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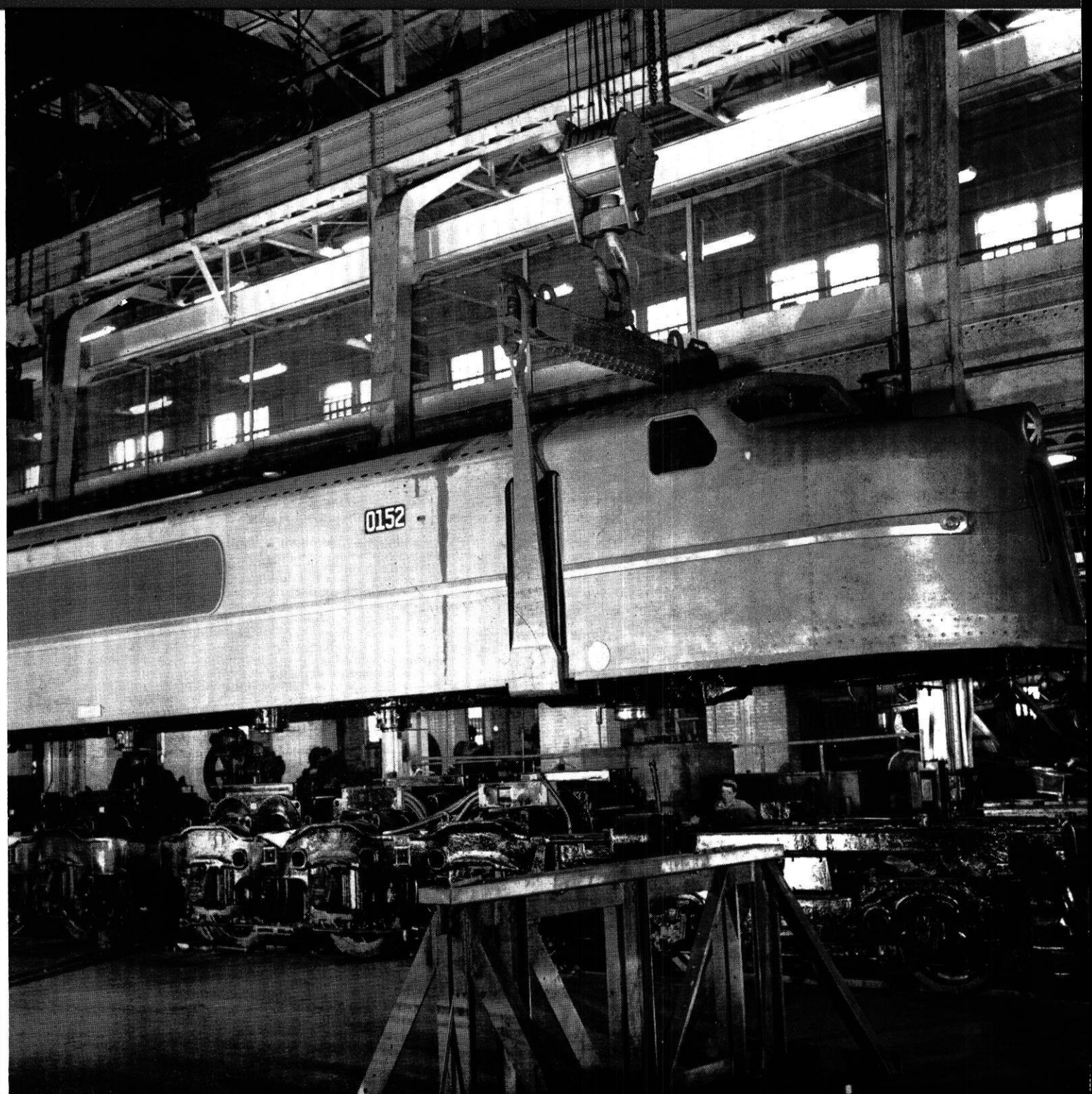
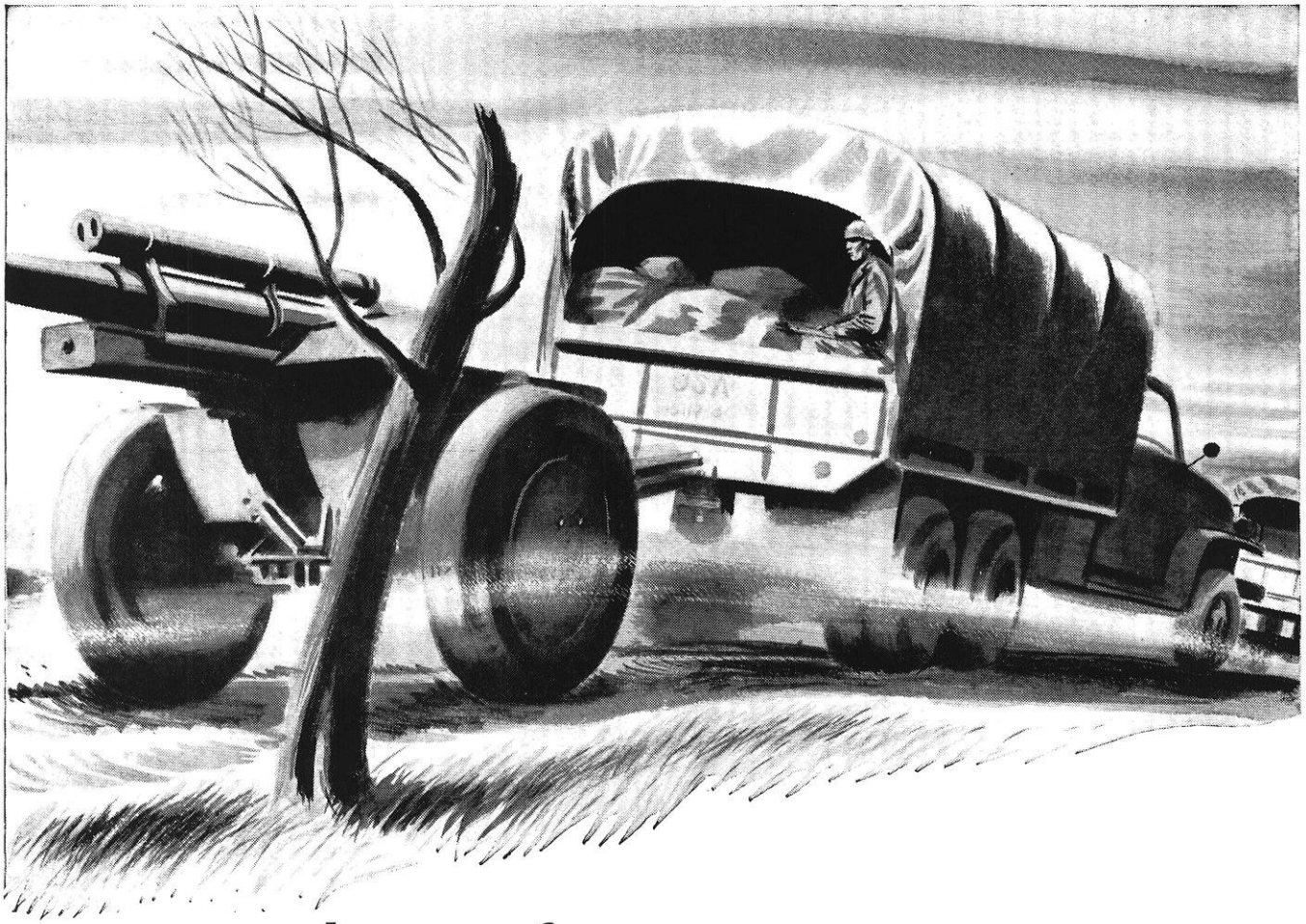
WISCONSIN ENGINEER

April, 1943



EMBER ENGINEERING COLLEGE MAGAZINES ASSOCIATED



Speaking of superior races . . .

Every wheel that rolls on the battlefield turns in a polished bearing race, ruggedly built to take the terrific shock of combat service.

To withstand such punishment, bearing races must be hardened by heat-treatment. Hard and soft spots occasionally occur. Such races may fail—at times when failure means disaster.

Recognizing the vital need, Westinghouse Research Engineers P. H. Brace and C. S. Williams set to work to develop a quick, sure method of detecting these flaws.

Their ingenious electromagnetic flaw-detector is based upon the fundamental law that the *permeability* of a heat-treated steel part varies with the degree of hardness.

In actual practice, Brace and Williams first *completely* demagnetize the bearing race under test. Next it is rapidly rotated and strongly magnetized. While the race is still turning at high speed its magnetic field is explored with a specially designed electromagnetic "pick-up."

Variations in the magnetic field of the bearing race, due to hard or soft spots, induce feeble currents in the pick-up system. These currents are amplified and shown on a cathode-ray oscilloscope.

A uniformly heat-treated bearing race traces a *luminous straight line* on the oscilloscope screen. Faulty heat-treating shows up as a pattern of *hills and valleys.*

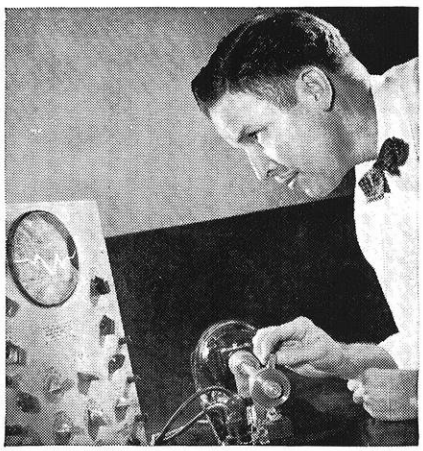
The Brace-Williams electromagnetic flaw-detector is now being used commercially—a typical example of Westinghouse *electronics at work.* It assures quality in millions of bearing races for our armed forces, *to keep 'em rolling on to victory!*

★ ★ ★

What Brace and Williams did—by employing Westinghouse "know how" to develop the magnetic flaw detector—many young Westinghouse scientists are now doing in other fields of fundamental research.

Today, they are helping to solve the technical problems of modern warfare. Tomorrow, they will tackle the job of building a better world for all of us.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pennsylvania.



ELECTRONIC FINGERPRINTS—Westinghouse Research Engineer C. S. Williams demonstrates the principle of the electromagnetic flaw-detector. Hard spots in the steel test piece show up as an irregular line on the oscilloscope screen. Williams joined Westinghouse after receiving his B. S. in Electrical Engineering at Northwestern University.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Electronics at work

The Goblin that works for America

THE INQUISITIVE alchemists of the Middle Ages were looking for silver. Repeatedly, they smelted certain ores and got a silvery-looking metal. But it was only *silvery-looking*. It never turned out to be silver. So the alchemists thought that a malicious spirit was thwarting them, and they called the strange metal Kobold, meaning goblin.

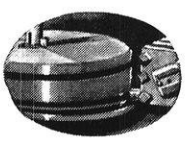
Today that same goblin, known in America as cobalt, has become one of this country's great fighting elements. Cobalt is alloyed with chromium and tungsten to make "Haynes Stellite" alloys which have the property of "red hardness." Metal-cutting tools made of these alloys keep on cutting even when red hot! Cobalt improves red hardness and toughness in other kinds of metal-cutting tools. Thus, cobalt has contributed greatly to the tremendous output of planes, tanks, guns, and other war materials.

Cobalt is also used to produce improved magnet steels. Permanent magnets of cobalt-tungsten steel are more powerful, and last longer. Permanent magnets are necessary in much electrical equipment.

This country's cobalt formerly came from Belgium, where it was refined from African ores found in the Belgian Congo.

As war clouds loomed, and as accelerated American industry made rapid inroads on the stockpiles shipped out of Belgium during 1938 and 1939, ELECTRO METALLURGICAL COMPANY, a unit of UCC, designed and built facilities in this country for the Belgians. ELECTROMET now operates these facilities so that HAYNES STELLITE COMPANY, another Unit of UCC, and other American companies can have the cobalt they need for essential war work. Operations began in 1941. Today, these facilities annually produce more cobalt than was ever imported in any year previously.

BUY UNITED STATES WAR BONDS AND STAMPS



RED HOT... STILL CUTTING! Faster production of metal equipment of all kinds is made possible by high-speed metal-cutting tools containing cobalt.

SIGHTED SUB! Better radio transmitting tubes and improved electrical equipment are assured by cobalt.

CALLING HEADQUARTERS! Telephones and other electrical equipment require permanent magnets. The better magnet alloys contain cobalt.

WEAR-FIGHTER! Planes fly farther with fewer repairs, thanks to exhaust valves protected with "Haynes Stellite" cobalt-chromium-tungsten alloys.

UNION CARBIDE AND CARBON CORPORATION

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

Principal Products and Units in the United States

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The Prest-O-Lite Company, Inc.

PLASTICS
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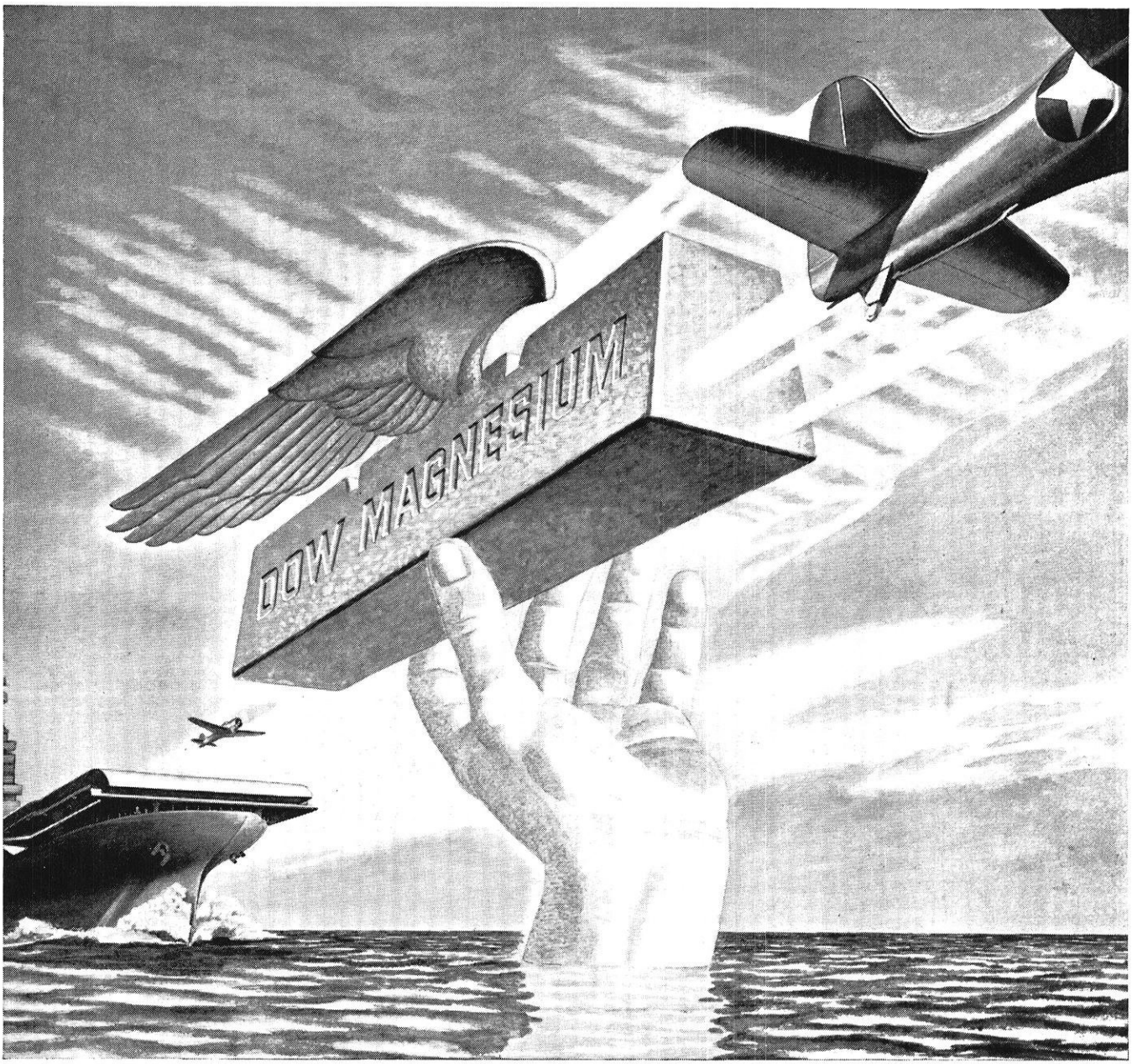

THE WINGED INGOT is a symbol of freedom. It is a graphic expression of Dow's recovery of magnesium, lightest of the light metals, from sea water to release our airplanes from hampering weight.

