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JANUARY 1935

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With the Contributors —

● Mr. Crawford is in the development and research department of the International Nickel Company, and has been interested mainly in finding new uses for Monel Metal.

● Mr. Zien, m'34, is taking a shot at the much discussed five year plan for engineering courses.

● Mr. Leopold spent last summer as an assistant engineer on soil erosion for the Department of Interior. He was stationed at the Navajo Indian Reservation in New Mexico.

The February Issue —

Robert Calkins, c'31, is writing of his experiences as Junior Agriculture Engineer of the United States Department of the Interior. He will write on Soil Erosion Control in the Coon Creek Drainage Basin.

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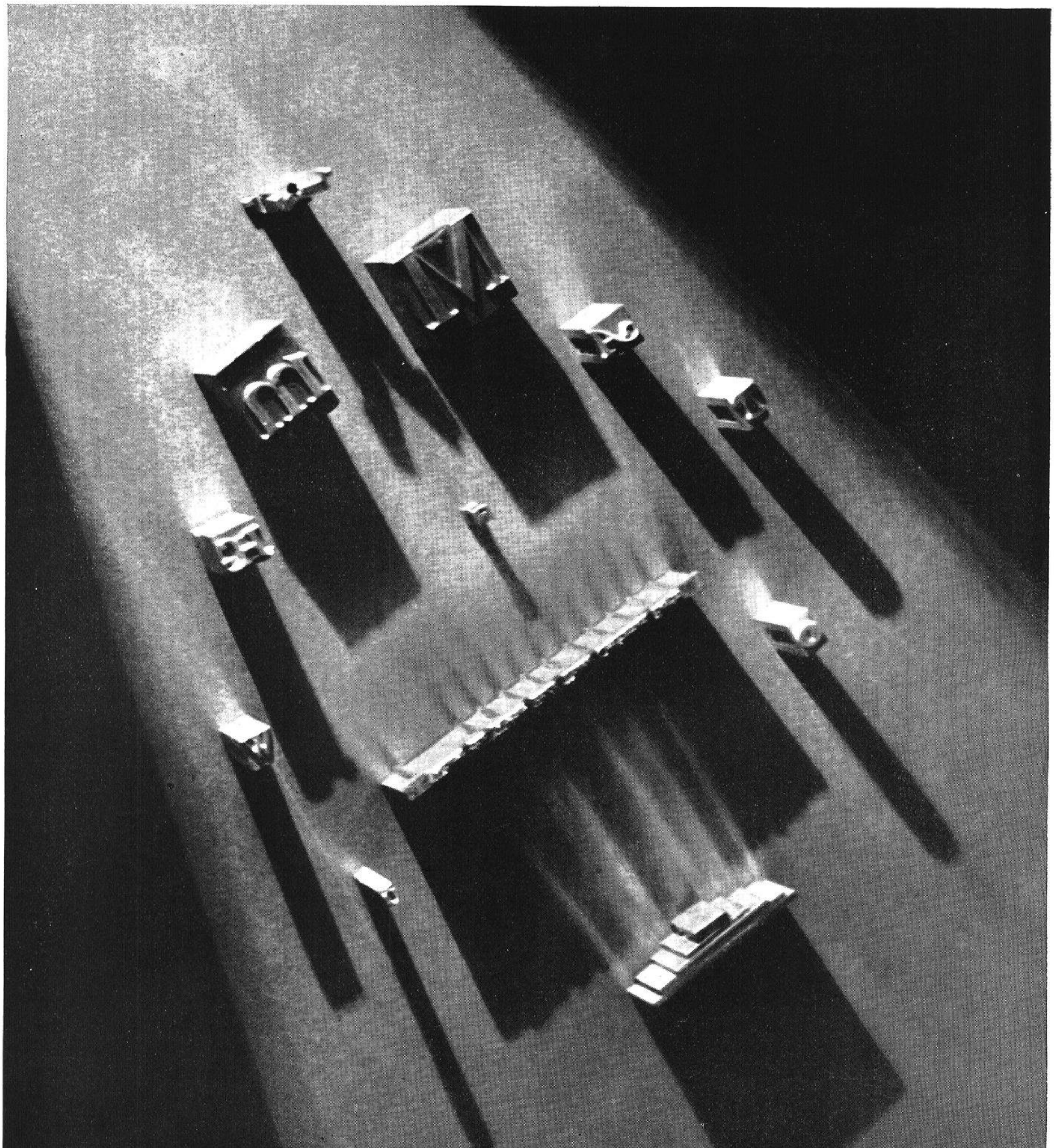


The WISCONSIN ENGINEER

VOLUME 39, NO. 4 JANUARY, 1935

"1935" Revision

"Go West, Young Civil, Go West"

Still Potent

By LUNA LEOPOLD, c'35

THE superficial glance afforded one who travels between Santa Fe and Los Angeles often leaves a bad taste in his mental mouth. On the trip he was too busy fighting the heat and the glare to appreciate the pinoned foothills and mountains armored with basalt and pine. He was too worried about the bad road to see the Painted Desert drape its delicately tinted cloak over wrinkled shoulders. The kind of person who learns to love the country is he who will venture off the beaten track to see Shiprock spread its sails before a desert breeze, or who fights his way into the interior of the reservation to see Canyon de Chelly flow with molten gold at sunset.

The uninitiated will gape into deep arroyos and curse the highway engineer in wet weather, wonder at flocks of sheep and goats, and enthusiastically wave to a staring unresponsive Navajo; but the connection between the things seen are too subtle to grasp. The fact that there are interrelations between Indians, sheep, and gullies should be apparent but seldom is, even to the extent of the casual observed reasoning thus, "There are too many Indians and too many sheep. The sheep ate all the grass so the country became cut up with gullies." It must be said that even engineers seldom get to this stage of reasoning.

It is indeed hard to believe when one looks at the Navajo country, that in 1860, these same fifteen million acres stretching from Gallup north to Mesa Verde and from Chaco west to the Grand Canyon, made up a superlative cattle range where grass grew knee high on the plain, and watering holes were common. Previous to the cattle boom in the 80's, overgrazing of sheep was local and uncommon. The Indians did not raise sheep commercially, as a result the flocks were too small to do irreparable damage. As fast as a gully was formed it was choked with hardy vegetation. The big cow outfits grew up in Northern New Mexico and Arizona with the advent of the railroad which found markets for large scale beef raisers.

The decline of the cattle boom came in the late 90's as a result of many interacting forces, among which were the Homestead Law, the erosion of the range, and the constant pressure of antagonistic sheep men. The point is that big cow outfits were the trigger pull which set off the accelerated erosion, and the Indian sheep only kept the process moving. The Navajo Reservation could never have been established until after the cow men moved out because they were politically powerful. Had the range been rested from grazing after the first damage was done, much of the land would undoubtedly have recovered, and the grass would have once more established itself. But there was no relief. The Navajos built up their sheep and goat herds to commercial size since their old way of living, by frequent raids on neighboring tribes and whites, was changed. For the past thirty years their stock has been the mainstay of their existence.

FIG. 1 — *Checkdam in flood.*

Until you have seen an arroyo — a natural channel worn by the flow of excess rain — twenty feet deep overflow after a small thunder-shower, or a level plateau covered as far as you can see with running water three inches deep, you have no conception of the condition of the range. The writer has seen water from a small storm come down a dry arroyo in a vertical front five feet high like a tidal bore, or as if a storage dam upstream had been dynamited.

The grassy mountain valleys were originally much like the western Wisconsin coulees, channelless water-courses, where water moved down the hillside in a thin sheet never gaining eroding velocity. In the west, "cienagas" were once common, marshy low spots where green grass was abundant and cottonwoods flourished; now these basins are cut by gorges and the water table is so low that the Indians must drive their sheep miles to water. It is apparent how the process goes from bad to worse, for when water becomes scarce the sheep are concentrated near the water holes, doing even more harm to the land than when they were spread over the range.

Artificial control, which is economical in much of Wisconsin where farm land is worth twenty to sixty dollars an acre, how can it pay for itself on land worth fifty cents an acre? Yet a certain amount of checkdamming may help considerably. What kind? Large storage dams, small checkdams, sausages, jetties, dikes, are only a few of the structures possible. Artificial planting or seeding may prove profitable or a combination of planting and damming.

These are only a few of the questions with which the Navajo Experiment Station, under the U. S. Soil Erosion Service, is grappling. In the spring of 1934 five experimental areas were laid out over the reservation. The largest is the Mexican Springs Area, about thirty miles north of Gallup, New Mexico, in which there are about fifty square miles fenced from grazing. At the station are gathered experts in fields allied with erosion such as range management, engineering, botany, plant ecology, and ornithology. During the summer two hundred Navajos were employed at Mexican Springs as laborers and foremen under S. E. S. and C. W. A. As well as the launching of the research program, permanent buildings were erected in view of the ten year plan outlined.

Most of the engineering work on the area was done in two typical watersheds. Mexican Springs arroyo drains some eight square miles; at the points where dams were constructed, the wash was about ten feet deep and two hundred feet wide. Since the arroyos are perfectly dry except during storm periods, methods were developed of approximately measuring the maximum flow which obtained during unrecorded storms. By the debris deposited on the arroyo walls during high water, the depth and slope of the water surface can be measured. A cross-section of the stream bed was taken on a straight stretch and the watermarks were surveyed upstream and down from that point to the bends in the channel. The velocity was estimated by the Chezy formula, the friction coefficient adjudged by examining the channel, and with experience, results were obtained for the flow which seemed reasonable when compared with determination made with actually flowing water. Many cross-sections were taken and the watermarks at each plotted for different storm flows, so enough data were available to make reasonable guesses at former flows. A light but intense rainfall in the mountains, which is very common during the rainy season, produced a maximum flow of about 1800 c. f. s. in Mexican Springs Arroyo. A very heavy storm in November, 1933, caused a flow estimated by the method just described, at 20,000 c. f. s. The water from this storm overflower the banks and ran over a highway where the channel was twenty-five feet deep and some fifty feet wide.

