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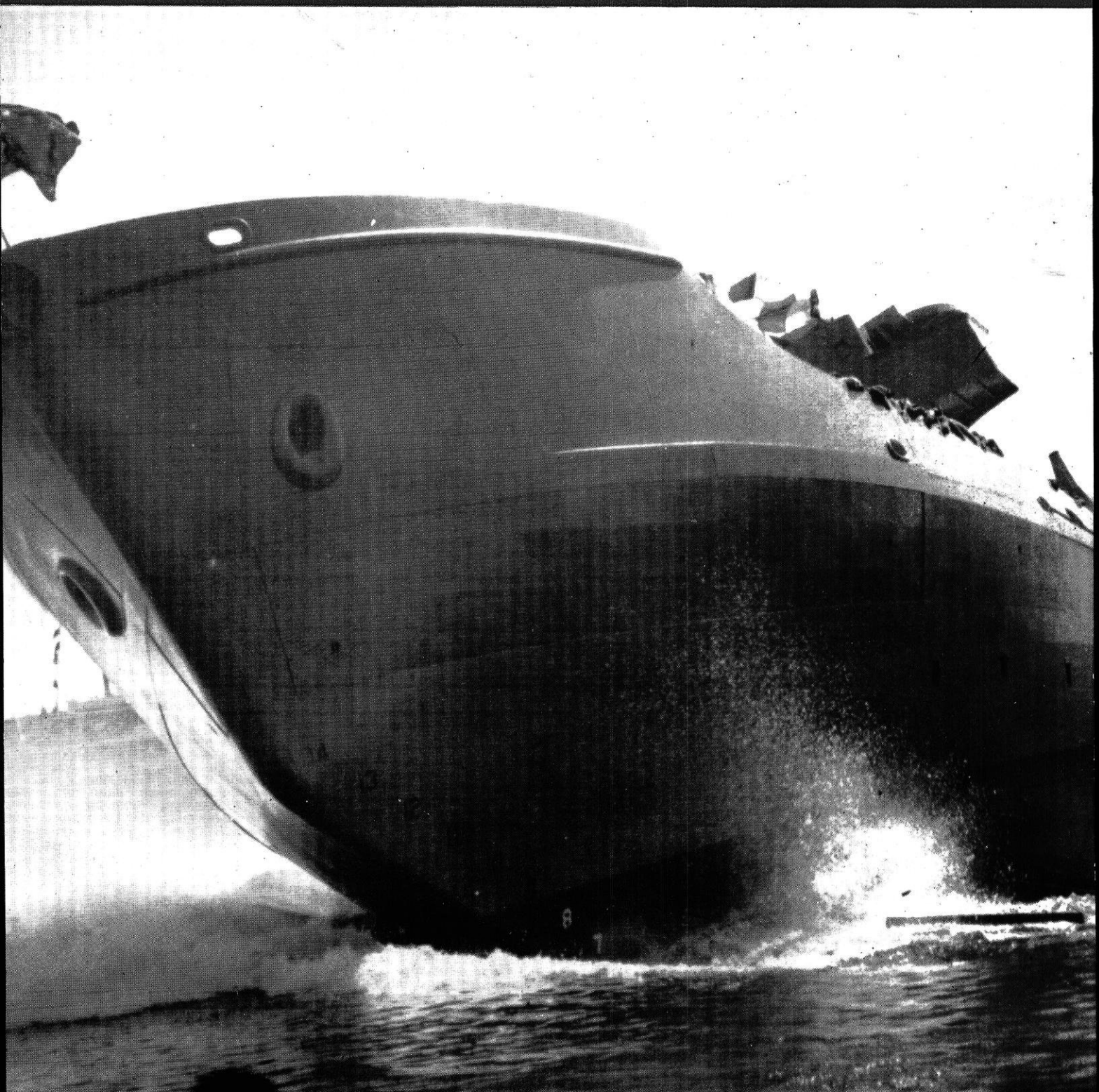
WISCONSIN ENGINEER

November, 1943



MEMBER ENGINEERING COLLEGE MAGAZINES ASSOCIATED

The Rubber Plant

with roots two miles deep!

THE MAKING OF synthetic rubber involves among other things the exact control of gas mixtures of great complexity. Formerly the analysis of some gases required several days of painstaking laboratory work, and in some cases a complete analysis was impossible.

Westinghouse scientists—working in close collaboration with engineers of leading oil and chemical companies—have perfected an electronic "chemist" which is an important addition to the present methods of analysis.

With the improved technique and apparatus now available, the time required for accurately making some of these analyses has been reduced *to an hour or less!*

An amazing electronic device . . . known as the* mass spectrometer *. . . not only improves the accuracy of the synthetic rubber process, but frees hundreds of skilled chemists from tedious but important production testing in these vital plants.

The mass spectrometer analyzes gases by sorting the molecules—according to their mass—in (roughly) the same way that a cream separator sorts out the cream from whole milk.

Let's say we want to analyze a simple gas mixture containing *one part* of oxygen and 10,000 parts of nitrogen. Here's how the mass spectrometer accomplishes this incredible feat:

First, the gas sample is bombarded with electrons. This *ionizes* the nitrogen and oxygen molecules, giving them electrical charges of their own.

These ions are then drawn by electrical force into a curved vacuum tube. Here, ions of different molecular weights whizz around *different curved paths*—depending upon their reaction to a powerful electromagnet surrounding the tube.

The heavier oxygen ions follow a straighter path than the lighter nitrogen ions and are directed through a tiny exit slit onto a plate where they give up their electrical charge. The amount of this charge, amplified and recorded by sensitive electrical instruments, is an extremely accurate measure of the *quantity of oxygen* in the gas mixture.

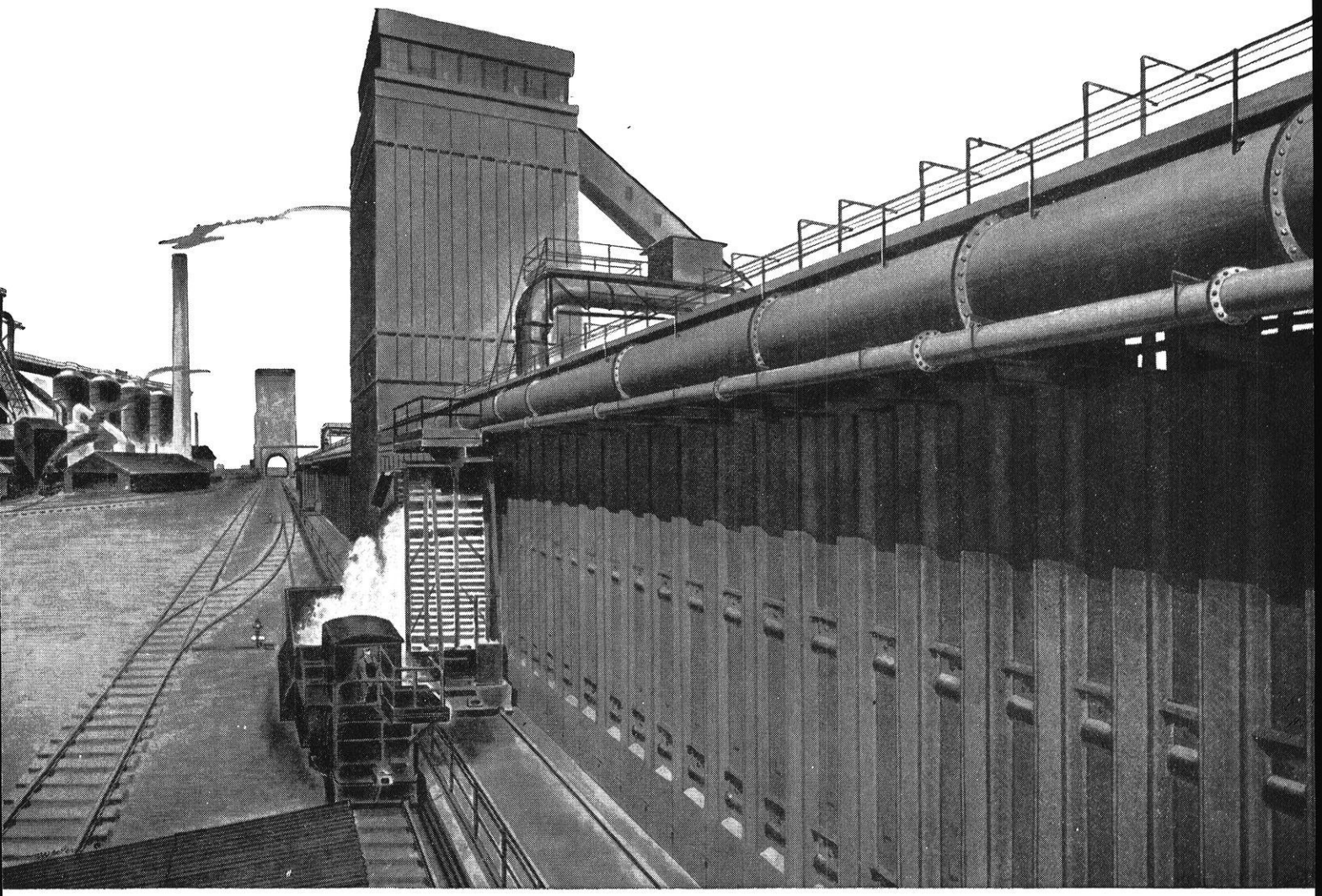
The starting voltage is then changed to allow the nitrogen ions to pass through the same exit slit—thus measuring the *quantity of nitrogen*. This same principle applies to the analysis of complex hydrocarbon mixtures.

The development of the mass spectrometer . . . for the quick, accurate analysis of butadiene . . . is a typical example of the way Westinghouse "know how" in electronics is tackling the wartime problems of industry in an effort to speed victory.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pennsylvania.

Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE



The Synthetic Age ushers in a **New Era** for the Coke Oven

Nearly half a million new combinations of the molecules have been developed since the synthetic age came in. Millions of new ones are possible. Nearly every time a synthetic material has been developed it has meant a drastic reduction in the price of the material and that has meant an ever-widening market, in the familiar pattern of mass-production.

In the last year for which official figures are available, almost half of the synthetic organic chemicals produced in America came from coal tar sources.

Vast new opportunities stretch away before the modern coke oven and before the people who work with it.

Koppers is the largest builder of coke ovens. It is one of the principal producers and distillers of tar from which many of the chemical wonders stem. It is one of the first designers and builders of recovery plants from which come materials for use in plastics, synthetic rubber, paints, varnishes, dyes, solvents, motor fuel, disinfectants, medicines, flavors, explosives. One of Koppers affiliates is the nation's largest independent producer of bituminous coal.
—Koppers Company and Affiliates, Pittsburgh, Pa.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY

INTRODUCTION TO THE ISSUE

Here comes the third issue of our 48th year of publication. As far as we have been able to check, this is the first time in those 48 years that we have put out ten issues in a volume. When first started, the Engineer consisted of four issues a year, book size, of tremendous thickness. All, incidentally, written by the faculty.

In the last few years, each issue was dedicated to one or the other of the five engineering departments. This time, we are covering all in one issue, and in addition, the department of agricultural engineering, and the application of engineering to military purposes. A new feature in these department studies is to soft pedal the department itself, and crescendo the discussion of the job the engineer does.

Agricultural engineering is covered by a senior ag. mechanical—Hobart Hagen, Hob for short. Hob is a married man and has received his degree in agriculture. Now he's struggling valiantly to finish up his engineering. When he is through he will have somewhat better than 200 credits. It seems that his engineering credits are electives toward an ag. degree and ag. credits are electives toward his engineering degree. Therefore, all other electives including 12 credits of R.O.T.C. don't count. Incidentally, he finished his R.O.T.C. and is now a shavetail.

Then we have the chemical engineering department. Our new business manager, Don Caldwell, ran that one out. A note to those of you who will be approached by me with a gleam in my eye. When asked to write eight or nine hundred words for the next issue, Don moaned, "My gosh, it'll take me a month to write that much." Three days later he called up and said, "Hey, Niles, how much did you say to write? I've already got 1300 words and I've just finished the introduction!" That from a business manager—of course, you know what a business manager is, don't you?—just a purse string with legs.

The civils were run down (oops! I mean out) by a junior V-12—Fred Engler. Fred has done a bit of writing before for us, in fact, one article about Isaac Newton was reprinted in SCIENCE DIGEST. There was just no holding the boy down after that. He's the fellow who talked the staff into holding a picnic at Vilas Park last summer because his current heart throb was life-guard there. The only catch is that only three of us went swimming—the rest of the staff hung around the life-guard stand.

Russ Johnson shocked the electricals. Being a senior in that marvelous organization, he was well-equipped for the job, having three and a half years of frustration behind him. It was a devil of a time catching up with him, but the article finally nestled happily in our mailbox.

The mechanicals were raked over the coals by Bill Mueller. Bill's that short little twerp who's always trying to get you to join the M.E.S.W. If he had his way, the mining and mets would be allowed to join. Yes, even some chemicals! An extraordinary feature of this article is that it was turned in on time.

C. Gordon Benson, that long drink of water with a beer mug's shape, dug the dirt for the mining and mets. You'd never mistake Benson, when you walk up to him, he looks down with a benevolent sneer and says, "Hello"—isn't that unusual? Read the article, it's just like the guy.

The additional write-up, that of the military engineers, is by P.F.C. Karl Wegener, of the Corps of Engineers. Karl was a sergeant on active duty all last summer, expecting to be shipped across any day, and what happens —he's in with the whole bunch of junior R.O.T.C.'s sent back to get some more education. "This is a fine welcome," he says when asked to write.

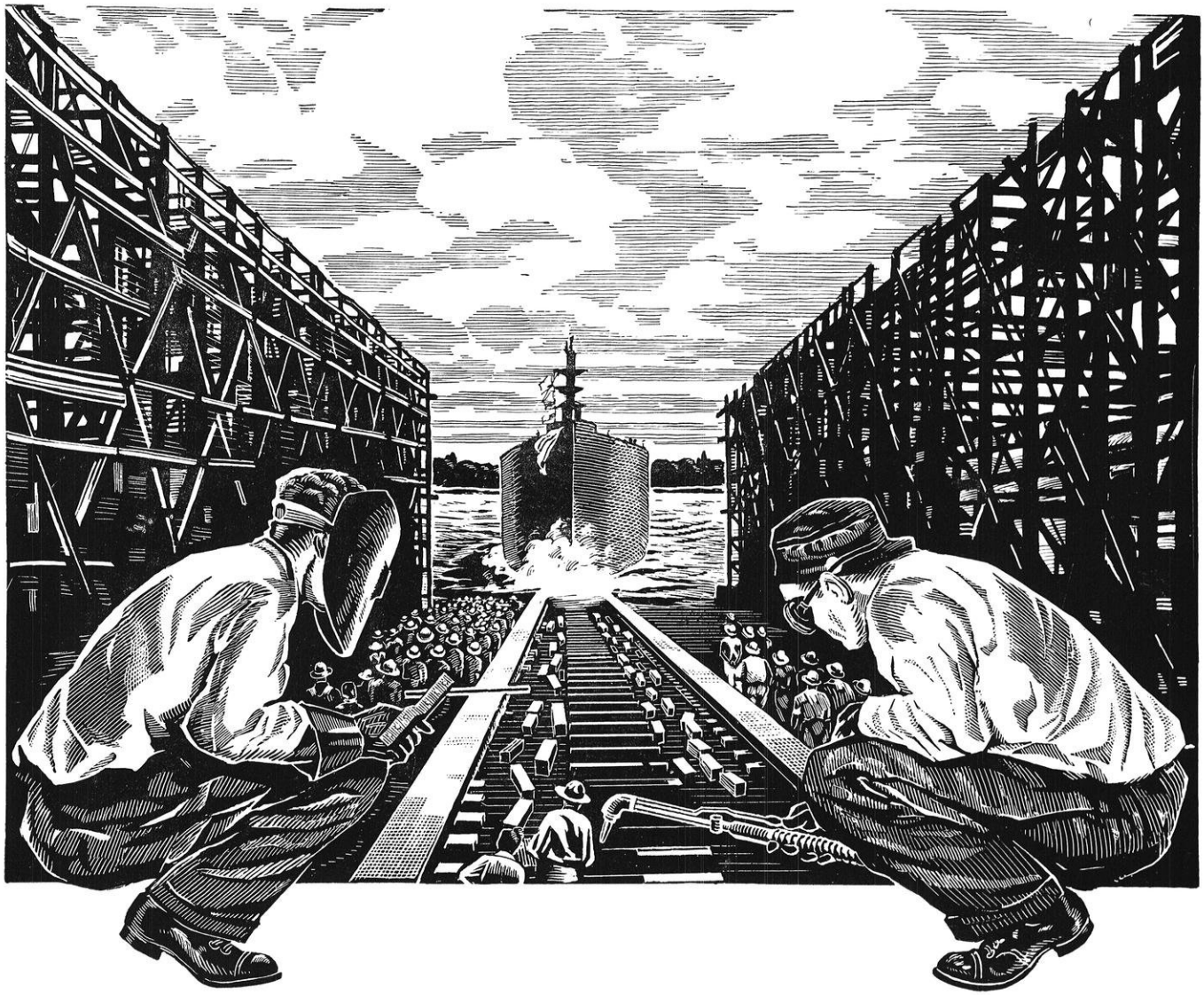
The second edition of our "Prof's in Who's Who in Engineering" appears this month, this time under the direction of Harold May. Harold, affectionately termed "Stinky," is the lesser of the two evils working under Professor Volk in the library. The big guy is George Zuelke who was going to write an article on pipe lines but then had to put it off for a month. (Ha, now you're stuck, George.)

