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THE WISCONSIN ENGINEER

« MEMBER »
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« MAY »
1933

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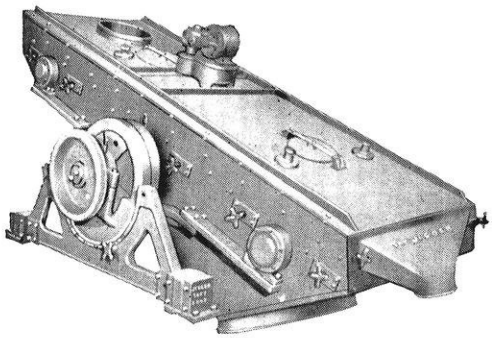

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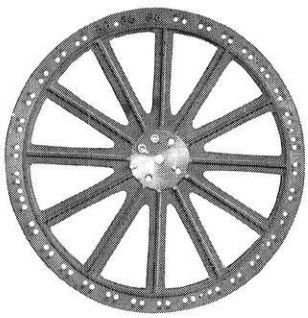
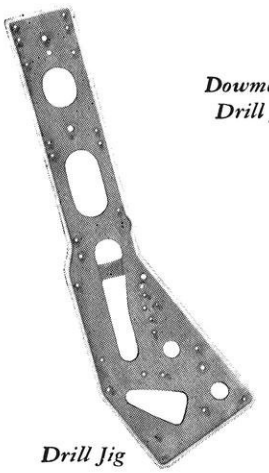
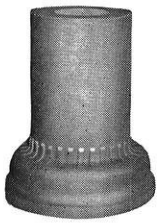


Dowmetal Drill Jig



Drill Jig

Tail Wheel Casting



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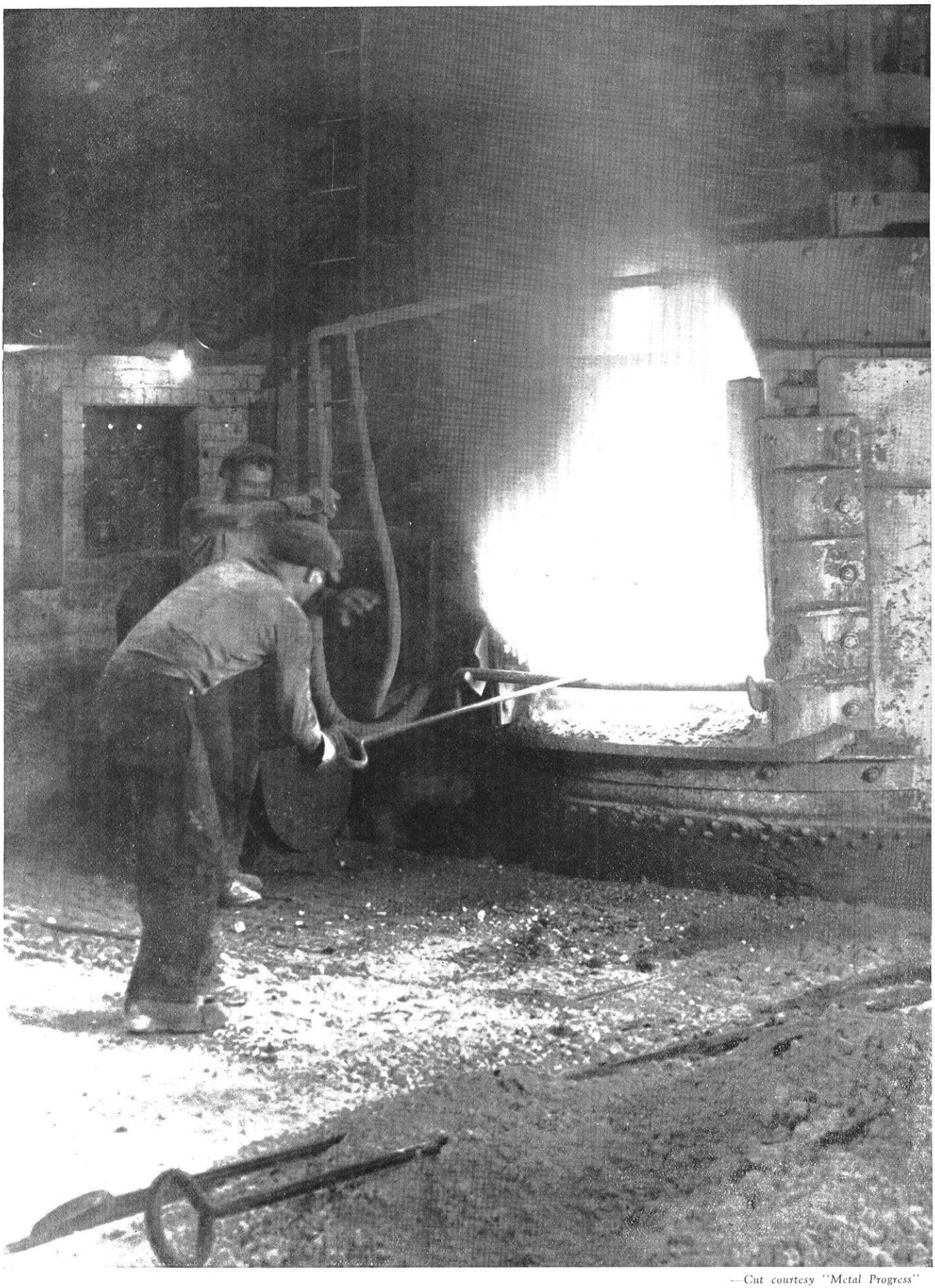