Also, it is a symbol of things to come. When peace returns the freedom of American enterprise will permit the full use of Dow's vast magnesium production to speed transportation of passengers and freight by air and lighten tasks in industry, business and the home.

Millions of pounds of Dow magnesium, extracted from the inexhaustible sources of the sea and from Michigan brine—as well as Dow facilities already established for the fabrication of Dowmetal castings and wrought products—will then be available to give this symbol of freedom—the flying ingot—its fullest significance.

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

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MAGNESIUM

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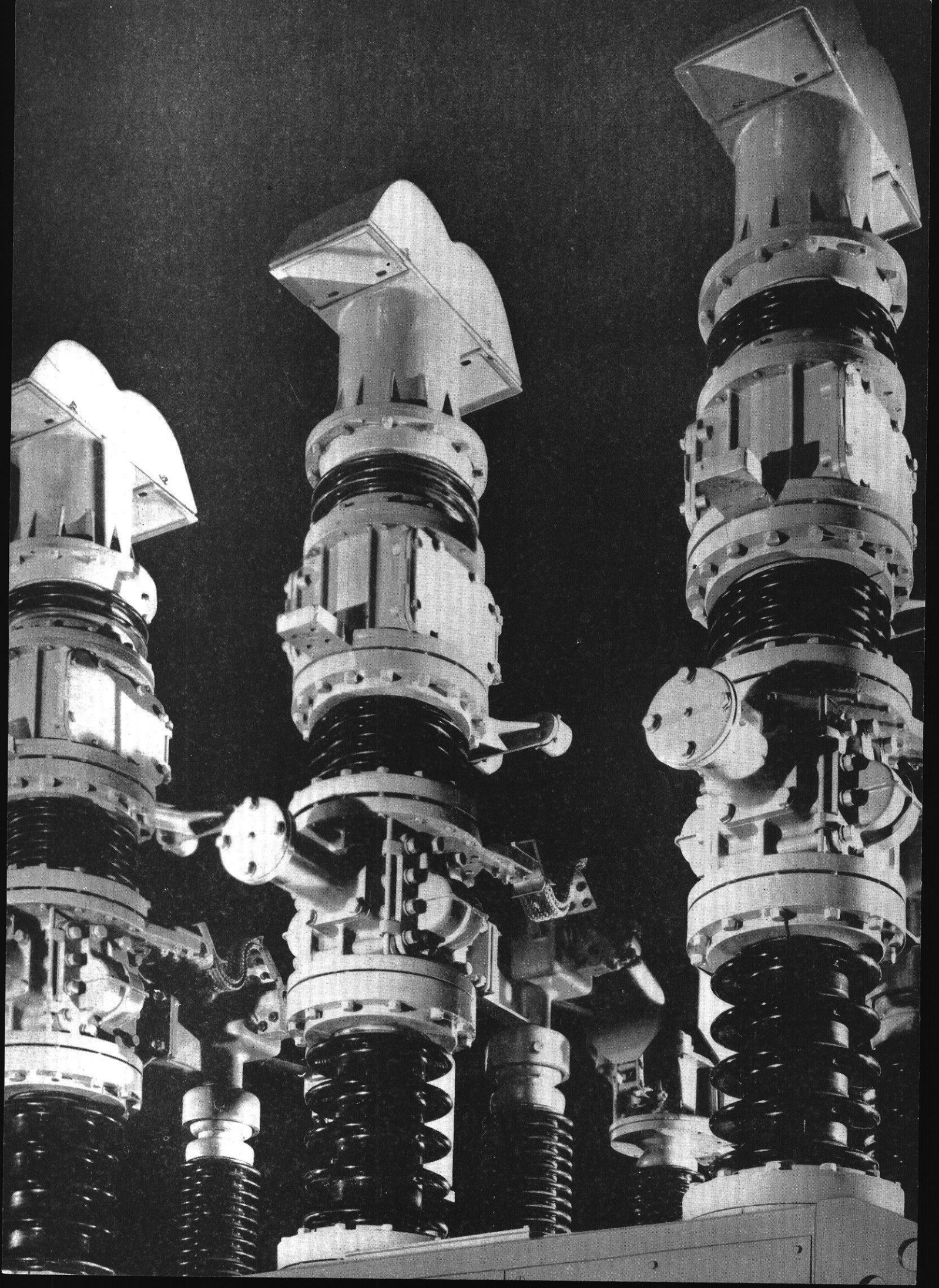
DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY



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In This Issue . . .

Department of the Month . . .

Mining and Metallurgy

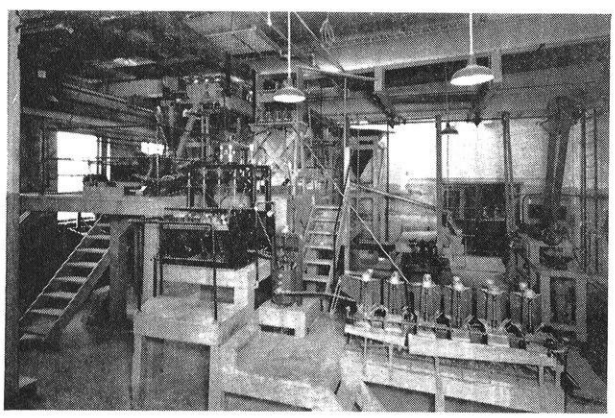
by Warren Friske, met'44

THE Department of Mining and Metallurgy has the distinction of being the "baby" of the College of Engineering as it is both the youngest and the smallest. It was authorized as a department in 1907, although courses in mining and metallurgy had been offered as electives in general engineering since 1889. Prior to this date, a department of Mining and Metallurgy had existed but not as a part of the engineering school. It was from this department that Charles R. Van Hise, late president of the University of Wisconsin, received his B.S. degree in mining and metallurgy in 1879.

All of the students in mining and metallurgy follow a general schedule during the freshman and sophomore years. At the beginning of the junior year, each student is required to select his major field from one of the three options offered: namely, Mining Engineering, Metallurgical Engineering, and Mining Geology. If Metallurgical Engineering is selected it is possible to specialize in either ferrous or non-ferrous metallurgy.

Laboratories

The metallurgical furnace lab is located on the East end of the ground floor. This lab is equipped with a tilting arc furnace, a blast furnace, both acid and basic lined converters, and a variety of metallurgical and assay furnaces with all necessary accessories. The blast furnace and converters are used in the reduction and refining of non-ferrous metals such as copper, lead, and zinc. The electric arc furnace is used for the melting and refining of steel. It is with the small gas-fired assay furnaces that the sophomores spend much of their second semester determining gold and silver values of ores from various American and Canadian mines.



Flotation equipment in mining laboratory. The miners learn the care and operation of many tools here.

Occupying the central portion of the first floor is the mineral dressing suite. Included in its equipment is a mineral dressing lab, a flotation testing lab, a chemical lab for control assaying in mill tests, gravity and magnetic concentrators, and a small-scale flotation mill which permits the development of any desired flow sheet. It is in this lab that research has been carried on to develop economic concentration of Wisconsin zinc ores.

Adjoining and very closely associated with the mineral dressing labs is the Crushing laboratory. It is provided with both small-scale and large-scale equipment for com-

(continued on page 34)

Putting the last touches on the mold in foundry lab.

A Brief Study of Electronics . . .

Microwaves

by John Sell, e'44

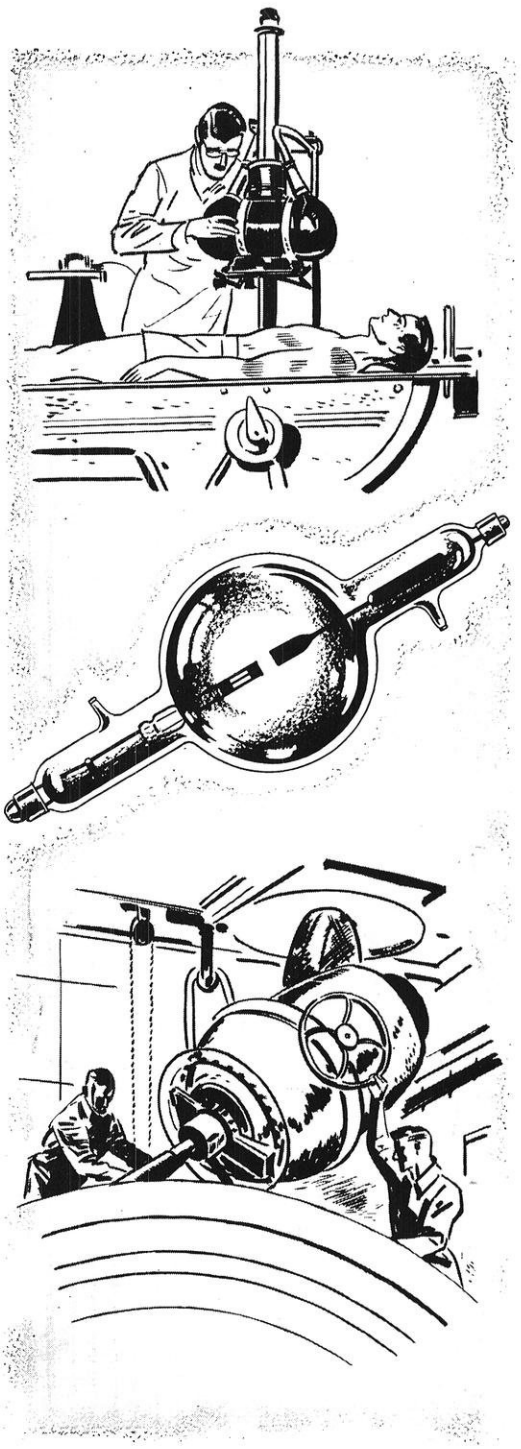
FOR this generation radio is still an amazing and unbelievable thing, a device whose design and operation are beyond the comprehension of the ordinary individual, all this even though it has become as familiar and commonplace as plumbing and the automobile. The elusive particles which make radio possible, electrons, are as elemental and ubiquitous as fire. For many centuries fire itself was wonder enough until civilization realized that it was not an end in itself but merely a new starting point, a tool of many uses. Something similar has been happening in electronics. Today we can have radio and television; tomorrow we can have much more as new blessings are tumbled from that scientific cornucopia which is the vacuum tube.

A vast new field has recently been opened in electronics which is far greater in extent and possibilities than the imagination can conceive, the field of ultrahigh frequencies or microwaves. In this article we shall be concerned with some of the interesting things that can happen to our notions of electricity when currents alternate at the rate of billions of cycles per second.

The first problem which arises is the one of how to approach the subject. If we had before us a frequency scale of the entire electromagnetic spectrum, we would see that microwaves are very much nearer in length to the wavelengths of heat and light than to those of electric power. So we might talk about "low-frequency light" or "low-frequency heat" just as easily as "high-frequency" electricity. As a result, many of our concepts which are carry-overs from static or low-frequency electrical phenomena will have to be discarded.

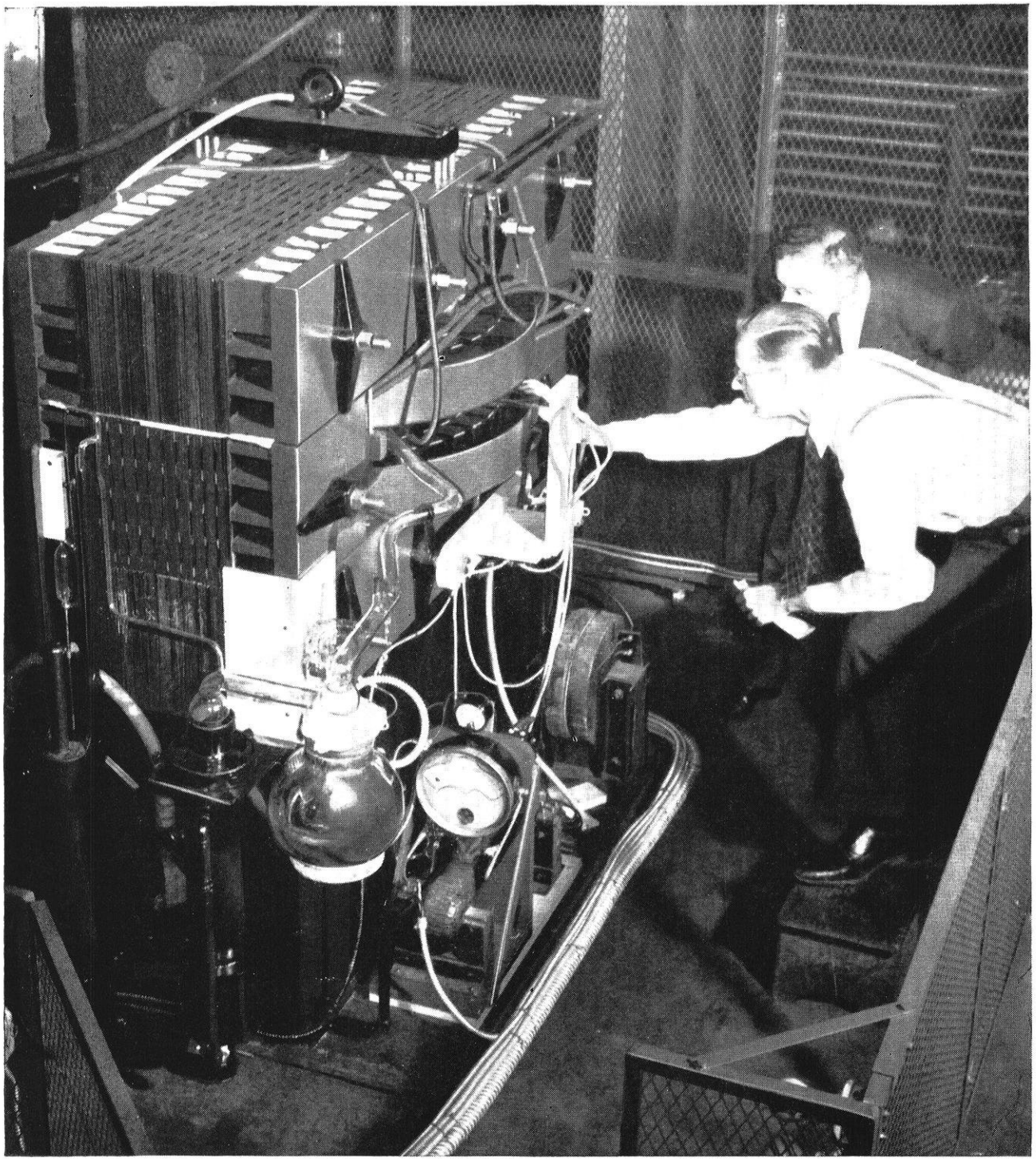
Conductor

However, let us start with one of the most fundamental concepts in electrical engineering, the flow of electric current along a conductor. At low frequencies the engineer thinks of current as a flow of electrons contained in the conductor, the current being uniformly distributed throughout the cross-section. As the frequency is increased there is a tendency for the current flowing to move toward the surface of the conductor resulting in what is called "skin effect." This effect increases in importance with increasing frequency until at frequencies of the order of one billion cycles per second electric currents flow **on** conductors rather than **in** conductors. Conductors become simply boundaries enclosing regions in which microwaves do their propagating and existing. So, instead of currents, or charges, or voltages, the micro-



X-Rays are part of field of electrons. Top, X-Rays in medicine; center, the vacuum X-Ray tube; bottom, X-Raying a large metal casting in industry.

Courtesy General Electric



Giant Rheotron, 20,000,000 volt electron accelerator used in X-Ray work.

Courtesy General Electric

wave engineer thinks in terms of electric and magnetic fields.