Two Eta Kappa Nu initiation articles are presented also. It seems Johnny Buxbaum threatened the initiates with the fate of having their articles printed in the Engineer if they didn't behave. This is the payoff.

Next month, unless I'm slaughtered by one of my friends, we will present our feature writers, the guys who grind out stuff **every** month. Like Arnold Ericsen who is looking for an alumnus who is a bootlegger, tsk, tsk.

Watch for the February issue, it's gonna be something!

—DON NILES



THE TEAM THAT BUILT A THOUSAND SHIPS

IN the short space of time since Pearl Harbor, more than a thousand 10,000-ton Liberty ships have been built in America's shipyards.

Two things are chiefly responsible for this epic production achievement: the resourcefulness of our shipbuilders and new mass production methods made possible by the oxyacetylene flame and th electric arc.

By widespread use of revolutionary pre-fabrication techniques, America's shipbuilders have created a gigantic fleet of cargo ships which are now helping to turn the tide of war in our favor.

In many other vital fields of industry the oxyacetylene flame and the electric arc have played equally important roles. And their proven efficiency and economy in war production foreshadows the important place they will assume in peacetime manufacturing.

Air Reduction research and engineering has made many important contributions to the development of oxyacetylene and electric arc processes. If you would like to receive our informative publication "Airco in the News," we shall be glad to send you a free copy. Address your request to Mr. G. Van Alstyne, Dept. C. P., Air Reduction, 60 East 42nd Street, New York 17, N. Y.

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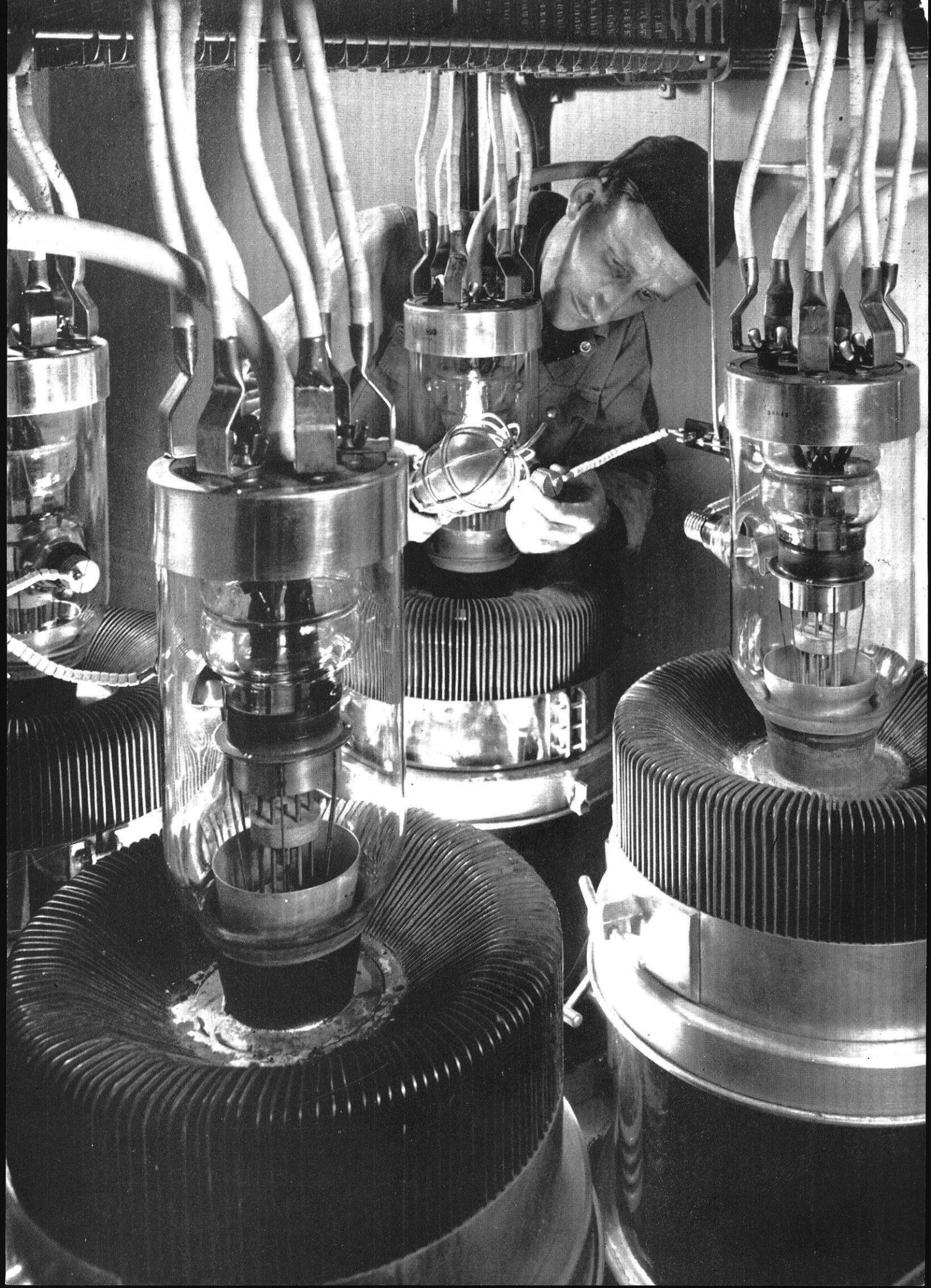

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In This Issue . . .

Agricutural Engineering

—Courtesy John Deere Co.

Farmers will see plenty of this machine after the war when production can be unrestricted. First commercially produced in 1936, about 1500 of these field forage harvesters are now on American farms.

They make haying a one-man job, with that man driving the tractor, and the machine doing its own pick-up, chopping, and loading.

The field harvester is a four-purpose machine, and with the right attachments it can handle dry hay from the windrow, standing green crops for grass silage, windrowed straw left by the combine, and standing corn for silage.

With all attachments and a crop blower the forage harvester can replace the hay loader, hay fork and barn hay equipment, ensilage cutter, and corn binder. It also produces chopped feed that can be stored in half the space whole hay would take.

by Hobart I. Hagen Ag m'44

The Department of Agricultural Engineering was founded about 1900, and the present Engineering building was completed in 1905. It is of engineering interest that this structure was the first reinforced concrete building on the campus. The late Prof. E. R. Jones was chairman of the department from 1918 until 1937 when Prof. F. W. Duffee, the present chairman, succeeded him.

The agricultural engineering course was non-technical innature and consisted of the required credits in agriculture and in addition the major studies in agricultural engineering.

This commercial major or non-technical course is still offered and is primarily designed for those students who are inclined toward engineering and desire to return to the farm or to take positions as agricultural agents, farm managers, or to enter the farm equipment business.

Today there is also a professional major. Because the College of Agriculture and the College of Engineering are on the same campus, Wisconsin is enabled to train and develop technical Agricultural Engineers, who receive Bachelor's degrees in both Agriculture and Engineering. It takes five years to complete the combined course, but it is well worth the price.

The first student to graduate from the combination course was Russel L. Perry in 1926. However, it was not until 1928 and 1929 that the enrollment began to take on appreciable proportions and has been on the incline until the outbreak of the present conflict. It reached about 60 at the start of the war.

Upon the completion of four years of required work, including 45 credits in agriculture, the B.S. Agricultural Degree is granted, with a B.S. Degree in Civil, Mechanical, or Electrical Engineering after the fifth year, if all the requirements for these degrees have been met.

Among the required courses in the Agricultural College are Agronomy, Animal Husbandry, Soils, Agricultural Bacteriology, Agricultural Economics, and fifteen credits of Agricultural Engineering, which includes Farm Power and Machinery, Farm Surveys and Structures, Farm Mechanics, Tractors and Tractor Machinery, Soil Erosion, Drainage and Irrigation Engineering, Special Problems and Seminary.

Practically all courses including both Agriculture and Engineering are required as listed.

Members of the Agricultural Engineering department include: Prof. F. W. Duffee, chairman, who specializes in farm power and machinery; Prof. O. R. Zeasman, soil erosion and drainage; Prof. S. A. Witzel, farm structures; Prof. F. B. Trenk, extension forester; Prof. H. D. Bruhn, extension farm power and machinery; Prof. M. J. La Rock, extension, farm structures; Prof. R. C. Swanson, farm safety specialist who recently became a member of the department and has been assigned director of the farm safety program; and assistant N. E. Rather, who completed the technical Agricultural Engineering course last semester.

The American Society of Agricultural Engineers was founded in the Agricultural Engineering building, December 27, 1907. Throughout the school year all agricultural engineering students function as a student branch of this organization.

It is essential that an agricultural engineer should have the same basic engineering training that is required of other professional engineers; yet he must have a training in and an understanding of agriculture that other professional engineers have not and will not acquire.

Technical Agricultural Engineers are trained for the research departments of farm implement companies and the agricultural engineering departments of other State Colleges, for directors of rural electric lines, for the more economical construction of farm buildings, and for improved design of drainage, irrigation and soil erosion control works.

Farm implement companies need engineers who know the requirement and problems connected with doing a farm job. Having had a thorough scientific background in agriculture, they are specially qualified to design and develop new machines for the various tasks on the farm which are labor saving and economical. Equipment must also be designed very often for a new type of work, arising from achievements of research workers in Agricultural Experiment Stations. For instance, when it was discovered that molasses or cornmeal was a good preservative for grass silage it was up to the agricultural engineer to design the proper equipment to distribute the preservative evenly with adjustments for control.

The Agricultural Engineering departments of state agricultural colleges continually do research work in farm building construction and design. In this way they are prepared to offer a great service to farmers in helping them in their building problems. These engineers, through their knowledge of agricultural economics and farm requirements, know what is the most desirable for each individual and can advise them wisely.

Likewise, the agricultural civil engineer, who specializes in drainage and irrigation, will have a better knowledge of his work as far as adapting it to the special needs of the type of soil or the crops grown is concerned.

Wherever there is a correlation between agriculture and engineering, the agricultural engineer is specially trained for that job. The future looks bright for him. Food to be produced in quantity must be backed up by the necessary farm implements, soil control and the comforts for the farm family.

CIVIL ENGINEERS

by Fred Engler, c'44

Today with the world at war, the demand for men with creative minds is at its peak. Perhaps an engineer may have an idea, but if he cannot express himself easily, his idea is forever lost to mankind. In the education of an engineer, expression is important and, therefore, should be taught by live teachers of English who do not criticize merely from the standpoint of elegance.

Let us examine the programs of the different engineering departments offered here at Wisconsin. If we look closely, we find that the Civil Engineering department offers many courses in Engineering English and expression. The C.E.'s at least upon graduation should have a smooth line. However, they usually don't have to wait until graduation.

In the world today many people have noticed a large gap between the viewpoints of the engineer and of the businessman or capitalist. No matter how skillfully a railroad is laid out or a building designed, the project will be a flop unless the operation is sound from an economic standpoint. With close contact between capital and engineer American investments will increase. Even today, in time of great emergency, the engineer's technical ability can hardly be doubted, but his commercial outlooks can be questioned.

The C.E. department requires the study of economic principles and suggests an abundance of courses in economic selections.

We have examined the civil engineer's ability to think along business lines, now let us look at his technical ability.

The theory of railroad practice, operation and design is considered one of the major fields of study for the civil engineer. Foreign students usually take all they can get, for railway development is rising in foreign lands. Not to be overlooked is the course in highway and airport design, which proves that this department has its eye on many future modes of transportation. Under the railway and highway departments comes the design of bridges which include steel structures and even buildings.

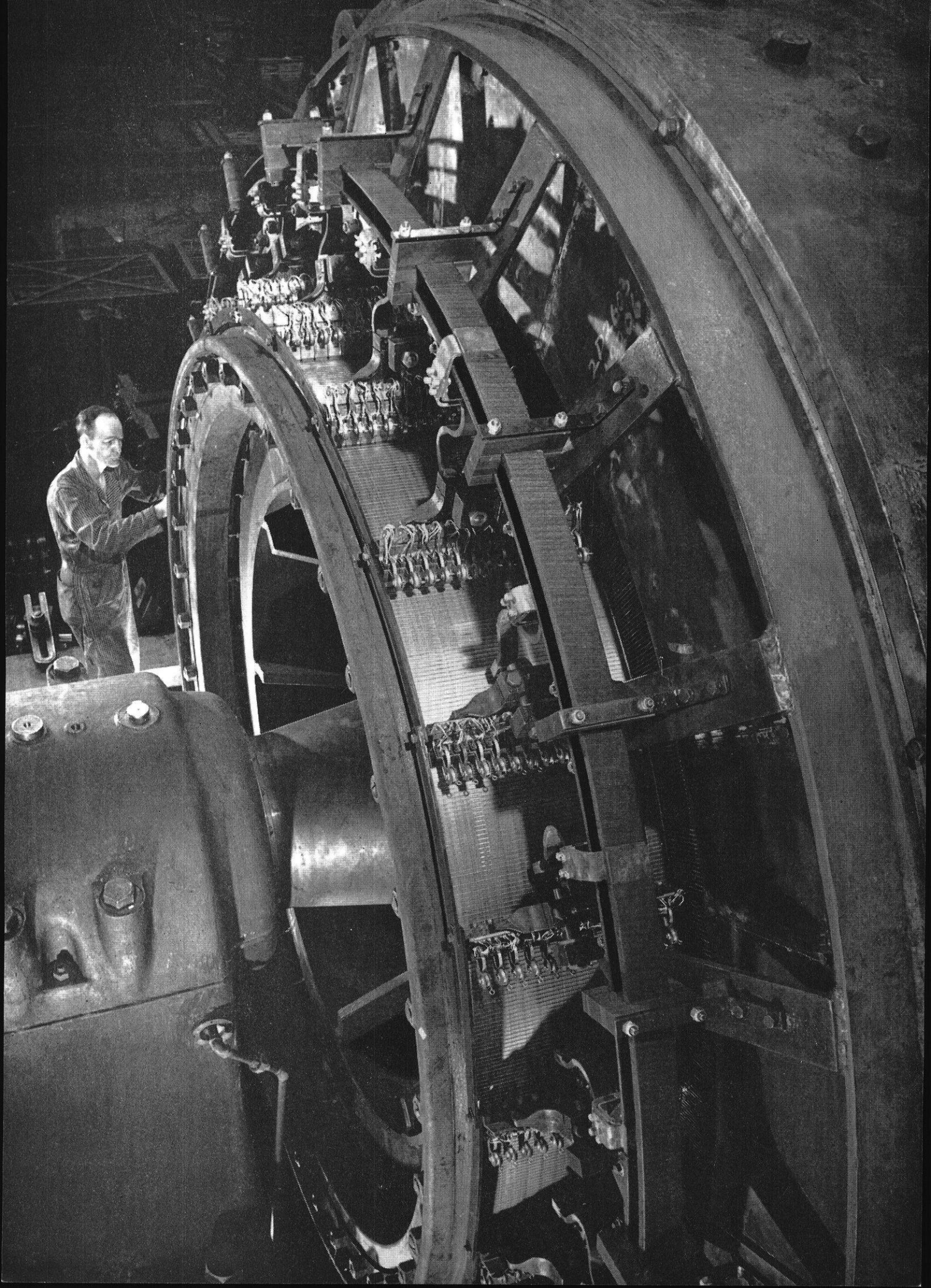
Those of us who have seen the huge hydroelectric dams along our major rivers must certainly agree that a sense of satisfaction must come to the designing engineer. To the Civil Engineering department is entrusted the education of our future creators of man's greatest supply of power. Courses in water supply, essential to successful dam operation; hydraulics; and concrete structure design aid in developing creative minds for this field.