—Cut courtesy "Metal Progress"

Sampling an Electric Heat, as Photographed by Bourke-White at Republic Steel Corp.

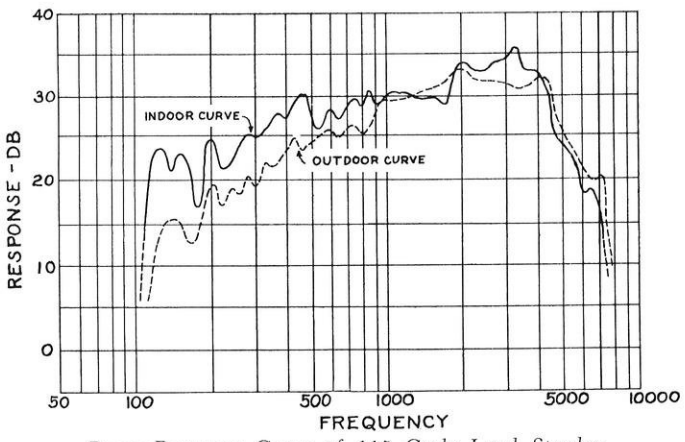
The Wisconsin Engineer

VOLUME 37, NO. 8 MAY, 1933

Steady-State Loud Speaker Measurement

By C. W. P. Walter, e'34

In the various branches of engineering, the efficiency of a device is defined as the ratio of the power output to the power input, and this efficiency is a measure of the effectiveness with which the device performs the functions for which it is designed. The input and output of most electrical apparatus may be found directly in terms of electrical units, but in the case of loud speakers there exists an acoustical output resulting from an electrical input. It is therefore obvious that a correlation between electrical and acoustical units of energy must be made. The electrical input is relatively simple to determine, but a difficulty arises when an attempt is made to determine the sound energy output. We have at our disposal, however, various devices for measuring small differences in pressure in a sound medium such as the Rayliegh Disc, thermal devices and microphones. The condenser transmitter, a special form of microphone, is by far the most convenient instrument for this purpose. The ruggedness of this transmitter as compared with other instruments used for such purposes, and the straight-forward manner in which it can be used, recommend it for practical loud speaker measurements. The condenser transmitter is not, however, an acoustical power indicating device, but instead, an acoustical pressure measuring device having a high impedance compared to the acoustical system in which it is used. It is analogous to an electrical voltmeter and its calibration may be obtained by means of the Thermophone.[1]



Power-Response Curve of 115 Cycle Loud Speaker.

