teeth.

But its appearance belies its general nature. It is a perfect example of humility, docility, and unfertility, besides obedient and an even temper. The spider can be frightfully abused by little children, yet it never snaps back and even when furnished with the all-around teeth it has never been known to bite. However, when vigorously kicked, it has been known to leave a mark upon the offender. It never engages in loud and obscene brawls with the other usual but inferior household pets such as dogs, cats, and canaries. Neither does it spin a web like its low-bred distant relative, the house spider. When spinning, it just spins. Its sex life is above reproach; it has never presented its owner with a litter of shiny new baby amature spiders, proudly or otherwise. Its main interest is in spinning a webless web, and when it is not spinning it is resting and waiting for another spin. What a relief from the cat's delightful pastime of clawing upholstering and nylon stockings, the dog's habit of leaving his muddy welcome imprinted on your best suit and leaving an assorted variety of bones under the davenport and then dragging them out when company comes. Its low cost maintenance is a delight to the master of the house as there is no need to buy dog discuits, canary seed, liver, or meat. The fact that it is housebroken from its birth saves embarrassment when guests are around and keeps your blood pressure down. Between spins it faithfully performs household duties such as holding doors open, holding doors partly open, and holding doors closed.

These are only a few of the many virtues of the armature spider as a household pet. Volumes could be written on this creature; for the dog or cat—a word, possibly two. In closing I would like to remind you that once the armature spider has completely replaced the dog, hamburger and hot dog sandwiches will be strictly hamburger and hot dog sandwiches—to be eaten without wondering.

A truck driver in a hurry to get to his destination missed a turn in the road. He drove across a farmer's yard and straight into the kitchen of the house where the farmer's wife was cooking. She looked up and nonchalantly keep right on cooking.

Truck driver: Can you tell me how to get to Madison?

Farmer's wife (calmly)—Straight past the dining room table and turn right beyond the piano.

Funeral Director—How old are you sir?

Aged Mourner: I'm 98.

Funeral Director—Hardly worth going home, is it?

•

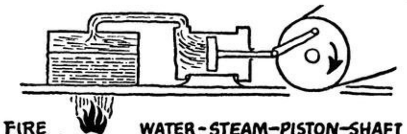
A newly wed filling out his income tax return listed a deduction for his wife. In the section marked "Exemption claimed for children," he penciled the notation: "Watch this space!"

THE 4th AND LATEST CONQUEST OF FIRE

1 FIRE . .

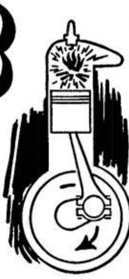
THE DIFFICULT THING ABOUT FIRE IS THAT IT'S HOT! IT BURNS! BUT PRIMITIVE MAN LEARNED TO USE THIS HEAT TO WARM HIMSELF · · · COOK · · · HARDEN CLAY · · · SOFTEN AND MELT METAL.

2



FIRE COULDN'T BURN WATER—INSTEAD IT CHANGED IT TO STEAM. SO MAN HARNESSED STEAM, USING FIRE INDIRECTLY TO PUSH A PISTON—TURN A WHEEL AND SHAFT....

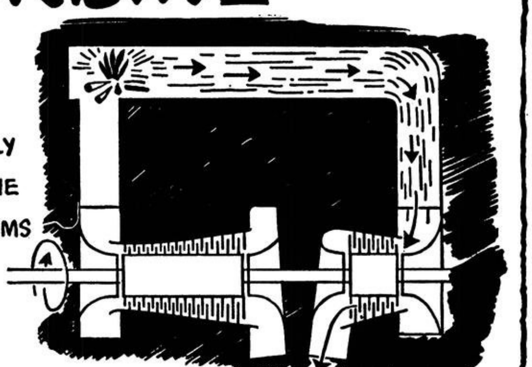
3 FIRE-PISTON-SHAFT . .



INVENTION OF THE INTERNAL COMBUSTION ENGINE ELIMINATED STEAM AS A LINK · · · BROUGHT FIRE CLOSER TO THE CRANK · · · BUT THE FRICTION OF RECIPROCATING MACHINERY STILL LOSES POWER · · · CAUSES WEAR.