As a result of this the conductor can be turned inside out to produce a long, cylindrical tube. A small spherical probe inserted in the tube is then charged by a high-frequency generator so that the lines of electric flux from the probe end on the cylinders' walls and, if the frequency is high enough, the electromagnetic field propagates down the tube. This type of power transmission and radiation is called a "wave guide." Thus in a broad sense current flow becomes a boundary condition, a condition which makes electric effects in the centimeter-wave region closely resemble light waves, which, in turn, we usually consider as passing through a medium with the boundaries acting as absorbers or reflectors but, nevertheless, boundaries only.

Going back again to our low-frequency concepts of electricity, an alternator inserted in a loop of wire causes

an alternating current to flow. To determine how much flows, we would contribute a certain amount of voltage toward overcoming ohmic losses and a certain amount toward overcoming the induced voltage due to the changing magnetic field. One way to look at this is that the changing current at every point in the wire gives us a changing magnetic field and this in turn causes an induced electric field at every point of the loop. The cumulative effect of that electric field is to require a certain amount of the applied voltage to be used up on overcoming the field to permit current to flow. Now these electric and magnetic fields do not jump instantaneously into existence in the space surrounding charges and currents which cause them but take a finite amount of time. As the frequency of the source is increased, the time which it takes for the magnetic field due to the current in one part of the loop to make itself felt at another part becomes an appreciable part of a cycle so that there will be some delay or retardation, resulting in a component of the induced electric field to be in phase with the current. We will thus sustain a loss through the magnetic field. So whether we like it or not, the loop has become a form of antenna; it radiates power.

Also, at high frequencies the loop might be several wavelengths long. Then, periodically around the loop, we shall find that the current in one part may be going in one direction while that in another part may be going in the opposite direction whence charges must be "piling up" at intermediate points. Since the distance from zero to the positive maximum of current along a conductor is only a quarter of a wavelength, it is very rare that centimeter wave circuits small enough physically to look like low-frequency circuits can be used.

Insulation of Circuits

This brings us to one of the important properties of centimeter-wave circuits. First, circuits in the usual sense hardly ever exist at these frequencies because it is difficult to build them tiny enough really to be a circuit. And second, small though the circuits are, the radiation from them, or the loss of energy, is proportionately large. So the centimeter-wave engineer has an insulation problem on his hands to keep the radiation of his system under control. Unless completely closed structures through which the waves will not penetrate are used, there will be leakage by radiation.

Since centimeter waves will not appreciably penetrate metal, as previously stated, the answer to our design problem is found. The circuit is built so that the current flow around it is self-enclosing. The practical realization of this trend of thought is the common centimeter-wave circuit known as a "resonant cavity," a common metal box.

The same result will be arrived at by another line of reasoning. Start with the most common impedance in radio engineering, a tuned parallel circuit. To insure that the circuit will resonate at the required high frequency a circuit consisting of only two plates connected by an inductance of one turn is used. Then put several of these one-turn inductances in parallel, one at each side of the plate. Next think of these one-turn inductances as applied all around the condenser. As the number is increased, they may be thought of as small cross-section inductance "bands" in parallel. Ultimately the condenser consisting of two plates is closed by the surface on which the current flows and is closed all the way around.

Now we have simply a closed box inside of which is our centimeter wave. It still has a resonant frequency, at which there will be a higher electric field between condenser plates and a very high current up and down the sides of the box. At some time the energy will be in the electric field, at a later time it will be in the magnetic field.

From some of the above principles arise two of the most surprising and interesting phenomena of microwave propagation, phenomena which are the exact antithesis of our power frequency conceptions. Since at these high frequencies the waves are propagated only on the surface of a material, glass, porcelain, and other of our so-called "insulators" can be used for transmission purposes. On the other hand, an ordinary transmission line of one-quarter wavelength presents an infinite impedance across its input terminals. At ultrahigh frequencies a co-axial quarter wavelength line is very convenient to handle and easy to adjust. Consequently such a line composed of one of our best "conductors," copper, can be used as a very high impedance. So we find ourselves using "insulators" where we formerly used "conductors," and vice versa.

Now you may wonder just how frequencies so high that they produce all these "unusual" results can be generated. It is done by very special vacuum tubes in which the primary considerations are the manner of bunching electrons emitted by the cathode, the length and shape of the electron paths within the tube, and the time spent by individual electrons on their way from cathode to anode. This time is called the transit time and is usually measured in parts of an oscillating cycle. The difficulty of keeping the transit time short in comparison to the period of the oscillations represents one of the main limitations of tubes.

A great deal more could be said about microwaves, their peculiarities, and the problems which they bring up. The entire field is very new, practically everything known has been developed since the beginning of the war. Great strides are being taken. Under the lash of necessity research, developments and applications which ordinarily would have taken years are now compressed into months. A vast new field is unfolding. All that has gone before, important as it has been to our lives and fortunes, may well be only a preparation for a new and greater adventure in living.

Phi Kappa Phi Initiates

ACTIVITY BOYS

Interviewed by Staff

Phi Kappa Phi is the all-university honorary society, designed to encourage participation in extra-curricular activities. Requirements include not only activities, but good grades as well.

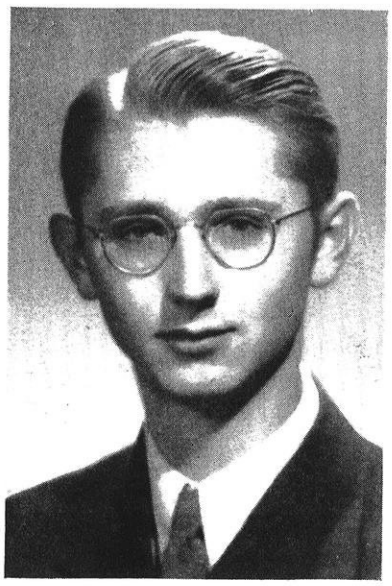
Fourteen engineers were initiated this semester. Six of them are immortalized in this article. Of the rest, four were written up in the February **Wisconsin Engineer** in the article on athletes. They are Dave Soergel, Jim Yonk, George Rea, and Fred Rehm. Henry Geisler was written up in the January issue as the retiring circulation manager of the Engineer, and Jerome Baird and Arne Larson will appear next month as graduating staff members.

Donald Jelinek graduated last January and could not be contacted for interviewing.

•

BOB DAANE

Bob Daane is perhaps the tallest initiate into Phi Kappa Phi this year. He extends 6 feet, 4 inches above the ground. Bob, a senior M.E., came from Oostburg, Wis., where he went to high school. He played in the high school band, and was art editor of the high school paper which gave him good experience for his cartooning on the Wisconsin Engineer. He was business manager of his high school extra-curricular activities.



BOB DAANE

He entered the University in 1939, and he was started off with a bang in Phi Eta Sigma. In order to keep the records straight, he went from Pi Mu Epsilon, to Pi Tau Sigma, through Tau Beta Pi and finally arrived at Phi Kappa Phi. His other activities include two years of band and being chief cartoonist for the Wisconsin Engineer.

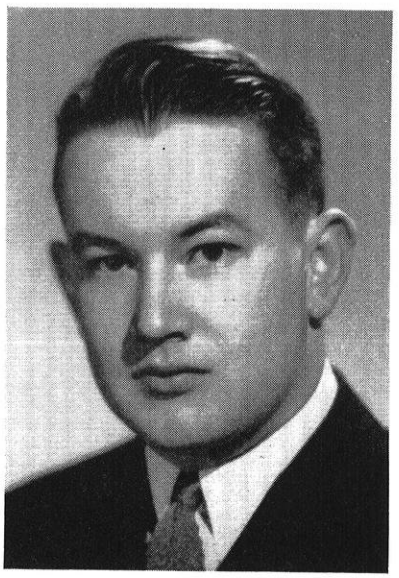
Last summer he worked at Pratt and Whitney as student engineer. He worked in the production engineering department where he was given a list of the amounts and types of machines which were to be placed in the factory, whereupon he was to take his pencil and instruments and make the drawing placing the machines in the plant. This was not simply a matter of putting the machines where it would be easiest to put them, but he had to consider production schedules and order of fabrication.

Bob will graduate in June and immediately after graduating will go to the Chrysler Institute of Engineering where he will get his master's degree.

•

MERK HOBSON

Merk Hobson, senior chemical engineer, is one of the home-town boys who is making good. He graduated from Central High, where he was active in many fields. He was quite an athlete, serving as president of the lettermen's club and captain of the football team, as well as being on the track and golf teams. In school he was president of the student council and president of his class for two years; he also participated in dramatic work. His scholastic prowess showed up early, for he was valedictorian of his class.



MERK HOBSON

Merk continued to pursue his studies diligently here at the Uni-

These boys have three things in common. They all have engaged in many outside activities and have accomplished much in them, they have gotten good grades, and they are all graduating seniors.

These fourteen (six here and the rest as noted) are the only engineers to be initiated this period.

Phi Kappa Phi is an honor worth striving for. Go to it, frosh.

—EDITOR

versity and was elected secretary of Phi Eta Sigma when he became a member. He has followed through by becoming a member of Phi Lambda Upsilon, chemical honorary, and Tau Beta Pi.

Hobson is one of the most active engineers in extra-curricular work. His classmates know him as the vice-president and treasurer of the A.I.Ch.E. He is chairman of the Union film committee and a member of the Union directorate, and has worked on orientation. In his fraternity, Delta Upsilon, he is rushing chairman and chairman of the finance committee; he also takes part in interfraternity football, hockey, and swimming.

Merk has spent a good amount of time in laboratory work since he's been in school. Two years ago he was an analytical chemist for a canning factory, and last summer he worked in the laboratory of the Monsanto Plastics Division at Springfield, Mass. At present he is doing hydrocarbon research under Professor Watson for his senior problem.

He will go to work for Standard Oil next September at their Baton Rouge plant.

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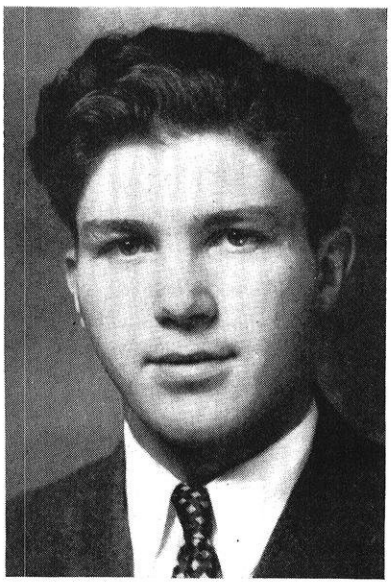
ROMAN PITZEN

"Romie" was born in Racine, Wis., and lived there until he came to the University as a mechanical engineer.



ROMAN PITZEN

He went to William Horlick High School where he was especially active in athletics. He won letters in basketball, football and track. He was also active in student government and while still in high school he was assistant industrial arts instructor at William Horlick.

He entered the University in 1939 and immediately became interested in R.O.T.C. He is now in his fourth year and is a cadet captain. He will continue his work in this line by going into active duty by June. His athletics have been confined to intramural dormitory.

He has been extremely active in S.A.E. and S.A.M.E., for which he is now treasurer. As could be expected, he swings a Phi Eta Sigma, Pi Mu Epsilon and Pi Tau Sigma key from his key chain.

His favorite courses up here have been taken under the Mechanics department which he believes is the best one here.

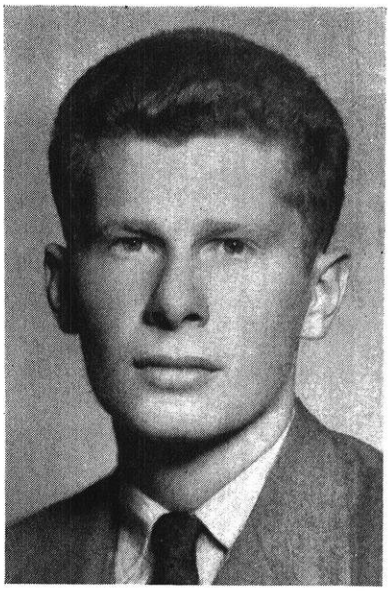
During the summers, he has had a great variety of jobs. He started out as a clerk in an A. & P., then worked in a tannery and went from the tannery to the drafting board at Twin Disc Clutch and for the last two summers worked as a machinist at the same plant. Fishing and hunting are his hobbies. He is not likely to develop others as he is a confirmed bachelor.

After graduation in June (he hopes!) he will leave immediately, if not sooner, for active duty in the U. S. Army. Due to the fact that the present seniors have not had their six weeks of summer camp, he will go to an Army school for a few weeks before receiving his commission as second lieutenant. He would like to stay in the Army after the war and make it his career.

•

HARMON LEWIS

Harmon Lewis, senior electrical engineer, is an Easterner who came here to the University all the way from Scarsborough, N. Y. His attendance at the progressive school there may help explain the way he has advanced, starting with his high school accomplishments. He was



HARMON LEWIS

editor of the school paper, and business manager of the magazine, as well as being on the student council and taking part in tennis and debating.

On this campus, Harmon has been intramural editor on the Daily Cardinal, and a sub-chairman of the Union hosts committee. He is president of Phi Gamma Delta, and has served as treasurer and house manager. He has been a governor of the interfraternity buyers' cooperative, and a member of the interfraternity stewards' association. His scholastic ability is attested by membership in Phi Eta Sigma and Eta Kappa Nu.

Last summer he attended the 12-week session, and he was a construction worker at Truax Field. The previous year he worked as a geologist's helper for the Oliver Iron Mining Company, a subsidiary of U. S. Steel. Harmon originally entered the University as a science major, and his year's training in geology was of great aid to him in this job where he classified rock and ore specimens from a diamond core drill.

He expects to graduate in September, and will enter the Navy through the V-7 program. He hopes to take part in the Naval Research Program. After the war he would like to take graduate work in elec-

tronics and television, with a view toward entering research and development work.

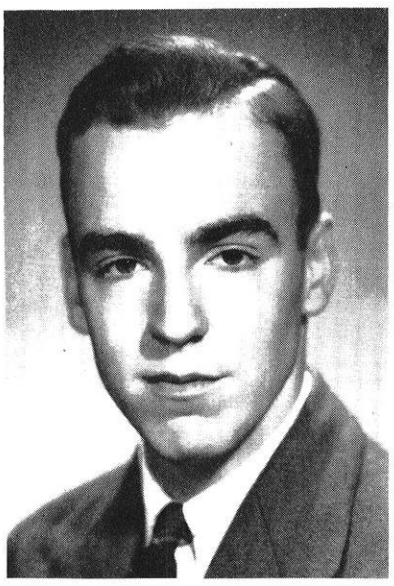
•

JIM COCKRELL

Jim is a senior electrical engineer who was born in Madison and lived here all his life. He attended West High School from which he graduated in 1939. While in high school, he played the cello in orchestra, was on the tennis team, baseball team, was a member of Student Council and entered into the activities of several other groups. In order to keep in trim for tennis, he played ping-pong during the winter, and became the high school champion. He has continued his good work in this sport, and reached the semi-finals in the University tournament.

He also played cello in a downtown orchestra during most of his high school career.

When he decided to come to the University, there was only one course worth consideration, and that was Electrical Engineering Communications. Jim didn't want to be confined to the drudgery of an engineer's existence, so he got a few jobs to do outside. When he was a freshman he played his cello in the University orchestra for a brief time. For two years he worked on the Orientation Committee as a subchairman and was a good man for the job as he knew the campus and Madison well.



JIM COCKRELL

He has been an officer in Pres House and is vice-president of Eta Kappa Nu. He started out well by joining Phi Eta Sigma, and lived up to scholastic expectations by being elected to Tau Beta Pi. He has been active in A.I.E.E. for some time.

Ever since he entered the U. he has worked at the Y.M.C.A. 30 hours a week. These 30 hours were besides taking full credits in order to graduate in eight semesters and one summer school. He was a lobby superintendent for two years, where he taught games to the younger group at the Y. In his last two years, he has assisted in the arrangement of high school dances and has been giving a bit of commando training to the high school boys in preparation for their future in the Army. As school and work only provided six days a week, he taught Sunday School for three years.

For two summers he worked as a councilor in the Y boys' camps; first at Camp Wakanda, and for the second summer, he worked at Camp Miniwanka, Michigan. When he wasn't councilling the boys, he was teaching them to swim.

During his last year here, he has had a scholarship from the Alumni Research Foundation. His research has been for the Forest Products Lab., taking results on the setting of wood glue in a high-frequency electric field.