Having decided upon the use of the condenser transmitter for the acoustical measuring device, we are now confronted with the problem of obtaining a medium to measure the pressure so that the measurement will bear some relation to the performance of the loud speaker. Indoor measurements are subject to reflections from the walls and objects in the room, and thus the pressure indicated by the transmitter would not be a true representation of the acoustic output of the speaker. Outdoor measurements would approach ideal conditions to a certain extent but such measurements can not always be made due to wind and weather conditions. In practice, however, tests are now made in so-called "sound proof" rooms where the walls, ceilings and floors are covered with sound absorbing material for the purpose of minimizing the reflection of sound waves from the bounding surfaces. The use of a large room results in less room reaction; but the complexity of the sound distribution, otherwise known as standing waves, makes it difficult to select a place in the room where the transmitter will indicate the direct pressure resulting from the output of the loud speaker. It has been found that satisfactory results have been obtained by rotating the condenser transmitter and the associated amplifier in the path of a circle, the plane of which is inclined at an angle of 45° to the horizontal. A mechanism is used to keep the plane of the transmitter diaphram at all times perpendicular to the axis of the loud speaker. Since a means is provided for averaging the variations in sound pressure in the path of

(Continued on page 120)

[1] "The Thermophone," E. C. Wente, Physical Review. Vol. XIX, No. 4, April, 1922.

Testing the Accuracy of the Theory that

Gold Is Where You Find It

Wisconsin Prospectors Go After the Pay Dirt

By F. T. MATTHIAS

FIRED by the statements of the press and by newsreels portraying the revival of gold mining in the western states, some of us at the Civil Engineer's Summer Survey Camp were bitten by the mining bug and decided to see if it was possible to solve our own personal depression problems by bringing back from the west all the gold we could carry and use. Visions of gold bricks as big as the concrete compression test specimens made in the mechanics lab floated before our minds; speculations concerning the amount of gold we could carry for a hundred yards if we could keep all that we could carry; computations to determine how many pounds of gold we would have to obtain to buy a car for each of us to come back in were perfected; in fact, we were enthusiastic. And then in a fit of pessimism we would console ourselves by considering the educational and recreational value of the trip even if the financial part did not turn out so well.

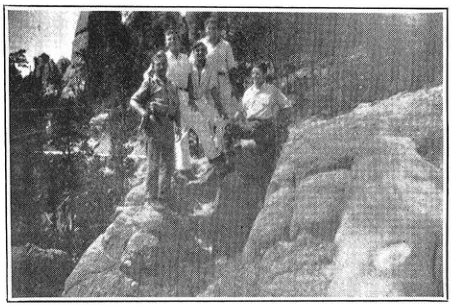
After talking over the prospects of prospecting for several weeks, five of us, Harry Thrapp, Vernon Hamel, Edward Niederer, Paul West and myself, organized a party and set out for the west in Vern Hamel's Marmon.

All went well till, just at the outskirts of the little town of Murdo, at the edge of the Bad Lands of South Dakota, a rear tire gave up the unequal struggle and went down in despair. We put on the spare and tried to get a tire tube in town, but none could be found to fit, even closely. So, with fear and trembling — the rest of the tires were none too good — we went on towards the next town forty-eight miles away without a spare.

At the next town, a city of about 600 — a metropolis in that part of South Dakota — our luck was no better, and we found it necessary to go through the Bad Lands without a spare with Rapid City about 160 miles away. With the rarest of good fortune, we succeeded in making Rapid City without any further trouble.

Receiving instruction in the ancient art of gold panning from an experienced 10 year old prospector.

After spending several days getting organized in Rapid City and determining the best location for our prospecting, we established a camp in Rapid Creek near the headwaters and about forty miles south and west of Rapid City in the heart of the Black Hills. We had hoped to go on to Idaho where the reports were more promising, but, owing to a horrible knock which had developed on the way out and which took a goodly portion of our operating funds to eliminate, we found ourselves financially unable to proceed.



On the Needles highway, Black Hills. Left to right: Matthias, Thrapp, Niederer, West, Hamel.

With the camp established, we wandered around the hills looking for gold. We had heard that it was necessary to work hard to find gold although our mental reaction to that statement was not particularly noticeable.

The old prospectors who talked with us concerning gold hunting invariably told us that experience is not necessary. It is well to know something about gold, the elementary methods of mining, and the type of geological formation in which gold is usually found. But, even without that knowledge, it is entirely possible to make a good strike. Many of the famous gold strikes of history were made by rank amateurs, who made their discoveries by accident. "Gold is where you find it" is a password in the gold mining regions. Maybe it is in a likely place, but likely it is in an unlikely place. So there you are.