4 THE GAS TURBINE . .

NOW, IN THE GAS TURBINE, FIRE IS APPLIED DIRECT TO THE SHAFT. A COMPRESSOR SUPPLIES AIR TO THE COMBUSTION CHAMBER. FUEL BURNER HEATS AIR, GREATLY INCREASING ITS VOLUME. HEATED AIR RUSHES THROUGH TURBINE AND TURNS SHAFT. SOUNDS SIMPLE BUT MANY TOUGH PROBLEMS OF DESIGN AND METALLURGY HAD TO BE SOLVED TO MAKE IT PRACTICAL.........



MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS HAS MADE MORE INDUSTRIAL GAS TURBINES THAN ALL OTHER COMPANIES COMBINED! WORK IS NOW GOING FORWARD FOR THEIR USE IN POWER PLANTS, LOCOMOTIVES, FAST SHIPS, PLANES, JUST ONE MORE EXAMPLE OF A-C LEADERSHIP IN SCIENTIFIC DEVELOPMENT OF BETTER MACHINERY FOR ALL INDUSTRY

ALLIS CHALMERS

ONE OF THE BIG 3 IN ELECTRIC POWER EQUIPMENT
BIGGEST OF ALL IN RANGE OF INDUSTRIAL PRODUCTS

Campus Highlights

(continued from page 22)

Wisconsin Engineer Banquet

Robert Burns DeLuxe, Prof. Pat Hyland's favorite cigars, were passed out at the annual Wisconsin Engineer banquet held at the University Club on Thursday evening, April 24. The banquet, an annual affair for the magazine staff members, featured Prof. Hyland as toastmaster and Prof. Glenn T. Trewartha of the geography department as principal speaker. Prof. Trewartha spoke on "The Outlook for Japan".

Other highlights of the event, besides the consumption of a roast beef dinner topped off with apple pie ala-mode, included the introduction of the new editor-in-chief, Emil Kasum, by Mr. Wayne K. Neill, assistant professor of chemical engineering and faculty advisor for the magazine. Retiring editor-in-chief Harold May and retiring business manager Kenneth Cummins then introduced the members of the respective staffs.

Keys were awarded by Prof. Jesse B. Kommers, chairman of the magazine's board of directors, to Kenneth Cummins, Harley Skatrud, and Bill Gottschalk of the business staff and Harold May, Emil Kasum, and John Tanghe on the editorial staff.

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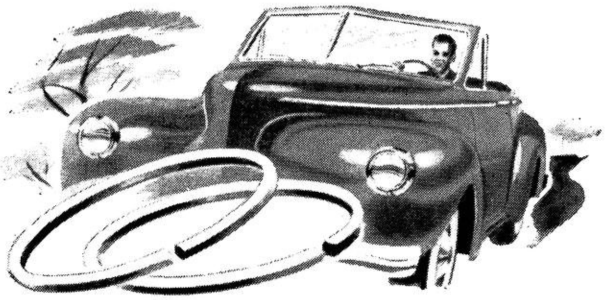
Triangle Elects New Officers

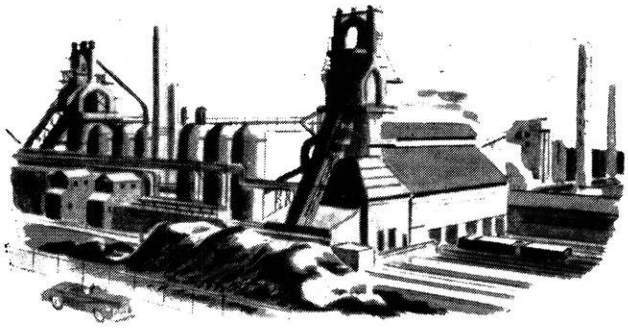
The Wisconsin chapter of Triangle, all-engineering fraternity, elected its officers for the summer and fall terms at the chapter meeting on April 7. Those elected for the summer term are: Harold Franz, president; Kenneth Maurer, vice-president; Erich Ahonen, recording and corresponding secretary; Fred Stoehr, steward; and Pat Lee, treasurer.