Not to be overlooked is the sanitary department which includes such courses as sewage disposal, city water supply, and the sanitary development of communities as a whole. On top of this program, the C.E. is required to take courses in electrical engineering and heat-power engineering, essential to power plant design.

We now can see why civil engineers spend most of their lives out of doors. Most civil engineers love outdoor work and long to be under the blue sky all day. To me, it seems that this is a vigorous mental and physical struggle and should appeal to men who crave adventure.

To the right . . . The Brooklyn Bridge, perhaps the most famous and highly publicized bridge in this country. Built in 1883, it was officially opened for traffic by U. S. President Arthur.
—Courtesy Civil Engineering


BROOKLYN BRIDGE
60th Anniversary
1883 – 1943



To a Future

ELECTRICAL ENGINEER

by Russ Johnson, e'44

The third department created in the engineering school was the department of electrical engineering in 1892. From that year until the present time, the value of the electrical engineer has become greater as the utilization of the resources of nature's mighty electrical power has become ever more pressing, because of its cheap cost in industry as compared to other energy producers.

The electrical engineer has two main fields of endeavor to consider for his future professional work. These two fields are power engineering, dealing with the transmission and harnessing of electrical energy to do man's vital work; and radio engineering, which is the ability to create apparatus to communicate with people without any conductor outside of the mythical "ether."

Power engineering may be subdivided into two classifications: (a) Distribution engineering, and (b) design engineering.

Regardless of the branch of power engineering which the professional man enters, he must understand fully the operation and inherent characteristics of the various motors, generators and other electrical equipment used in the industries of today.

There are four courses given to acquaint the future electrical engineer with these important concepts of electrodynamics and equipment and are as follows:

E.E. 1—an introduction to electrodynamics covering the essentials of electrical phenomena upon which future work depends; E.E. 2—a well-organized course concerned primarily with teaching the engineer-to-be elementary magnetism and D.C. motor and generator theory; E.E. 3—a beginning course on the fundamentals of alternating currents; E.E. 4—advanced alternating current theory with emphasis on A.C. power equipment, such as A.C. motors, generators, transformers, etc.

The theory obtained in the classroom is applied directly by the student in the various electrical laboratories throughout the campus.

Advanced courses are given to students who wish to become better acquainted with power distribution systems and heavy electrical equipment used in industry. E.E. 137 is a power engineering course primarily dealing with problems of power transmission of various distribution systems. E.E. 214 is an advanced laboratory course of main interest to engineers who wish to enter the equipment field. E.E. 213 is an advanced course on symmetrical components primarily for design engineers.

For all men interested in radio work, the electronics major is well-established and a thorough background into radio and ultra-high frequency phenomena is given. Anyone completing the various courses offered in radio engineering is able to enter electronic research or other affiliated fields.

The applications of electronic research can be found everywhere today in industry; therefore, it is well for the power engineer to understand the principles of electronic control. Efficiency of plants and power systems is materially increased by using automatic controls; ignitranstubes, thyrotrons and other similar electronic equipment. There is an ever-expanding field for men well trained in radiotronics.

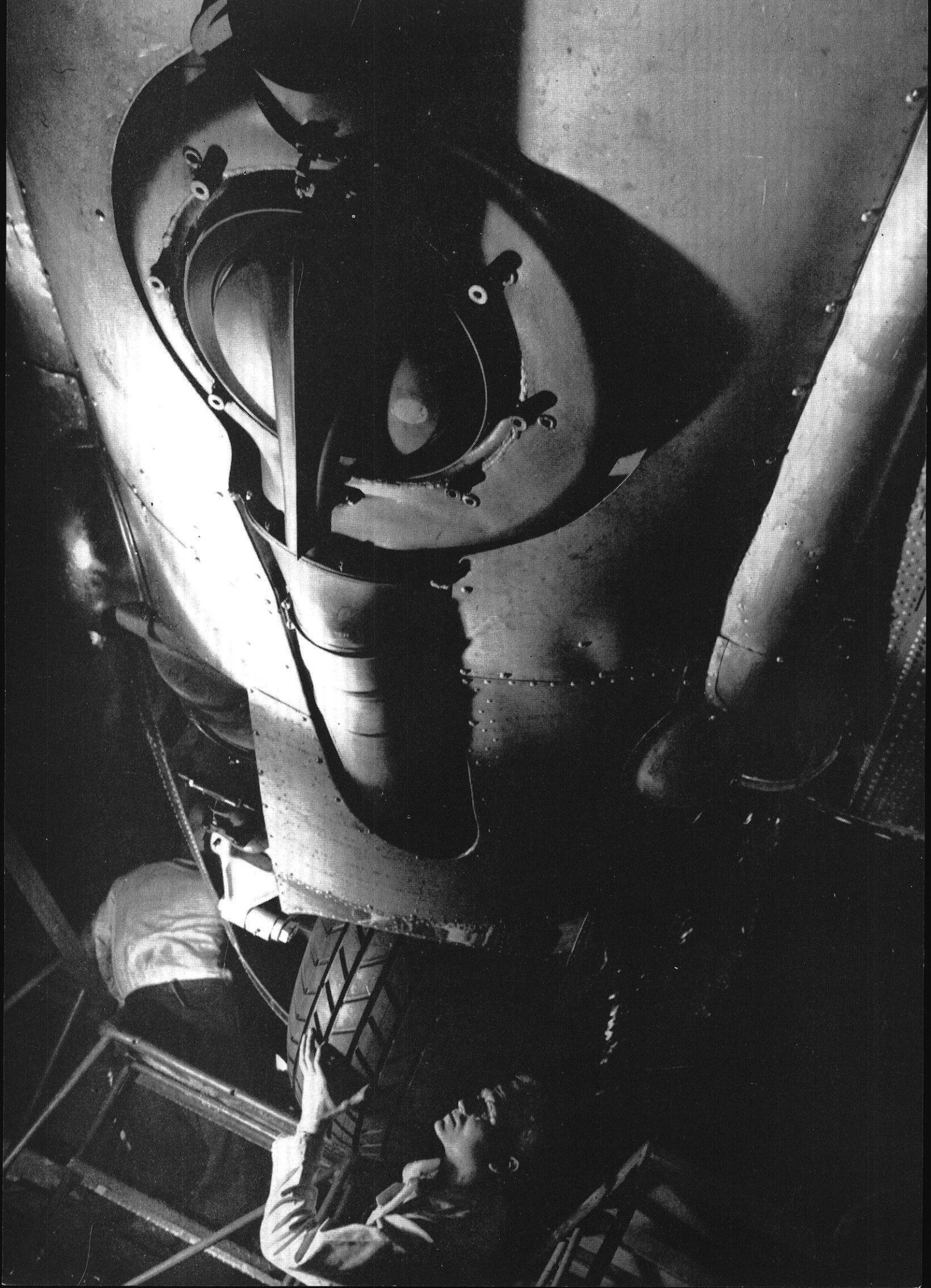
The radio engineering course is also subdivided into two major divisions: (a) electronics, and (b) communications.

The courses given in radiotronics are the following: E.E. 112—an introduction to the principles of electrostatic and electromagnetic fields and a thorough study of electronic applications to industry; E.E. 155—a course dealing with elementary amplifier circuit design and theory of radio tubes; E.E. 156—an understanding of long line transmission and filter design; E.E. 154, 157, 158—advanced amplifier design and ultra-high frequency techniques dealing with the principles of radar.

As in the power engineering courses, sufficient laboratory work is offered in radiotronics so that the student becomes familiar with everyday radio and electronic equipment.

The greatest difficulty in any engineering school is to "keep up with the times." Once the laboratory equipment falls out of date, the future radio or power engineer will not be trained in a capacity which would fit him for industry. The laboratories of the University of Wisconsin are well-supplied with both power and electronic equipment and are manned by competent instructors and professors.

To the left . . . A 250 ton D.C. Motor, with a 19,000 hp. peak. It can reverse itself in less than 1½ seconds. —Courtesy Allis-Chalmers Electrical Review



MECHANICAL ENGINEERING

by Bill Mueller, m'44

The Mechanical Engineering Department is one of the better organized departments on the campus, having been in the capable hands of Prof. G. L. Larson, who retired as chairman in 1942. The department now is under the competent direction of Prof. L. A. Wilson.

Working with Prof. Wilson are Profs. B. G. Elliott, P. H. Hyland, G. L. Larson, J. W. McNaul, and D. W. Nelson, who not only are well-liked by the M.E.'s but also are capable consulting engineers. "Gus" Larson was President of the American Society of Heating and Ventilating Engineers for some years. "Ben" Elliott worked on the design of the Port Washington Power Plant. "Pat" Hyland has written a book on "Machine Design," in collaboration with J. B. Kommers of the Mechanics Department, which is used by many of the major engineering schools in the country, including West Point.

The courses taught, with the help of Instructors Bill Feiereisen, J. W. Medlin, Phil Myers, and E. K. Springer include Machine Design, Thermodynamics and related courses such as Heat-Power Equipment and Heat-Power Laboratories, and Power Plant and Manufacturing Plant Design. C. F. Peters and R. N. Schumann teach the Juniors rudiments of welding.

Advanced courses include Heating and Ventilating, Refrigeration, Internal Combustion Engines, and Air Conditioning. These subjects have been designed to give the student a basis for more advanced work and specialization in industry.

After the Mechanical Engineer graduates, he can go into practically any field he chooses — Design, Development, Research, Production, or Sales.

The Design Engineer is the engineer who spends the major part of his training on drafting. He must have a working knowledge of mechanics, mathematics, physics, chemistry, metals, machine design, and similar subjects. His is an imaginative mind. He is a planner; he must be able to foresee all problems which will arise to hinder his design of a given product. He also must have a knowledge of markets and sales, for if he designs a product which cannot be sold, his time has been wasted just as effectively as when his "brain-child" cannot be machined.

A Development Engineer is the "handy-man" of the profession. He is the one who takes the designer's specifications, builds whatever is called for, and then attempts to iron out all "kinks" which are in the product. All this before the article goes into production and on the market, so that the consumer can be reasonably sure that the product will work.

The Research Engineer spends the major part of his time doing research on new products and processes, or on the development of new products and processes. He is the real scientist of the Mechanical Engineers.

The Production Engineer—who studies Production Methods and Control, and Time-Study — has charge of production. Production Methods and Control entails the issuing of all orders necessary for production, laying out the sequence of machines, processes and operations, assigning time required for the completion of each process or operation, starting all operations and processes at the time set and in the manner planned, insuring that all tools required are at hand, and collecting all records of performance that are necessary for the various administrative departments.

Time-Study Engineers study the times required for various basic motions, and apply them to various jobs to determine the time required for completion of the work. The engineer planning to do time-study must have a scientific, orderly mind, must be quick and alert; he must be able to interpret data quickly and accurately, and above all, he must be able to sell his work to the average workman who usually is suspicious of and hostile to the work of the time-study man, and of the man himself. The field is relatively new and offers many opportunities to the young engineer meeting the qualifications.

The Sales Engineer sells the product. He must have a definite knowledge of the various mechanical aspects of the product he is selling, plus an understanding of the basic principles involved. For this reason, the young graduating engineer will find that the company which employs him will give him a training program of from one to two years, during which time he familiarizes himself with the various products manufactured and sold by the firm so that he can readily explain and sell the product to prospective customers who themselves are good engineers.

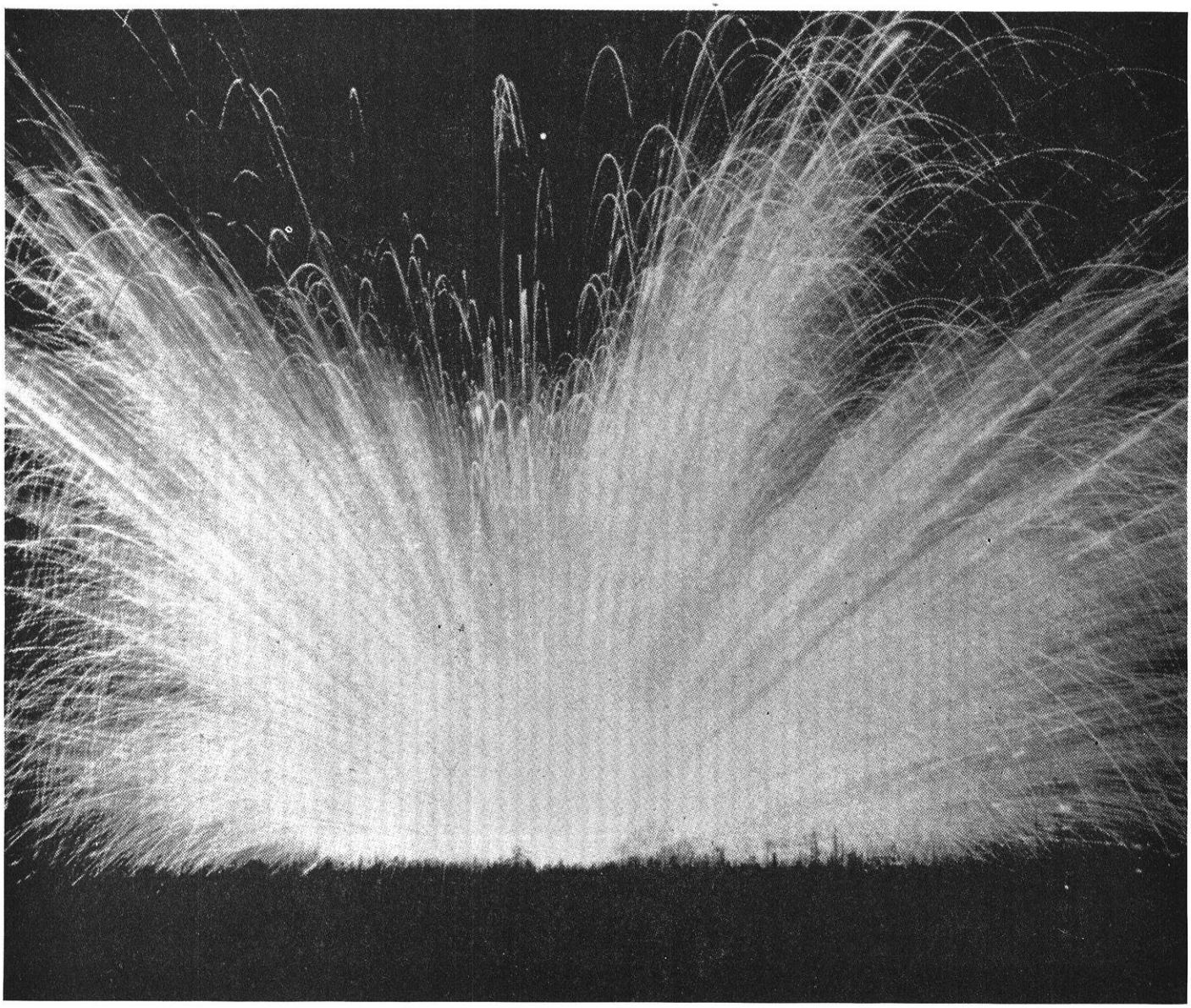
The various fields of endeavor for the graduate are many and varied so that the M.E. graduate can surely find his place in industry. It is obvious the graduate must have a good background not only in technical phases of engineering, but also in non-technical subjects so that he will have a chance to succeed in the profession. That the Mechanical Engineering Department and the College of Engineering recognize this is a well-established fact since the graduates can receive credit for their work at any college in the country.