Jim will graduate in June. He has accepted a position with RCA, working on cathode ray tube production at Lancaster, Pa.

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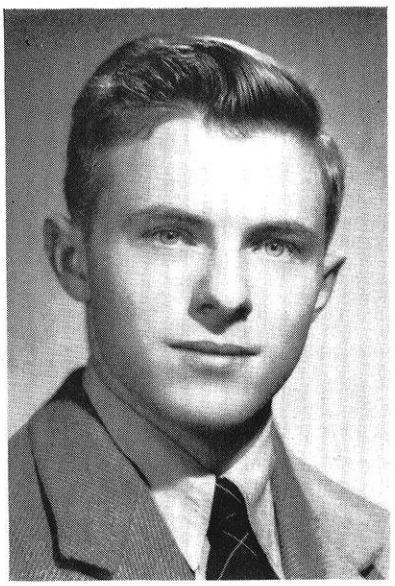
DONALD LIVERMORE

Don, a senior in the mechanical school, has become a member of Phi Kappa Phi, all-university honorary scholastic and activity fraternity, this semester. Strictly a Madisonian, he sprouted from West High in '39 with a good musical background to his name. This music carried him into the University Concert Band as a freshman where he has since faithfully tooted his clarinet under the baton of Professor "Ray" Dvorak. In addition to this, Don also enjoys playing in the



DON LIVERMORE

marching band and has seen as much of the stadium turf as most football artists.

It is obvious that Don has had no difficulty in keeping himself occupied these past four years when we realize that he has spent two years on the Community Chest Committee, has been a chairman for part of the Freshman Orientation Program, has actively participated in both engineering expositions, and has recently been selected as a member of the Student Court Board of Appeals. Not only this, but Pi Tau Sigma, mechanical honorary fraternity, and Tau Beta Pi, all-engineering honorary society, claim him in their ranks.

In the field of sports we see that Don dabbles in all intramural gamboling, with emphasis placed on skiing. Then too, it isn't at all surprising to see Don disappear from the face of the earth for a few weeks during the summer when he packs his rations and heads off on a canoe trip through the wilds of Northern Wisconsin with a couple of other fellows. For variety, he even played a season of city league basketball.

However, graduation comes closer with every day, and with past summer work in Gisholt together with Pratt and Whitney, Don is now set to dig his teeth in at the General Electric Company in Schenectady this June.

Review of . . .

ST. PAT'S BALL

by Bill Haas, c'5

Friday evening, March 19, some three hundred forty engineers threw their sliderules, lab manuals, and report sheets in the corner, either clipped off the shrubbery or gave it that final trim as the circumstances may have required, grabbed their best girls, and dashed over to the Union for the annual St. Pat's Dance. Forgetting Mechanics, Steam and Gas reports, and the like for the evening, they danced to the music of Bob Rapp's orchestra. When the intermission came, Ed Dickinson introduced a popular dinner speaker, Pat Norris, who took over as Master of Ceremonies (and **ceremonies** they were!). First was the Beard Judging Contest. At an afternoon preliminary, the judges had eliminated all but four of the ten entries. In the evening, Pat, along with Badger Beauties Jean Durgin and Margaret Gunkel, carefully scrutinized each of the four finalists' beards. After due deliberation with his two co-ed cohorts, Pat awarded the first prize, $7.50 in trade at Brown's, to Bill Cunningham, m'43. Elmer Mertz, ch'43, won second prize, a fountain pen from Jerry's. The third prize, a general engineering handbook from the Co-op, went to Ralph Gribble, c'43. MacNeil and Moore gave $5.00 in trade, the fourth prize, to John Cremer, e'44.

The beard contest was followed by the deeply traditional ceremony of kissing the Blarney Stone. It seems that every year the Blarney Stone disappears, but someone manages to find it at the last minute. Such was the case that evening, so the St. Pat candidates could kiss the symbol of good luck. These four candidates were Bill O'Brien, representing the civil engineers, Elmer Mertz of the chemicals, Bill Cunningham, representing both of the mechanical societies, and John Cremer, the electricals' man. This part of the ceremony completed, John Cremer was announced as the St. Pat for 1943. Using the famous Norris ability to embarrass people, Pat really went to work on Cremer as he bestowed upon the latter the title of St. Pat. You see, during the beard contest someone accidentally disconnected the microphone cord, and it was **not** Cremer, the only **electrical** on the stage, who put things in order again.

Prof. and Mrs. B. G. Elliot and Mr. and Mrs. E. T. Hansen were the chaperons at the dance. Mike Dunford worked hard as General Chairman, but was unable to attend the dance due to the fact that he was called by the Army Air Corps about a week before the affair. Other Polygon men planning the dance were Ed Kloman, c'44, Beard Contest; Ed Dickinsen, e'43, and John Halgren, e'44, Promotion; John Meigs, m'43, and Bob Jirucha, m'45, Buttons and Tickets; Earl Maas, c'43, and Bill Jacobson, ch '44, Publicity; Stan Puidokas, m'43, and Walt Wollering, met'44, General Arrangements; and Fred Graper, m'44, Finance.

-- *St. Pat Was An Engineer* --

WOMEN WORKERS

by Loella Niles, sj'44

Cuts courtesy General Electric

WOMEN today are successfully assuming more positions in industry than ever before in the history of the world. They are, in many cases, taking over tasks formerly labelled "Hands Off—For Men Only!" And they're doing all of their jobs well.

Not all women are being urged to take jobs in war plants—it is just as important for some to take jobs in civilian services, thereby releasing a young man for Army duty, as well as helping fulfill the shortage of men in certain industries. The Manpower Commission has been definite in its assertion that women with young children will not be asked to apply for war jobs—**until absolutely necessary.**

The War Manpower Commission estimates that 5 million more women will be needed in factories and offices by the end of 1943, and 5 million more by the end of 1944. At present, American industry employs 2½ million women out of 132 million people. In Germany, over 9 million women are employed out of 80 million people. Paul McNutt (WMC chairman) estimates that 30% of all war workers will be women by the end of 1943. The aircraft industry will employ more women than men!

Many plants already have a large percentage of women workers. Communications equipment has most with 48%; electrical machinery, 36%; small arms ammunition, 35%; technical instruments, 34%; and rubber products, 33%. In the manufacture of 60-calibre guns and over, and in tanks, both involving heavy metal work, the proportion of women is 9% and 7% respectively.

Naturally, the proportion of women employed varies widely in different sections of the country, according to the local degree of labor shortage. If the male labor supply is dangerously low, employers will be more liberal in giving women a chance to prove their worth.

Training

The most serious drawback in preparing women for factory jobs is that so few have any real mechanical bent or background. Consequently, they must be constantly drilled in fundamentals completely alien to them, but with which most men are familiar.

An important point in this respect is that technical machinery terms stick much better if they are put into every-day language. This was proven by one foreman who got very poor results in explaining the intake and outlet valves on a compression molding press until he identified the valves with hot and cold water faucets on sinks. After using these terms until the operation was familiar, "intake and outlet valves" were inserted gradually and soon became well-known terms.

The A. O. Smith Corporation in Milwaukee has special night classes in mechanical drawing which it holds at Marquette University. These courses are open to all girls to enable them to take over men's jobs in the drafting rooms. The course offered is an intensive one of 16 weeks with three hours of class being held four nights each week. No cuts allowed!

At the Monsanto plant a group of young women, mainly from Art Schools, with little or no technical engineering knowledge are making great strides in mechanical drawing under one of the oldest designing engineers in

Calibrating fine instruments.

the company. He's finally been given an opportunity to prove his favorite theory—that women who could draw would provide good working material. Monsanto still believes, however, that women should not be hired until men can no longer be obtained.

General Electric has bravely commenced testing women in its training course for graduate engineers. In some cases the girls will replace men and in others they will give skilled assistance to engineers in laboratories and factories. Preference in this course is given women who have had "some basic science training, with mathematics or physics backgrounds." Already more than forty women "engineers" have been hired and are being rotated among the departments in orientation work—they figure computations, chart graphs, calibrate fine instruments and do productive testing work. They also attend classrooms and learn fundamentals of engineering and advanced mathematics. Courses of this type assume greater importance due to the fact that of 12,000 engineers to be graduated from college in 1943, only 4,000 will be available to private industry.

They learn blueprint reading.

The rewards for training women, especially for factory jobs, are larger than those for training men. The women do not have to "unlearn" a previous method of handling tools, machinery or equipment. Besides this, they react more quickly to the use of devices to insure safe working conditions and are more careful in the use of such devices.

That women are eager to learn to do their jobs better and faster is seen clearly in one of General Electric's plants where the girls have started a "back to school" movement to brush up on subjects that will help them do their work more efficiently. Classes are held in a school building and high school instructors teach the classes. Subjects are a review of high-school mathematics, blueprint reading, and use of measuring instruments, micrometers, "go and no go" gages and others.

In other cities, high schools are running special courses in blue-print reading, drilling, mold and tool design and the use of various types of equipment.

Working Conditions

This is often one of the most confusing problems in factories where women have not previously been employed. The Women's Bureau of the United States Department of Labor lists working conditions which the plant management should guarantee women workers. Among them are: one-half hour lunch period with the opportunity for a hot meal; safe work clothing and accessories such as caps, goggles, gloves and shoes; and an adequate first-aid department. Any employer who runs up against particular problems when hiring women for the first time may consult the Bureau and be advised on procedures to promote the woman worker's efficiency and safeguard her health.

A problem often encountered by employers is that of transportation to and from the plant for women workers on the night shift. Such employment is easier when the company, **prior to hiring,** guarantees such transportation.

Uniforms

Another important point in hiring women workers is to equalize their wages with those paid men for the same job. Assumption that the man is the head of the family and therefore deserves a higher wage has been proven greatly erroneous. A pay differential may be established successfully if it is proven to the woman that her job has been simplified and is not identical to that being performed by the male worker.

The topic of uniforms for the woman worker has been the basis for much controversy with some employers and employees preferring them and others not. In the plastics industry a uniform coverall is furnished. Elbow-length or no sleeves are preferable, but the women usually wear a sweater under this uniform. Certain chemical companies, such as Monsanto, have found that their especially designed uniform is of distinct value in the building of morale of their feminine workers.

The opposite effect of uniforms has been shown in one Wisconsin plant where uniforms were a chief reason deterring women from applying for jobs. This seems to be an exception rather than the rule, however.

Hazards in factory work are listed as jewelry, loose belts, metal fastenings, long sleeves, thin-soled, narrow-toed shoes. The Women's Bureau of the Department of Labor has designed a new line of practical work-clothes, all trouser-type uniforms. The Allis-Chalmers plant in Milwaukee has pioneered in permitting slacks for office wear—they "follow a fashion trend and cover the hosiery shortage."

A great difficulty in hiring women factory workers was that they appeared for work in fashionable, toeless shoes, frilly silk dresses or light-weight slacks, despite instructions to the contrary. It took only a few cases of artificial

Correct equipment for protection against artificial sunburn

"sunburn" among the welders to show them the error of their ways.

One of the most revolutionary concessions to feminine workers has just been started by the N. A. Wordworth Co. of Detroit. An ultra-modern, fully equipped, beauty salon has been established within the plant in an effort to reduce absenteeism among the women employees. Those with good records will be given time off during work hours to go to the shop. Prices are the same as those in town, and the shop will run twelve hours a day (from 8 a.m. to 8 p.m.) to give women on all three shifts an opportunity to use it.

Large-Scale Jobs Done by Women

The Buffalo steel plants plan to avoid a critical labor shortage by hiring hundreds of women for jobs formerly held by men. Bethlehem Steel on February 1 began by hiring women as bricklayer's helpers and common laborers. Republic Steel is employing them for light work in mills and may soon put them on "pick and shovel" gangs. "The National Safety Council has ranked the steel industry close to the top of the list as a safe place to work," according to Edward F. Entisle, General Manager of Bethlehem. Women will be assigned, as far as possible, to work in locations where safety hazards are at a minimum.

An occupation that women take to like ducks to water, is that of welding. They're classified by enthusiastic executives as being eager to learn, learning rapidly and producing work of excellent quality. Best of all, there's a large available supply. No previous working experience is required—consequently, beauticians, salesgirls, housewives, and secretaries are flocking to these jobs. Girls over 21 are preferred (so that they may work shifts) and under 30 (because older women often lack the stamina needed to stand all day). Only one out of 100 fail to have the necessary aptitude and ability.

While learning, these girls are paid up to triple the wages they formerly earned; when they begin actual production they receive the same wages as men. When the training course is completed, the girls are required to pass a difficult welder's test before being put to work.

Shipbuilding, long the profession offering itself as a bulwark for stalwart males, has at last given way to the manpower shortage and women workers have flocked in. Government Navy yards have taken the lead and 1,400 are now employed in the large Washington yard alone. One Alabama yard plans to hire 1,000 women welders.

Compared to other war industries, however, shipyards still have a low percentage of women workers—three per cent at present. A rapid rise is predicted shortly.

Besides routine factory jobs, women are also offered opportunities as laboratory assistants, estimators, chemists, photostat, blueprint and Rockwell hardness testing machine operators by many plants.

One of the most unusual jobs being performed by women is that of a girl employed in the General Electric Illuminating Laboratory. She is thought to be the first woman in the United States to compute isocandle curves, which show lines of equal candle-power. She is a perfect illustration of what ability alone can do, for she never graduated from high-school and had almost no knowledge of geometry. She just "picked up" use of the slide rule and recognition of isolux curves and horizontal foot candle and isocandle intensity curves. Right now, she's "picking up" trigonometry.

Computing isocandle curves.

Attitude of Women Toward War Work

The chief reason women are engaging in war work, is that they are well aware of the critical manpower shortage, despite claims to the contrary. In their work, especially in factory jobs, they feel they are actually helping win the war.

It is true, however, that many women are not aware of this shortage and must be informed of it. Unfortunately, there is still a social stigmata on women who work in factories. More social pressure must be brought to bear on the importance of these jobs.

A safe generalization would be that few women really want to work if they don't have to and when our men return from military service, women will be willing to leave their places in shipyards, welding departments, steel mills and drafting-rooms and go back to dusting, sweeping and cooking.

Push-up Power

by Marvin Woerpel, ch'44
and Warren Friske, met'44

OFFICE OF FRISKE & WOERPEL

Insulting Engineers Par Excellence

Dear Reader:

Because of your seeming interest in the progress made by the scientific world, we are submitting a copy of these results obtained in our laboratories.

Due to the increasing stress being placed on physical fitness in regard to the war effort, we were asked to determine quantitatively the value of the well known physical exercise, the push up. Needless to say we immediately threw our entire resources into the determination. We not only determined the cost of such an exercise, but calculated the work which if harnessed could be of invaluable aid in one of our many ship yards or other defense plants.

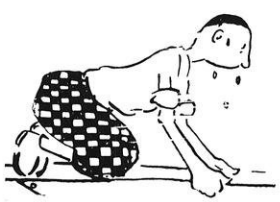
We trust that you will appreciate the hours of work required to make such a comprehensive survey. We assure you that we have checked and rechecked all calculations, and are confident of their accuracy.

We wish to publicly acknowledge the assistance given us in this matter by our friends and colleagues, who are experts in their respective fields, the Gremlins and Lobalies.

Yours truly,

Dontget Friske

Ifyouget Woerpel.



RESULTS:

Basis: A 150 Lb. man does 15 push ups in 30 secs. Man 5'10".

150 x 3.5=4.5 x X

X=116 Lbs.

Ft-Lb=116 x 2 x 15

Ft-Lb=3,500

HP=3,500/30 x 550=0.212 HP.

745.8 watts equals 1 HP

0.212 x 745.8=159.5 watts

Electricity in Madison costs $0.02/kw hr.

30/3600 x 2 x 0.159=0.00266 cents.

The power required in above mentioned exercise would cost this much at the rates charged by MG&E Co.

If the subject would hold a 50 watt light bulb in his mouth he could support the illumination for 95.8 secs.

159.5/50 x 30=95.8 secs.

At this point we change the basis of our calculations. We now consider 10,000 of the above average men doing 15 push ups in 30 secs. once a day.

This power would light the 50-watt bulb for 22.2 nights (12 hour nights). This data will have value when "The Lights Go On Again, All Over The World."

If the work done in the aforementioned problem were converted to heat rather than power we find that:

It would warm 1,100 12 oz. bottles of Ale to body temp.