FIG. 2 — *Spillway of an earth dam.*

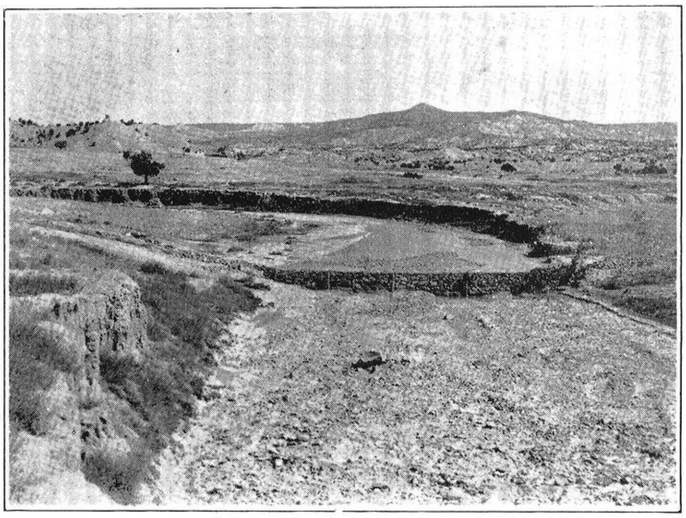


FIG. 3 — *A "sausage" checkdam, showing effective silt retention.*

The first type of dam to be tried was a large earth structure with a rubble masonry spillway, see Fig. 2. Two of these were built about a mile apart. Such large dams were not the most economical, since they cost $14,000 apiece and silted up to the top of the ten foot spillway with two not unusually heavy storms. The main advantage of the large dams, since their backwater capacity is practically nil, is the reduction of the water slope.

More economical structures were then built. A "sausage" is a woven-wire covered rock dam whose cross-section is approximately semi-circular, see Fig. 3. The top of the spillway is three feet above the river bed, and though one "sausage" stores only two or three thousand cubic yards of silt, since the cost is only eighty dollars, the cost of silt storage per cubic yard is less than in the case of the big structure. The question continually present is the terrific cost of this kind of reclamation, but it must be admitted that an experiment station must investigate all the possibilities and demonstrate what can be done. Ultimately, when vegetation is established on the silt platform above the "sausage," the reduction of the water slope and the increase of the friction coefficient will decidedly reduce the flow and erosion in the arroyo.

Higher Marine Speeds Call for Better Turbine Blading

By C. A. Crawford
Development and Research Department, The International Nickel Company, Inc.

Cuts Courtesy International Nickel Company

IN both merchant and naval ships the demand today is for greater speed to compete with other means of transportation. To meet this demand, mechanical engineers have been forced to work continuously towards higher steam pressures and temperatures. Steam pressure in marine work has risen to 400 pounds and the temperature to 650° F. in ships built and building, and up to 850° F. in vessels projected. Along with these changes, the trend of design has been towards faster rotation speeds in the turbine itself. Whereas a few years ago steam turbines were operated at speeds not higher than 1800 r.p.m. on the low pressure turbines, today 2300 r.p.m. on low pressure is good practise. On the high pressure side, the speed has already been taken up to 3600 r.p.m. These trends have increased the demands for performance, upon the metals used in the construction of steam turbines and upon the turbine blading in particular.

Monel Metal is a nickel alloy with approximately 60% nickel (min.), 0.5% aluminum (max.), 3.5% Iron and 36% copper.

Monel Metal reaction blades today represent one of the most carefully produced and inspected products available to mechanical engineers.

The blading is of a uniform quality, high in such properties as tensile strength, ductility, shock resistance and endurance under fatigue conditions. The elastic limit, regarded as of the utmost importance by turbine designers and always measured in the annealed condition of the blading, is about 35,000 pounds per square inch.

It is true that with the changes in design the turbine units of the present day are smaller than formerly. But while this has permitted the use of shorter blades — one of the few factors in modern design favorable to the materials used — this advantage has been far more than outweighed by the increased speeds. As the tip speed of the blades increases, the stresses due to tangential and centrifugal forces increase.

Tip speed usually refers to the linear velocity of the tip of the blade in the fastest moving wheel of the turbine; this is the speed of the outer ends of the blades in the largest (that is the last) expansion of the low pressure turbine. In Parsons turbines built at the period of the World War, the maximum tip speed was not in excess of 400 ft. per second. In ships recently built and under construction, tip speed has increased to 550 ft. per second, and 600 ft. in approved designs. The trend is still upward. Turbines of other designs are built to operate at even higher tip speeds.

To meet the conditions of increased temperature and pressures, as well as the high stresses due to faster rotating speeds, Monel Metal has been increasingly employed in American shipyards for construction. This has been true especially for the past five years, during which period the technique of manufacture of cold rolled, high tensile blading has been improved tremendously and the amount of metal used for blading purposes in the Parsons (reaction) type turbines has increased several times over. Concurrent improvements in composition of silver solders and fluxes for use with the metal have been made the assembly of packing pieces to blade ends equivalent in strength to solid roots drop forged integrally with the blade.

Monel Metal also is used for impulse blading, but for present purposes, however, discussion is limited to reaction blading and all the illustrations and references here are of that used in Parsons turbines.

In these turbines, Monel Metal is used for blading in the high pressure end of the turbine, where it must stand the highest steam temperatures and pressures, and at the low pressure end, where the blades are longer and heavier and must, in consequence, carry the highest stresses. At

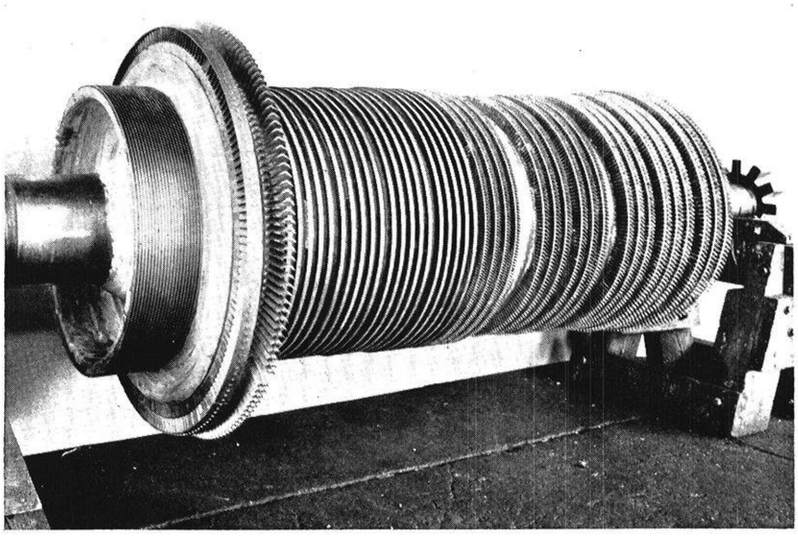


Fig. 1 — Completely bladed high pressure turbine rotor for 27,000 horsepower unit. First two rows, impulse blading, at the left end are of Chrome-iron. The following 30 rows of reaction blading are Monel Metal.

this end, also, wet steam frequently will introduce an erosive effect, in resisting which Monel Metal compares on a highly favorable basis with any available material, including the low alloy and high alloy steels. As modern trends increase the demands upon the blading, this metal is finding greater application in the intermediate expansions, also, where it is replacing less durable materials. In the latest design of Parsons turbines for ships requiring two 25,000 H. P. units, it is being used for all the blading in both high and low pressure rotors and also for all but three expansions of the high pressure casing. These will be the first Parsons turbines having all reaction blades in the rotors of Monel Metal.

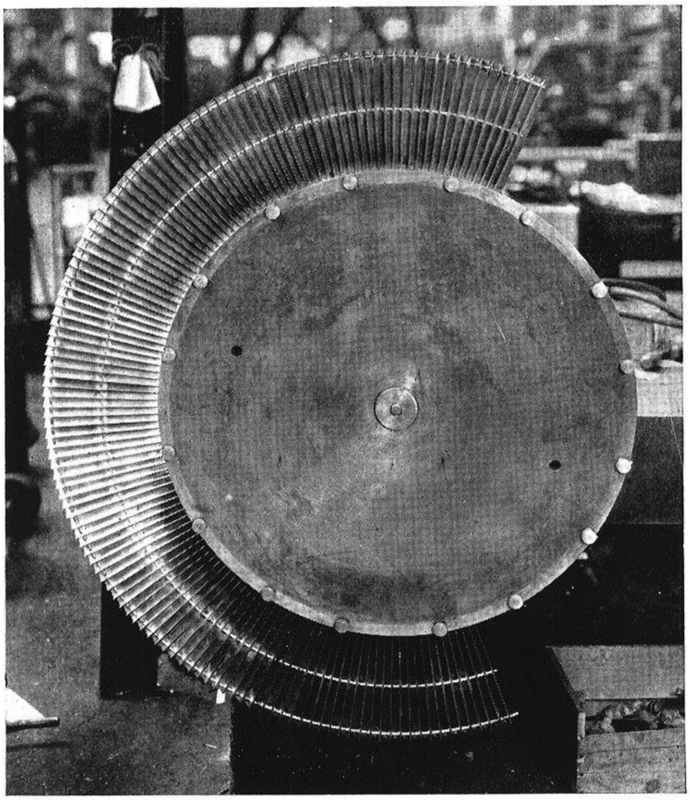


FIG. 2 — *Jig for assembly of wheel in machine shop. This jig is used where segments are to be shipped for assembly in the turbine. Each wheel is assembled in the jig, fitted, marked, taken down and packed for shipment. The jig in the photograph is two-thirds full.*

A rotor of a high pressure side of a typical modern marine turbine is shown in the photograph Fig. 1. The turbine in which this rotor operates, in conjunction with its companion low pressure rotor, will develop approximately 27,000 H. P. on the drive shaft. Each ship for which these turbines were designed has four complete turbines forward and aft, port and starboard, and each unit consists of one high pressure turbine and one corresponding double flow low pressure turbine.