A view of the turbosupercharger in the inboard nacelle of a Flying Fortress.
—Courtesy Allis-Chalmers Electrical Review

On Being a

Chemical Engineer

by Don Caldwell, ch'44



"A big bang in the world of chemistry" or "There goes Caldwell flunking chemistry." Actually a phosphorus shell exploding at night. The chemicals figure the composition for greatest potency.
—Courtesy Monsanto

For the whole freshman year the chemical engineer has but a few identifying marks. He is tagged as such and tossed into a general engineering pot and boiled for one year along with every other frosh engineer. During this period he is given certain basic courses that will enable himto take up the more specialized courses to come later.

First of all there is general chemistry. It is very fortunate for him that he is privileged to take this course under the direction of Dr. Sorum, a man with a gift for putting things across in a way that makes you like him and the course at the same time. In the lab the student learns how to prepare compounds and how to analyze salts qualitatively for their metallic elements and for certain basic anion radicals. After a number of tries he also finds out that it is usually wise to put filter paper in a funnel before filtering (personal experience). His work in lecture and in quiz section serves to give him an understanding of his lab work.

Mathematics classes held in ancient North Hall take up much of the freshman's time. The principles of orthographic projection, isometric drawings, and lettering are the other things he must absorb in mechanical drawing.

Freshman composition (English to you) is by general consensus the most disliked course that the frosh engineer is forced to take. Having to think of something to write about and then sitting down and writing the damned thing out will never get him anyplace in engineering, he says to himself repeatedly. Of course maybe he doesn't realize it at the time but he is probably right. **(Ed. Note: I resent that.)**

Starting with his sophomore year the Ch.E. has to hit the the books in no uncertain manner. Confronting him for a whole year are calculus, physics, and organic chemistry. One semester courses that he is required to take are quantitative analysis, industrial chemistry, and chemical engineering fundamentals.

One of the most important courses taken by chemical engineers is organic chemistry. In a few words, organic chemistry is the chemistry of carbon compounds. A knowledge of it is vital to all of those who upon graduation enter an organic field—petroleum for instance.

The Ch.E. gets a one semester introduction to quantitative analysis. Primarily a lab course, it is a course where the student must analyze a number of samples for the exact amount of each element present down to 1/100 of one percent by gravimetric and volumetric means.

Industrial Chemistry and Chemical Engineering Fundamentals are the chemical engineer's first introduction to the department of which he is a member. In the former he learns the plant set-up, the flow diagram of raw materials and the reactions that occur in a number of the foremost industrial chemical processes. In the latter the student is introduced to methods of making some industrially important calculations.

Now he's a junior. This year the Ch.E.'s schedule becomes more specialized as he takes up courses for which he has had the basic training in his first two years. The only entirely new subject that he takes is Thermodynamics where he is taught the theory of internal combustion engines and steam cycles.

One of the most important courses that the junior takes is Physical Chemistry. Opinions of many to the contrary, it is nonetheless true because the essence of chemical engineering is applied physical chemistry.

Also in his junior year the Ch.E. is given a heavy dose of Mechanics and Strength of Materials. Three separate courses are taken in this field, two of them being problem courses and the third a materials testing lab. The Ch.E.'s junior work is completed with four courses in the Chemical Engineering Department itself. They are industrial chemical calculations, industrial instruments for measurement and control; fuel, gas, and water analysis; and manufacturing operations, a course covering the machinery and theory of various unit operations. A lab course illustrating the theory of the unit operations is also given.

Senior subjects are all engineering subjects and all but two of them are taken in the Ch.E. department. The exceptions are a two semester course in Electrical Engineering Theory and Machinery and a semester of Machine Design taken in the M.E. department. Completing the list of subjects taken by a chemical engineer in the course of his attendance at the university are Applied Electrochemistry, Metallography, Chemical Engineering Thermodynamics, and a course in special problems.

A chemical engineer's college work does not get him immediately in a responsible job. What college training does for the engineer is to teach him some of the theory behind his job and general methods of attacking engineering problems. Before entrusting new men with responsible jobs some companies put them through special training courses of their own design. Others, usually smaller companies, endeavor to give their new men experience in all parts of the plant while working in a subordinate position. At present there are three main functional groups of chemical engineers: Those in plant operation, those in development, and those in design. In peacetime engineering salesmen would be included but due to the tremendous wartime demand for chemical products that almost sell themselves (**Now he's bragging**), the salesman has been pushed into the background. A chemical engineer is fitted for any of these groups. He is qualified in many cases to take over a job for which he was not specifically trained because he has a very flexible and varied background of technical work.

The names of the men who by their constant effort and foresight keep the Wisconsin Departmtnt of Chemical Engineering among the foremost in the nation are not to be neglected (I've still got some courses to take before I get out). Those teaching are Professors R. A. Ragatz, O. A. Hougen, K. Watson, Associate Professor Altpeter, and Instructors R. B. Beckman, T. C. Fong, D. Hanson, W. K. Neill, A. E. Pufahl, D. Schilling, R. G. Taecker.

ENGINEERS BEHIND THE GUNS

by P.F.C. Karl Wegener, m'44

Corps of Engineers

Previous wars have proven that well-equipped men, thoroughly trained, will win the fight even when faced with superior numbers. We are now engaged in a modern war which has become so technical that in order to win, our engineers must not only develop the best "tools" of war, but they must shoulder a gun and with superior skill and training defeat the enemy in the field.

To our fighting engineers falls not only the job of leading the battle by clearing and paving the way for the other troops to follow, but they must take over all maintenance and reconstruction in occupied countries, and, should we be forced to retreat, stay behind and with mines and demolitions slow up the enemy's advance.

Ever since the Revolutionary War, the Corps of Engineers has been an integral part of our Army. West Point has always sent its highest ranking men to the Engineers—a good example of this is General Douglas MacArthur.

Until the last war, the Engineers were trained only in the performance of their technical duties. And, not being able to defend themselves, they suffered over 80% casualties. Today, the Engineer trainee finds that he must not only learn his technical duties, but he must master a tactical training and become proficient with weapons as well.

Nearly all of this construction taught the trainee is of the expedient or temporary nature. Bridges are sometimes constructed from local materials, while others are of the portable type. The portable bridges are built in a manner which closely resembles a toy Erector Set and can be put up in an incredibly short time. A new type of Bailey bridge, for example, can be put up in less than a day, and when reinforced will carry a load of over 70 tons on an unsupported length of over 100 feet. Roads of better than gravel surface are rarely built in the battle theater, but gravel, dirt and other expedient roads must be mastered by these soldier-workers to the extent that they can lay them out, build and grade them at night, while working with rifles slung over their shoulders and wearing gas masks.

Since demolitions are one of the most important duties of the engineers, trainees must learn to calculate, place and set off charges where they will do the most good. Placing of land mines and anti-personnel or "booby trap" mines must be mastered, and a knowledge of enemy mines also gained in order to fit them as sappers.

Because the engineers often find it necessary to defend themselves and their installations, they are given extensive training in the use and care of arms. Throughout his training, the engineer carries his rifle with which he must qualify in marksmanship. He also learns to use the bayonet, carbine, Thompson sub-machine gun, heavy caliber machine gun, rocket or bazooka gun, and the rifle and hand-grenades.

In operation the Army Engineers have repeatedly proven their worth. The Alcan Highway, laid out and built almost entirely by United States Army Engineers, was cut through the wilds of western Canada and Alaska at a rate which broke all construction records. In North Africa, they were much used as mine field sappers. In Sicily and Italy today, they are speeding up our Army's advance by quickly repairing roads, bridges and other structures which are so methodically destroyed by our enemies as they retreat.

The Navy's equivalent to the Corps of Engineers are the Seabees or Construction Battalions. The officers belong to the Navy's Civil Engineers Corps, an organization which was begun in 1775.

The Seabees were made necessary due to the damage done by the Japs at Pearl Harbor, and other naval bases. A tremendous amount of construction work was necessary, and because in many cases it was within range of the enemy, civilian personnel could not do the work.

Thus the Seabees were born, with their symbol of a bee carrying a hammer, monkey wrench and Tommygun and their motto, "We defend what we build."

Other military organizations using the engineer are the Signal Corps, Airborne Engineers, Ordnance, and the engineering maintenance officers in the army and navy air forces.

To the right . . . A German Sub crash diving a bit late. This pic was taken from the rear pit of a divebomber pulling out after releasing its depth charges. Note the circles around the bombs. —Courtesy Douglas Airview

Mining and Metallurgical Engineering

or How to Earn $400 Per Month

by C. Gordon Benson, met'44

"Good morning, George." "Hello, Joe." That's the way we greet our professors each morning. It may sound a little informal, but, most of us don't wear white ties and tails to class anyway. Our quizzes are informal too, most of them being of the honor type. The quiz is written on the board with instructions to place the finished blue books on the table. The professor then leaves the room to attend to more important matters than watching college students to see they don't cheat.

The Department began developing to this present state from the time it was first organized on the campus. The first classes were held in the fall of 1908 in the old heating station which now has been remodeled into Radio Hall. All three of our professors finished at least part of their college work on this campus. Professor Edwin R. Shorey is our expert on mining practice and ore dressing; he is reputed to have gone under ground more times than the average college student goes under the table. Professor George J. Barker specializes in reduction metallurgy and has supervised much research on industrial clays, not to be confused with facial mud packs. Professor Joseph F. Oesterle takes the lead in production or industrial metallurgy; he divides his time among his wife and five children, teaching and 90% of the problems of industrial Wisconsin.

The students are offered various courses in which these professors share their knowledge and experience. The Freshman and Sophomore M. & M.E. curriculum is about the same as that for other engineers with the additions of survey courses in geology, mining and metallurgy and a course in mine surveying. The latter requires a field trip to one of the lead-zinc mines in Southern Wisconsin where the students make a complete mine survey. Everyone gets a lot of enjoyment and experience but very little sleep out of this trip. Upper-classmen are offered the real meaty courses in mining and metallurgy. Mining courses are given covering prospecting, mineral evaluation, mining methods (which includes shaft sinking, haulage, ventilation, safety and hoisting), and ore dressing. Reduction metallurgy courses (changing ore into metal ingots) are given dealing with copper, lead, zinc, iron, the minor metals and assaying. Production metallurgy (changing metal ingots into useful articles) are given dealing with heat treatment of steel, foundry, physical metallurgy, alloy structures and x-ray analysis.

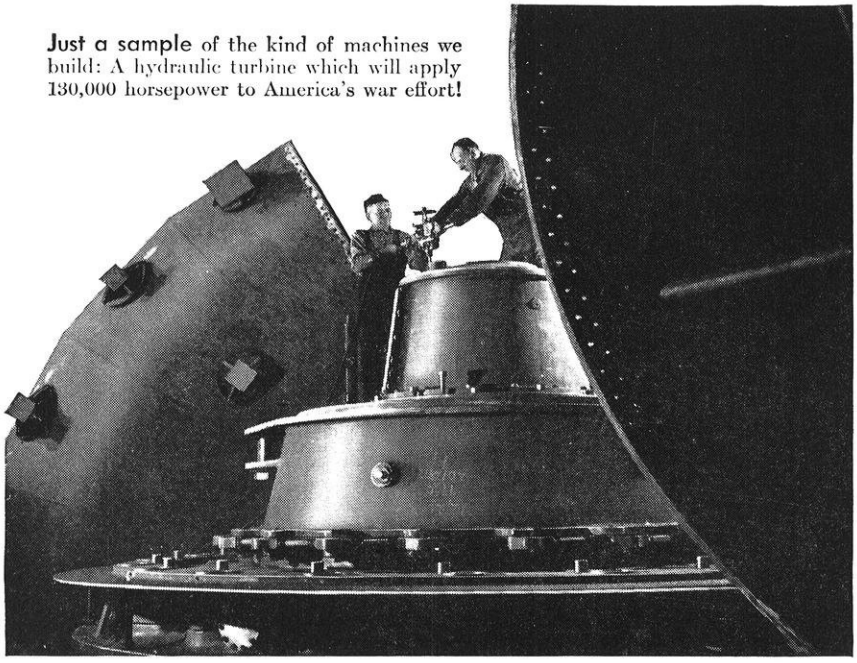
In addition to these courses the student takes advantage of the other fine departments on the campus and acquires a knowledge of mechanics, AC and DC electrical machinery, physical chemistry and electives as he may choose. At the present time some of us are looking for a course in conversion factors from slip-stick to lip-stick; we haven't had much luck as yet. The students do learn to operate the many different kinds of plant equipment which the Department possesses including a copper blast furnace, copper converter, cupolas, assaying furnaces, electric arc furnaces, controled atmosphere furnaces, jaw crushers, roll crushers, gyrotory crushers, ball mills, jigs, flotation cells, photo microscopes, and an x-ray machine. Various combinations of these items are used in practically every defense plant so upper-classmen are having little difficulty in obtaining deferments so they may complete their training.

At the start of World War II the Department had the largest Freshman and Sophomore enrollment in its history, but Adolf and Tojo soon changed that. Every one of the Freshmen and Sophomores at that time enlisted in the armed services; some have returned to Wisconsin under the Navy program and others have gone into active duty. At the present time there are 46 upper-classmen of which 26 are Navy men. In addition to contributing to the war effort by training Navy men and civilians the Department is actively engaged in research on various defense subjects.

Thus, you see, we have a Department that is turning out men with good mining and metallurgical training. They will take their place in industry or the armed services, whichever they and their local draft boards feel needs them the most. By the way, if you really want to earn $400.00 per month, take a three week welding course, but don't let Dean Johnson know I told you.

Cooling and mixing alloy iron in the foundry of a midwestern plant prior to pouring the casting. —Courtesy Allis-Chalmers Electrical Review

Shrink the World



Just a sample of the kind of machines we build: A hydraulic turbine which will apply 130,000 horsepower to America's war effort!

Power

TWO BIG JOBS! And Allis-Chalmers helping do both. This unusual compa makes 1600 industrial products—everyth from equipment that helps make and sha steel and aluminum for U. S. airplanes giant turbines for U. S. power plants.