Several days were spent in finding a place to dig. After we had found a claim which had been abandoned, and had been able to extract some gold from the abandoned workings, we went to Rapid City to file claim on that property only to find that the claim had been filed by someone else the day before, a situation commonly occurring only in the pages of a novel. So we were forced to work claims owned by an old miner who made us a very liberal proposition. If we mined only five dollars worth of gold per day per man, we could have it all. If we made more than that, he was to get half of the amount in excess of five dollars per day. That sounded good to us, as by then we had reached the point where our visions

(Continued on page 120)

Hardening Characteristics of High Carbon Steel

By C. R. EARL, ch.'33 *and* C. J. GRUBER, ch.'34

THAT the hardness of steel, particularly in the higher range of carbon, may be greatly increased by rapid cooling from a high temperature is widely recognized, even by non-technical men. However, detailed knowledge regarding the influence of various factors on the magnitude of the effect produced is not widely held. A survey of the technical literature has revealed surprisingly little data regarding the variation of surface hardness, center hardness, and depth of hardness as influenced by such factors as carbon content, quenching medium, size of section, and quenching temperature. Work has been started on this problem in the chemical engineering department, and the data presented in this paper represent some of the results obtained by the writers.

Hardness Gradients in Quenched Steel. The change in hardness produced by cooling from elevated temperatures is a function of the cooling rate. In general, the greater the cooling rate, the greater the hardness. It is apparent, therefore, that in quenching steel, maximum hardness will develop on the outer surface where cooling is most rapid, and that the central regions which cool at a somewhat retarded rate will show a lower hardness. However, it should not be inferred that a uniform hardness gradient will be developed under all conditions. For example, if a bar of fairly heavy section (¾" diameter or greater) is quenched in water or aqueous solutions of salt or lye, an intensely hard outer shell is formed, with a central core of much lower hardness. Within the outer hard shell, the hardness gradient is small, with a gradual drop from outer surface inwards. A similar condition holds with respect to the inner relatively soft core. Transition from the intensely hard outer shell to the relatively soft inner core occurs quite suddenly over a short distance, hence

TABLE NO. 1
ANALYSIS OF STEELS

	No. 1	No. 2	No. 3
Carbon	0.86 %	1.03 %	1.06 %
Silicon	0.19 %	0.16 %	0.16 %
Manganese	0.41 %	0.23 %	0.20 %
Phosphorus	0.015%	0.014%	0.010%
Sulfur	0.032%	0.016%	0.012%

in this transition zone there is a very high hardness gradient. The condition just described is illustrated in the upper curve of Fig. 1. Under other conditions, uniform hardness gradients may be developed. The lower curve shows the variation in hardness across the section of a bar 1" in diameter, quenched in oil. The cooling in this case did not produce a hard outer shell, and a uniform hardness gradient therefore developed.

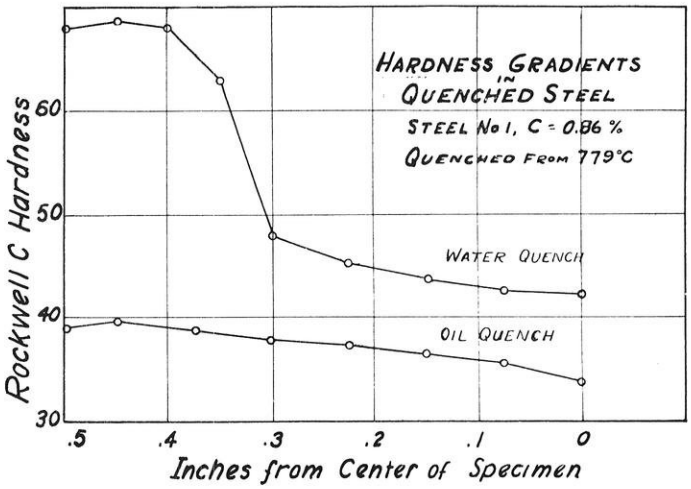


FIG. 1. — *Influence of quenching on the hardness gradient.*

Influence of Specimen Diameter and Quenching Bath. Specimens 1", ⅞", ¾", ⅝" and ½" in diameter and 4" long were machined from steel No. 1. The machined bars were quenched from 1435°F. (779°C.) in four different quenching mediums. Results are summarized in Table No. 2.