Figuring on the basis of a 15% ale.

Specific heat x 1000=150 x .548+850 x 1

Specific heat x .932

3,500 ft-lbs/778 4.5 BTU/person x 10,000=

45,000 BTU

XLbs. x 58.6 x 0.932=45,000

X=824 Lbs. ale

824 x 16/12=1,100 12 oz. bottles ale.

If this heat were obtained from an Anthracite coal which has a heat of combustion of 7,800 cal/gm it would require 3.26 lb. of coal.

7,800 x 454/252=13,800 BTU/lb.

45,000/13,800=3.26 lb.

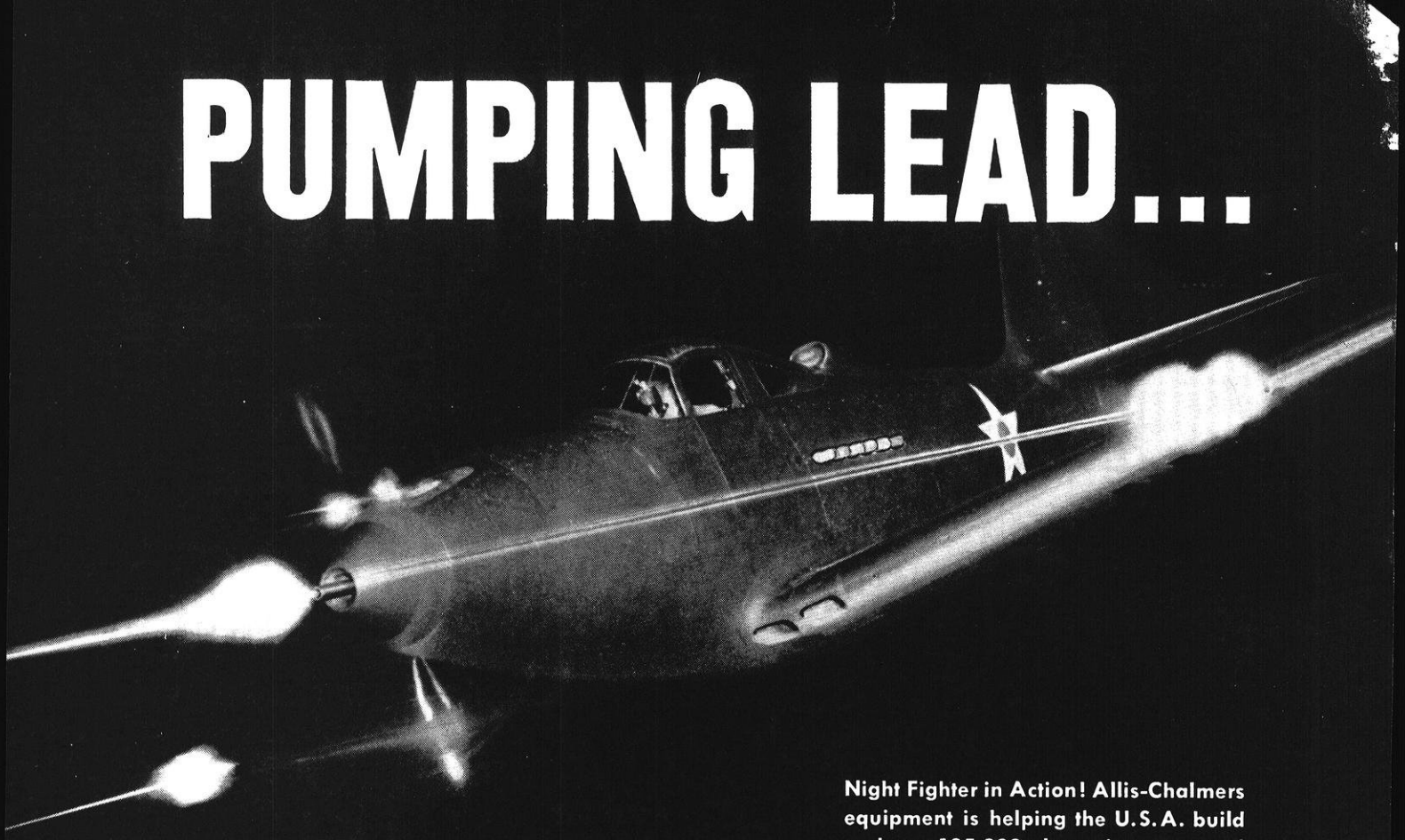
If this coal cost $8.00/ton the heat generated by the physical action would be the equivalent of 1.3 cents.

800 x 3.26/2000=1.305 cents.

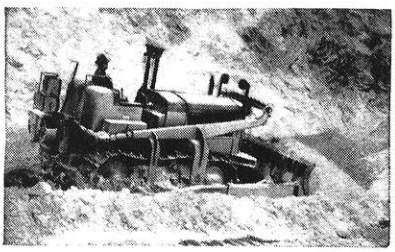
CONCLUSIONS:

From the above data we would make the recommendation that the work resulting from doing 15 push-ups in 30 seconds be converted to some type of electrical work. The cost of an equivalent amount of electrical energy would be 26.6 cents (per 10,000 persons) while the work converted to heat would cost only about 1.3 cents.

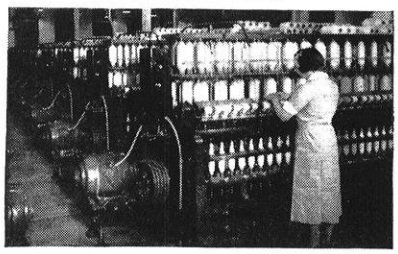
PUMPING LEAD...



Night Fighter in Action! Allis-Chalmers equipment is helping the U.S.A. build and arm 185,000 planes in two years!



A-C Tractors and Bulldozers help build roads and air fields.



Allis-Chalmers equipment helps make cloth for Army and Navy.

Metal for Bullets, Machine Guns, Planes...Water Supp for Cities—flow from Allis-Chalmers Equipment!

BULLET LEAD for Night Fighters is mined and refined with the help of Allis-Chalmers equipment.

So is *steel* for guns—*aluminum* for wings!

And great pumps which deliver tons of precious water to America's cities are also among the *1,600 Allis-Chalmers products.*

The thousands of Allis-Chalmers employees in 8 great plants are proud that their effort aids production in *every* major U.S. industry.

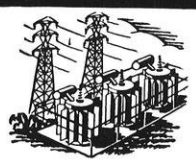
And in 65 cities Allis-Chalmers engineers are on call to help you produce *more*—not just with new machines, but with machines *now on hand!*

ALLIS-CHALMERS MFG. CO., MILWAUKEE, WIS.

New Allis-Chalmers turbines add U.S. Industry's growing power.

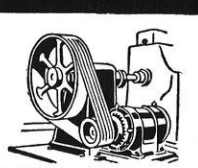
ALLIS-CH

OFFERS EVERY MANUFACTURER EQUIPMENT AND ENGINEERING



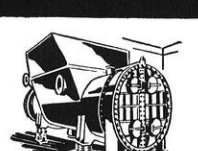
ELECTRICAL EQUIPMENT

STEAM AND HYDRAULIC TURBINES



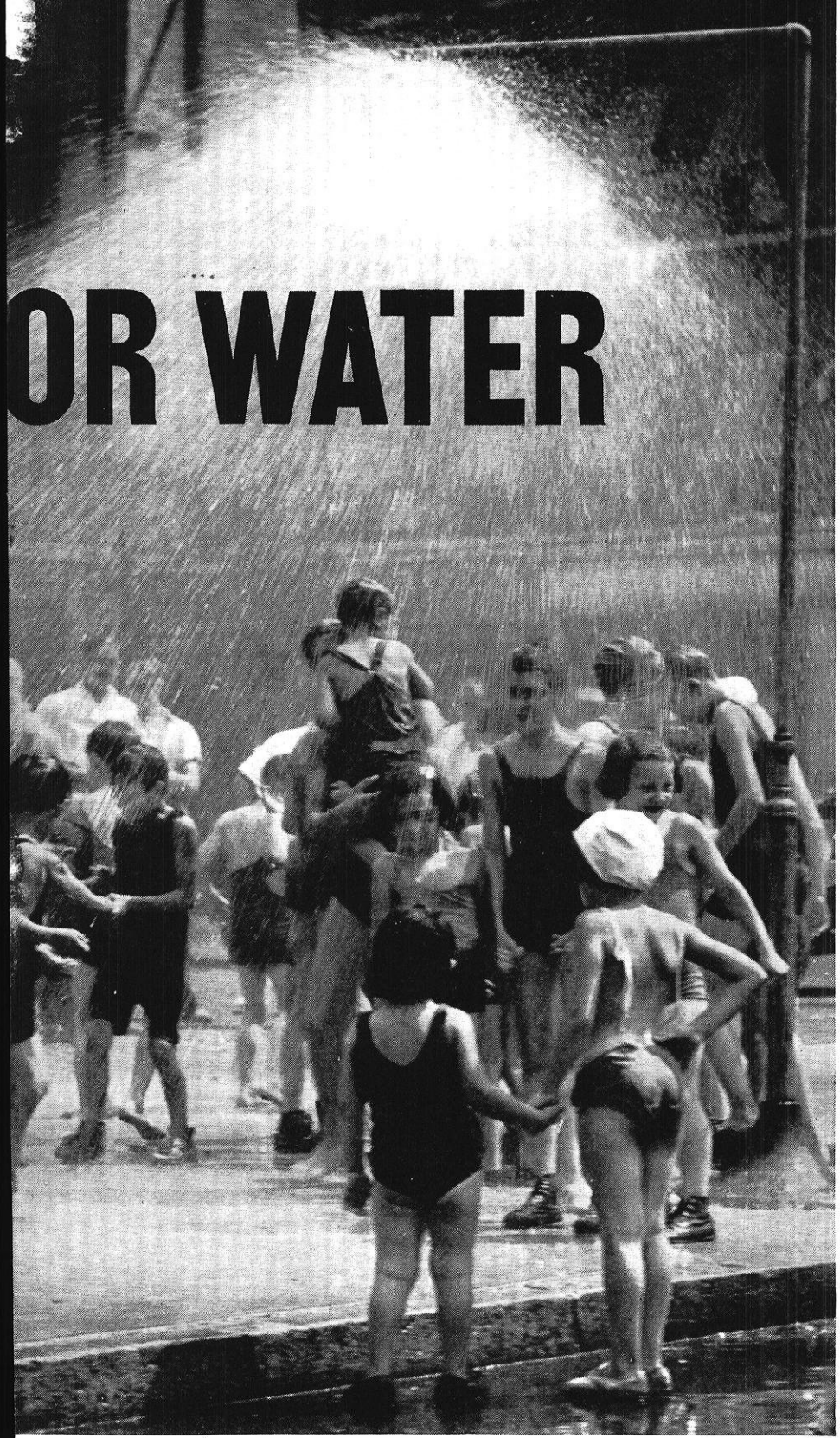
MOTORS & TEXROPE V-BELT DRIVES

BLOWERS AND COMPRESSORS



ENGINES AND CONDENSERS

CENTRIFUGA PUMPS

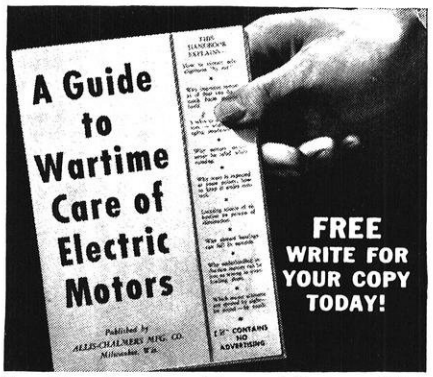


Water for Millions! Allis-Chalmers pumps help keep many of America's cities alive.

VICTORY NEWS

A New Fleet of Tugs is being built for the U. S. Navy. Their principle duty is long towing of disabled vessels in rough seas.

The most powerful of their kind in the world, most of the tugs will be driven by Allis-Chalmers electrical propulsion equipment. Their electrical equipment includes Allis-Chalmers motors, generators and control.



New Handbook on Care of Motors. With motors operating 168 hours a week instead of 40 hours as formerly, most books on motor care are seriously out-of-date.

A new handbook entitled "A Guide to Wartime Care of Electric Motors" has just been published by Allis-Chalmers. It takes a new slant at motor care and is of great value to war plant engineers and maintenance men, and particularly for training new men. *The book contains no advertising, and is available upon request.*

Rush A-C Tractors to World Battlefields. Thousands of gun-pulling Allis-Chalmers track-type tractors will soon see action in Russian and U.S. Forces overseas. These tractors differ from Allis-Chalmers regular commercial models only in additional equipment carried. The army version of this tractor is also speeded up somewhat over the commercial model.

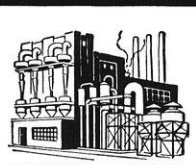
FOR VICTORY
Buy United States War Bonds

ALMERS

WE WORK FOR VICTORY — WE PLAN FOR PEACE

RATION TO HELP INCREASE PRODUCTION IN THESE FIELDS...


LOUR AND SAW
LL EQUIPMENT


CHEMICAL PROCESS EQUIPMENT


CRUSHING, CEMENT & MINING MACHINERY


BOILER FEED WATER SERVICE


POWER FARMING MACHINERY


INDUSTRIAL TRACTORS & ROAD MACHINERY

Slipstick Societies . . .

ON THE CAMPUS

ASCE

March 10, 1943

The meeting was called to order at 7:30 at the Hydraulics Lab. Ed Korpady read the report sent to him by the Student Committee of the national A.S.C.E. Earl Maas reported on the ticket and button sales. A dinner meeting with the Wisconsin Section was announced and all chapter members urged to attend. Roy Erickson was appointed chairman of the Publicity Committee to succeed Dick Andrae, who has been called by the Army Air Corps.

The speaker of the evening was Emeritus Prof. D. W. Mead. He urged the civils to get the greatest benefit out of their college education, mentioning the fact that when he went to college, the facilities were very limited compared to those of today. Prof. Mead stressed the need of building one's reputation and friendships during his college days.

He pointed out that it should be the aim of the student engineer to obtain the broad education required of him, and to develop the ability to find out things that he doesn't know. Above all, he said, good ethics were the most important requirements of an engineer.

March 25, 1943

The student chapter of A.S.C.E. met with the Wisconsin Section at a dinner meeting in the Old Madison Room of the Union. Entertainment was furnished by three student civils, Don Porath, Jack Scholbe, and Elwyn Nelson, who did a bit of smooth harmonizing on several standard tunes and a special song dealing with the many reasons "she wears his A.S.C.E. pin." The boys' singing went over so well that they were called back for an encore.

The main feature of the evening was a sound movie entitled "How Steel is Made" presented by Bethlehem Steel. The present wartime demand for steel made the picture exceedingly timely. The film showed the various processes used in making the different types of steel which have a great variety of uses. The principles of the open hearth process, Bessemer process, electric furnace, blast furnace, etc., were well explained, as well as methods of working the steel ingots into finished products. The most emphasis was placed on the numerous tests that are taken, and their relation to the control of the chemical composition and physical properties of the steel.

Officers of the Wisconsin Section who were present are H. H. Brown, President; Arthur Boley, 1st Vice President; E. L. Roettiger, 2nd Vice President; O. Neil Olson, Secretary. Nine members of the student chapter and twenty-two members of the Wisconsin Section were present at the dinner.

SAE

On Friday, April 2, several members of the local chapter went to Milwaukee for a meeting with the Milwaukee Section of S.A.E. Dinner was served at the Milwaukee Athletic Club. The speaker of the evening was Major Howard R. Hammond, of the Armored Force Board, Fort Knox, Kentucky. His subject was "Tank Power Plants." Major Hammond covered trends of tank development and engineering, and discussed U. S. Army and foreign tank engine developments, of both gasoline and Diesel types. He also took up the matter of tank maintenance. A film "Tanks in Action" was shown.