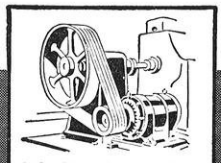
THAT SUPER CARGO PLANE is like so thing out of the future. You didn't pect to see it for years. Yet there it is

America's great industries are cramm years of aviation advancement into mon And Allis-Chalmers is working at top sp to help them produce more and better pla

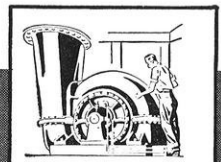
Huge Allis-Chalmers turbines help g

ELECTRICAL EQUIPMENT

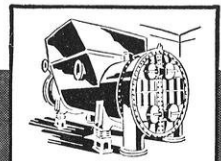
STEAM AND HYDRAULIC TURBINES



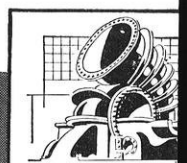
MOTORS & TEXROPE V-BELT DRIVES



BLOWERS AND COMPRESSORS



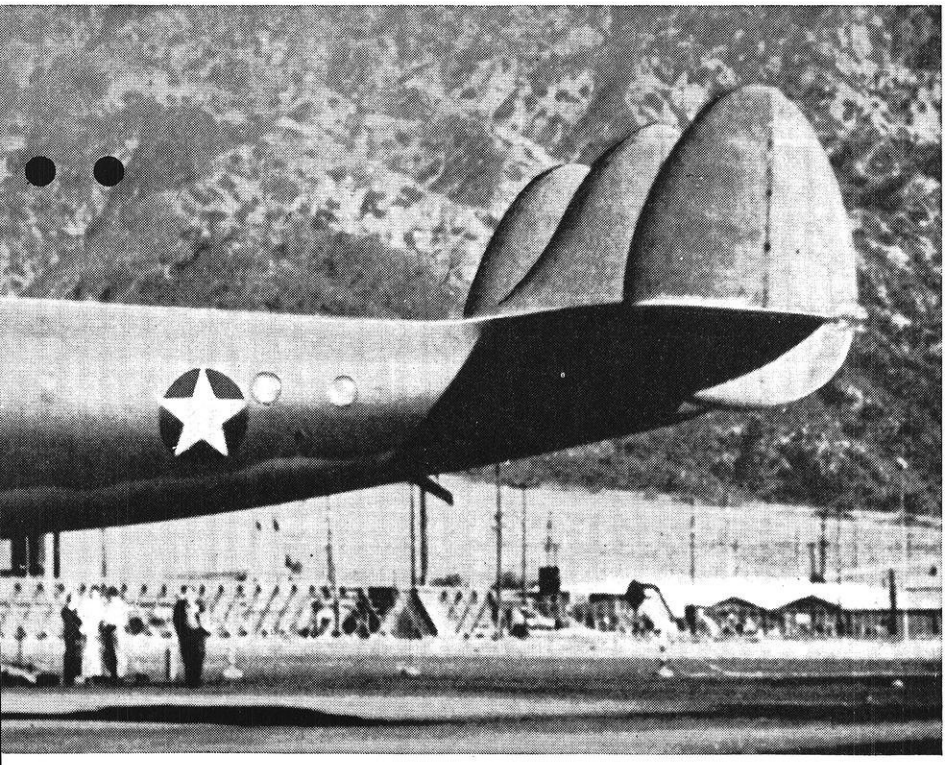
ENGINES AND CONDENSERS



CENTRIFUGAL PUMPS

ALLIS-CH

SUPPLYING THE WORLD'S LARGEST LIN



the Nation!

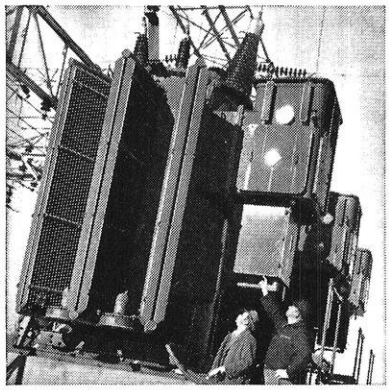
erate the tremendous electric power needed.

A-C motors, drives, controls keep production flowing . . . and Allis-Chalmers also produces equipment for making aluminum and removing precious magnesium from the sea.

1600 different industrial products come from this one company. And Allis-Chalmers engineers are helping plane makers and other manufacturers *produce more*, not just with new machines—but with *machines on hand!*

It's a tremendous job—and out of it Allis-Chalmers men and women are gaining experience that can mean better peacetime planes, better peacetime goods of all kinds.

ALLIS-CHALMERS MFG. COMPANY, MILWAUKEE, WIS.



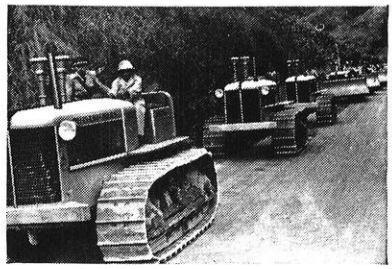
One of many Allis-Chalmers transformers that help transmit vital electrical power to U. S. war plants.

VICTORY NEWS

A-C Maintenance Booklets Now In Spanish, Portuguese! More than 200,000 Allis-Chalmers booklets on wartime maintenance of motors, pumps and rubber V-belts have been requested by men in industry whose job it is to keep machines running.

So great a demand has also come from South American countries that these booklets are now being printed in Spanish and Portuguese.

They are packed with practical information which is particularly helpful in training new men for the important job of making motors, pumps and rubber V-belts last longer during this critical war period. Write for your copies (English, Spanish or Portuguese) today.



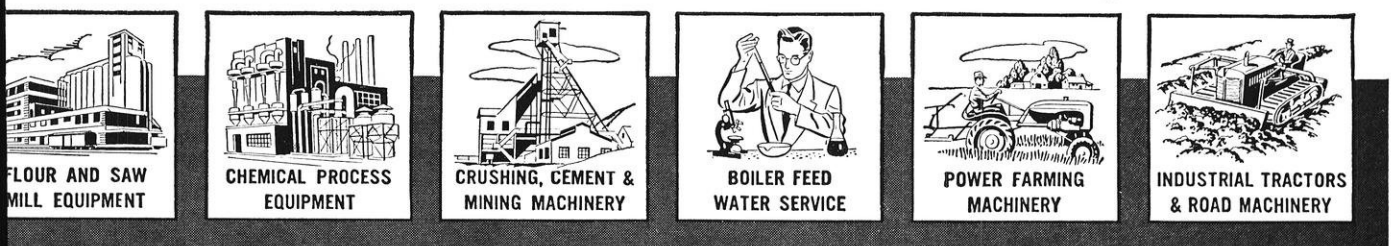
Good Neighbors get together! The picture above shows Allis-Chalmers equipment ready for an important road-building job near Rio de Janeiro.

A-C Aids Ship-Building Program: America's shipyards have already smashed every ship-building record in the book—and production of merchantmen and warships is still climbing.

A-C is one of the companies which is feeding these yards. It supplies a larger variety of equipment for ships than any other company in the U.S.A.

Belts, blowers, castings, condensers, control devices, generators, motors, turbines, rudders, complete hull sections, transformers, pumps are just a *few* of the items which we are supplying.

FOR VICTORY
Buy United States War Bonds



ALMERS

OF MAJOR INDUSTRIAL EQUIPMENT

WE WORK FOR VICTORY — WE PLAN FOR PEACE

ALUMNI NOTES

by Charles Tomlinson, ch'44

and Arnold Ericksen, ch'44

Chemicals

BORKIN, ROBERT, '41, was married to Evelyn Stein of Chicago, Ill., recently. He is at present working with the National Die-Casting Co. of Chicago.

DONAHUE, JEROME T., '42, who is a 2nd Lieutenant in the Air Corps, was sent to Forest Products Laboratory for further instruction during the month of September.

REZBA, JOHN, '39, has been promoted to Lieutenant (jg) of the Coast Guard. He finished Officers' Indoctrination School at St. Augustine, Fla., last May, and is now stationed in Chicago.

SCHWENN, MARVIN, '41, is now shift superintendent in charge of nitrocellulose production at the Hercules Powder Co., Sunflower Ordnance Works, which is located in Lawrence, Kan.

Civils

POST, ARTHUR L., '39, a captain and pilot in the Army Air Corps, has returned safely to his base after being reported missing in action in the Southwest Pacific last July.

WILSON, JOHN, '03, died during the summer at Duluth, where he had lived and practiced in the municipal field for many years. He was raised on a farm near Dodgeville, Wis. Upon graduation he went to work for a railroad but ultimately changed to municipal work. He was city engineer for Mankato, Minn., from 1908 to 1912 and was city engineer at Duluth from 1912 to 1933. Since 1933 he has been in private practice.

MORITZ, ERNEST A., '04, is one of the six regional directors for the Bureau of Reclamation recently appointed under a new decentralization plan. He will have headquarters at Boulder City, Nev.

SOERGEL, ROBERT J., '12, died on June 25. He was principal structural designer for the Bureau of Bridges and Public Buildings for the City of Milwaukee.

CUMMINGS, ALBERT E., '15, for many years manager at the Chicago office for the Raymond Concrete Pile Co., has been appointed research engineer for the company at New York. He is recognized as an authority on foundation matters and is a frequent lecturer on the subject at universities throughout the country.

BLOODGOOD, DON E., '26, has resigned as superintendent of the department of sanitation at Indianapolis to accept an appointment as associate professor of sanitary engineering at Purdue University.

LIDDLE, GEORGE F., '27, city manager and engineer for Muskegon Heights, Mich., is now a captain in the Corps of Engineers, U.S.A. He is post engineer at Fort Sheridan, Ill.

WARD, GERALD C., '29, is a major in the U.S.A. with the forces that are roughing up Italy. Gerry was editor of the Wisconsin Engineer during his senior year and was instructor in railway engineering following his graduation.

HUTH, ALTON M., '30, is a lieutenant in the U.S.N.R., located in the Southwest Pacific.

HAGESTAD, HERMAN T., '32, mayor of River Falls, Wis., has been commissioned a first lieutenant in the U.S.A.

FERBER, HERBERT J., '38, geophysicist with the Western Gulf Oil Co., at Bakersfield, Calif., received an A.B. degree in geology from Fresno State College this year.

MOCKRUD, LEE N., '39, ensign in the U.S.N.R., is attached to submarine division 12 and is in training for that branch of the service.

SCHUETTE, EVAN H., '40, was married on August 14 to Gertrude Elizabeth Hansen of Fort Wayne, Ind. Schuette, who was editor of the Wisconsin Engineer during his student days, is now an engineer with the National Advisory Committee for Aeronautics at Hampton, Va.

RESNICK, SOL D., '42, has left TVA to accept a position with Carson-Newman College as teacher of engineering mathematics and drawing. It is a small Baptist school at Jefferson City, Tenn. Recently it has received a contingent of Navy trainees.

MAAS, EARL R., '43, volunteered for induction and is to enter the Navy's SV-7 program. He will be assigned to a midshipman's school as preparation for an ensign's commission.

NAESER, CHARLES J., '43, is an ensign in the U.S.N.R. in training at the University of Arizona at Tucson, Ariz.

Mechanicals

BOUDA, FRANCIS, '43, whose engagement to Betty Jean Querhammer was recently announced, is now working as a mechanical engineer in Camden, N. J.

BUSKE, GILBERT E., '40, formerly employed by the Taylor Instrument Co., Rochester, N. Y., is now employed by the Johnson Service Co., Milwaukee.

DETTMANN, CHARLES E., '40, has been promoted to the rank of Captain and is now teaching Mechanical Engineering at the Army Institute School, Cairo, Egypt.

KLEIN, JOSEPH H., '43, was married to Lois Meng, Badger Beauty of last year, on September 12. He is now employed by the Chrysler Corp. in Detroit.

LOSSE, PAUL L., '40, has recently accepted a position as assistant to the general superintendent of the Baldwin-Hill Co. of Trenton, N. J., manufacturers of rock wool insulating materials.

NOVOTNY, CHARLES, '32, has been promoted to a major and is now Chief of Military Training Ordnance Replacement Center, at Camp San Anita, Calif.

REA, GEORGE, '43, was married to Doris Mehne on August 13.

RENDALL, DAVID W., '43, was married to Gladys Ziegler on August 21. They are making their home in Milwaukee where he is employed by the Allis-Chalmers Corp.

STONE, S. HERBERT, '43, was married to Ruth Tomlinson on September 1. At the present time he is with the John S. Barnes Corp. of Rockford, Ill.

WEIDNER, RALPH B., '42, who is now an ensign in the Navy, was married to Harriet Reich on September 14.

WILSON, JOHN P., '43, was married to Jane Kiplinger on August 28. He is an Officer Candidate stationed at Ft. Belvoir, Va.

(turn to page 33 please)

NOW signalmen can wear helmets with this *new* headset!

SIGNALMEN formerly saw action without helmets because old-style headsets were too bulky. Now miniature receivers with earplugs are being used for both radio and telephone work.

Fitting snugly under the helmets they give better reception by keeping out battle noise . . . they are cooler, more comfortable.

Signal Corps engineers working with Western Electric and Bell Telephone Laboratories developed this new all-purpose military headset.

Here is another instance of Bell System service to our nation at war.

War calls keep Long Distance lines busy . . . That's why your call may be delayed.

PROFS IN WHO'S WHO

by Harold May, m'44

JESSE B. KOMMERS

Jesse B. Kommers, professor of Mechanics at the University, came into this world on March 11, 1884. A native of Wisconsin, he gives his home as Sheboygan.

He received his college education here at the University of Wisconsin, receiving his Bachelor of Science in E.E. in 1906.

He later received his professional degree in M.E. from Wisconsin while on the instructional staff here in 1922. In the meantime, he had gained membership in Tau Beta Pi and Sigma Xi. He was married three years after graduation and has two children, Robert and William.

Upon graduation in 1906, he went to work for the Chicago Telephone Company, but Wisconsin wouldn't let him stay away for long and in 1907 he came back as an instructor in Mechanics. In 1920 he was given a 1½ year leave of absence from his position as assistant professor to go to the University of Illinois as associate professor of Engineering Materials and Engineer of tests on joint Investigation of fatigue of Metals.

He returned to Wisconsin in 1921 as associate professor in Mechanics and has continued on the staff to date, being promoted to the position of professor in 1927.

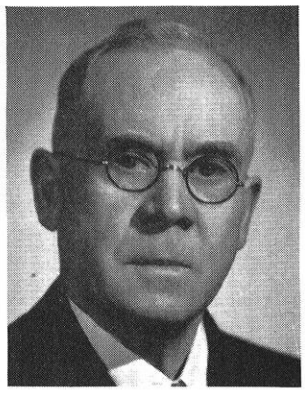
Prof. Kommers has carried on research work similar to that started at Illinois for over 30 years, publishing numerous articles and bulletins on his work during that time. His most recent article was written for the annual convention of the A.S.T.M. in 1943, the subject: "The Effect of Over-stressing and Understressing in Fatigue." He has coauthored two books. The first, published in 1927, has since been translated into Russian, and the second, published in 1929 and recently in its third edition, has received recognition as a text book. In speaking of Prof. Kommers' many research papers and publications, let me quote Dr. H. J. Gough, British authority on the fatigue of metals, who when speaking of Prof. Kommers' experiments at Illinois, made this statement, we quote: "Admittedly one of the most valuable sets of experiments ever made." I think such a compliment explains fully why Prof. Kommers is recognized as an authority on the fatigue of metals.

He is probably better known to the Engineer staff as chairman of the board of directors, having been on the board since 1931 and chairman since 1940.

I hope you haven't decided that Prof. Kommers spends all of his time in research work, teaching and writing (although I don't see where he would have any more time), because he really enjoys playing contract bridge, besides doing some non-technical reading of history, biography and fiction. Before the war he did a great deal of country driving, but he says that he has pretty well given this up "for the duration."

ADAM V. MILLAR

Adam Vauce Millar, assistant Dean of our College of Engineering and professor of Drawing and Descriptive Geometry, was born at Mattoon, Illinois, on September 18, 1873. He received his college education at the University of Illinois, receiving his Bachelor of Science in 1897 and his M.S. in 1901. In the meantime he became a member of Chi Phi, Tau Beta Pi, Theta Tau, Pi Tau Sigma and Phi Eta Sigma.



(He must be weighted down with keys.) He didn't, however, spend all of his time with the fraternity, having been secretary of the Y. M. C. A., and a member of the Delphic Literary Society (debate society) while a student.

After graduating in 1897 he went

(turn to page 26 please)

THE FUTURE WILL BE YOUR RESPONSIBILITY!

learn to know your Bearings NOW

American colleges turn out good engineers. That's why so many of the world's greatest engineering achievements stand to America's credit.

The world of the future will be a world of wheels and wings to an extent that cannot be completely foreseen now. But one thing is sure—it will be a world of bearings, too, for wherever wheels or shafts turn, they must turn on bearings.

It is not too much to say, in view of their present dominant position, that it will be a world of Timken Tapered Roller Bearings; for there is no bearing requirement that Timken Bearings cannot meet.

So, while you are still studying, learn to know your Timken Bearings thoroughly —their design, application and potentialities. Then you'll be still better equipped for your job when college days are over and you take up the responsibilities of a full-fledged engineer. The Timken Roller Bearing Company, Canton, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

PROFS IN WHO'S WHO . . .