The oil quench did not develop a hard outer shell. The hardness gradient from outer surface to center is gradual and of approximately the same magnitude for all section diameters tested. The water quench developed a hard outer shell and a relatively soft inner core in the 1", ⅞" and ¾" sections. The surface hardness values for these sections are substantially the same, but the depth of the hard shell increases as section diameter diminishes. At the same time, the center hardness tends to rise gradually. The ⅝" and ½" sections hardened fully, with no relatively soft central core. The central regions are only slightly lower in hardness than the outer surface.

Refined measurements made by various other investigators have shown that brine and lye solutions are more efficient cooling mediums than pure water. However, the data indicates that substantially the same results were obtained with brine and lye as with water. When the quenching conditions are such that there is rapid movement of the steel relative to the quenching liquid, there appears to be little difference between the results produced by water, brine or lye. However, if the movement of the steel in the quenching bath is slow, brine and lye solutions do show a definite superiority. This was demonstrated by quenching ¾" sections in water, brine and lye, and in each instance holding the steel in a fixed position, with no up and down movement, after immersion in the bath. The water quenched specimens all showed

TABLE NO. 2

INFLUENCE OF SPECIMEN DIAMETER AND QUENCHING BATH

Diameter	OIL			WATER			BRINE			LYE		
	Rockwell C Hardness Surface	Center	Depth of Hard Shell	Rockwell C Hardness Surface	Center	Depth of Hard Shell	Rockwell C Hardness Surface	Center	Depth of Hard Shell	Rockwell C Hardness Surface	Center	Depth of Hard Shell
1″	39	35	Nil	68	42	0.17″	68	42	0.17″	66	42	0.17″
7/8″	41	33	Nil	68	43	0.21″	68	43	0.20″	67	43	0.21″
3/4″	39	33	Nil	67	47	0.26″	68	46	0.26″	67	46	0.26″
5/8″	39	34	Nil	67	63	5/8″	67	65	5/8″	67	64	5/8″
1/2″	38	34	Nil	67	64	1/2″	67	64	1/2″	67	65	1/2″

Steel: No. 1 Hot Rolled. Initial hardness, Rockwell C 27. Brine: 10 parts water and 1 part NaCl by weight.
Lye: 10 parts water and 1 part commercial lye by weight.

soft surface spots, whose hardness was approximately equal to that of the soft central core. The brine and lye quenched bars showed no such soft surface spots.

Influence of Quenching Temperature. With the steels listed in Table 1, it is necessary to quench from a temperature above 1340°F. (726°C.), or else no hardening effect is produced. The hardening effects produced at three temperatures above this minimum were determined for steels No. 2 and No. 3, and the results are summarized in Table 3. In each instance, surface hardness does not increase; in fact a small drop in hardness, which probably is due to slight decarburization, was obtained. While surface hardness is not increased by raising the quenching temperature, the depth of hardening shows a definite increase. Center hardness increases with rise of quenching temperature.

Hardenability of Different Steels. Within the past few years, it has been demonstrated that steels of very nearly the same analysis may differ markedly in hardening characteristics. The results tabulated in Table 3 for steels No. 2 and 3 treated under identical conditions illustrate this point. Both steels developed substantially the same surface and center hardness under similar conditions of heat treatment, but steel No. 2 hardened to a considerably greater depth than did No. 3. While the reasons for such variations are not clearly understood, certain manufacturers claim to be able to control the depth hardening capacity of their product, and guarantee to furnish material that gives constant performance under given heat treating conditions.

The hardenability of a steel is influenced by the carbon and manganese contents. Comparison of the proper data in Table 2 with that of Table 3 shows that steel No. 1 has greater depth hardening capacity than either steel No. 2 or No. 3. The carbon content of No. 1 is 0.86%, which appears to be the optimum value for inducing deep hardening. The manganese content of steel No. 1 is also greater than for steels No. 2 and No. 3, and this also tends to increase the depth of hardening.

Further work is now in progress on the depth hardening characteristics of steel as related to composition.