(continued on page 30)

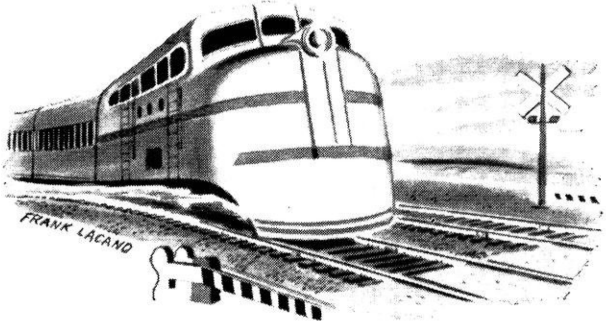
How many times did we meet today?

When you took your shower [1] . . . and combed your hair [2] . . .





drove your automobile [3] . . . . . . passed a steel mill [4] . . .



crossed the railroad [5] . . . . . bought a moth preventive [6] . . .

Chances are, you were seeing evidences of Koppers engineering and chemical skills.

1. Koppers chemicals, derived from coal, for use in making certain types of soap. **2.** Koppers chemicals used in making plastic combs. **3.** Koppers American Hammered Piston Rings. **4.** Coke ovens, designed and built by Koppers. **5.** Railroad crossties, pressure-treated by Koppers to resist decay. **6.** Koppers Hex...new, efficient moth protection. Koppers makes all these... and many more useful things besides. All are identified by the Koppers trade-mark, the symbol of a many-sided service. Koppers Company, Inc., Pittsburgh 19, Pa.

K
KOPPERS

STATIC

(continued from page 17)

Grandpa Cutplug says there may be such a thing as the "age of discretion," but no one has ever lived long enough to reach it.

"How old is grandma? Well, I really couldn't tell you but she must be getting up in years. When they lit the candles on her last birthday cake, three of the guests fainted from the heat."

•

A hunter in Northern Michigan saw a big bear sniffing at his tracks.

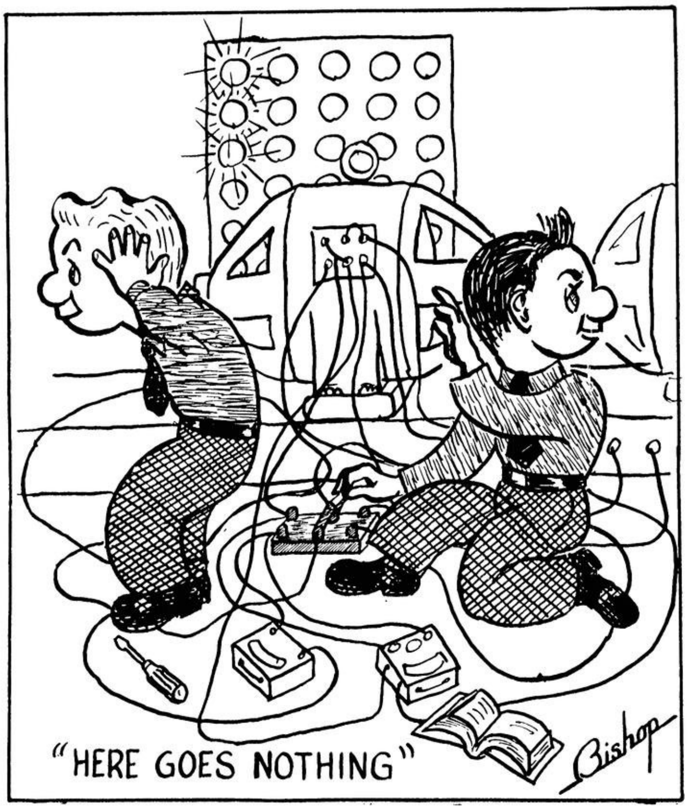
Said he, "That bear loves tracks, I'll make him a lot more in a hurry."