(continued from page 24)

to Champaign High School as math instructor from 1898-1900. Upon completing his graduate work in math, in 1901, he started on the instructional staff at University of Illinois as instructor in General Engineering Drawing from 1901-1902.

Dean Millar came to the U. of W. in September 1902 as instructor in Drawing and Descriptive Geometry and he has been on the instructional staff ever since. However, his interests remained in Illinois until the following year, when he traveled to Cortland and returned a married man. The Millars have one daughter, Harriet. He was promoted to assistant professor in 1908, and became associate professor in 1919. In 1921 he assumed the duties of assistant dean, and the following year he received the title of full professor. For fifteen months, from July 1937 to September 1938, he was acting dean of the College, in the absence of Dean Turneaure, and before the advent of our present dean.

He is probably best known to all engineers as their freshman advisor. He, with the capable help of Miss O'Keefe, has been freshman advisor for all freshman engineers for approximately twenty years, as well as having had charge of personnel work and the loan fund of the Engineering College for some time.

Another of Dean Millar's responsibilities, and one which neither many of the students nor faculty members know about, is his work on the University Co-op board. He was appointed to the board in April 1919 and has served as chairman for several years now. He informed me that during these many years it has meant many a headache for him, but that when he thinks of its advantages for the students he feels well paid for his efforts. In spite of his many responsibilities, Dean Millar has been an active instructor during all these years, as a matter of fact there are only three other people on the campus who have been here as active instructors longer than he, and these three only one year longer.

Regarding his work he states that he likes teaching and personnel work and enjoys seeing the students as they advance through school.

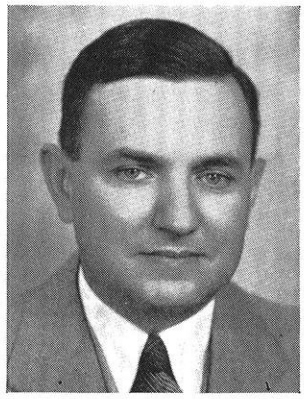
When it comes to recreations, he finds time for golfing and bowling as well as gardening. Incidentally, Victory gardeners, please note that Dean Millar loved gardening even before the war.

•

ROLAND ANDREW RAGATZ

Ronald Andrew Ragatz, Professor of Chemical Engineering at the University of Wisconsin, is that stout gentleman with the broad smile of whom the Chem Engineers always speak so well.

Another Wisconsin man, Prof. Ragatz was born in Prairie du Sac, on December 19, 1898. He came to the University of Wisconsin for his college education, receiving his Bachelor of Science in 1920, his Master of Science in 1923 and his Ph.D. in 1931—all degrees being in Chemical Engineering. While picking up these (few) degrees he also gained membership in Alpha Chi Sigma, Tau Beta Pi, Phi Lambda Upsilon and Sigma Xi.



He married a native of Milwaukee in 1930 and has two children—Karen Helen and Andrew Roland.

Upon his graduation the University decided not to let a good man out of their sight, and consequently he started immediately as instructor in Chemical Engineering, which position he held until 1926 when he claimed the title of assistant professor. In 1929 he left Wisconsin to take a position as research engineer for A. O. Smith at Milwaukee. The call of the Alma Mater brought him back the following year to assume his former position. In 1937 he again changed his title—this time to that of associate professor, which position he held until this past year when he was promoted to full professor.

He has written numerous articles on Chemical Technology, temperature measurement and heat treatment of steel for various technical societies in the field of chemistry and chemical engineering, many of which have received notable recognition. At present he is working (with others) on the development of a new type of steel cartridge case for a (censored) manufacturing company.

Prof. Ragatz has always taken an active interest in the Wisconsin Engineer and is at present a member of the board of directors. He says that he enjoys reading our paper and that he thinks it offers many opportunities to the students. (That had ought to help our sales.)

When he leaves his Chem.E. duties Prof. Ragatz is quite a sports fan; whether winning or losing, he is still in there cheering. He also enjoys a little amateur photography and spends the rest of his (spare) time gardening.

EDWIN ROY SHOREY

Edwin Roy Shorey, professor of Mining and Metallurgy at the University of Wisconsin, was born in Appleton, Wisconsin, on August 10, 1884.

He came to the U. of W. for his college education, receiving his Bachelor of Science in C.E. in 1908. In 1922, while on the staff here he also received the degree of Engineer of Mines to add to his title.

Prof. Shorey started on the road to practical experience early by working as a surveyor on a United States Reclamation Service project in lower Yellowstone Park, between semesters while in school. (In those days there wasn't a full semester

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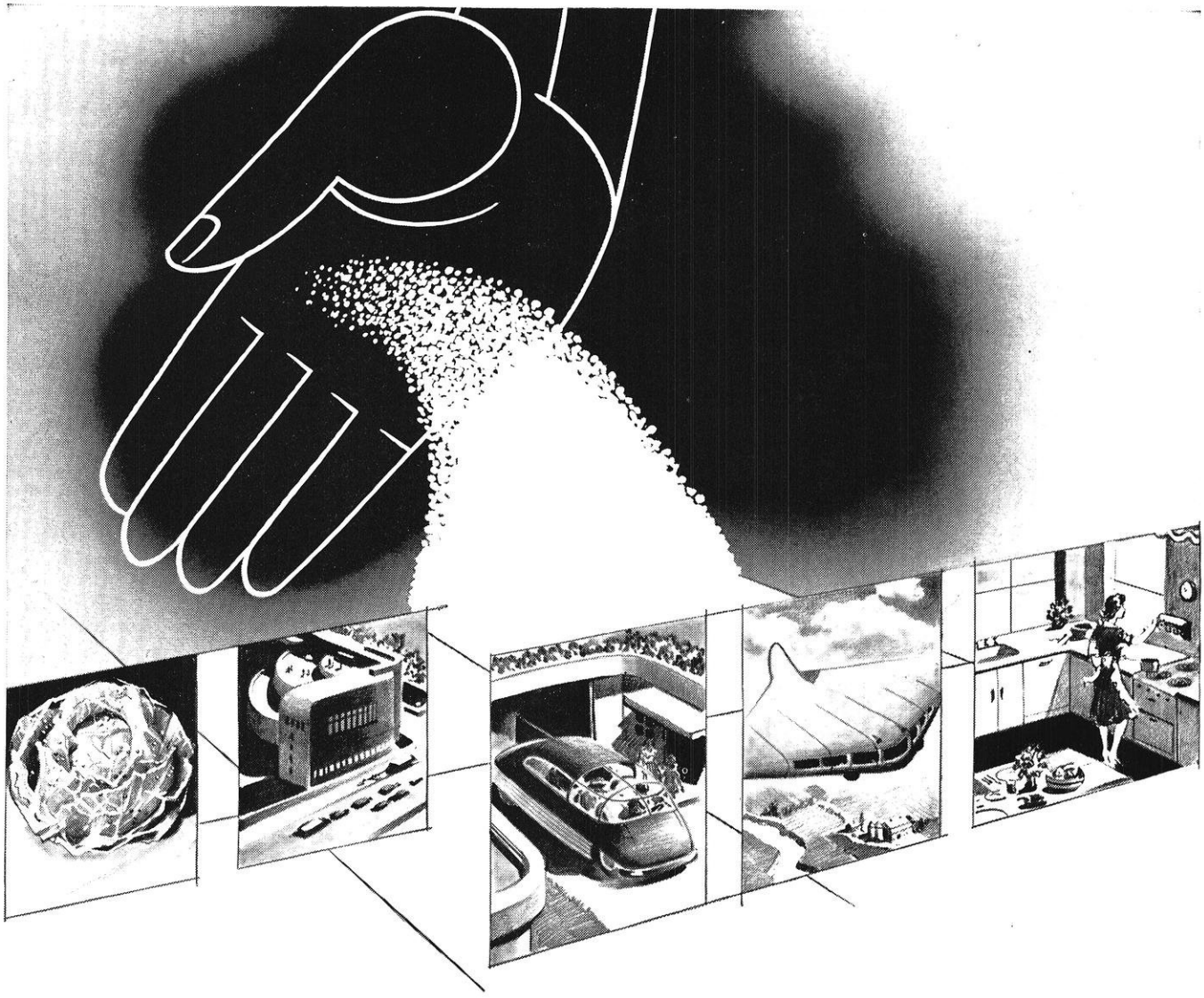

PLASTICS—products of industrial initiative

Plastics are a stimulating source of inspiration for architects and industrial designers in search of new ideas. When these intriguing materials are released from their military commitments, innumerable applications for the home front will arise. No products offer a better example of how progress can be accomplished when industry is given free rein to its initiative.

As a producer of basic chemicals needed for the manufacture of plastics, Dow is in a particularly fortunate position to promote their development. Three major Dow plastics—Styron, Ethocel and Saran—have already been produced. They possess distinctive properties that permit a bewildering array of uses in almost every field of human activity. There are also varieties of Dow plastic materials for coatings, finishes and other purposes in the electrical, textile and many other industries.

These plastic products do more than supplant other materials. They are veritable points of departure that lead to fresh fields. When normal conditions return, self-reliant industry, expanding on its own resources, will develop and apply them for the greater well-being of all America.

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CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

Initiation Articles for

ETA KAPPA NU

by a Couple of E.E.'s

Necessity of Thermodynamic Labs To the E.E. Student

by MERVAL OLESON

ONE of the big difficulties which college trained men usually encounter upon their initial entrance into the industrial world is lack of practical experience. A man may have done very well scholastically in college, but yet when he comes to take a position in industry, there is a period over which he must still learn. He must learn to work with his hands, and he must learn to apply the knowledge which he gained from books and lectures to actual practical cases. In order to make this transitional period easier and shorter, most colleges have included in their required curriculum several laboratory courses where the student works and experiments with the equipment he has studied in the classroom, and a few colleges even send their undergraduate students out into factories to work as part of their training. However, this procedure materially lengthens the time required for the college education, and so here at University of Wisconsin we use the laboratory courses. Now, while these laboratory courses are not quite as effective as sending the men to industrial plants, they still serve the purpose of acquainting the student with the equipment, and training him to work in close cooperation with other men on the problems encountered.

In the electrical engineering curriculum, we have a total of nine required laboratory courses which cover, besides electricity, the fields of chemistry, heat engineering, physics, and an optional surveying course. Neglecting electrical labs, the heat engineering labs take up more credits than any of the rest, which is logical, since the problem of power and heat is an important one to the electrical engineer who plans to go into power work. Also since it is an established fact that many of the engineers who graduate in one field eventually end up in another, it is best for him to have a working knowledge of all the diverse fields of engineering. (To quote an example, Professor G. L. Larson of the mechanical engineering faculty graduated from college as an electrical engineer, and is now teaching thermodynamics.) Other graduates of engineering colleges have, after a few years, come into positions where they are in supervision of not only electrical equipment, but also power plants and heat-power machines. Now, while they may not be directly in charge of the maintenance and operation of this equipment, it is still quite essential for them to know the problems involved, so that they can intelligently criticize and aid the men who are doing this. Also, we have the important considerations of mechanical power involved in the design and manufacture of most all types of electrical generators, especially those in the higher power ranges. The size of the heat engine installations are an important factor in the economic problems of a power station, which is after all the problem of the electrical engineer.

It seems then, that we may consider the courses in thermodynamics and their associated labs an essential part of our electrical engineering education, so let us see specifically what they consist of. The first course of this nature which the E.E. student comes in contact with is M.E. 63 where he learns the elements of the gas and vapor cycles and their corresponding engines. Then in M.E. 64 he studies the different types of engines in considerable more detail, and it is here that he has the first thermodynamics lab, M.E. 74. The experiments of M.E. 74 are designed to illustrate and fix the information of the classroom in his mind as practical material. It might be interesting and informative in this vein to run over some of these experiments: (1) Pressure and vacuum gages. The importance of pressures in heat engine work need hardly be elaborated on; this experiment teaches the construction and operation of gages of the type used for these measurements. (2) Engine indicators. In determining heat engine efficiencies and operating characteristics it is necessary to know the actual cycle of the engine, and engine indicators are used for this. (3) Steam calorimeters. The amount of water in steam has a very important effect especially on turbines, and a steam calorimeter is used to find the per-cent of water in a steam supply. (4) Engine tests for various engines. Several experiments are devoted to making tests of different types of steam engines, adjusting them for efficient operation, and testing various boilers which are used in conjunction with the engines.

The previous experiments teaching the proper use and operation of measuring devices and instruments are really all leading up to the testing of engines. These tests serve to actually make the material learned in the classroom seem real instead of merely abstract theory and computations. They also serve as a basis for working with these engines in the factory, so that the graduate engineer is not unfamiliar with the practical aspects of his job when he takes a position in industry.

Now, in order to form a more accurate opinion of the course itself, we might take note of some comments by undergraduate students and faculty members. The consensus of opinion among the students who have taken the course or are taking it now seems to be that the course is really a necessary addition to their curriculum, but they do feel that too much is required of them for the credits

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Stepping Up...and Keeping Up the STEEL CUTTING PRODUCTION of the United Nations

WITH the outbreak of war in 1939, the Allied Nations—abruptly cut off from Germany as a principal source of supply for carbides—diverted the full flood of their carbide demands to the United States.

Fortunately, American industry had established—as far back as 1928—its own independent sources of supply. These American suppliers were ready to meet the emergency with a background of 10 years' experience in the development, manufacture and application of this urgently needed material. They had the skill, the equipment, and a generous margin of reserve capacity.

To the hard pressed Allied Nations—struggling to offset the tremendous output of a German war production long since tooled with carbide *by official decree*—went tons of American carbides in steadily increasing quantities. Foresight and preparedness enabled American carbide manufacturers to fill this urgent need and at the same time meet the pyramiding demands of domestic industries.

Today, you will find carbides a factor of vital importance in stepping up and keeping up the production of not only the United States but also such countries as England, Russia, Australia, Canada, China, India, Mexico and many others among the United Nations.

The full extent to which carbides are being used in the cause of victory is difficult to visualize. Carboloy Company production alone, for example, is at an annual rate 45 times greater than that of any pre-war year. Monthly production of carbides—formerly measured in pounds—can today be expressed in tons—many tons per month! Yet the average carbide tool contains but a fraction of an ounce of carbide at the cutting edge—and a single tool during its usable life machines hundreds of parts for the implements of war. Particularly important is the use of carbides for cutting steel—a major field of use for Carboloy tools. (More than 60% of the Carboloy Cemented Carbide produced today for machining purposes is for cutting steel.)

A high order of performance—so high as to have been once considered incredible—is now commonly expected, and obtained, with carbides. Such things as increases in output of 3 to 1, lengthened tool life of 10 to 1, finish cuts that eliminate arduous grinding, machining of former "non-machineable" alloys, reductions of 25%, 50%, 75% in machining costs—results such as these are every-day occurrences in war production today.

This widespread use of carbides in war, indicates a new era of production economy when normal commerce returns. Manufacturers who have converted to carbides to meet the present emergency will then have at their immediate disposal an economic weapon of unusual advantage in seeking world markets.

Carboloy Company, Inc., Detroit, Mich.

Authorized Distributors: **Canadian General Electric Co., Ltd., Toronto.**
Foreign Sales: **International General Electric Co., Schenectady, N. Y.**

CARBOLOY
TRADEMARK

TITANIUM — TANTALUM — TUNGSTEN CARBIDES

Society Doings . . .

Campus Notes

by Glenn Jacobson, ch'44

A.I.Ch.E.

The student chapter of the A. I. Ch. E. held its last meeting on September 15 in the Top Flight room of the Union. After a short business meeting, the 27 members present were privileged to hear Lt. Sam Hughes of the V-12 group stationed here on the campus. Lt. Hughes clearly outlined the functions of the V-12 program, indicating what the boys were learning, and its correlation to the entire Navy set-up. He stressed the importance of Chemical Engineering to the Navy, both today and for the future. According to Lt. Hughes, the post-war world will offer ample opportunities to the specially trained men that are now being educated in the V-12 program.

—Marvin Woerpel

•

MINING CLUB

The Student Chapter of A.I.M.E. met in the Library of the Mining Building on Wednesday, September 29. This initiated the current series of monthly meetings. This meeting also served as the introduction to the Mining Club of the V-12 Mining and Met students on the Campus.