For the manufacture of reaction blading, specially shaped rods are rolled accurately to rigid specifications. These are finished by cold rolling and annealing, and the total dimension tolerance permitted is .005″ on width, thickness or diameter. These sections must, moreover, be completely free from seams of even the most microscopic depth. They must carry no laps, folds or guide scratches, no slivers or surface defects whatsoever. They must be bright, free from oxide and at the same time soft. They are rejected on inspection at the slightest suspicion of pipe, lamination or internal seam. Special inspection methods have been set up to detect such defects.

The wide blades are rolled from special flat sections of brass and the packing pieces usually from sized rounds. In the process of rolling the wide blades and packing sections it is necessary to anneal up to three or more times during the rolling to shape. In these cases often two sets of shaped rolls are used for roughing and finishing.

In order to provide essential annealing control, a special furnace of modern design has been installed at Torrington, which not only gives the necessary close temperature control, but also provides for the necessary bright annealing without oxidation. Experience has taught that the blading must be annealed in a sulphur-free atmosphere and preferably one that is non-oxidizing. The furnace constructed was, therefore, based on the use of liquid propane as the only certain source of

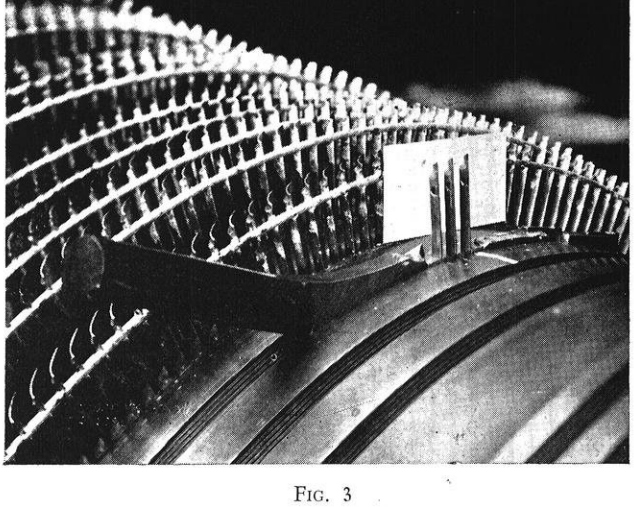


FIG. 3

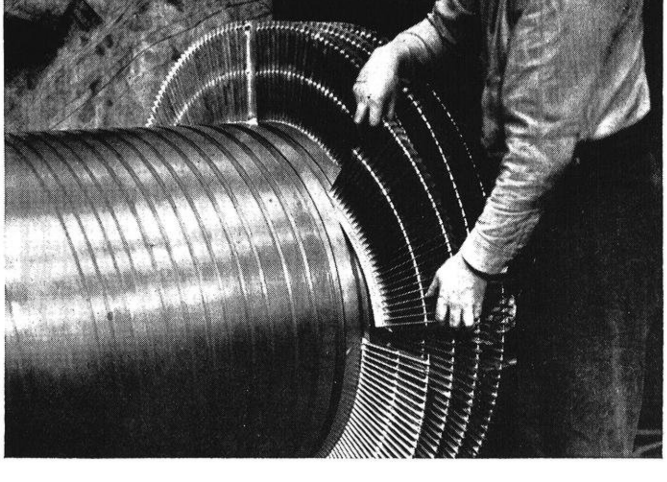


FIG. 4

Figure 3 — Method of assembling individual Monel Metal blades fastened by caulked copper packing sections. This is the intermediate blading on the 5th, 6th and 7th expansions of the high pressure rotor. The unfinished row is the third row of a 5th expansion of a 20,000 horsepower turbine. Figure 4 — Placing finished segment in low pressure rotor.

sulphur-free fuel available outside of natural gas fields; electric heating was considered.

The trend toward increasing applications for Monel Metal blading is based upon the performance of hundreds of thousands of blades installed in destroyer turbines built during the world war. Although that blading was all drop forged at a time when the technique of forging high nickel alloys was in the early stages of development, the vast majority of it is still in serviceable condition after 15 years. Less than a dozen specific cases of individual blade failure are on record and these are traceable to original forging defects that would have been detected and rejected by inspection according to present knowledge and standards.

Technical improvements at every step have been consistently made in producing the modern Monel Metal blade from original ingot to final assembly in the rotors and casings. The propane furnace for annealing blade sections between cold roll forming operations, and the latest combination of solder and flux seem to have eliminated the last element of uncertainty from the turbine builders standpoint.

The blades are assembled by various methods. The smallest blades for the highest pressures are "end tightened," a term referring to the shrouding attached to the outer ends of the blades, convex on rotor segments and concave on casing segments. These blades are assembled into segments by cutting, milling, jigging and silver soldering.

Where the blade sections are fitted in one shop and shipped for final assembly elsewhere, each wheel is fitted into a jig corresponding to a wheel or row of the turbine, as shown in the partially filled jig in Figure 2. After the remaining segments are fitted, the last one will be cut so as exactly to close the wheel with the desired tolerance. The segments wil then be removed from the jig and marked and packed for shipment. Figure 4 shows how finished segments are set into the turbine rotor. The serrations on one side of the base of the blade segment fit into corresponding serrations in the rotor forging and the small space remaining on the opposite side of the segment is filled with soft Norway Iron blocks driven in place to fill the serrations in blade segments and forgings and to lock the wheel.

Another method of construction is shown in Figure 3. In this method the individual blades are machined, milled and drilled and small serrations imprinted in the lower end by a hydraulic press or stamping die. The blades are slipped into place one at a time and each blade followed by a copper packing section cut to length. The blades and packing sections are driven up firmly as they are assembled in the groove, as shown in Figure 3. When the row is completed the copper packing sections are caulked radially between the blades, using special caulking tools, and finally the binding wire is attached by silver soldering in place.

After the wheel is assembled, the two binding wires shown are silver soldered in place. These binding wires are cut at intervals to provide for expansion and the gaps where the cut occurs are bridged by a junction wire which passes through three blades at each side of the gap. This junction wire is silver soldered to the blades at one side of the gap and is a sliding fit through the blades at the other side of the gap.

CRITICAL ANGLE

CURRENT ECONOMIC PROBLEMS As a result of the efforts of Dean Turneaure, the seniors in the College of Engineering will have an opportunity, during the second semester, to hear a dozen of the leading men in the department of economics discuss current economic problems. The schedule has been cleared for Wednesday at 11 a. m. so that practically all seniors will be able to elect this course. It will probably be given in the auditorium of the Engineering Building, in which case students not regularly enrolled in the course will be able to attend the lectures.

The course is opportune; at this time Congress is facing the task of finding the legislative precipitant that will crystallize out of our economic solution the new economic compounds that will dominate future social and business life. This Congress cannot complete the task; other Congresses will modify and complete the legislation. The changes promise to be radical. It is a time, therefore, when citizens should be informed upon economic matters. The men who are graduated this year will, of course, be faced with their own economic problems. They should not lose sight of the fact, however, that their private problems are influenced strongly by the handling of the general problems.

The lectures probably will not present the solutions to the problems. They will accomplish their purpose if they succeed in presenting the problems clearly.

SPEED AND THE RAILROADS With the advent of 1935 the railroads whose lines traverse Wisconsin are inaugurating very much improved time schedules between major cities. This generally improved public service is made possible by building and reconditioning equipment costing a great deal of money.

It is apparent that carriers of all kinds are becoming more formidable competitors daily, each faction building up its organization to meet the requirements of the transportation industry. Almost all of the money invested in the railroad equipment is coming through receivership administrations. Those of us who are unfamiliar with the economic structures of the railroads cannot conceive of the extent to which they have approached insolvency. The air-conditioned coaches comfortably carry more and more passengers daily all of which is gradually placing the railroads back into the good graces as far as the riding public is concerned, but their future financial trends are still obscure today. It is improbable that the defaulted obligations will meet with remedial action of any far-reaching nature within the near future.

All these developments lead one to all the more emphatically maintain that the financial structure of so large and intricate an industry needs a very widespread reorganization, whereby the brokers' profits are the more relegated to the background and the public's money permitted to flow in normal business channels.

Where Is Our Four Year Engineering College Curricula *Taking Us?*

By BURTON J. ZIEN, me'35

The title, "Where Is Our Four Year Engineering College Curricula Taking Us?", is an open challenge to you. This question will NOT be answered in the following discourse. Rather the writer explains his reasons for a five year plan. Refutation and contrary opinions will be welcomed. All replies will be received at the WISCONSIN ENGINEER office, and if presented in written form will be printed in the next issue.