•

Little pay check, in a day,
You and I will go away
To some gay and festive spot;
I'll return, but you will not.

•

Why do you wear your stockings inside out?
My feet are so hot I just turned the hose on them.



Pat Hyland says there is no such thing as a poor cigar. Some are just better than others.

•

Mary: "Why doesn't John ever take you to the movies anymore?"

Joan: "One evening it rained and we stayed home."

•

Young Mother Hubbard
Went to the cupboard
To get the ice man a bracer;
But hubby came in
And instead of the gin
The ice man got only the chaser.

•

FOR SALE: Twin beds, one almost like new.

•

Arriving home earlier than usual, a husband found his wife in the embrace of a friend. The friend asserted himself, "Now that you've trapped us, let's have this thing out, man to man. I love your wife and she loves me. Will you play a game of gin rummy for her?"

"Yes, but how about playing a penny a point to make the game interesting."

•

Then there's the story about the moron who sang flat so that he'd have a place to live.

•

A new shipping clerk, who wasn't very bright but was the best available, was hired and the first day on the job he arrived late.

The boss saw him coming and said, "You should have been here at 7:30."

"Why," asked the clerk, "what happened?"

•

Waiter: Mr. Brown left his umbrella again. I believe he'd leave his head if it were loose.

Manager: Guess you're right. I heard him say yesterday he was going to Arizona for his lungs.

•

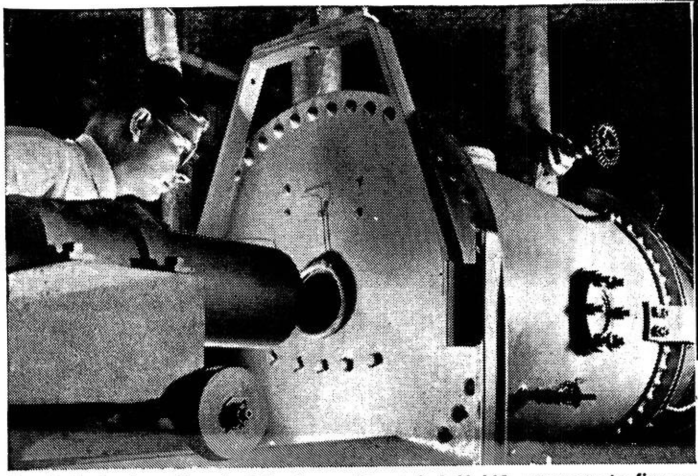
A small boy was very interested in watching a baldheaded man scratch the fringe of hair around the side of his head. After some time the boy said in a loud whisper: "Say, mister, you'll never catch him that way. Why don't you run him out into the open?"

Du Pont *Digest*

Items of Interest to Students of Science and Engineering

Explosives—an essential industrial tool

A. L. St. Peter, Princeton '37, supervisor blasting operation Susquehanna River Project, lowers a 5½ inch "Nitramon" Primer into one of 600 drill holes preparatory to blasting a pipe line ditch.



Frank A. Loving, Chemical Engineer, Texas A & M '41, prepares to fire an explosive charge into a chamber of methane or dusty air to test safety under conditions found in coal mines.

INDUSTRIAL explosives are as much of a yardstick of industrial progress as sulfuric acid. They are involved in the fabrication of nearly all the products used by man. This year the United States will use over 500 million pounds of industrial explosives.

The technical problems that confront the explosives industry are many and varied. A measure of this is the fact that the Du Pont Company manufactures about two hundred dynamite formulations, each intended to do a different job, from the slow heaving action of blasting coal to the rapid, violent shattering necessary for a hard ore. Ranging between these two extremes are a large number of intermediate grades, including explosives especially formulated for agricultural work, seismic prospecting for oil, submarine blasting—right down to the tiny charge used in an explosive rivet.