A movie on the heat treatment of steel, as prepared by the Lindberg Engineering Company of Chicago, was shown. This movie illustrated the modern industrial method involved in heat treating. Following the meeting, refreshments consisting of cider and doughnuts were served. **—Warren Friske**

•

A.S.C.E.

The meeting of the A.S.C.E. was called to order September 22 by President Kloman at 7:30 p.m. at the Hydraulics Laboratory. A short business meeting was held. Professor Woodburn, the main speaker of the evening, presented an illustrated lecture on "Grand Coulee Dam." Prof. Woodburn showed approxi-

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ETA KAPPA NU . . .

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they earn. M.E. 74 is a two credit course having a four hour lab once a week. However, the material required in the necessary reports and the computations require several additional hours for even the better students, and figuring on the basis of three hours per credit, the time required for proper pursuance of the course is not warranted by the credits given.

This same impression was mentioned by one of the teachers, but he said the extra time taken was due to the fact that some students became interested in the course and spent more time than was necessary in reading reference material. However, in either case, if the course actually requires more time, or if the students feel that they want to spend the time on it, indications are that it is worth more credits. Another point in regard to this course that some students mentioned is that a few of the men teaching the course were unable to answer their questions and help with the problems encountered because they didn't know the material well enough themselves. Now, it would seem that the instructors chosen for these labs should be thoroughly familiar with the material themselves, since it would be in the labs that questions would arise concerning the engines, even more than in classes.

In closing, I would like to repeat the statement made above, that whatever the failings of these courses might be, they are no more than would be encountered in other similar courses, and the general feeling is that the courses serve a definite need among electrical engineers.

Presenting Mr. Koehler . . .

ONE of these days the manufacturers of Briggs Pipe Tobacco are going to have to shut up shop and take a long vacation when their sales dwindle to a mere fraction of their former size. And on that day you will undoubtedly hear rumors humming through the wires of the electrical laboratory to the effect that Professor Koehler has given up his pipe! Until that day arrives, however, you will be able to find the Communications Laboratory, Mr. Koehler, and his pipe together in the east wing of the electrical laboratory. And what is more, if you are an electrical engineer or hope to be one (perish the thought!) you will, in the natural course of events, see a great deal of the communications laboratory, Mr. Koehler, and his pipe so that you will have a special interest in the brief biography of Mr. Koehler that follows.

At present, and since 1929, assistant professor of electrical engineering at the University of Wisconsin, Glenn Koehler was born on November 30, 1894, at Van Wert, Ohio. Brought up on a farm, he attended a country school and then the Van Wert High School. The first two years of his college training were obtained at Ohio State and subsequently he transferred to and was graduated from the University of Illinois.

Always interested in radio, he assisted in the building of a radio station for the University of Illinois during his senior year there. And with a B.S. degree in E.E. he

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CAMPUS NOTES . . .

(continued from page 30)

mately sixty slides and a few feet of movie film upon the steps in the construction of the dam. His informative and interesting lecture was well received by the large group of civils present at the meeting. The meeting was adjourned at 10 p.m. and refreshments served.

The last meeting of the summer term was called to order October 20 at 7:30 at the Hydraulics Laboratory. The main business of the evening was the election of officers. The new officers of the society are: President, Roy Ericksen; Vice President, Jack Scholke; Secretary, Marlin Clark; Treasurer, Dale Jennerjohn; Polygon representative, Gordon Robeck. After adjournment of the meeting, refreshments were served. **—Ed Kloman**

•

A.I.E.E.

The last meeting of the A.I.E.E. was held in the Top Flight room of the Union. Officers for this semester were elected. John Lyons replaces Walker Smith, who has graduated, as chairman; Harold Boettcher was elected vice-chairman, and Merval Oleson secretary-treasurer. In accepting their positions, the new officers indicated that they are going to try for a larger organization and more frequent programs.

After the elections, the main speaker of the meeting was presented. Mr. H. K. Smith of Westinghouse Mfg. Co. spoke on "What the graduating engineer has to offer industry, and what industry has to offer the graduating engineer." His well chosen subject struck a responsive chord in the audience as shown by the lively discussion following the talk. **—Merval Oleson**

•

M.E.S.W.

A regular meeting was held on Thursday, October 14, with thirty members in attendance. The speaker of the evening was Dr. Bradley, who showed the motion picture film, "Trip Through the Sierras." He accompanied this with a commentary.

An election of officers was also held. Those securing positions are as follows: President, Roy Anderson; Vice-President, William Mueller; Treasurer, Donald Rasmussen; Secretary, Elwood Buffa. The advisor for M.E.S.W. is Professor Nelson. **—Roy Anderson**

•

TAU BETA PI

Congratulations were in order for the retiring officers of the Wisconsin Alpha chapter of Tau Beta Pi, honorary engineering fraternity. At the October meeting held in the Reception Room of the Union it was decided: Gerhard Beyer will succeed Alvin Loeffler as president, and James Keating will succeed Walter Hirchert in the position of vice-president; Calvin Lovell, recording secretary, Richard Mason, corresponding secretary, and John Caldwell, cataloger, will replace Harold Gauper, Gordon Haddock, and Allen Jones, respectively, all recently graduated.

—Jerry Beyer

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ETA KAPPA NU . . .

entered the Signal Corps of the United States Army in April, 1918. While in the Signal Corps Private Glenn Koehler was stationed at Camp Vail, New Jersey, and carried on work in radio research and development, and became Sergeant Koehler! Discharged (honorably) in March, 1919, he was then employed by the Western Union Telegraph Co. in research and development work as a facilities engineer until February, 1920, when he began his instructional duties as a member of the Electrical Engineering Department of the University of Wisconsin.

Aside from his regular duties as a staff member Mr. Koehler has spent his summers in a variety of positions and pursuits, any one of which is calculated to keep a person from becoming afflicted with the typical summer do-nothing disease. For instance, during the summers of 1920-21 he was engaged in work on inductive interference for the Wisconsin Telephone Co. as a facilities engineer. The summers of 1922, '23, '26, '27, and '28 found Mr. Koehler calibrating electrical instruments for the utilities of the State of Wisconsin at the Standards Laboratory. Subsequently during the warm months of 1929, '30, '31, '32, and '36 Radio State WHA used his services as an engineer and in the development of their new transmitter. More recently (summers of 1934-37) Mr. Koehler has been connected with Radio Station WLBL as an engineer. We might also mention (and in fact we will!) that during the summer of 1924 the engineering department of the R.R. Commission of Wisconsin had a capable engineer, or that research work on audio transformers was carried on during the summer of 1927 by at least one engineer—and so on!

As busy as he was during these years, Mr. Koehler found time to be married, June 15, 1922, and to raise four children (with a little help from Mrs. Koehler, he admits). One 18-year-old daughter is now attending the University of Wisconsin, while another, aged 17, is in a Madison high school. The oldest son, 19, is enrolled in a radio technicians' school at Naperville, Illinois, while the youngest son, aged 6, is engaged in making home life interesting for the Koehlers (in a hectic sort of way) as six-year-olds are apt to do.

Mr. Koehler has written technical articles on a variety of subjects including the following topics: the design of transformers for audio frequency amplifiers, audio amplifiers, synchronous commutators for oscilliographs, and field intensity meters. He is also one of the authors of the text, **Ultra High Frequency Techniques,** which was published in 1942.

As far as his present work is concerned, Mr. Koehler might be called the man of the hour as he is the single teacher of six electronics courses which are designed to give E.E. graduates 18 credits in electronics. When it is understood that these 18 credits are the ones of most concern to the Army and Navy, the Man Of The Hour title is well justified, you will agree!

ALUMNI NOTES . . .

(continued from page 22)

Miners and Metallurgists

HENDY, ROBERT G., '41, 1st Lieutenant in the Air Corps, has been helping to enlarge and improve the field at Gulfport Field, Miss.

JOHN E. BROBST, e'03, G-E Engineering Consultant, Dies—J. E. Brobst, general consultant of the industrial control engineering division of the General Electric Company, died in Schenectady, on September 30 after a brief illness. Mr. Brobst had been associated with General Electric for 40 years and is credited with many important contributions to the development of industrial control equipment.

A native of Mondovi, Wisconsin, Mr. Brobst was graduated from the University of Wisconsin in 1903, joining G-E's motor design department at the Schenectady plant that same year. A short time later he became a design engineer in the industrial control department.

In 1929, he was made manager of the company's Bloomfield, N. J., plant, returning to Schenectady a year later to head the industrial control engineering department as managing engineer. He continued in this post until January 1, 1943, when he was appointed general consultant to the department.

Mr. Brobst was an associate member of the A.I.E.E. He was active in civic affairs and was a past president of the Schenectady Council of Boy Scouts.

•

Electricals

HARRISON, EMANUEL, '42, is in the testing laboratories of the General Electric Co. His first test was in Vacuum Tube Engineering on the development of a new tube for the Ultra-High Frequencies.

SCHULTZ, ARTHUR, '43, is with the Sylvania Co., and has recently completed a three month training period. At the present time he is working in the Commercial Engineering Department where development of consumers' special needs is considered.

SCHWALBACH, HERBERT M., '42, is working with RCA at Harrison, N. J., in the Advance Development Shop. In this department first models of new tube types are developed.

THOMASGARD, ROBERT B., '42, has been put in charge of student transfers in the testing labs at General Electric.

SCHNEIDER, HOMER JAMES, '42, was married to Elizabeth J. Bauer on May 24, 1943, in Milwaukee, Wisconsin. They are now living in Philadelphia, Penn.

CAMPUS NOTES . . .

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The following officers were elected for the fall semester by the Mechanical Engineering Society of Wisconsin at a meeting held Friday, October 8:

President—Roy Anderson
Vice-President—Bill Mueller
Treasurer—Don Rasmussen
Secretary—Elwood Buffa

Prof. D. W. Nelson will continue as faculty advisor.

ROARK REVISES HANDBOOK

A new edition of Prof. Raymond J. Roark's handbook, "Formulas for Stress and Strain," recently announced by McGraw-Hill, presents data that have become available since the publication of the first edition. The handbook "brings together and presents in convenient form all the available formulas for stress, strain, and strength of materials that are likely to prove useful to the designing engineer."

STATIC . . .

(humor)

stolen by

Gene Daniels, e'45

No, that e'45 is not wrong; the guy transferred from civil to electrical. Now watch the Static.

•

Law Prof (at registration): "So you are a pre-legal, eh?"

Student: "Like hell. I'm the youngest in our family."

•

Reprinted without permission from The Wisconsin Octopus.

•

Ed Stenson, A.S., thinks he's going to see a page of jokes all plagiarized from The Virginia Tech Engineer. Wishing him a merry trip to Great Lakes soon, we are reprinting the following:

Motor Cop: "Hey, you! Didn't you hear me tell you to pull over?"

Driver: "Why, I thought you said, 'Good afternoon, Senator'."

Motor Cop: "Isn't it a warm day, Senator?"

•

She was only an optician's daughter, but two glasses and what a spectacle she made.

•

"That's a pretty dress you have on."

"Yes, I only wear it to teas."

"Whom?"

•

Highlight of last semester was the time several social-minded civils brought their dates to Professor Woodburn's class in water supply. The girls learned all about plumbing and other things civils are interested in.

•

The Pi Tau Sigmas are drinking their beer with oil in it. Strange people these mechanicals.

•

No kidding, the jokes aren't all this bad. For proof come up to 356 M.E. building and read the ones we've left out of the magazine, but put up on the bulletin board.

Don Caldwell, whose picture adorns another part of this mag, is interested in having his phone number printed for the benefit of girls who might have gone astray and read The Engineer. Without further ceremony, here it is—F. 9262.

•

Saddest story of the last week in each semester: "Next semester everything is going to be different—no late reports—no cut classes . . . "

•

Willie in a fit insane,
Thrust his head beneath a train.
All were quite surprised to find
How it broadened Willie's mind.

•

Wisdom—Knowing what to do next.
Skill—Knowing how to do it.
Virtue—Not doing it.

•

Guest (to host in new house): "Hello, old pal, how do you find it here?"

Host: "Walk right upstairs and then two doors to the left."

•

She was only a conductor's daughter, but she had a low resistance.

•

She was only a grave-digger's daughter, but you should see her lower the bier.

•

MODERN GIRL

Legs ..... By Steinway
Body ..... By Fisher
Necks ..... By the hour

You should have come from the previous page.

•

"Look at that man swimming out there. Isn't he afraid of sharks?"

"He has 'Marquette is the best school in the world' tattooed on his chest and even a shark couldn't swallow that."

•

Caldwell applying for a lifeguard job:
Official: "Can you swim?"
Caldwell: "No, but I can wade like hell."

•

A half breed is a man with a cold in one nostril.

•

When you knock at the door and find husband at home, then brother, start selling something.

•

"Wish we had a fifth at bridge."
"You don't need a fifth for bridge, you dope."
"Well, make it a pint, then."

•

"I feel like telling that professor off again."
"What do you mean, again?"
"I felt like it yesterday, too."

•

"What kind of a fellow is Max Tauscheck?"
"Well, the other night the lights went out in his girl's house, and he spent the rest of the evening tinkering with the fuses. Judge for yourself."

•

A woman drove into a filling station in one of those bantam cars and tooted her horn. The attendant came out running and stopped on sight of the miniature car. Said the driver:

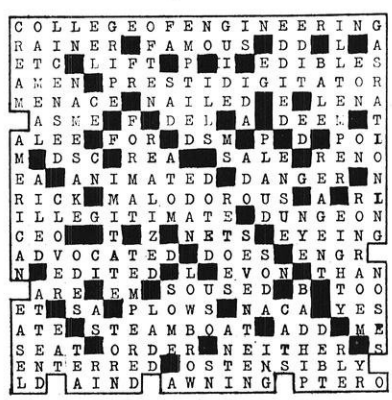
"Sonny, I want a cup of gas and a tablespoon of oil."

Dismayed, the attendant glared down at her and shouted: "And I suppose you want me to belch in your tires?"

•

A justice of the peace in a small Maine town was called upon to perform his first marriage ceremony. After he had the knot safely tied, the young couple continued to stand before him as if expecting some further rite.

Whereupon the justice stammered out, in a desperate attempt to round off the ceremony with something of a religious turn, "There, there it's all over! Go, and sin no more!"



This Is What You Should Have Had Last Month

The sergeant strode into the squad room. "All you blankety blank lazy apes get outside!" he shouted.

The soldiers grabbed their hats and swarmed out . . . all but one who continued to lie on his bunk blowing smoke rings.

"Well," roared the sarge.

"Well," remarked the rookie, "there sure were a lot of them, weren't there?"

•

The one who thinks our jokes are poor
Would straight-way change his views,
Could he compare the jokes we print
With those we could not use!

•

Absent-minded Dean (knocking on the gates of St. Peter): "C'mon, open up there, or I'll throw the whole fraternity out."

•

"Why have you painted one side of your car red and the other side blue?"

"It's a swell idea. You should hear the witnesses contradict each other."

•

"What's the idea of the black crepe on the door—somebody die?"

"Naw, that's just my room-mate's towel."

Silence—The college yell of the school of experience.
Hysteresis—Mental disease suffered by engineers.
Stress—Musician who wrote the "Blue Danube."

•

Mary had a little lamb,
Its fleece was white as snow,
She took her lamb to the M.E. lab,
Now look at the damned thing.

•

Tobacco is a filthy weed—
I like it.
It satisfies no normal need—
I like it.
It makes you fat, it makes you lean,
It keeps your wits from being keen;
It's the worst damn stuff I've ever seen—
I like it.

•

They called the baby "Weather Strip" because he kept father out of the draft.