WE are Mechanical Engineers at an outstanding College. Each day we come prepared, or unprepared, to answer questions in Steam and Gas, Electrical Engineering, and Machine Design. The logic involved is the logic of the handbook, of tables, of the slide rule. We spend hours in the various laboratories observing the personalities and power of the machines which we can control. Steam engines, oil engines, internal combustion engines — Lincoln and even McKinley would fear their noises, their motives — huge, powerful, cold.

We sit in our classrooms in seats that at various times during the day pulsate to the rhythm of the reciprocating engines in the Steam and Gas laboratory. We understand the influence of the prime mover over the generator; the generator over the motor; the motor over the vacuum cleaner — a descendence of power into the very close intimate order of our personal lives.

We become a part of this material business. Are we being totally subjected to it? Are we losing our identity as Men, *beings, having human sympathies and understanding?* Must our teachers lecture power, efficiency, and success only in terms of power, efficiency, and success? Is it possible that the summation of these influences will result in Men, or are we becoming merely masses of habits and automatic reflex actions?

It pleases many of us to speak of the machine as the blessing of mankind and the grand alliviator of human drudgery. If one may be facetious, that just happens to be true. It is an ironic fact that in the banquet hall and on the platform, we commend our industrialist for his Humanitarian measures, for his social philosophy. But this is mere sentimentality. We see the truth today. In the establishment of the recent NRA codes, we witnessed months of struggle in the key industries of the national business, wasting thousands of BTU's of human energy stubbornly arguing — while a great proportion of the population were jobless, foodless, helpless. A still more recent example is the present investigation of the Senate Arms Committee. The facts revealed many of our leading "apostles"— business leaders — selling arms to conflicting nations, assisting in fomenting war and civil disruption. The machine, it seems, was not intended to ease the labor of mankind.

It must be admitted that the machines, by the direction of a strange force, have raised the general standard of living. Theoretically, too, it must have raised our standard of ideals. But paradoxical as it may seem, instead of broadening the base of the pyramid, it has increased the height, and narrowed the base—the ascent becoming steeper, and less certain.

Education has closely followed the trend of this philosophy. Rather than blaze, it has been content to find the blazed path, with an indifferent attitude concerning its direction. The Society for the Promotion of Engineering Education, in 1929 — this was still during the period of prosperity — pointed out very clearly that . . .

1. The American Engineering educational system had no set philosophy.
2. The tendency was to demand a thorough technical background with little concern for the other necessary social characteristics the engineer must possess.
3. The development was purely an individual affair, little cooperation existing between industry and the engineering colleges.

Though the report of the Society did not explicitly contain any direct warning, the men behind the report must have sensed the debacle that was to follow.

Such is the philosophy of the profession today.

And the practising engineer, himself? Dean Potter, former national president of the A. S. M. E., concisely characterizes him. "He has been an individualist who surveyed, designed, constructed, tested, and operated public works, machines, tools, and gave little attention to the wider significance of his work or his social responsibilities."

In a personal survey amongst the students, the two specific criticisms have been found. First, the curriculum should contain a greater proportion of courses such as English, Economics, and Philosophy. Second, the five year plan would be much more suitable to his desires, the heavy schedules tending to rush him through in four years, preventing him from — and this is strange — reading the newspaper.

The five year course, as a substitute for the present system, is receiving the confirmation of a greater proportion of the students than in previous years, though encouragement from the educational administrators is generally pathetic. It is true that the method is not a new educational device. It has been tried in the last twenty years about the country and has generally failed. The University of Wisconsin offered the plan after the war; it was a failure. The records concluded lack of interest by the student body. Why remain five years when industry demands only four? The reason was not so much student apathy as it was the despotic dictation of the utilitarian industries — the orders of men not educators, but exploiters of men and machines.

In the light of these briefly discussed circumstances, I submit the following detailed course planned for Mechanical Engineers at the University of Wisconsin. It might easily apply to any other similar college The planning of this course is based on the demands and the desires of those men who are students at the present time — today. They are looking toward their ultimate situation in life, whatever it may be, hoping to be most receptive to what it has to offer.

A FIVE YEAR COURSE FOR MECHANICAL ENGINEERS

Pre-Engineering Course

Freshman

Eng. 1a	3	Eng. 1b	3
Chem. 2a	4	Chem. 2b	4
Fresh. Lec.	0	Fresh. Lec.	0
Phys. Act.	0	Phys. Act.	0
Extem. Spk.	2	Extem. Spk.	2
Math. 51	5	Math. 52	5
Draw. 1	3	Draw. 2	3
Credits	17		17

Sophomore

Math. 54	4	Math. 55	4
Econ. 1a	4	Econ. 1b	4
Psychology 3	3	Man-Nature	3
Amer. Gov. Politics	3	Amer. Gov. Politics	3
Credits	14		14

Professional Engineering — A Three Year Course

First Year Engineering

Shop 1-2	2	Shop 4-5	2
Physics 51	5	Physics 52	5
Mechanism 1	4	Mechanism 2	1
Mechanics 1-2	5	Mechanics 3	5
*Lecture 3	1	Desc. Geo.	3
		Mechanics 53	2
Credits	17		18

Second Year Engineer

S. and G. 1	4	S. and G. 2	4
Mech. Des. 3	4	S. and G. 22	2
Shop 6-13	3	Shop 7	2
Hydraulics 3	3	Mach. Des. 4	4
Elective	3	Mach. Des. 12	2
		Eng. Comp.	3
Credits	17		17

Third Year Engineer

S. and G. 105	2	Pow. Pl. Des.	3
S. and G. 23	2	S. and G. 124	1
E. E. 6	3	Shop 9	1
E. E. 56	2	Metallography	2
Eng. Admin. 1	3	E. E. 7	3
Eng. Admin. 5	2	E. E. 57	2
Electives	3	*Engineer and Society	2
		Electives	3
Credits	17		17

Credits now	146
Credits after	165

The general construction of this Five Year Course is similar to a professional course. Further, each semester's work with the exception of one consists of seventeen or less credits.

The first year, Freshman pre-engineering, has but one change over the present system. It contains a two semester course in extemporaneous speaking. This addition needs no explanation.

Sophomore pre-engineering, as seen from the schedule, is the radical change. Except for engineering mathematics, the subjects presented — the special course in psychology, philosophy, and a casual insight into government and politics — would be new to the present student. *The purpose of concentrating these subjects into one year is to picture in a general way the various components in the resultant flux of living.* Of course, the engineer will not be expected to master the psychology of James, the ethics of Plato, or the theories of Adam Smith, but the essence will be invaluable.

The first year of specialization, the third year of college, is solid technical work, similar to the present Sophomore year — the addition being the insertion of a one credit lecture course specifically pointing out the relation of the curricula of the previous year to the technical work to follow.

The second year Engineering, comparable to the present Junior period, contains a choice of three credits in electives which may be chosen as the students elects, and an additional three credit course in English Composition.

The fifth year allows for six credits in electives, and the addition of two credits of lecture, preferably called the "Engineer and Society." The "Engineer and Society" would be the key course of the five year plan. If necessary, an extra sum would be appropriated by the legislature to bring the best available man to conduct it. As the situation now exists, the courses offered — which attempt to bring forward this desired concept — quietly point out the methods of accounting, bookkeeping, and industrial organization. Good enough. These courses are not to be criticized for what they are doing, but rather for what they might do. The students of this generation demand more. They ask for additional curricula so planned and so taught that they will find inspiration toward understanding; they seek consciously or unconsciously a course that will bring a greater sensitiveness and appreciation of the real obligation to society — *the proper application of the machine to cause a simpler existence for man, instead of quagmiring his every step.* The "Engineer and Society" would be aimed at this specific relation. It would integrate the second year's curricula with the following three years of technical work.

That in brief concerns the changes that are essential. Do not think that such training would completely convert the engineer into the Messiah of our complex difficulties. Far from that. But at least he will have received a glint into the various channels of our many desires. He will have more general knowledge with which to interpret those experiences which, though they do not often touch him directly, exert an important indirect influence. He will have greatly stimulated such interest, better fitting him to understand.

* * * *

We students of the middle twentieth century will be compelled to recognize our place with confidence. This statement is a bromide weighted down with the monotony of repetition. We must decide whether we are obtaining the correct training that we demand for our objective. We more than ever before must decide if we are to be merely machines or men.

A Summary of the Polygon Plan

POLYGON PROPOSES AN AMENDMENT

Polygon desires that an amendment be made to the Polygon Plan. Are you going to vote for or against it?

This is the situation. During the first semester of this school year, Polygon gave a smoker and a dance. The dollar activity fee entitled you to complete participation in these functions, and you were obligated in no other way whatsoever.

But Polygon has bumped into something. When the Polygon Plan was first drawn up, the brilliant successes experienced this last semester were not anticipated. Polygon's officers took the plan and estimated their semester's running expenses with admirable accuracy. Their Financial Report shows that.

POLYGON — FINANCIAL STATEMENT

1st Semester 1934-35

Classification	Number Registered	Number Paid	Per Cent Paid
Freshmen	263	242	92.0
Sophomore	198	171	86.5
Junior	211	180	85.4
Senior	231	185	80.2
Non-Promoted Frosh	35	21	60.0
Total	938	799	
Grad's	Not Complete	10	
Cards Outstanding		6	
Faculty	Not Complete	50	
Grand Total		865	85.2

DISTRIBUTION

Receiver	Amount	No. Paid
A. I. E. E.	69.90	
A. S. C. E.	55.20	
A. I. Ch. E.	47.70	
A. S. M. E.	65.70	
Min. Club	14.10	
Polygon	178.10	
Wisconsin Engineer	432.50	
Society Cards Outstanding	1.80	
Totals	865.00	865.00

E. Ziehlsdorff, Treasurer.

However, we want another smoker like the last one. All right, Polygon says we are going to get it.