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AIME

The mining and metallurgical engineers gathered in the library of the Mining Building on March 10 with Mr. R. G. Stagg of Crucible Steel Company as the speaker of the evening. The meeting was preceded as usual by a dinner prepared and served by members of the club. This one was a different but especially delicious meal with the main dish consisting of spaghetti and meat-balls and was prepared under the supervision of George Pazik. George admitted that it was his debut as a chef, but it is generally agreed that it was a rousing success. The dinner can also be termed a

(continued on page 24)

ALUMNI NOTES

by Glenn Jacobson, ch'45
and Charles Tomlinson ch'44

Chemicals

WISNIEWSKI, THEODORE F., '32, an assistant sanitary engineer with the State Board of Health is stationed at Madison. He recently called at the Chemical Engineering Building to discuss the Board of Health's civilian gas defense program.

TESSMAN, HUBERT R., '40, is chief metallurgist for the Northern Engraving and Mfg. Co. at La Crosse, Wis. His work is in the control and development of electroplating procedures.

MUELLER, FLOYD F., '42, who is with the Hercules Powder Co., is now at their Radford Ordnance Plant at Radford, Va.

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Civils

YAGER, RALPH M., '09, is executive engineer for the United Light & Power Service Co., in charge of the Davenport office.

THOMSEN, DARRELL E., '27, is an officer in the USNR, located at Camp Endicott, Davisville, R. I.

MEYTHALER, HAROLD E., '35, is reported to be a first lieutenant in the U. S. Army.

NERODA, EDWARD K., '35, a lieutenant in the Navy, is doing naval construction work at the Naval Air Station at Dallas, Tex. He has just returned from the Caribbean Area where he has been for the past two and one-half years.

TER MAATH, BERNARD H., '36, who is with the U. S. Navy Construction Battalion, is stationed at Camp Peary, Williamsburg, Va.

VOELKER, ENSIGN RAY F., '37, is training for the Sea Bees at Camp Endicott. He writes: "We have enjoyed innumerable new movies, Jack Benny and his show, USO shows, the WAVES, bowling, pool, and dances. All at no cost to officers and enlisted men."

ALEXANDER, FRED C., '38, former business manager of the Wisconsin Engineer and since graduation in the publicity department of Allis-Chalmers Co., began training as an aviation cadet in the U. S. Army on March 19.

NEIGHBORS, JOHN O., '38, chief engineer officer of the University ROTC, was recently promoted from the rank of captain to that of major.

KUTCHERA, RALPH J., '39, is back with the Consolidated Water Power & Paper Co. at Wisconsin Rapids, and is to have charge of design and construction during the absence of **TOM UTEGAARD,** '17, who is in military service.

WERREN, FRED, '41, is a lieutenant (jg) in the USNR.

BERZOWSKI, ENSIGN ROMAN C., '42, is at present assigned to inspection of naval material at the plant of National Fireworks, Inc., at Cordova, Tenn.

REE, ENSIGN MELVIN C., '42, was married on January 30 to Wilma Winifred Parker at Boston, Mass.

WIGGINS, DONALD C., '42, is a midshipman, USNR, in training at Notre Dame University.

HANSON, WILLIAM, '42, was reported as "missing in action," following the German thrust in Tunisia.

Mechanicals

ERBACH, FRED, '22, formerly in refrigeration industry, is at present a dollar a year man with the WPB. He is really an employee of the Yates-American Machine Co. of Beloit.

HUNZIKER, C. E., '22, is with the American Blower Co. at Schenectady.

JENS, WAYNE, '43, is an engineering trainee for North American Aviation Corp. at Inglewood, Calif.

GEISLER, HENRY, '43, is also with North American. Geisler formerly was circulation manager for the Wisconsin Engineer.

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Electricals

R. E. BEITZ, TED TREIT, and **R. A. IMM,** all '42 grads, who have been with General Electric, are now in the testing department.

FISCHER, PAUL M., '42, is testing electronic devices in gun turrets for General Electric.

CUSTIN, T. G., '42, is doing secret work in the Transmitter Division of General Electric at Schenectady.

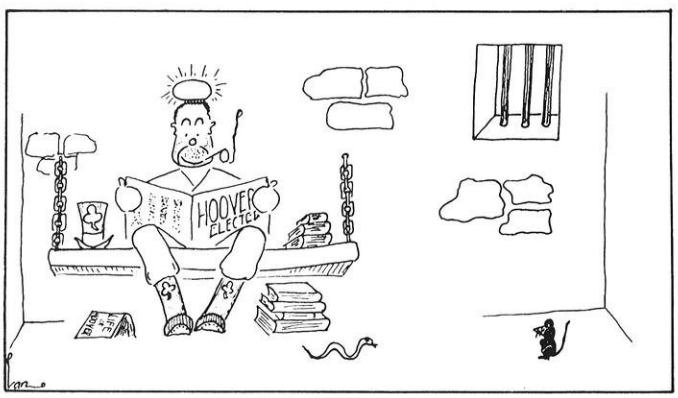
Hey, You Alumni!

Why not lend us a hand and let us know where you are, and what you're doing. We're really interested, and it's good medicine for us who are still struggling, to learn of the successes of our predecessors.

THE MAD ENGINEER

by Maru Woerple, ch'44

ONE evening as I wearily pulled my canoe on the beach of Lake Mendota, I decided that never again would I let the authorities persuade me to stay way over here across the lake, even if the room was free. This canoe trip night and morning was getting pretty tiresome, and much harder now that there was a film of ice on the lake. I just finished tying down the canoe, when I noticed a man coming toward me. This was unusual for the matron seldom allowed one of the inma—, I mean one of the roomers, out on the grounds alone. The only reason



The "Rooming House"

she permitted me to row over to the university every day was that she figured as long as I stuck to engineering my condition would get no better. The man approached me and asked, "You're an engineer, aren't you?" This was a marvelous deduction, for I had no means of identification other than my slide rule, a handbook of Chemistry and Physics, and my weary expression.

"Why, yes, I am. How did you know?"

"Very simple, my boy, I merely asked you at breakfast this morning. Remember? Anyway, I believe that you are the one to which I was destined to impart my great secret. I have been thinking all day about that remark you made yesterday. You said as you pushed your boat out into the water, 'Floget, warb and gong fleer.' Now it was an insignificant remark, yet it shows that you have that spark of learning that will keep my secret alive until people are prepared to believe my tale."

We pulled our nice easy wheel chairs up to the radiator, took out the checker board, and played a rousing game of rap poker till far into the night. As we played we talked, and as we talked we played, etc. This is his story.

"To start in the beginning which I always believe is the only place to start a really good story, my name is Worn Fastlob. In 1943 I was chief mechanic's assistant in the giant mushroom plant in Entrainio. We were doing overtime on war work, for as you may remember, the president passed a law that not one man in our armed forces or in the forces of our allies should go without mushrooms at least three times daily. Because of this our engineers were rushed to the breaking point, which isn't so very far in the case of most of the engineers that I know. Anyway, the lobalies which were so publicized in that year were brought in to assist them, but by some quirk they were subversive, and hindered all production particularly in the engineering office. I was assigned to the research that was necessarily carried on at that time. Although I had originally been a lawyer, I was too honest and had to give it up as a bad job. Having attended law school I had learned nothing so I was thoroughly pre-

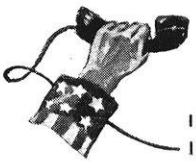
His Law Degree Was a Big Help

pared for the giant undertaking. The field to which these little men were most peculiarly adapted was the slide rule. They could change their viscosity at almost a second's notice, and often did. I remember one time when one of the junior members was to take an exam. He had adjusted his slide for freedom of sliding as well as accuracy. No sooner had he gotten out of reach of a screwdriver than the lobalies changed viscosity, and he could hardly move his slide. We found that a lobalie in the prime of life could change his viscosity from 0.02 centipoise to 2.7×10^7 in one second at 20 degrees centigrade. The rapidity of this change depended on the age of the lobalie. We set up an equation which enabled us to determine the

(continued on page 28)

Every branch of the Armed Services uses the telephone. No. 2 of a series, Submarine.

Five thousand miles from home Bill—Torpedoman—is keeping a date. Weeks of waiting, days of watching, hours of hiding under the sea, all for the moment when he reports over his wartime telephone, "All tubes ready, sir!" There'll be other dates, Bill—better ones—in the kind of world you're fighting for.



Western Electric

IN PEACE...SOURCE OF SUPPLY FOR THE BELL SYSTEM.
IN WAR...ARSENAL OF COMMUNICATIONS EQUIPMENT.

ON THE CAMPUS . . .

(continued from page 20)

success by the fact that several of the metallurgists mastered the art of twirling the stringy stuff about a fork, although it took at least three helpings to accomplish the feat.

The club departed from its customary stag affair by having three girls as their special guests. They were Miss Dionysia Mackrie, Miss Eleanore Kostka, and Miss Mary Stagg. The former two are secretaries at the Mining Building and the latter is the daughter of Mr. Stagg.

Mr. Stagg, a metallurgist who is well-known in the steel industry, was introduced by Professor Oesterle. His talk concerned the subjects of heat treating and design of tools and was illustrated by slides. "The failure of tools," Mr. Stagg stated, "is many times wrongly blamed upon the quality of steel, when in reality, it is caused by poor design which results in a concentration of stresses. Some of the features that cause stress concentration are sharp angles; abrupt changes in cross-section; the presence of keyways, holes, and fins; and irregular rough surfaces." In his discussion of heat treating, Mr. Stagg explained the effects of quenching temperature and time upon the transformation of austenite in various carbon and alloy steels. Much research is being carried on in the

study of transformation in the process of cooling from 400 degrees to room temperature.

The meeting was adjourned following the election of an "Official Dishwasher." For this honored position, Lyon Brinsmade was unanimously elected — or perhaps the word should be "railroaded."

A I E E

The student chapter of A.I.E.E. met in the Reception Room of the Memorial Union Wednesday, March 25. Mr. A. D. Robertson, a 1938 electrical engineering graduate of North Carolina, was the speaker of the evening. Mr. Robertson is one of the officials of the Marine Engineering department at Allis-Chamers. He gave a very enjoyabe and informative talk, telling of the electrical control equipment and the engines and motors used on Navy craft, and emphasized that a great many special motors were needed. These included motors that would run when subjected to spray, or even when completely submerged, motors that would not ignite inflammable gasses, and many other types of auxiliary power equipment. Mr. Robertson also showed slides on some of his experiences with the Navy.

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A.S.M.E.—S.A.E.

At a joint meeting of A.S.M.E. and S.A.E. held Wednesday, March 24, in the Twelfth Night room of the Union, it was suggested that a new mechanical engineering society be formed on the campus.

At present, there are two societies, the Society of Automotive Engineers and the American Society of Mechanical Engineers, to which mechanical engineers may belong. The new society would not supplant the older two but would be in addition to them. The main purpose of the new society would be to coordinate better the activities affecting mechanical engineers as a whole.

A board of six men was elected to draw up by-laws for the new organization. The personnel of the board is composed of three men from S.A.E. and three from A.S.M.E. The basis for selecting these men was the following: two of the men elected are the present presidents of the two societies, Al Miller of the S.A.E. and John Wilson of A.S.M.E.; two of the men are either sophomores or juniors, Bob Jirucha from S.A.E. and a man to be elected in the future from A.S.M.E.; and two senior men, Seymour Dolnick from S.A.E. and Stan Puidokas from A.S.M.E.

Another joint meeting of the two societies was set for April 21, at which the by-laws of the new organization will be presented and criticized.

After the business meeting, a film entitled "The Story of Neoprene," produced by Du Pont, was shown. After the movie, the members enjoyed refreshments and singing.

•

A I Ch E

A meeting of the American Institute of Chemical Engineers was held in the Top Flight room of the Union, March 10.

Mearl Diedrich was appointed chairman of the committee in charge of plans for the Chem. Engineers' party held March 27. All entertainment, refreshments and admission were free to members.

Following the business meeting, members were very pleasantly entertained by Romie the Great, and his friend, Bert Salisbury, State Officer, who displayed many feats of magic. These two gentlemen explained that the art of legerdemain was merely their hobby, but members thought they looked like professionals.

(continued on page 32)

Something for you to do, afterward?

A MESSAGE TO MEN ON COLLEGE CAMPUSES

At no time in all the years we have been the confidant of young men approaching a career have we been so sure of the opportunity implicit in your future.

Today, your campus may not be of your own choosing. Your courses, your schedules almost all are pointed toward immediate necessity. Your career is set.

Have you a true conception of how much your special training means to your country? To Victory?

We think you do. But, honestly, don't you catch yourself wondering whether there is really going to be something for you to do, afterward? Are you sometimes in doubt of what's to come after NOW?

We say to you: There is a world to be made anew.

That world is going to offer you creative opportunity surpassing anything we old-timers have ever seen. You are going to have tools and materials and knowledge to work with such as no generation ever had.

We think you are going to find not only a country, but a whole world, waiting for your talents.

And we know that in this country you are going to find a point-of-view throughout industry which is a new thing under the sun. Already countless leaders in industry are laying plans which are based on flat acceptance of the principle that their first responsibility, after all-out production for war, is to make postwar jobs.

We at Alcoa are one group of such men. We are Imagineering now, for you. We intend to do everything we know how to make aluminum make jobs, whether they may be with us, or in a thousand other industries which will be using Alcoa Aluminum when it is again available.

Wherever you are in service, you will surely be in, or around, or supported by, American airplanes. Will you remember two things: They are made largely of Alcoa Aluminum. *And*, the folks who make that metal are even now Imagineering for your future.

A PARENTHETICAL ASIDE: FROM THE AUTOBIOGRAPHY OF

ALCOA ALUMINUM

• This message is printed by Aluminum Company of America to help people to understand *what we do* and *what sort of men* make aluminum grow in usefulness.

STATIC . . .

Humor by Dick Roth, m'43
Cartoons by Bob Daane, m'43

Definition of lawyer: A man who induces two other men to strip for a fight, then runs off with their clothes.

o o o

These were voted "tops" as the three sweetest words in the English language:

1. I love you
2. Dinner is served
3. All is forgiven
4. Sleep 'til noon
5. Keep the change
6. Here's that five.

And the saddest were:

1. External use only
2. Buy me one
3. Out of gas
4. Dues not paid
5. Rest in peace.

o o o

At a recent dinner, a man sitting next to a lady was, to say the least, inebriated. He leered at her and commented, "Shay, you're the homeliest woman I've ever seen!"

With a show of spirit, she replied, "Well, you're the drunkenest man I've ever seen!"

"I know, madam," the souse answered, "but I'll get over that by morning."

o o o

"This one is on the house," said the sea gull as it turned back towards shore.

o o o

Girls when they went out to swim,
Once dressed like Mother Hubbard.
Now they have a bolder whim,
And dress more like her cupboard!

o o o

Dedicated to M.E.'s taking E.E. Lab:

Hand, pliers,
Thousand volt wires.
Blue flashes,
Hand ashes!!

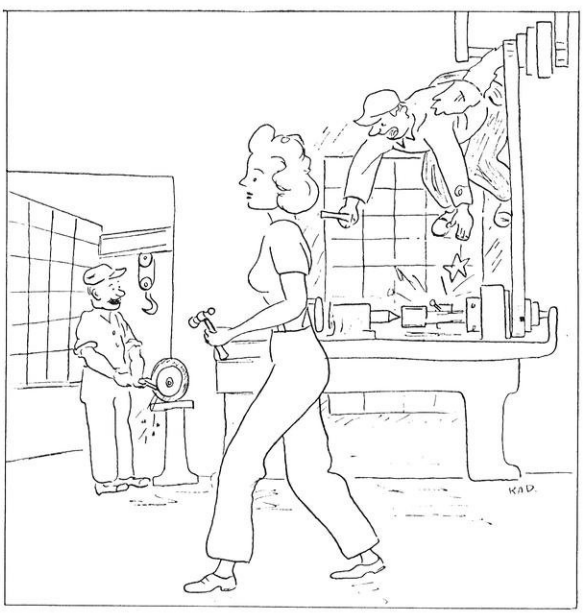
"Hell," said the devil as he picked up the phone.

o o o

The only game which isn't called on account of darkness, is love.

o o o

About 11:00 p.m. one recent Friday night, a certain M.E. was slipping stealthily through the basement of the Steam and Gas lab. After barking his shins on two or three condensers and various turbines and Corliss engines, he reached the time clock, stamped his report and sighed, "Now I can go and drink beer with an easy conscience."



Those women in the shop will ruin Jake yet.