•

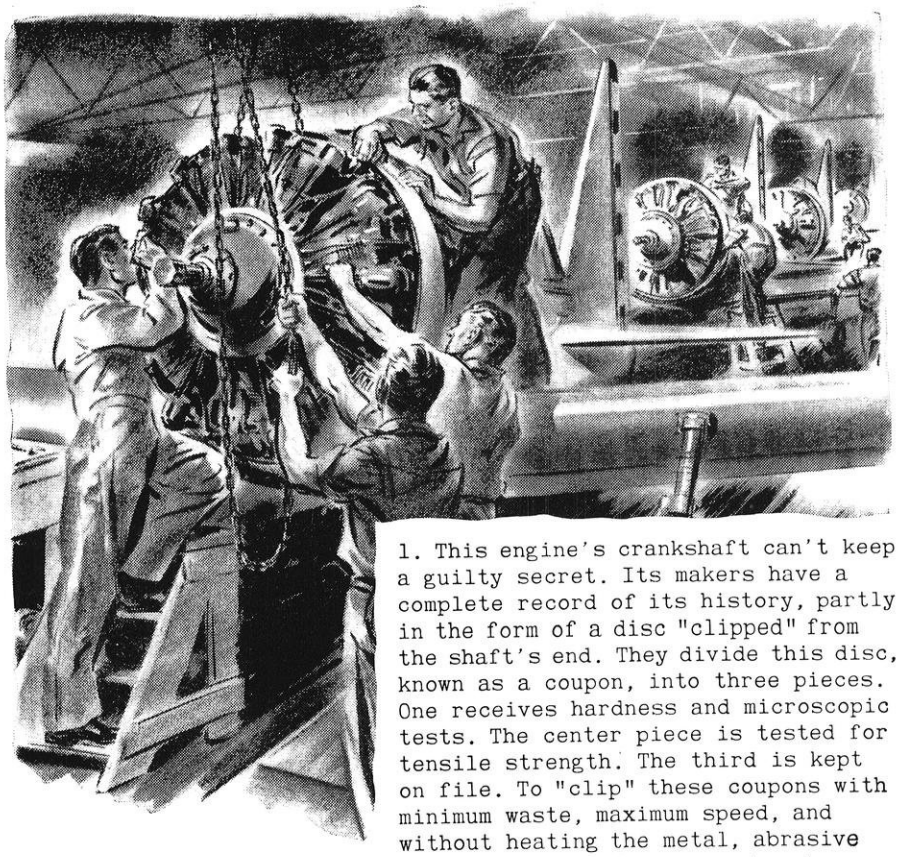
Passenger: "Porter, get me another glass of ice-water."

Porter: "Sorry, suh, but if Ah takes any more ice dat corpse in the baggage car ain't going to keep."

•

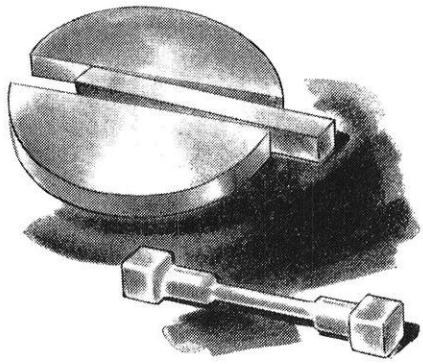
Turn the page, mug.

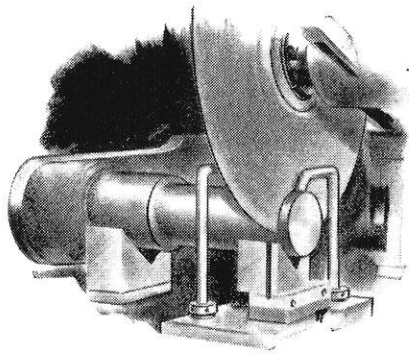
Clipping coupons from airplane engine crankshafts!



1. This engine's crankshaft can't keep a guilty secret. Its makers have a complete record of its history, partly in the form of a disc "clipped" from the shaft's end. They divide this disc, known as a coupon, into three pieces. One receives hardness and microscopic tests. The center piece is tested for tensile strength. The third is kept on file. To "clip" these coupons with minimum waste, maximum speed, and without heating the metal, abrasive cutting off wheels are employed.

2. With speed and precision counting for so much these days, abrasive cutting off wheels by Carborundum are coming into far wider use. In seconds they perform jobs which require minutes by ordinary methods. Such wheels are now used to cut plastics, glass, brick, tile, steel and non-ferrous metals in plate and bar stock faster and more accurately than they were ever cut before.





3. In industry you may run into abrasive applications that may be strange to you. When and if you do, remember that Carborundum is ready to help you solve your abrasive problems. The Carborundum Company, Niagara Falls, N. Y.

CARBORUNDUM
REG. U.S. PAT. OFF. BRAND
ABRASIVE PRODUCTS

Carborundum is a registered trade-mark of and indicates manufacture by The Carborundum Company

New Executives

This month we introduce two new officials on the staff of the Engineer.

Our new associate editor is Glenn Jacobson and new business manager is Don Caldwell. Editor Niles, however, remains situated as is.

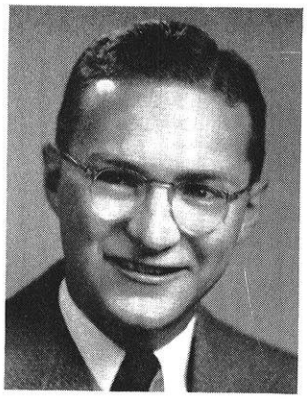
The reason for this switch is due to an Engineer policy to always let a retiring officer hang around as emeritus boss for one semester after retiring. Although the new officers control the mag, the predecessors are always around to help them over the rough spots — of which there are plenty, so help me! Bill Jacobson (Glenn's brother) and John Caldwell (no relation to Don) each graduate next February, consequently they will have one semester left to teach the new dogs old tricks.

Enough of this confab, on with the stories.

DON CALDWELL

This handsome looking gent, peering out from behind that grin, is the pride of the chem engineers, Don Caldwell.

A senior in the aforementioned department, Don is a resident of Madison. His high schools are many and varied although it is believed he graduated from Lodi High. While there, he was happily engaged in dramatics, Boy Scouts (in which he was a star — literally), played football, and of all things was sports editor of his high school paper. And him on our business staff all these years.



Before starting at the U., he spent the summer of 1940 touring the country. He rode a bike to Salt Lake City, Utah, and from there thumbed his way to Los Angeles, California (What he did with the bike he wouldn't mention, but it was either the galloping dominoes or a girl). After seeing all there was to be seen of L. A. (you should hear the way he rolls that L. A. off his tongue, just as though he had lived there), he hitched his way to Seattle and spent some time at this metropolis. He then hopped a fast freight for home, but the brakeman induced him to travel on another road—with force. So Don hitched the rest of the way.

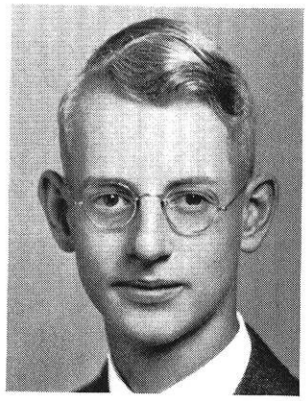
Since then, Don has confined his athletic experiments to his weight lifting hobby and an attempt to swim Mendota last summer. After 4½ miles, he was fished out, draped over a barrel, and brought home.

Another of his athletic achievements is a large briar (Iron Fireman Automatic Stoking). His main trouble is keeping the darn thing lit. He is considering using powdered coal and water tube coolers. Kerosene over shredded corn silk cooked fine, but he didn't care for the aroma of Havana El Eyebrow.

His favorite adornments are plaid shirts and girls. He says girls are all right in their place—anyplace.

His biggest job is trying to keep the editorial staff from spending too much money on each issue.

But just wait 'til February!



GLENN JACOBSON

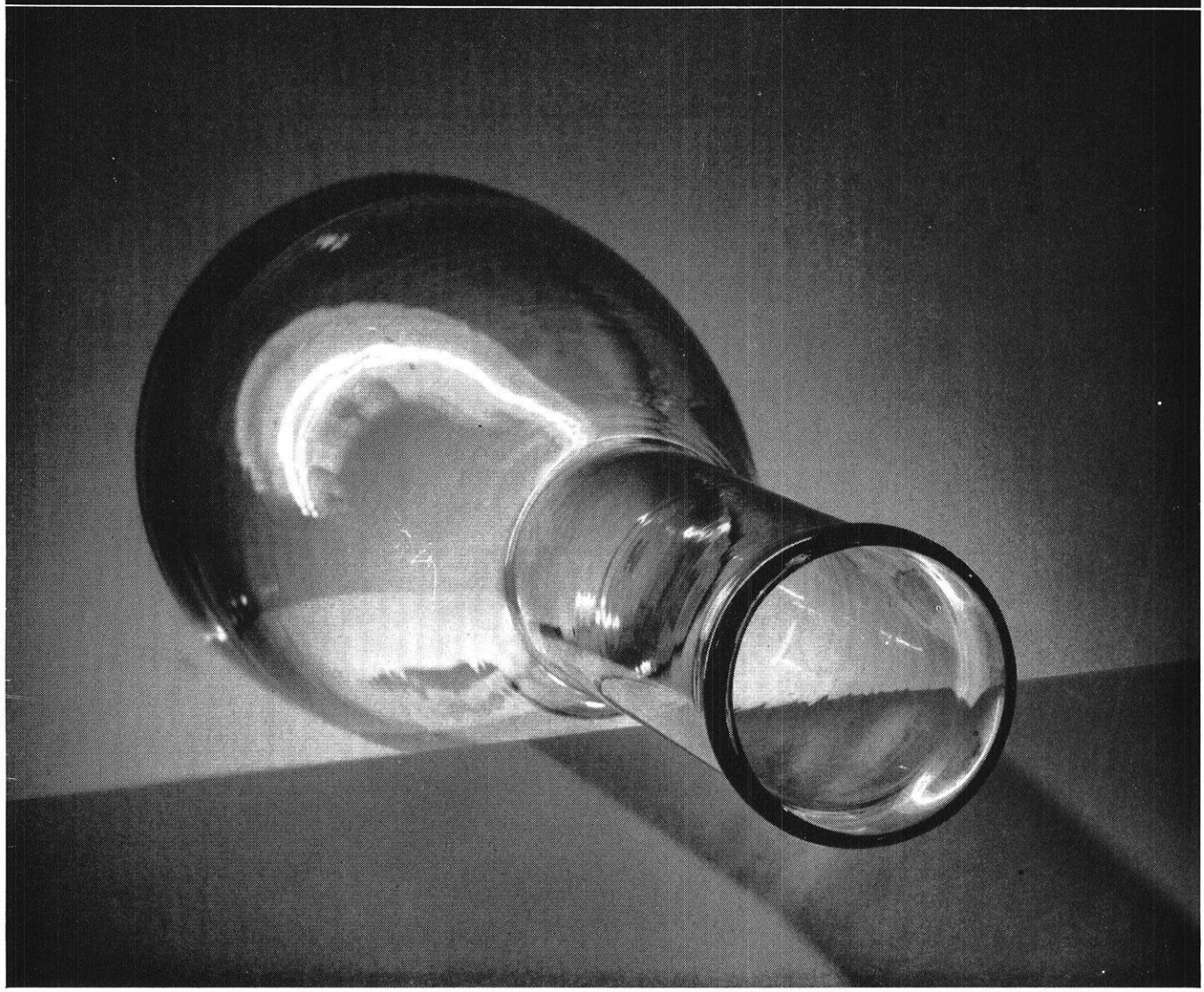
Glenn Jacobson, sophomore chem engineer, is stepping into his brother Bill's position as associate editor of the magazine. Last year he had charge of the alumni section, a feature that received honorable mention at this fall's convention of Engineering College Magazines Associated. This summer, except for a time when he was waging a fight with pneumonia, he was editing campus news.

Glenn was very active during his high school career at Genoa City, Wisconsin. He was a letter man in basketball and baseball, worked on the school paper, played in the band, and took part in forensics and dramatics. He was president of his senior class and valedictorian.

He has continued his good work here, obtaining freshman honors last year. In addition to his work on the Engineer, he has been publicity chairman for the A.I.Ch.E. this year, and one of their ace membership salesmen. In the line of athletics, he took part in dorm intramurals last year, and has joined the Hoofers' Club. He recently pledged Theta Chi.

Glenn expects to graduate in July, 1945, and would like to enter industry at that time if the war is not over. After the war he plans to attend law school, and become a patent attorney.

Submarine hunt in the Chemung Valley...



NO, it isn't a gun or a new style bomb. It's all we can show you of a special glass tube that is part of our secret submarine listening apparatus.

The same kind of tubes are used in listening devices that can pick up the menacing hum of an enemy plane miles away. And they're made out of special glass, to exacting requirements, by skilled Corning workmen in the peaceful Chemung Valley in Southern New York State.

Did we say "peaceful"? That isn't exactly correct. No subs actually prowl the Chemung, but there's plenty of war-like activity going on at Corning Glass Works, just as in every glassworks in the whole United States.

For Corning, like other glassmakers, was ready to turn its skill and experience to our country's use before the smoke had cleared at Pearl Harbor. For example, since World War I, Corning has developed medical and chemical glassware that frees this nation from dependence on foreign imports. This material is now flowing in a steady stream to industry, hospitals, and laboratories.

Hundreds of other items are made by Corning to aid the war effort. Optical glass, insulators for planes and tanks and ships, heavy glass parts for the manufacture of explosives, even glass precision gauges (ring, plug and others). Many of these jobs represent new uses for glass, where glass replaces metals because it is strong, resistant to wear and corrosion, and fairly plentiful. After the war many of these uses will stay, and new ones will be added because glass is a material of endless possibilities. And then, as now, Corning will be the center of American glass research.

In your own future as an engineer, *keep your eye on glass!* Corning Glass Works, Corning, New York.

CORNING
means
Research in Glass

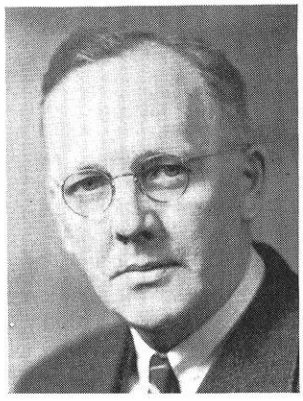
PROFS IN WHO'S WHO . . .

(continued from page 26)

during the summer, remember w-a-a-y back when we never had full summers?) Upon graduating he accepted a position as Mining Engineer for Oliver Iron Mining Co. in Chisholm, Minn. He continued in this position until 1909, at which time he gained some underground experience as a miner. (You should see the pictures of those underground days, which he has in his office.) In the fall of 1909 he came back to his home state as mining engineer for the Vinegar Hill Zinc Co. at Platteville, holding that title until 1911, when the position of mining mill superintendent was bestowed upon him.

In the meantime, however, he came back to Madison during the summer of 1910 to get married. There are now two young Shoreys, Mary, at present a Lieutenant in the U. S. Army Medical Corps, and Edwin Robert, also in the service as a Captain in the Infantry.

The young Shoreys aren't the only soldiers in the family, however, because their father left his job at Platteville in 1918 to serve as a 1st Lieutenant in the U. S. Army Corps of Engineers during the first world war. After the war he again returned to the mines, this time as operating engineer for the Oliver Iron Mining Co. at Shullsburg, Wisconsin. The call of his Alma Mater soon caused him to leave that position in the fall of that year and he came to the U. of W. as assistant professor of Mining and Metallurgy. In 1927 he acquired the title of associate professor and ten years later was promoted to that of full professor, which title he holds today.



Besides his teaching duties Prof. Shorey has carried on extensive research here at the University on the concentration of zinc, lead and fluorspar ores as well as work on consulting practice, and examination and evaluation, test mill operations in the U. S. and Canada. At the present time he and Prof. Barker are consulting engineers for a mine in the southwest part of the state. (That's the part of the state which I call home.)

He holds membership in the A.I.M.M.E., the Professional Engineers' Society of Wisconsin, and the Society for the Promotion of Engineering Education as well as Triangle engineering fraternity.

When it comes to hobbies he is a great camera fan. He has quite a collection of outstanding photographs and any time you amateur photographers want some tips I advise you to stop in and see Prof. Shorey.