But do you want another dance like the last one? No! Absolutely not! If we have anything to say about it, we'll not let Polygon give another dance like this last one.

Why not? Because we want a bigger and better one! Seven hundred couples cannot, as you saw, dance comfortably in so small a space as the Great Hall and Tripp Commons afford.

So what will Polygon do about it? Well, it has foreseen this. Therefore, this amendment is proposed —

> "Each person obtaining a ticket for a dance wil pay a ten cent (10c) service charge."

That means, then, that the cost of tickets and other incidentals will be defrayed by this service charge, so that the full benefit of the part of your dollar that goes to Polygon will be given to making a bigger and better dance—possibly to get the entire Union for the dance, and three orchestras.

How to Vote on the Amendment

When you fill out your cards at Lathrop your Polygon Fee Card will be in your envelope. Attached to the card will be a stub on which you may check YES or NO on the amendment. There will be a table in Lathrop at which you may deposit this stub in a ballot box. Whatever you do, cast your vote. Here's for an even more successful semester than last.

WHAT HAS IT DONE?

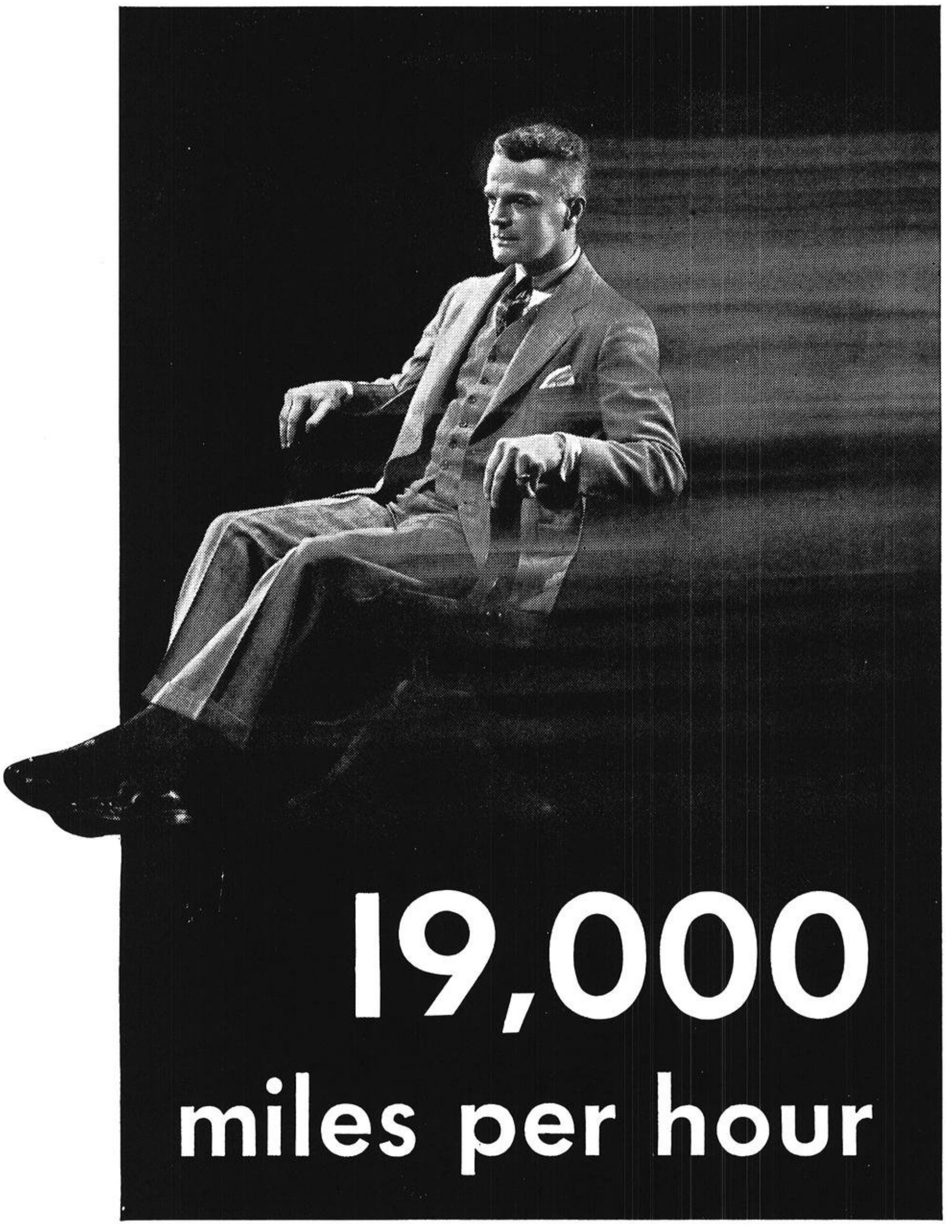
Gentlemen, have you stopped to consider what has been going on? Did you notice the increase in attendance at the various engineering society meetings this semester? Had you realized that there were about *seven hundred couples* at the last Polygon Dance? Were you aware that *four hundred* engineers, for the first time so far as is known, spontaneously started singing together at Polygon's Smoker —a manifestation of a wonderfully fine spirit? Were you one of those who cried for more, when Professor Mathews suggested he close his lecture on Crime Detection? Remember the A. S. C. E. Christmas party? And do you recall how, after you were mercilessly mauled in that jam trying to get in to the Boulder Dam movies, you had to be turned away from the doors? Are you one of those observing ones to whom it has occurred that the *Wisconsin Engineer* has swelled in size? Did you know that your *Engineer* enjoys a larger subscription list than does the Daily Cardinal?

These are some of the things that you ought to see in that Financial Report Polygon has submitted to you. All of these has Polygon done with that dollar you paid at the beginning of this last semester. And more! — something that cannot be measured nor set down in cold statistics: *your interest and spirit!* Perhaps you have already noticed that. If not, why, sit back and take stock. Surely you can feel that intangible something which has begun to pervale our engineering activities! Were you not conscious of the interest being aroused this semester? Certainly it must be evident to you now!

But wait! The year is not yet over. Another semester is at hand. And with it is coming? — ah! The Engineers' Parade—another Smoker—another Dance—more fine speakers —programs—and bigger and better *Engineers!* Don't you think that is something to which you can look forward?

But Polygon has only begun. You have given it a marvelous start to a successful year. You've overcome that greatest difficulty, the starting friction; so now let us get the ball rolling faster. Polygon is your organization. To cooperate with it 100% is to give yourself the best you have.

He is ill clothed that is bare of virtue.



By Long Distance telephone, a sales executive recently "covered" more than 153,000 miles in three business days. He spent a total of eight hours in talking with his agents in 194 cities — using Sequence Calling Service.

This service enables subscribers to place with the Long Distance operator any number of calls on which they wish to talk consecutively. Connections are completed rapidly with a minimum wait between calls.

Sequence Calling is just one of the many services developed to gear the telephone more and more closely to business needs.

Why not visit your folks tonight . . . by telephone? For a lot of pleasure at bargain rates, use station-to-station service after 8:30 P. M.

BELL TELEPHONE SYSTEM

« ALUMNI NOTES »

MINERS AND METALLURGISTS

GRIEVE, GILBERT G., '22, is on the National Safety Council, with offices in Chicago, Illinois.

JONES, EVERETT W., '25, is business manager for the Albany General Hospital, Albany, New York.

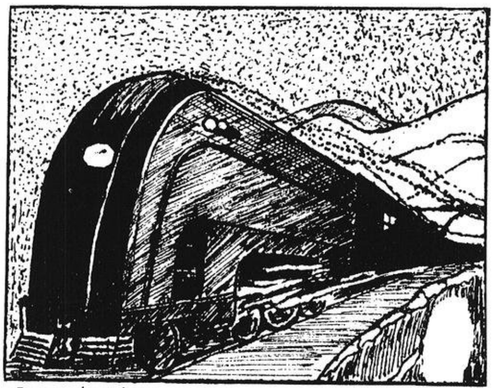
SIRELSCHIKOV, INNOKENTY A., '31, is a metallurgist in Chicago with offices at 1414 E. 59th Street.

REID, BYRAN S., '13, is associated with the Vacuum Oil Company in Chicago.

MECHANICALS

WELCH, HALBERT A., '31, has a position as engineer for the Bucyrus-Erie Company, South Milwaukee.

WEHMEYER, ARTHUR H., '30, engineer for the Wisconsin Motor Corporation at Milwaukee, lives at 3147 South Adams Avenue, Milwaukee.



Reproduction: Streamlined Steam Locomotive

E. Ermenc

QUAMMEN, DELBERT J., '24, Way Lin Manor, Lansdowne, Pa., is district manager for Cutler Hammer, Inc., Philadelphia.

SCHILSTRA, GEORGE S., '28, engineer for the Wisconsin Power & Light Company at Sheboygan, Wisconsin, resides at 2322 North Sixth Street, Sheboygan.

FROEHLICH, FRANK R., '09, manages M. J. Seiwert Forwarding Company of Milwaukee.

RYNDERS, FRANCIS A., '23, is a mechanical designer for the Milwaukee city engineering office.

WUPPER, BENJAMIN F., '23, practices patent law in Chicago. His home is at 1629 S. Courtland, Park Ridge, Ill.