TABLE NO. 3

INFLUENCE OF QUENCHING TEMPERATURE AND VARIATIONS IN INHERENT HARDENABILITY

Quenching Temperature	Steel No. 2			Steel No. 3		
	Rockwell C Hardness Surface	Center	Depth of Hard Shell	Rockwell C Hardness Surface	Center	Depth of Hard Shell
1430° F. (776° C.)	68	44	0.16″	70	44	0.11″
1520° F. (827° C.)	69	46	0.17″	69	45	0.12″
1600° F. (871° C.)	67	50	0.24″	66	51	0.15″

Specimens: 7/8″ diameter, 4″ long.
Quenching bath: Brine: 10 parts water and 1 part NaCl by weight.
Initial condition of steel: Both annealed. No. 2, Rockwell 86B. No. 3, Rockwell 82B.

THE FRONT COVER

The Forest Products Laboratory, an essential unit of the Forest Service, U. S. Department of Agriculture, has been maintained since 1910 in cooperation with the University of Wisconsin. For some 15 years it has been badly in need of the advantages embodied in its new building. Increased efficiency is insured by the additional space provided and the linking up of all departments under one roof, according to Director Carlile P. Winslow, who issued the following statement on the general structure and purpose of the building:

"As it stands today, the new Forest Products Laboratory building represents an achievement of modern structural economy. The entire structure contains no item of purely exterior decoration except the wood ribs or "fins" accenting the vertical lines of the architecture. All parts of the building have been integrated to the one purpose of efficient scientific research and development work on wood and wood products, to the end that the usefulness of wood in all its forms may be increased, markets and outlets for the products of the forest may be retained, and forestry play a bigger part in solving the problem of idle lands and idle men."

Most of the equipment provided in the new building for the nine research sections of the Forest Products Laboratory came from the former quarters. Facilities include a log storage yard, a sawmill, dry kilns, woodworking plant, gluing, and paint shops, a mechanical testing laboratory, a creosoting plant, a wood distillation plant, a complete experimental pulp and paper mill, and several chemical laboratories.

Holabird and Root, Chicago, were the architects, and C. B. Fritz & Co., Madison, were the contractors.

« « EDITORIALS » »

A RABBIT'S FOOT TO OUR GRADUATES This June sees a large class of Wisconsin engineers leaving this campus with an opportunity to engage in the most thrilling tasks and to wrestle with the toughest problems that civilization has seen. Their's is the opportunity to be in on the making or the breaking of some of the biggest traditions and countries of the world. Some of them will have the intestinal fortitude to dig right in and be a real credit to the society which has produced them. Regardless of what they do or are, the *Wisconsin Engineer* wishes them all the very best of luck and Godspeed.

CHEAP STUFF Press dispatches of recent days carried the story that the great Hoover Dam, now in the building on the Colorado River, is to have its name changed to Boulder Dam. It is an action that has nothing to justify it except pettiness of spirit. It is reminiscient of the practices of ancient days, when the bones of some national hero, who had been buried with honors by one party, would be dug from their grave to be dishonored by a succeeding party.

Why call it Boulder Dam? It isn't in Boulder Canyon; it is actually being built in Black Canyon. The name Boulder Dam has no significance; the name Hoover Dam has. Hoover has been connected with the efforts to control and utilize the Colorado for ten years — long before he was president. We quote from the Colorado Engineer of January, 1923:

> "Herbert Hoover has again demonstrated his ability as a mediator in his able handling of the Colorado River controversy. The successful outcome of the conference, which ended with the signing of a treaty providing the equable distribution of the river waters, was entirely due to his efforts and is a great tribute to his sagacity and farsightedness."

Not only was Mr. Hoover active in making the dam a possibility by his work in bringing to an agreement the various antagonistic states; he was, furthermore, president when the work was actually put under construction. Naming the dam after him was not only in line with the practice which has given us a Roosevelt Dam and a Coolidge Dam; it was a well-justified recognition of the fact that the existence of the dam has been made possible largely through his personal efforts.

Well-informed people will assuredly resent the change in name of the Hoover Dam, particularly if Boulder Dam later becomes Garner Dam or Huey Long Dam.

A JOB FOR THE SUMMER When speaking to our engineers this last month, Dean Potter took an optimistic view of the present economic condition and said that at least now we had an opportunity for doing some studying.