THE ALL-AMERICAN ENGINEER

He won a Tau Bete at Pennsylvania,
He's a Chi Ep from Notre Dame,
He did some research at Smith and Vassar,
And Princeton still sings his fame.
He burst an atom at Alabama,
He won a Nobel Science prize they say.
He's got two degrees, from every college,
Now he's a soldier in the U. S. A.

(continued on page 28)

HARD-HITTING FROSH

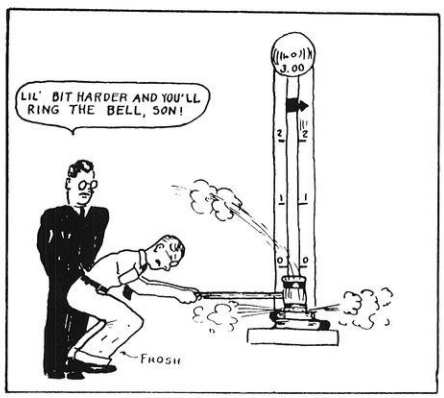
First Semester, 1942-43

HIGH HONOR RATE

Blumenfeld, John F.	3.00
Harris, Elwin A.	3.00
Johnson, Douglas L.	3.00
Stewart, Warren E.	3.00
Daub, Edward E.	2.82
Kluberton, Thomas R.	2.82
Brusberg, Jack L.	2.80
Dergaraberian, Paul	2.80
Timmel, Frederick	2.80
Rose, Paul J.	2.75

HONOR RATE

Wendt, Frank J.	2.71
Sell, Robert F.	2.71
Garber, Richard L.	2.65
Pipal, Calvin W.	2.65
Gehl, Eugene O.	2.60
Goldsand, Kurt E.	2.60
Peterson, Dean R.	2.60
Schmitt, Art J.	2.60
Brzezinski, Jerome P.	2.59
Donalds, John E.	2.59
Halla, Clarence A.	2.59
Strohm, Jack A.	2.59
Johnson, James Alen	2.53
Swartz, Bob L.	2.53
Vick, Alvin J.	2.50
Chandler, Kensal R.	2.47
Dunwiddie, Foster W.	2.47
Jacobson, Glenn H.	2.47
Leistikow, Elver R.	2.47
Widstrom, Robert B.	2.47
Hlinak, James C.	2.41
Olsen, John W.	2.41
Peck, Edward C.	2.41
Rowland, Robert L.	2.41
Zamzow, William H.	2.41
Martin, Wm. C.	2.41
Helfrecht, Kenneth G.	2.40
Hellinger, Robert L.	2.40
Timmerman, Robert	2.36
Garber, Frederick G.	2.35
Kermish, Raphael D.	2.35
Knetzger, Robert L.	2.35
Plombon, Julian	2.35
Sharp, James F.	2.35
Stare, Samuel B.	2.35
Belter, Walter G.	2.33
Cohen, Hirsh G.	2.29
Dittman, Jack C.	2.29
Lathrop, Richard C.	2.29
Zabel, Robert H.	2.29
DeHaven, William K.	2.27
Tobison, Norman	2.27



MAD ENGINEER . . .

(continued from page 22)

age of the lobalie by this method. The age was the most important of all the variables for we found that the destruction was directly proportional to it. At first we thought that the simple equation, Age $= \frac{dv}{dt} \times R$, would satisfy, where R is a variable constant depending on the day of the week. We had a value for every day except Sunday, for regardless of their other faults no lobalie would dare work on the Sabbath. It was not long before we found that the lobalie year was not the same length as ours, so we could not keep track of the age by our present time system. Therefore it was necessary that we introduce a dA which was the change in age of the lobalie. This required taking a successive integral which resulted in a formula of this type:

$$H\,dA = dv \times R\,(C—D)\,dt$$

where H is the height of the lobalie, C the color, and D the density. This was the hardest to determine. Weight was easy for we could note the trouble on a particular slide rule, and knowing the number of lobalies necessary to bring about this havoc, we merely divided the change in weight of the slipstick by the number present.

"We finally devised a very easy method of determining the density. We used a sclerescope in conjunction with a hydrogen calomel electrode. By taking the resulting readings and dividing by your smallest son's age the density was determined to an accuracy of plus or minus 0.003%. The only drawback was I was the only married man in the plant.

"The color was found with the use of a spectrophotometer. The absorption spectra was plotted vs. the number of teeth in a Plymouth Rock chicken. The optimum value was used, thus doing away with any variations in shade on the **piebald** type.

"I spent the best years of my life on this study yet when it was published in Gags magazine, no one would believe me. Conditions in our plant got so bad that all calculations had to be run out long hand, yet they would not let me apply my newly acquired genius. I finally got so well acquainted with these little men that I could see them. As far as I know, I am the only one ever to see them. That is why when I heard you use that oath yesterday morning, I recognized it as Lobalie talk, and realized that you are the one destined to bring the world to its senses. As far as I know there are only three of us ever to live that have or had the ability to understand these people. Chaucer was the other. If you take the first and last letter of every sixth word in every fifth paragraph in his "Canterbury Tales" you will learn all that Chaucer knew, and as I have told you all that I know, we two are the best informed in the world."

Just then we were interrupted by an attendant who took off our jackets, rubbed our arms to restore the circulation, then put the jackets back on us. He then led Worn to his room. The next morning I learned that poor old Worn had tripped over a gum wrapper and broken his neck, leaving me the only living expert on slide rule lobalies.

STATIC . . .

(continued from page 26)

Getting out this magazine is no picnic. If we print jokes, people say we are silly. If we don't they say we are too serious. If we publish original stuff, they say we lack variety. If we clip from other papers, they say we are too lazy to write. If we stay in the office, they say we should be out hunting news. If we go out hunting news, we are not tending to business in the office. If we wear old clothes, we're stingy. If we wear new ones, they're not paid for. Like as not someone will say we swiped this article from another magazine. We did.

o o o

Two college men were eating in a restaurant. At the end of the meal, one of them requested a loan.

"Can you lend me a five-spot for a week," he asked.

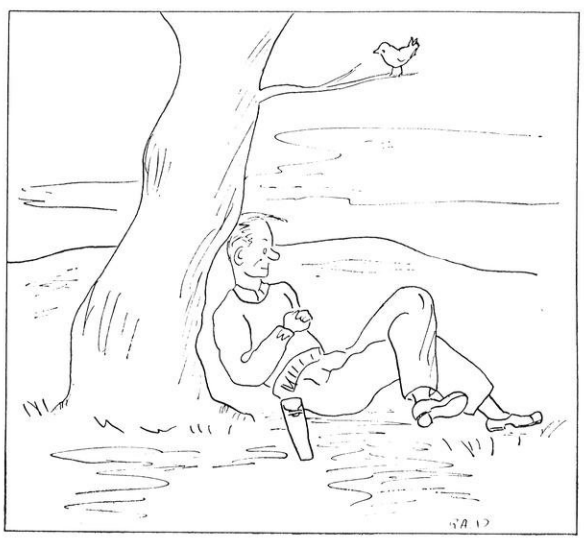
"Sure," replied the other, counting out the cash.

As they rose, the second man spoke again.

"Remember," he reminded, "that is only for a week."

The borrower turned a vivid red.

"You'll get your money!" he screamed. "Stop hounding me!"



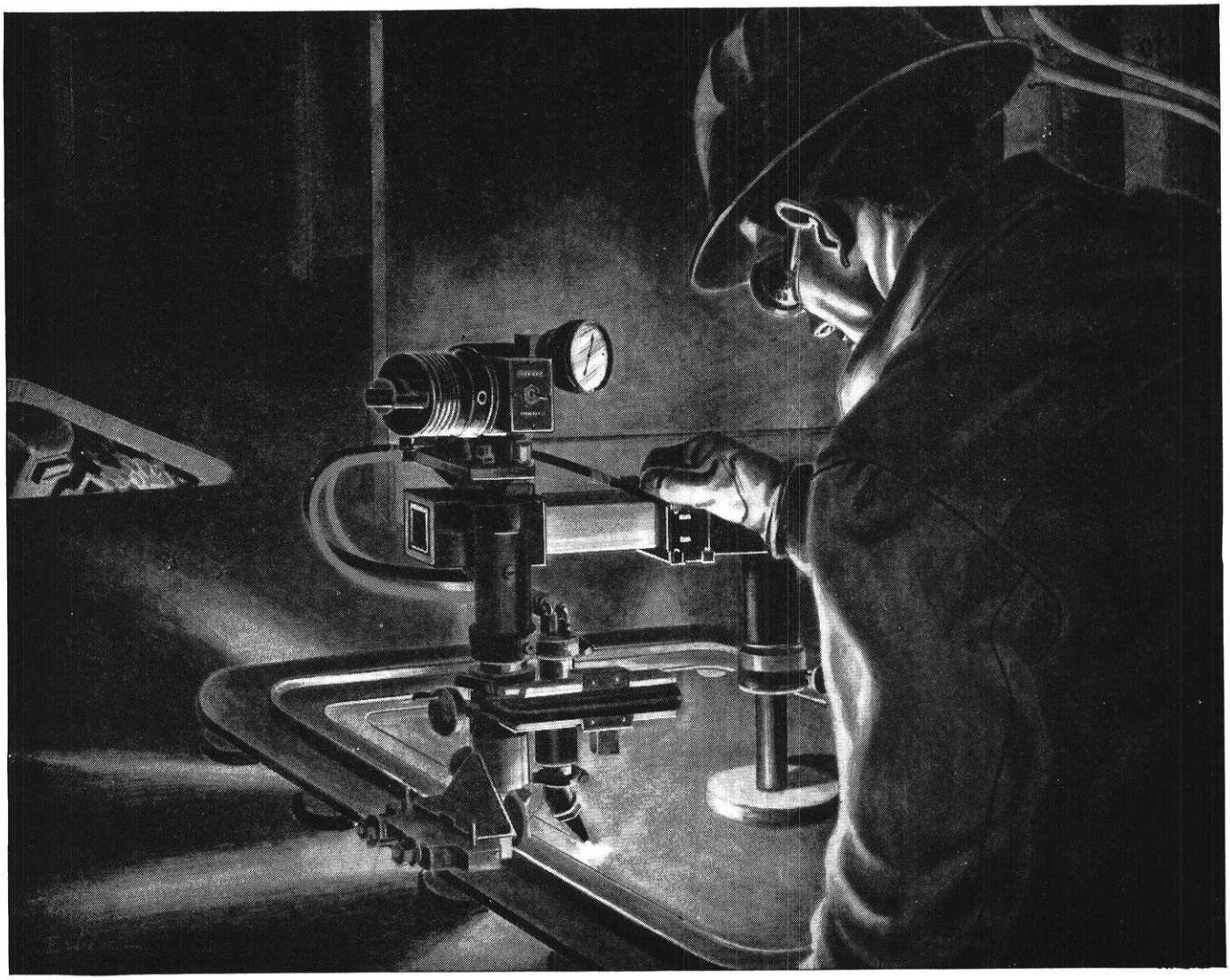
Gosh, I wonder if Pat took roll today.

Little Johnnie had torn his trousers twice in the course of one morning, and when he came in with his pants torn again his mother said: "You go right upstairs, remove your pants, and mend them yourself."

Some time later, she thought of him and went upstairs to see how he was getting on. The torn pants were lying on a chair, but there was no sign of Johnnie. Returning downstairs, she heard a noise in the cellar and decided that he was down there playing. "Are you down there running around without your trousers on?" she called loudly.

"No, madam, I'm just reading the gas meter," a deep voice answered.

(continued on page 30)



SLICING DAYS OFF SHIPBUILDING SCHEDULES . . .

UNTIL recently, cutting hatchway openings out of heavy deck plating was a bottleneck in the construction of certain types of ships. It was a slow, costly job requiring many laborious machining operations.

Could the oxyacetylene flame eliminate this bottleneck? This was the problem presented to Airco's research engineers by one of its customers. The problem was solved by an entirely new gas cutting machine, designed and constructed specifically to handle this job.

With this machine it is possible to cut beveled openings, rounded at the corners, out of thick steel plate—all in a single continuous operation! The finished cut is smooth and clean, and more important, the openings are cut in 1/120th the time required by the former method. Today this machine—the Airco Polygraph—has become standard equipment in shipyards and many other war production plants throughout the country.

This development is typical of the achievements resulting from the teamwork of Airco engineers and its customers—each contributing their specialized knowledge towards one common objective.

If you want to keep posted on some of the most recent developments and applications of oxyacetylene flame and electric arc processes, write for a free copy of the illustrated booklet, "Airco in the News." Please address your requests to Air Reduction, Room 1656, 60 East 42nd Street, New York.

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ANYTHING AND EVERYTHING FOR GAS WELDING OR CUTTING AND ARC WELDING

STATIC . . .

(continued from page 28)

POME

I often sit and medit8
Upon the scurvy trick of f8
That keeps me still a celib8
Oh, cruel f8
I want a 10der maid sed8
To love me and be my m8
My 40 2de is not so gr8
I cannot w8
Oh, f8, be9, be4, 2l8
Relieve my awful single st8
And when I've l this maid sed8
We'll oscul8

o o o

I am not under the alsofluence of inkohol, even tho some thinkle peep I am. I'm not so thunk as you drink, but I fool so feelish. I don't know who is me. The dunker I stand here, the longer I get.

"I am your new thermodynamics instructor; Professor Wilson has been drafted."

A Britisher, while touring the United States, remarked to a man in the West: "You have an extr'ord'nary country here, you know; very extr'ord'nary—stunning women, rippen' big cities, and a bally lot of other things, but you have no aristocracy."

"No what?" asked the westerner.

"No aristocracy," replied the Britisher.

"Aristocracy? And what's that?"

"Oh, people who never did anything—and whose parents and grandparents never did anything—whose families have always been people of leisure."

"Oh, yes; we have 'em here, but we call 'em tramps!"

o o o

Woman, visiting kennels: "Is that a real bloodhound over there?"

Kennel Master: "Yes, lady. Rover, come over here and bleed for the lady."

Once upon a time the fence broke down between Heaven and Hell. St. Peter appeared at the broken section of the fence and called out to the devil: "Hey, Satin," he said, "since all the engineers are over in your place, how about getting them to fix this broken fence?"

"Sorry," replied Satin, "my men are all too busy to go about fixing measly fences."

"Well, then," replied St. Peter, "I'll have to sue you if you don't."

"Oh, yeah," chortled the devil, "where you going to find any lawyers?"

o o o

A Scotsman and an Irishman were on board a ship for Scotland.

Scotchman (catching sight of his fatherland): "Hurrah for Scotland."

Irishman (riled): "Hurrah, hell."

Scotsman: "That's right. Every man for his own country."

o o o

A citizen who prided himself on being something of a good Samaritan was passing an apartment house in the small hours of the morning when he noticed a man leaning limply against the doorway.

"What's the matter," he asked, "Drunk?"

"Yup."

"Do you live in this house?"

"Yup."

"Do you want me to help you upstairs?'

"Yup."

With much difficulty he half dragged, half carried the drooping figure up the stairway to the second floor.

"What floor do you live on?" he asked. "Is this it?"

"Yup."

Rather than face an irate wife who might, perhaps, take him for a companion more at fault than her spouse, he opened the first door he came to and pushed the limp figure in.

The good Samaritan groped his way downstairs again. As he was passing through the vestibule he was able to make out the dim outlines of another man, apparently in a worse condition than the first one.

"What's the matter?" he asked. "Are you drunk, too?"

"Yep," was the feeble reply.

"Do you live in this house, too?"

"Yep."

The good Samaritan pushed, pulled, and carried him to the second floor, where this second man also said he lived. He opened the same door and pushed him in.

As he reached the front door he discerned the shadow of a third man, evidently worse off than either of the other two. He was about to approach him when the object of his solicitude lurched out into the street and threw himself into the arms of a passing policeman.

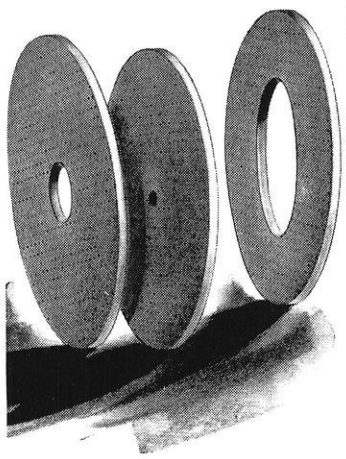
"Off'shur! Off'shur! Fer Heav'n sake, Off'shur," he gasped, "protec' me from that man. He's done nothin' all night long but carry me upstairs and throw me down th' elevator shaf'."