EGGERT, ERWIN H., '29, is associated with Procter and Gamble Company. He is at the Pork Ivory plant at Staten Island, New York.

BAILY, ROBERT W., '07, M. E.'10, is president of two companies in Philadelphia: the Baily-Davis Corporation and Concrete Vibrator Equipment Company. He is the designer of equipment for placing concrete by vibration.

ALLEN, CARLTON H., '10, is a manufacturer of paper mill machinery at Glens Falls, New York. The firm is Allen & Trinby Company.

ARNDT, REUBEN F., '07, is with the U. S. Lighthouse Service at 305 Custom House, Portland, Oregon.

CARRIER, EARL G., '28, is in Newark, New Jersey, where he is a mechanical engineer for the Carrier Engineering Corporation.

GALLOWAY, EDWARD W., '04, is associated with the Semet-Solvay Engineering Corporation in New York.

CORP, PAUL M., '33, was married on December 29 to Helen Mary Bailey of Chicago. Corp is a son of the late Professor Charles I. Corp of this university. The bride is a daughter of O. A. Bailey, c'15, chief engineer of the Chicago Bridge and Iron Works. Corp is on the staff of Sloan and Cook, consulting engineers of Chicago.

LHOTAK, FRED R., '26, manages the machinery department of the foreign division of Fairbanks, Morse & Company in New York.

LUICK, ADOLPH J., '07, is a consulting engineer in Chicago under the firm name of Lucas and Luick.

MARSHALL, JR., OREN H., '19, is an engineer for the Rochester Gas and Electric Corporation of Rochester, N. Y.

NEESS, CARL J., '28, directs the Wisconsin Transient Bureau at La Crosse.

POSZ, HOWARD M., '21, is a power specialist with the Southern California Edison Company.

ELECTRICALS

ANDERSON, JR., WALKER, '13, is sales engineer for the General Electric Company, Pittsburgh, Pa.

BELLING, JOHN W., '03, manages the transportation department of the General Electric Company in Boston, Mass.

BLATZ, JR., A., '08, is with the State Highway Department with offices at 744 North Fourth Street., Milwaukee.

BRADSHAW, JOHN W., '06, is connected with the New York Telephone Company, New York.

GOLZ, NORMAN A., '26, transmission supervisor for the Wisconsin Telephone Company, lives at 2417 Monroe Street, Madison, Wisconsin.

HERLING, RUEBEN E., '24, is an engineer with the Milwaukee division of the Wisconsin Telephone Company.

HIBBARD, ALLEN C., '07, has a real estate business in Oakland, Calif.

JOHNSON, EVERETT A., '30, engineer for Foote Brothers Gear and Machine Company, Chicago, now lives at 6106 University Ave., Chicago, Ill.

LEHMAN, DONALD G., '22, field engineer for the Kimberly-Clark Company of Neenah, Wisconsin, resides at 1618 North Appleton St., Appleton, Wisconsin.

POWELL, DAVID A., '07, is vice-president and general manager of the San Antonio Public Service Company, San Antonio, Texas.

SCORGIE, ROBERT, '27, lives in Milwaukee where he is connected with the Wisconsin Telephone Company.

SHARRATT, CLARENCE W., '25, is assistant to the traffic supervisor of the Wisconsin Telephone Company, Milwaukee, Wisconsin.

STEIHM, FLOYD M., '27, of W. Liberty Ave., Hales Corners, Wisconsin, is working in the telephone maintenance department of the Wisconsin Telephone Company.

TAYLOR, WILLIAM H., '25, is vice-president and general manager of General Electric Appliances, Ave. R. Saenz Pena. 636, Buenos Aires, Argentina, South America.

COBINE, JAMES D., '31, is an instructor in electrical engineering at the Harvard University Engineering School, Cambridge, Massachusetts. He is living in Cambridge on 11 Longfellow Road.

HELZER, ARTHUR E., '05, died at his home in Chicago on October 13. He was an electrical engineer with the Bell Telephone Company.

Following his graduation, Mr. Helzer was employed by the Wisconsin Telephone Company as an inspector. After holding several other positions with this company and the Central Union Group, he became appraisal engineer for the Chicago Telephone Company in 1912. In 1921 he was appointed assistant engineer of buildings of the Illinois Bell. He became engineer of buildings, state area, in 1928, and was transferred to the Chicago area in the same capacity in 1933. He is survived by his wife and one daughter.

RADKE, ORVILLE E., '20, is an engineer for the Milwaukee Electric Railway and Light Company.

STREETER, RAYMOND, '25, has a position with Allen-Bradley Company, Milwaukee, Wis.

THOMSON, CAMERON A., '28, is an engineer for the Johnson Motor Company, Waukegan, Illinois.

WELCH, JOHN F., '24, has a position with the International Harvester Company, Milwaukee.

WHITE, GEORGE L., '11, is sales engineer for Ryerson and Haynes Company, Jackson, Michigan.

WOLLAEGER, LOUIS A., '28, who works for the Heil Company, Milwaukee, lives at 1606 Martha Washington Drive, Milwaukee.

COTTON, ALFRED R., '22, is junior accountant in the accounting and finance division of the Milwaukee Public Service Commission.

HAUKEDAL, ORAL E., '32, is living in Montello, Wisconsin, where he is work secretary for the State Drought Relief Program.

HERRICK, ROSWELL H., '22, is a radio engineer in the Naval Research Laboratories, Anacostia, Washington, D. C.

JORDAN, ROY D., '27, is the assistant manager for the publicity department of the General Electric Co., Schenectady, New York.

MILLER, THOMAS F., '24, of 2213 N. 52nd Street, Milwaukee, is associated with the Wisconsin Telephone Company.

MORACK, MARVIN M., '28, who lives at 106 Bruce Street, Scotia, New York, is connected with the General Electric Co., Schenectady.

NELSON, ERIK N., '24, is a distribution engineer for the Ohio Public Service Company, Massillon, Ohio.

RASMUSSEN, CLARENCE F., '23, manages sales for Walker Vehicle Company, Chicago.

RUDIE, LIEF N., '26, works for the Commonwealth Edison Company in Chicago.

CIVILS

ZEIDELHACK, FELIX S., '10, is a civil engineer in Portland, Oregon, with offices at 414 Spalding Building, Portland.

BIRD, HOBERT S., '94, LL. B.'96, is an attorney in New York with offices at 299 Broadway.

SOGARD, LAWRENCE T., '24, is sales engineer for the Surface Combustion Company, Chicago.

ZIEHLSDORFF, WALTER C., '29, died on December 17 at a Madison hospital following a month of illness. He had been on the engineering staff of the Wisconsin Highway Commission since graduation. Mr. Ziehlsdorff was a member of Chi Epsilon, honorary civil engineering fraternity, and Tau Beta Pi, honorary engineering fraternity.

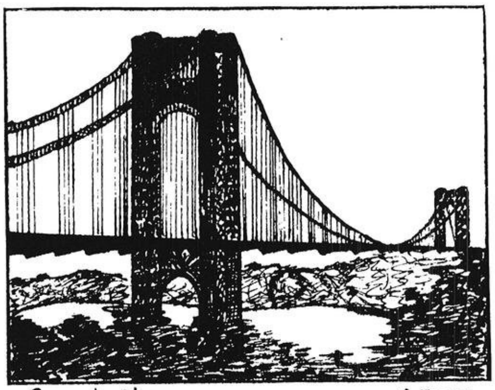
GINRICH, HIRAM E., '10, is the chief estimator in the plate department of McClintic-Marshall Corporation of Bethlehem, Pa.

HOMEWOOD, ROBERT T., '27, M. S.'29, assistant state sanitary engineer in Virginia, is now living at 3321 Patterson Ave., Apartment No. 2, Richmond, Virginia.

LOVERUD, JR., EARL K., '23, conducts consulting engineering work at Stoughton, Wis. Address: 101 E. Prospect Avenue, Stoughton, Wis.

McINTOSH, FABIAN C., '13, is business manager for Johnson Service Company in Pittsburgh, Pa.

NATHAN, WALTER S., '18, manages sales for Alloy Products Corporation, Waukesha, Wisconsin.


Reproduction E. Ermenc

SALTER, GEORGE S., '24, structural engineer for the Sanitary District of Chicago, is now living at 3955 N. Lomon Ave., Chicago, Ill.

STIVERS, MAJOR CHARLES P., '13, is with the Infantry of the U. S. Army at Fort Leavenworth, Kansas.

THORNE, JENT G., '06, manages the utilities for the city of Kewanee, Illinois.

CHEMICALS

HAINER, FREDERICK W., '20, is a supervisor for the gas utilities of the Wisconsin Power & Light Company in Madison.

HARRIS, ROBERT E., '24, is a patent attorney with offices at 7 South Dearborn St., Chicago, Illinois.

HIEMKE, HUGO W., '26, has a position as welding engineer for A. O. Smith Corporation of Milwaukee.

PESCH, ANTHONY W., '21, is chief chemist for the Southern Kraft Corporation in Mobile, Alabama.

VELGUTH, WALDEMAR, '20, is with the Buick Motor Company, Flint, Michigan, as metallurgist.

FRANK, DAVID S., '23, is associated with the Pure Oil Company in Chicago as a combustion engineer, specializing in the installation of fuel using equipment.

ON THE CAMPUS ∾ ∾

ENGINEERS FOR SALE

Plans are being formulated by Pi Tau Sigma and the A. S. M. E. for the publishing of a senior mechanical engineering bulletin tentatively known as the "employment bulletin" which will contain the picture, activities, qualifications, experience and location desired of each member of the graduating class. The bulletins will be distributed to employers and interested parties and will aid in placing graduates in their chosen field of endeavor.