Studies in Laboratory and Field

One of the first industrial laboratories for chemical research in the United States, the Eastern laboratory of the Du Pont Explosives Department has nearly two hundred chemists, engineers, physicists and assistants. There, methods have been developed for measuring the power of explosives, the degree to which they shatter or pulverize various materials, their water resistance, their safety characteristics when exposed to shock or flame, the composition of the gases they produce, etc. As a result of studies of the influence of various factors on dynamite performance, it has become possible to formulate an explosive to meet practically any blasting condition.

In keeping with these improvements, the application of explosives has reached a new level of efficiency. Technical service men, usually mining engineers or civil engineers, aid consumers in the selection and use of explosives. They also work closely with research men in solving unusual problems encountered in the field.

Research—Path to Progress

A few of the results gained through research are: (1) lowering of dynamite freezing points by nitrating ethylene glycol along with glycerol to diminish the hazards of thawing frozen dynamites. (2) Production of less hazardous dynamites by substituting ammonium nitrate partially for nitroglycerine, in spite of the greater hygroscopicity and lesser explosive power of the former. This resulted in dynamites less hazardous to manufacture and use. (3) Introduction of "Nitramon," a blasting agent containing a high percentage of ammonium nitrate as its major ingredient. It is equal in strength to the most powerful dynamites commonly employed and yet is by far the safest blasting agent available. (4) Development of explosives with a minimum of noxious gases for use in confined areas. (5) Numerous improvements in the composition, manufacture and design of the blasting caps which set off the main charge.

Aside from these developments in explosives and blasting supplies, there have been many accomplishments in chemistry and engineering associated with such projects as the oxidation of ammonia to nitric acid; manufacture, granulation and drying of ammonium nitrate; substitutes for nitroglycerine and ethylene glycol dinitrate, concentration of nitric and sulfuric acids, and a host of other subjects.

Questions College Men ask about working with Du Pont

WHAT ARE THE OPPORTUNITIES FOR RESEARCH MEN?

Unusual advantages in facilities and funds are available to men qualified for fundamental or applied research. Investigation in the fields of organic, inorganic and physical chemistry, biology, parisitology, plant pathology and engineering suggest the wide range of activities. Write for booklet, "The Du Pont Company and the College Graduate," 2521 Nemours Building, Wilmington 98, Delaware.

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

More facts about Du Pont—**Listen to "Cavalcade of America," Mondays, 8 P.M. EDST, on NBC**

Campus Highlights

(continued from page 26)

Those chosen for the fall term include: Jim Price, president; Henry Preu, vice-president; Kenneth Maurer, treasurer; Roy DeMeyer, recording secretary; and Stan Jeselun, corresponding secretary. The retiring officers are: Richard L. Wilson, president; Gerald A. Miller, vice-president; Robert Burgy, recording secretary; Henry Preu, corresponding secretary; and John Tanghe, steward.

Triangle also wishes to announce the initiation of the following men: Howard Buer, James Vasilion, Ernst Wendt, Art Bukovich, and Doug Kanitz. They were received into the chapter at the initiation ceremonies held on Sunday afternoon, April 27, and were feted at the Founders' Day Banquet held that evening.

A blue-jean party was held at the chapter house on Saturday evening, April 19. A combined summer formal dance will be held with Kappa Eta Kappa on Friday evening, May 2.

•

KHK Election

At a recent meeting of Kappa Eta Kappa, professional electrical engineering fraternity, Merval W. Oleson, EE 4, was elected chapter president. He succeeds Myron Larson, who resigned to take over the position of National Expansion Vice President of Kappa Eta Kappa. Mr. Oleson is also a member of Phi Eta Sigma, Tau Beta Pi, and Eta Kappa Nu.

Recent chapter activities include an informal rushing smoker held on Monday evening, April 7. Plans are now being made for the annual spring formal to be held in conjunction with Triangle fraternity on Friday evening, May 2, at the Knights of Columbus Hall.