(continued on page 33)

This Merry-go-round has gone to war!

1. It takes a lot of parts to make a Jeep. And this "merry-go-round" has the job of grinding some of those parts (those with flat surfaces)...in a hurry! By rotating a large number of pieces beneath a Carborundum made disc wheel, it surface grinds them in a fraction of the time required by older methods. This process is one which Carborundum helped develop.

2. Surface ground parts for jeeps, tanks and other weapons just couldn't be finished one at a time; production would be hopelessly low. The introduction of disc wheels and the "merry-go-round" surface grinder put surface grinding on a real mass production basis. The method can be used to generate flat surfaces to precision tolerances, on smallest pieces or on massive forgings and castings. It speeds production of many vital war items from valve springs to connecting rods, from piston rings to clutch plates!



3. You'll come to know Carborundum-made products well when you take your place in industry. Whenever you encounter a problem abrasives might solve, please feel free to call on us. The Carborundum Company, Niagara Falls, New York.

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

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

ON THE CAMPUS . . .

(continued from page 24)

Tau Beta Pi

Tau Beta Pi initiated the following undergraduates on April 13.

Harold Gauper	EE4
Robert Verhaeghe	ME4
Gordon Haddock	ChE4
Kenneth Smith	ChE4
Harold Brenner	ME4
John Sell	EE4
Norwal Rather	ME4
Karl Wegener	ME4
Russial Christesen	CE4
Albert Omar	ChE3
Francois Palmatier	EE3
Gerhard Beyer	ChE3
Walter Wollering	M&M.E3
Louis Mikunda	ME3

•

Pi Tau Sigma

Pi Tau Sigma, the honorary society that is more than just an honorary society, held its initiation of the present semester on Tuesday, March 30, at the Wisconsin Union. The men inducted into the organization at this time were Norval Rather, Ed Rawson, James Duddleston, Stanley Wilk, Don Orloff, Richard Mason, Joseph Spradling, Willard Notbohm, Ray Holton, Phil Charley, and Walter Hirchert.

The Wisconsin Chapter of Pi Tau Sigma was formed in 1915 just a few short months after Pi Tau Sigma had its beginnings at Illinois. During the past years the chapter has been of great assistance to the Mechanical Engineering Department by sustaining high scholastic ideals and by cooperating with the faculty in all departmental student activities. Evidence of such cooperation is the drawing contest sponsored by Pi Tau each year for the freshman engineers.

While the prime purpose of Pi Tau Sigma is to recognize the scholastic achievement of Mechanical Engineers, the organization also provides some measure of social entertainment for its members. Earlier in the semester a party was held for members and their dates at the Union. On Friday, April 9, several of the honorary engineering societies, including Pi Tau, sponsored their annual dance at the Loraine Hotel. At present members are looking forward to the stag picnic to be held in the near future.

•

BUTTONS - TICKETS - GOAT

Sales on buttons and tickets decided which of the four candidates was to reign as St. Pat at the dance. The campaign early developed into a race between the hard-driving civils and the well-organized electricals, with the latter group finally winning. About 4,700 buttons were sold. Members of the armed forces bought a substantial number of them, in spite of the fact that it is against regulations to wear such tokens on a uniform.

The electricals can probably attribute more than a small share of their success to the "goat incident." In case you didn't happen to be on State Street the first night of the campaign, the electricals had a pet goat on a leash. When they visited each of the State Street ale houses in turn, the customers would ask about the goat, and the EEs would sell a bunch of buttons right on the spot. "Blarney" proved to be fond of eating napkins and tipping glasses over and lapping up the spillin's. But after a time the boys got to feeling pretty good, and suddenly the goat got away from them. For a couple of hours, everybody on State Street was chasing Blarney. But the electricals finally got their four-footed mascot back again.

The Polygon Board plans on distributing the major share of the profits to the various engineering societies. As the dance was quite a success, the several societies will each benefit by the biggest all-engineering event of this spring.

•

FACULTY INSPECTS CHEMICAL ENGINEERING PROJECTS

An active program of research in chemical engineering was presented to the faculty of the College of Engineering by Prof. O. A. Hougen and various members of the staff in chemical engineering at the regular Research Conference on March 29. The Wisconsin Alumni Research Foundation, Professor Hougen explained, has made a direct grant to the department to support research in industrial processes, and the old building by the lake is crowded with projects. The research program has overflowed the barriers between the colleges on the campus and has brought together research in agricultural bacteriology and in mechanical engineering in connection with the chemical engineering program.

Speakers at the meeting included: A. E. Pufahl, R. B. Beckmann, Don Hanson, B. Gamson, T. C. Fong, C. S. Brown, and W. A. Bain.

•

FROSH DRAWING CONTEST

At the time of printing, several hundred freshman engineers were sweating (yes, cussing too!) over their entries for the annual Pi Tau Sigma Drawing Contest. They have been working late nights in the drawing rooms of the Education-Engineering Building as the drawings were due March 31. The entries will be judged by the entire drawing department. The first prize will be a slide rule, the second will be a handbook appropriate to the student's field, and the third prize will be a general engineering handbook.

STATIC . . .

(continued from page 30)

Two young ladies were walking down Fifth Avenue. Suddenly one cut loose with a piercing shriek. "Look," she cried in amazement.

"What is so terrible?" asked her friend. "They are only midgets."

"Thank goodness," said the other girl, greatly relieved. "I thought for a minute they were rationing men."

o o o

Prof: "Are you teaching this class?"

Stude: "No, sir."

Prof: "Well, then sit down and stop acting like an idiot."

o o o

A colored man doing a hauling job was informed that he could not get his money until he had submitted a statement. After much head scratching, he turned in the following:

"Three comes and three goes at four bits a went. $3.00."

o o o

ODE TO MY SLIDE RULE

Women are babbling all the time,
Of dates, and drinks, and dresses,
Which wouldn't help at all when I'm
Computing strains and stresses.
My slip-stick conquers without a doubt,
Whole hosts of sines and surds,
And helps me work in peace without
An avalanche of words.
Slide rules are always accurate,
Women never so;
And though they're not affectionate
They never answer, "No!"
So hence with women's wanton ways,
With eyebrows, lips and curls.
My little log-log polyphase
Is worth a dozen girls.

o o o

An old Southern colonel was making a trip through Turkey and one day he hired a guide to take him on a personally conducted tour of the Sultan's harem. While wandering through the halls he suddenly recognized a burly black negro attendant as a former hand on his Southern plantation.

"Well, Sam," exclaimed the surprised colonel, "what on earth are you doing away over here?"

"Well, suh, boss," replied the grinning negro, "Ah'll tell you. Ah has de best job in de wol'. Every day ah sits heah in front o' dish yeah doorway. Ah has a bowl o' watah in mah hand an' when dat long line o' beautiful gals wat belongs to de Sultan passes by, ah dips mah fingahs in de watah and trows it on 'em. When ah comes across one wat sizzles—ah is done fo' de day!"

MINING AND METALLURGY . . .

(continued from page 6)

plete crushing, grinding, and pulverizing operations. Complete screen testing equipment is available for experimental work involving the size of the crushed ore.

Opposite the mineral dressing labs is the Ceramics laboratory. It is well equipped for the manufacture of all types of clay products including brick, tile, and ceramics, and the preparation and application of glazes.

Moving to the West end of the ground floor, we find the Physical Metallurgy lab and the X-Ray room. The first mentioned lab contains several large and small electric furnaces that are equipped with positive temperature control apparatus. Suitable quenching facilities are available for the heat treating of steel specimens. Rockwell and Brinnel hardness testers are provided for the study of heat treating effect on physical properties. The X-Ray lab is equipped with a back-deflection camera. The patterns obtained are used for the measurement of lattice parameters of metals and alloys.

The East wing of the second floor is occupied by the chemical lab. It is provided with all of the standard equipment essential for chemical analysis and control work for assaying and metallurgical processes, including a very fine array of analytical balances.

Adjoining it is the electrolytic lab where experimental work in the electrolytic production of non-ferrous metals is carried out. It contains apparatus for the complete hydrometallurgical operations such as roasting, leaching, purification, and electrolytic recovery of metals.

The metallographic lab is used for the study and analysis of metal structures and the effects of heat treating and mechanical work on physical and structural properties. It is equipped with micrometallographs, microscopes, photographic apparatus, dark room, and complete polishing equipment.

The Foundry Laboratories are located in the Mechanical Engineering Building, and it is here that the principles and practice governing the production of metal castings including sand control, cupola operation, core making, etc., are studied. The melting equipment includes cupreous, electric arc, and gas-fired furnaces. Core ovens and molding equipment are provided for control of the cast product.

Faculty

The chairman of the department of Mining and Metallurgy is Prof. J. F. Oesterle. In addition to his regular duties in instructing ferrous and foundry metallurgy, he and Professor Shorey conduct regular off-campus courses in foundry in Milwaukee. He is largely responsible for the close organization of Wisconsin's foundry industry.

Prof. E. R. Shorey is the department's authority on Mining Engineering. Professor Shorey is well known throughout the mining industry and the development of the lead and zinc mines in southwestern Wisconsin can be accredited much to his efforts.

Prof. G. J. Barker is in charge of most of the non-ferrous metallurgy courses offered by the department. He has recently attracted nation-wide attention in his research work in the improvement of clays through a pH control.

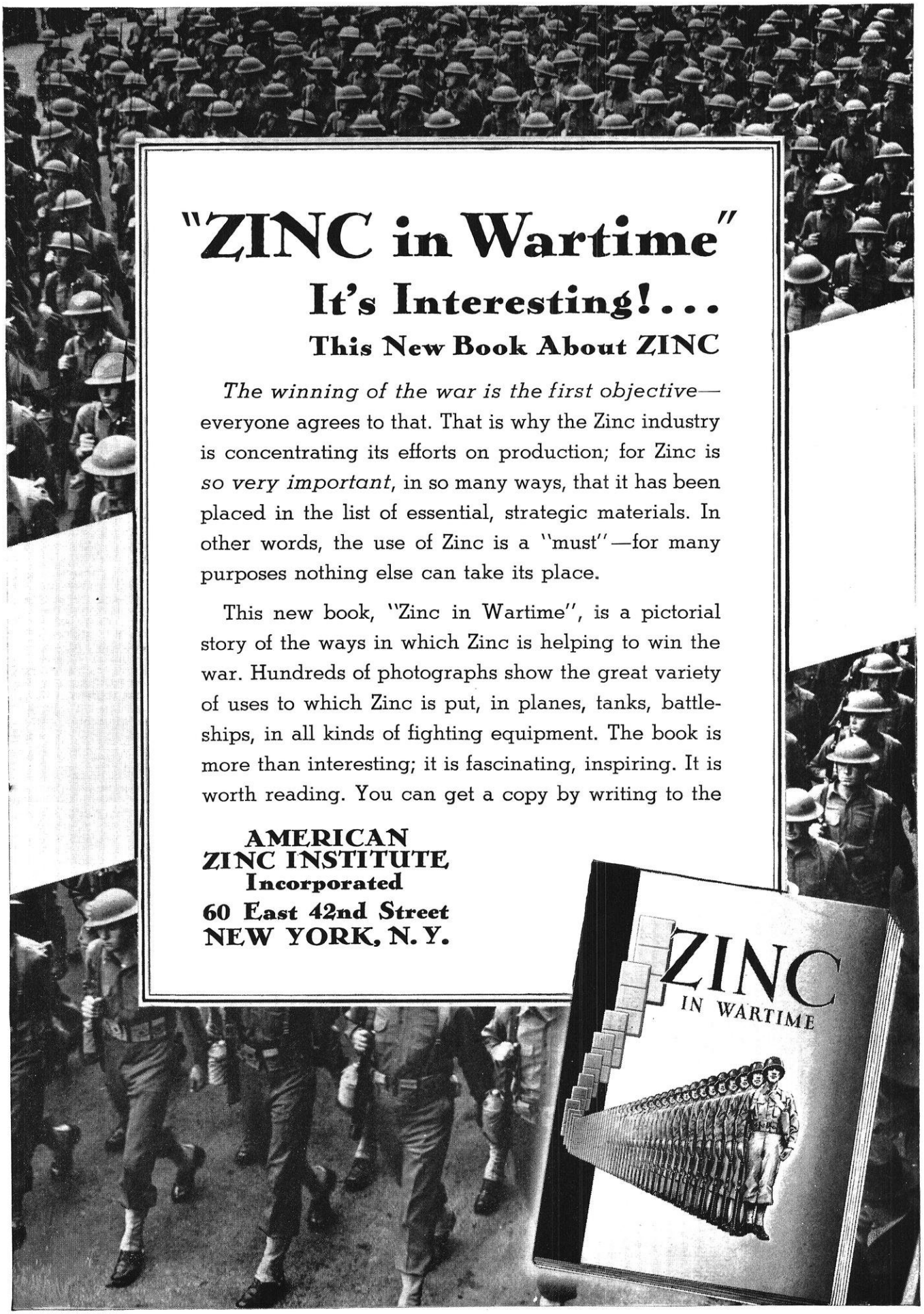
The youngest member of the faculty is Dr. D. J. Girardi, a recent graduate of the University of Michigan. He is the specialist in physical metallurgy, X-Ray, and other ferrous metallurgy courses.

The titles of Professor and Doctor have but little significance in the mining and met department as far as students are concerned. Instead, first names predominate, and the fellows who do the instructing are known, in the same order as above, as Joe, Roy, George, and Dan.

Another person prominent in the mining building, although not a member of the faculty, is the mechanician, Frank Wolf. He is the fellow who is responsible for the repair and upkeep of the machinery and laboratory apparatus.

Mining Club

All students in Mining and Metallurgy automatically become members of the Mining Club which is an affiliate of the American Institute of Mining and Metallurgical Engineer. The club meets each month and presents at the meeting a guest speaker who is prominent in industry. The talks serve to acquaint the students with problems and situations that are encountered in actual practice. The Mining Club has the distinction of being the only engineering organization that precedes its meetings with a dinner that is prepared and served by members of the club.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AN ENGINEER

I am an Engineer—
A humble worker in material things,
An inspired builder,
A high priest before the Altar of Progress.

My slide rule is my baton,
And I count my musicians among the creeping waters
Of mighty streams, the forces of the air and earth.
I compose my symphonies in concrete and steel—
My lyrics in the hum of cable spans.

My beacon is a torch of hope
Kindled with a faith in myself and my fellow-men.
Through time eternal it has come to me, never flickering.
May I strive to hand it on undimmed.

Under the swirling heat of the desert,
Up where the snow lies deep on mountain crests,
Down where the trickle of water drums against the caisson floor
I dream,—yet unlike the dreamer, build my dreams.

I labor that other souls, yet unborn,
May tread the earth,
Or sail the wastes of air and sea unafraid,
Mine is the hand which sets countless wheels in motion,
Spans mighty chasms,
Throws down the gauntlet before the elements,
I AM AN ENGINEER.

By R. D. Jordan '27, published in
THE WISCONSIN ENGINEER, January 1927

STATIC . . .

(continued from page 33)

The other day, a young Civil Engineer staggered into the Infirmary with a glazed, insane look in his eyes and babbled out the following story:

With meticulous care he had set up the transit and placed it in perfect adjustment. Here at last was his big opportunity and he wasn't going to muff it. He still had time to carefully clean the lens and eye-piece before operations commenced. At last the big moment had arrived! Turning the plates through the proper angle and adjusting the telescope to the proper inclination, the surveyor squinted through the instrument. With a cry of disappointment, he staggered back, his notebook dropped from his hands; alas! all was lost. Trying desperately to muster his senses, he muttered aloud, "Dammit! She pulled her shades down again."

o o o

It was officially announced today that the Germans had taken Castoria. The British War Office announced that they doubt the ability of the Germans to hold it. Late dispatches state that the strain of the rear is tremendous. The British have caught them on the run several times while they were attempting to evacuate along the lines. The trenches are said to be filling fast. Several flank movements were followed by gas attacks. The Germans tried to suppress the report, but it leaked out somehow, and the British got wind of it. The Germans now realize the value of a scrap of paper.