THEY'RE HERE AGAIN

Final examinations are in the air and this writer took unto himself the task of ferreting out student and faculty opinion on the time eternal question of abandoning the semi-annual pain of pains. One prominent member of the faculty exclaimed with an eloquent wave of the arm, "sure, throw 'em out. We've got you students fairly well catalogued, after the first week of the semester, anyway?" Another younger instructor rather cautiously opined, "We're only following the set rule of the university."

A certain campus leader when approached and given the third degree, groaned and shuddered, then hurried away with these parting words, "Did you have to remind me?" Another gentleman seriously analyzed the situation so familiar to him over twenty-five years of service and wisely summed up his words thusly, "I believe we dislike marking the examinations more than you fellows dislike writing them." And yet, fellow sufferers, tradition overwhelms us, and soon we shall be stocking up on midnight oil and having blue-book nightmares as the fatal week draws near.

AFTER THE EXAMS ARE OVER

Even the engineers will lay aside the slide rules and don the soup and fish for the big social whirl of the year, Junior Prom. Several engineers have been appointed to committees assisting King Richard Brazeau in the prom arrangements. Among these are John F. Wright, Ch. E., music committee chairman; John O'Connor, M. E., finances, and Clarence J. Mueller, Ch. E., boxes committee.

NICE GOING

That a recent Wisconsin graduate will attain national recognition for his interest in the field of Diesel engines appeared certain when an article on Coal-dust Diesels by E. R. Kaiser, M. E.'34, and research fellow, appeared in the January issue of the *Diesel Digest.* The article entitled "Diesel's Dream Materialized" first appeared in the November 1934 issue of the *Wisconsin Engineer* and deals with the development of the Rupamotor, a coal-consuming engine.

THIS ------ HAPPENS

TURNING ON THE HEAT

Endeavoring to perform a valuable public service and to disseminate information for dealers, industries, and homeowners on the efficient and economical use of fuels and fuel using equipment, two three-day conferences will be held in the mechanical engineering building under the direction of professors in the steam and gas department.

The first sessions or "short course" on solid fuels and stokers will be held January 31, February 1-2 and an extensive line of exhibits of fuels and equipment in the field of heating and ventilating will be on view. Technical features, such as analysis and characteristics of solid fuels, principles of combustion, and fuel gas analysis will be taken up at the first conference. A commercial session on Friday, February 1, will deal with the problems confronting the dealer and manufacturer. And the subject of the session will be the home-owner's problems in heating and purchasing of equipment and fuel.

The second conference on fuel oils and burners opens on February 7 with a discussion of various aspects of fuel oil, such as the supply, production, use and principles of combustion. The committee in charge of the arrangements is Professor C. L. Larson, D. W. Nelson, B. C. Elliott, and L. A. Wilson; R. A. Rose and E. R. Kaiser.

FACULTY BRIEFS

Professor Ray S. Owen, topographical engineering department, is a proud grandfather as the result of the blessed event which took place Dec. 9th at the Wisconsin General for his son-in-law and daughter, Mr. and Mrs. John Marshall.

* * * *

Three engineers were recently elected as trustees and directors of the Madison Y. M. C. A. for the ensuing three year term. Dean F. E. Turneaure is one of the new trustees while W. W. Cargill, C'16 and E. J. Kallevang occupy seats on the board of directors.

* * * *

Professor C. C .Wilson of the steam and gas department is the author of a recently published bulletin entitled "Oil and Gasoline Information for Motorists" which is based on experimental work extending over an intermittent period of six years.

* * * *

Efficiency of electrical merchandise is closely tested at the University of Wisconsin Standards Laboratory and under the directions of Prof. Royce Johnson the claims of manufacturers of electrical products have been tested. Among the latest studies completed were the testing of electric light bulbs of all sizes, shapes and prices to verify claims and counter claims. L. C. Larson, instructor in electrical engineering, has been conducting tests of newly developed multiple-link fuses in an effort to eliminate bad fuse hazards and check faulty and dangerous electric fuses.

* * * *

Professor Ben C. Elliott, Steam and Gas department, has been appointed chairman of the mechanical engineering committee of the Society for Promotion of Engineering Education. This committee will conduct a national survey of the objectives and courses of study, beginning with an investigation of time, requirements in shop and lab courses.

« CAMPUS ORGANIZATIONS »

TAU BETA PI

The following seniors were initiated into Tau Beta Pi at the Initiation banquet held in the Old Madison Room of Memorial Union on Wednesday, December 19, 1934:

Civils: William C. Ackerman, Lawrence J. Bidwell, J. Everett Henry, Reginald C. Price.

Chemicals: Thayer W. Burnham, Robert J. Knake, Harry J. McCauley.

Electricals: Robert M. Bennett, Kermit D. Johnson, Harold W. Jury, Joseph F. Kuzela, Frederick J. Kuehn, Elmer Mohaupt.

Mechanicals: Roald H. Amundson, C. Bradford Kniskern.

Miners: William O. Smyth.

Mr. E. J. O'Meara, safety engineer with the Wisconsin Highway Commission, who was introduced by Professor Raymond J. Roark, toastmaster, spoke on the factors influencing automobile accidents. The president's welcome to the initiates was given by George R. Wernisch with the initiate's response coming from Robert M. Bennett.

CHI EPSILON

Officers for the coming semester were elected by Chi Epsilon, honorary civil engineering fraternity, at a meeting held at the home of Ed Neroda, retiring vice-president, on January 9. Officers who will be installed at the first meeting after vacation are:

President .... Wm. Ree c'4
Vice-President .... Lee Crandall c'4
Secretary .... Luna Leopold c'3
Treasurer .... Wm. Ackerman c'4
Ass't Editor of Transit ..... Carl Matthias c'3

An enlightening resume of the national conclave at Urbana, Illinois, held December 13, was given by the delegate of the local chapter, Reggie Price. The outgoing treasurer, Paul West, reported all funds "accounted for."

Plans for inspection trips to the water power plants at Prairie du Sac and Kilbourn, both designed by D. W. Mead, Wisconsin professor who is a national honorary member of Chi Epsilon, were discussed. President Henry appointed Ree and Ackerman to lay plans for the trip to inspect the two projects next semester.

A. I. E. E.

The student branch of A. I. E. E. presented a lecture and demonstration on "Recent Work with the Photo-Electric Amplifier" on Thursday evening, December 13, 1934, at Washburn Observatory. The lecture and demonstration was in charge of Prof. Joel Stebbins, professor of Astronomy and director of Washburn Observatory. Prof. Stebbins was assisted by Edwin J. Bernet.

The group saw the equipment as it is actually used in conjunction with the other equipment in use at the observatory. This was followed by Mr. Bernet's discourse on the various steps in the development of the photo-electric amplifier as it is used at the observatory at the present time. Prof. Stebbins pointed out current problems which must be dealt with in the field of astronomy in his discussion which concluded the program for the evening.

A. S. C. E.

Over two-thirds of the 170 members of A. S. C. E. attended the Christmas Party held in Tripp Commons on December 19. Refreshments were served while Vic Pape disguised as Santa Claus, passed out appropriate gifts to everyone present. Singing was led by Ralph Vogel after which two short Mickey-mouse films were shown.

At the regular business meeting held on January 9, the Society voted to sponsor a recommendation that the money derived from fines paid by students violating traffic regulations on the University campus be placed in the Student Loan Fund.

Officers for the coming semester are:

President .... Edward K. Neroda, c'35
Vice-President .... Victor G. O. Pape, c'35
Secretary .... Eldon C. Wagner, c'36
Treasurer .... Ralph H. Vogel, c'36

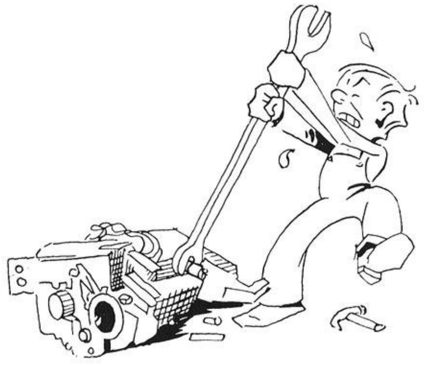
(Continued on page 72)

A SLICE OF "PI"

CALL B. 3.1416

By

KOKO-NUT KREME



New Year Resolutions

● All students to study harder next semester.

Flashes from 1990

● Bud Tock overslept Organic Chemistry lecture today for the first time in a week.

● Joe Urschel finally returned from the North Pole in his new steamship. Due to the peculiar design of the steam engine he had to paddle the ship back from Hudson Bay. "It worked swell going up, however," he stated.

● Prof. Ziehlsdorff, it is rumored, will succeed Professor Mead as lecturer in Contracts 101 next week.

● Stuart E. Schreiber, former custodian of the Chem Engineering building and now coach of the U. S. Olympics team, led his team to a smashing triumph over the slipping athletes of Greece.

Windy

● Some guys blow smoke rings, others, bubbles, but Bob Nepil takes great delight in blowing circuit breakers in the E. E. lab.

Announcement

● "Cackleberry" Carlson, c'32, announces his forthcoming marriage in February.

Vacation Details

● John Kindrigen, manager of the Knight Hotel at Ashland, is out gunning for H. Viets Fuller, m'33, "Light Horse" Harry Wilson, e'33, Bob "Buttons up" Ritchie, ch'34, and George "Two-timing" Walters, ch'32. It seems these boys attended a party at his hotel New Year's Eve.