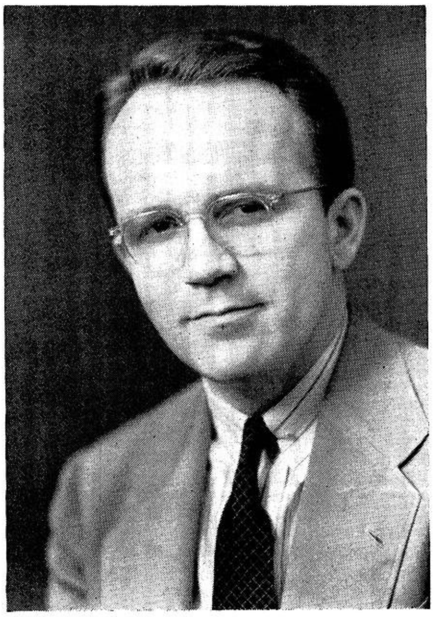
Alumni Notes

Congratulations

JUNE HARTNELL e'46 who is now working as a research engineer with Curtiss-Wright Aircraft Corporation in Columbus, Ohio, has announced her forthcoming marriage to Mr. Frank Harris Wheeler, Jr., graduate Aeronautical Engineer of Mississippi State on May 10, 1947.

While at Wisconsin June served two and a half years as Editor of the WISCONSIN ENGINEER, during the war years, and kept up the tradition of continuous publication since 1896. She was also a member of the University Band, Hoofers, AIEE, and Sigma Kappa Sorority. Honorary groups prizing her membership were Sigma Epsilon Sigma, Phi Kappa Phi, and Tau Beta Pi.

Promoted



O. F. VEA e'32, an engineer in General Electric's motor divisions, has been named assistant to W. H. Henry, assistant manager of the company's industrial divisions. In his new position, Mr. Vea will be in charge of the newly combined motor marketing and sales promotion section and statistics and forecasting group. Vea entered G. E. at Schenectady, N. Y., in 1936 as a student engineer on the test course.

(continued on page 32)

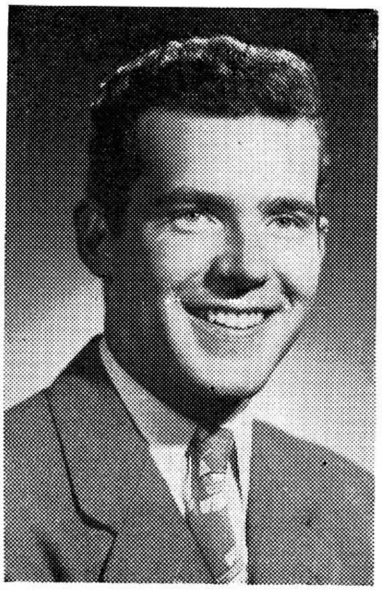
Alumni Notes

(continued from page 31)

ROSCOE F. BALLARD m'13 died June 13, 1946 at the United States Veterans Hospital at Castle Point, New York. Born in Milwaukee, Wisconsin, on April 16, 1891, he completed high school in 1909 whereupon he entered the University of Wisconsin, graduating in 1913 with his B.S. in Mechanical Engineering. While at Wisconsin he was a member of Sigma Nu Fraternity and a member of Haresfoot. Previous to World War I he was affiliated with the Righter Conley Manufacturing Company of Pittsburgh, Pennsylvania. Upon discharge from service he was employed by the American Gas Company of Philadelphia. His last position was that of Research Engineer for the Morgan Concentrating Company. He is survived by his wife, Mrs. Elizabeth C. Ballard, and two daughters.

O. ANDREW BAILEY CE'15, a Vice President of the Chicago Bridge and Iron Works, died recently. He joined the company immediately after graduation and has been connected with them throughout his career, eventually becoming chief engineer and then Vice President. During the war he was awarded the Civilian "E" for work on temporary dock units for the armed forces.

Former Staff Member Receives Award



Ed Brenner, a chemical engineering senior, and a former staff member of the Wisconsin Engineer, was the recent recipient of the Wisconsin Alumni Association annual award for the senior who has "done the most to promote the best interests of the University during his senior year." Ed, who was the winner of the Herfurth award as a junior, returned to the campus after his discharge last fall, was elected senior class president and has been very active in all campus activities. Congratulations, Ed!