Bowled Over

● George Wernisch, c'34, received a granite loving cup in Structures class.

Exit

● By special request, Horace "Sliderule" Norton left Chem Engineering 115 lecture early one day a few weeks ago. Horace has been paying more attention lately as a result.

Yule Tide

● Dean Tureanure was a good boy this last year, so Santa Claus gave him a present at the A. S. C. E. Christmas party.

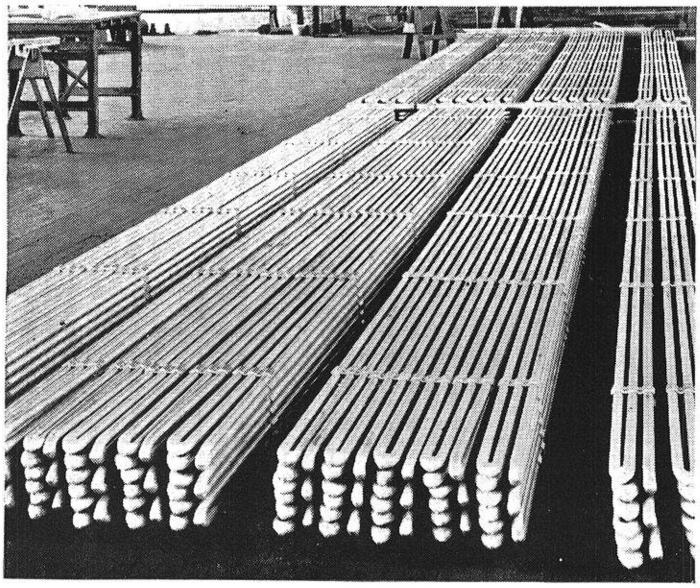
CAMPUS ORGANIZATIONS

(Continued from page 71)

A. S. M. E.

The December 12 meeting of the A. S. C. E. was held in the Graduate Lounge of the Memorial Union. The speaker of the evening was Prof. Roark of the Mechanics department. Prof. Roark discussed "Hunting Tigers in Indo-China." Movies taken on the trip were explained as they were shown.

After the movies he answered questions, and further explained his trips while in quest of big game, which took him to both Indo-China and Africa.



SEVEN HUNDRED WELDS—were needed to make this assembly of aluminum piping.

New Metals Emphasize Desirability of Jointless Design

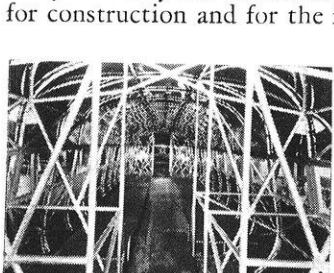
Welding Preferred Method for Fabricating Jointless Designs from New Materials

By H. E. ROCKEFELLER*

Welding is an important aid in securing the full benefit of the newer light weight alloys, corrosion- and stain-resistant steels and other ferrous and non-ferrous metals. Jointless welded designs in these new metals make the finished product attractive in appearance, efficient and economical to use and enable it to be priced salably.

In All Industries

Fabrication by welding can be undertaken without heavy capital expenditures and carried out at low cost. Welding is used in every industry for maintenance, for construction and for the fabrication of many products. The welding of mechanical refrigerators and gas ranges is typical of its production applications. Other typical applications include welding of chromium steel for resistance to sea water corrosion on seaplane pontoons, welding aluminum fuel tanks for airplanes, welding of the frame work of alloy steel on the new high speed railroad trains, welding of stainless steel beer barrels and innumerable other familiar products.



HERE'S HOW—the framework of the light weight, streamlined rail cars for high speed is Linde-welded from chrome-molybdenum steel tubing.

Welding is Simple Production Tool

Welding is the preferred method of fabricating almost every design in modern metals. Jointless welding can be done rapidly with a minimum of preparation of the pieces to be joined. Under procedure control providing jigs for positioning pieces, production can be as rapid and as free from rejections as any highly developed factory process. From the plant equipment standpoint it is easy to adopt welding. From the personnel standpoint the welding technique is quickly acquired through instruction by competent engineers.

For Jointless Strength and Safety

Products fabricated by welding are jointless, leakproof, permanent and safe. Improved methods of testing make it possible to tell exactly what stresses or loads a jointless welded assembly can take. Metals of different compositions, providing the most suitable material for the service it is to perform, can be welded into sound unified assemblies forever free from any of the losses which occur from joint failures.

Specialized Welding Assistance

To utilize the new alloys and metals fully, the advice of competent engineers in welded design is advisable. The Linde Air Products Company, a unit of Union Carbide and Carbon Corporation, has for many years specialized in the development of new ways to use oxy-acetylene welding. Linde Engineers will gladly consult with you without obligation, and help you use welding and organize for welding production. This assistance can be secured by a telephone call to any Linde Sales Office. They are located at Atlanta — Baltimore, Birmingham, Boston, Buffalo, Butte— Chicago, Cleveland — Dallas, Denver, Detroit—El Paso—Houston—Indianapolis—Kansas City —Los Angeles—Memphis, Milwaukee, Minneapolis—New Orleans, New York—Philadelphia, Phoenix, Pittsburgh, Portland, Ore.—St. Louis, Salt Lake City, San Francisco, Seattle, Spokane and Tulsa.

IN JIG TIME—using jigs, welded joints can be made quickly in any commercial metal or alloy.

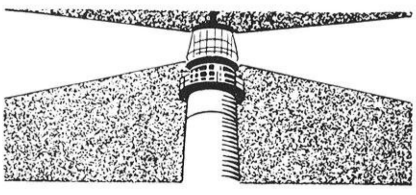
Everything for oxy-acetylene welding and cutting—including Linde Oxygen, Prest-O-Lite Acetylene, Union Carbide and Oxweld Apparatus and Supplies—is available from Linde through producing plants and warehouse stocks in all industrial centers.

*Engineer, Development Section, The Linde Air Products Company, Unit of Union Carbide and Carbon Corporation.

G-E *Campus News*

SEDAN TO SYDNEY

Radio Engineers were up bright and early not long ago to make a two-way radio-conversation test between the General Electric short-wave station W2XAF near Schenectady and station VK2ME at Sydney, Australia, 10,000 miles away. It was 6:30 a.m. in Schenectady and 10 o'clock at night in Sydney. Everything was in readiness, but C. H. Lang, U. of Michigan, '16, manager of the Company's Publicity Dept., who was to talk to officials in Australia, was delayed at his home. On a chance, the radio police test car, which G-E engineers had equipped for two-way radio communication for the Boston Police Dept., was sent to pick up Mr. Lang. From the car, Mr. Lang's voice was sent by ultrashort waves to the G-E plant and from there by land wire to W2XAF for transmission to Australia. Conversation from Australia was picked up at the short-wave station, sent by land wire to the plant, and from there by the special police transmitter to the moving car. So successful were the results, despite the complicated hook-up, that the small sedan continued to cruise about the Schenectady streets for 15 or 20 minutes more, Mr. Lang carrying on his part in the conversation through an ordinary French-type telephone.

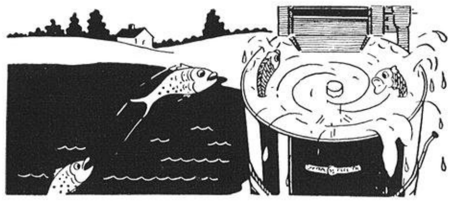


YELLOW LIGHT ON CAPE MAY

The orange-yellow light of General Electric sodium-vapor lamps now illumines roadways in more than 50 installations. It is also being used to light the façades and towers of buildings.

But now this light has another application—in the lighthouse at Cape May, N. J., at the entrance to Delaware Bay. The Cape May Lighthouse was erected in 1859. Its light source is 165 feet above mean high water and can be seen for approximately 19 nautical miles under clear atmospheric conditions. The lens is a first-order, 16-panel, flashing lens rotated by motor drive so that the beam of light has a four-second flash and a 26-second eclipse. The lamp itself does not flash—the rotation of the lens causing the alternate flash and eclipse.

In this test with the sodium-vapor lamp, all equipment has been supplied by the General Electric Company, and the installation was made by the Fourth Lighthouse District.



FISH GYM

The patrons of Joe Medway, a restaurateur up in New York State, literally fished for their dinners. They chose and netted their trout from a large pool. But what made Mr. Medway and his patrons unhappy was that the trout, presumably because of the treacherous refinements of effete pool life, became sissies. They just nosed around listlessly.

One day Mr. Medway gathered up a batch of netting by the pool and placed it in his General Electric washing machine for a rinsing. When he removed the net, there was a trout jumping about the machine in a most sprightly fashion. It exhibited such joyous abandon, in comparison with its sluggish brothers in the pond, that he turned on the activating element again to give it real satisfaction. The trout then accelerated its speed and leaped about in the swirling currents as though it were swimming for life or love in a mountain stream. Mr. Medway threw it back in the pond. It was off like a flash, and had soon churned up the placid waters into a sea of tiny whitecaps with its capers. Then, says Mr. Medway, the bit of spotted dynamite swished in to shore, came to a spray-raising stop, and with wiggles and flops implored its owner for another turn in the washer.

Well, Mr. Medway bought six more General Electric washing machines, and now all the trout are systematically exercised. Mr. Medway is willing to bet that there isn't a single speckled trout from the wildest streams in the country that could last a half a round with his trout. "Because," he says, "they're scientific trained."

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GENERAL ELECTRIC