How true that is! Maybe if jobs stay as scarce all summer as they are at present, we really will be able to find out what is inside of some of these big books that we buy at the beginning of the semester but never get a chance to look inside of. Maybe Johnson's *Materials of Construction* will yield up something we didn't get; perhaps with this notebook-making out of the way we can find out what is in Agg's pavement book; or without so many long reports to write, what is in some of the rest of these text books which are stacked up in front of us. Then there are some magazines that we've heard about but never got around to read such as *Engineering News-Record* and the monthly publications of all the engineering societies. It may be impossible to enroll for the summer session, but we can sponge a little reading time out of some of the libraries just the same. Maybe we can find some startling development in the engineering field and practice some of that stuff Van told us about engineering journalism and write up the development for the *Wisconsin Engineer;* they're quite willing to publish that kind of an article.

Yes, it looks as if there is plenty to do this summer even if we can't manage to persuade someone to pay us for doing it. We can make an investment in ourselves.

LOUD SPEAKER MEASUREMENT

(Continued from page 115)

the transmitter, as will be discussed later, this serves to further minimize the effect of standing waves.

The measuring procedure is as follows. The output of the oscillator is connected to the loud speaker by means of the D. P. D. T. switch. The sound energy impinging on the diaphragm of the polarized condenser transmitter causes a voltage to be generated. This weak voltage is increased in magnitude by the amplifiers, and a suitable deflection of the milliameter is obtained by adjusting the gain control of the last amplifier. Due to the rotation of the condenser transmitter, the deflection of the meter varies periodically. It is this variation that enables the operator to average the differences in pressure experienced by the rotating microphone. The D. P. D. T. switch is now thrown so that the oscillator output is connected to the attenuator. The potential output of the attenuator is now adjusted until the deflection of the milliameter is the same as that obtained with the oscillator connected to the loud speaker. The setting of the attenuator is the response of the loud speaker at that frequency. The same procedure is gone through at small intervals of frequency throughout the range in which the speaker will give a measurable output, and these points are plotted against frequency. The resulting curve is called the response-frequency characteristic of the loud speaker under the conditions tested.

The advantage of using this type of circuit lies in the fact that the characteristic of the speaker is not changed by any variations in battery voltages, tubes, etc., or by the variation of amplification with frequency; because the amplifiers are used only to compare the voltage produced by the condenser transmitter with the voltage output of the attenuator. The calibration of the attenuator remains quite constant so that the only corrections to be made are for the non-linearity of the transmitter characteristic and the variable impedance transformer.

Standard conditions for testing consist of placing the loud speaker at a constant pre-determined distance from the transmitter and maintaining a constant pre-determined input to the loud speaker by means of the vacuum tube voltmeter.

The characteristics of a 115 cycle cut-off exponential horn, equipped with a moving coil type unit, measured outdoors and indoors is shown in the figure on the preceding page. Both characteristics were obtained by placing the rotating microphone twelve feet from the horn mouth. A comparsion of the two curves shows a divergence at the low frequencies, which shows that the sound absorbing quality of the damping material on the walls, etc., of the room are not as great at the lower frequencies as they are at the higher frequencies.

From the above general considerations it can be seen that it is quite difficult to interpret the significance of response measurements on loud speakers unless such measurements are qualified by statements regarding the acoustic measuring conditions. These conditions concern the position of the condenser transmitter relative to the loud speaker, the size of the medium in which the measurements were made, and the method of measurement, i. e., transmitter stationary or rotating. On the whole, however, it has been found that the response-frequency characteristic, even though complicated by a very wide variety of factors, some too involved to be considered in this article, and of a lesser degree of importance, is the most significant single criterion upon which to judge the merits of a loud speaker.

GOLD IS WHERE YOU FIND IT

(Continued from page 116)

of the gold that we would get had shrunk to approximately the size of a doorknob. Then, as we left this miner after making the arrangement, he quietly announced that he would be exceedingly fortunate if he would get anything out of it. That didn't sound so good to us.

Anyway, we fixed up a sluice and fixed up a dam and started to dig. On Saturday the active sluicing began and we worked all afternoon as we probably have never worked before. That night when we cleaned up the sluice we found that we actually had found some gold, flecks and particles in large numbers, but exceedingly little in quantity. Enough, at any rate, so that our spirits lifted considerably and we decided that we could take out some money after all. So the gloom that had started to permeate the camp lifted.

And the next night the rain came. The little peaceful creek which wound through the valley got right up on its front legs and kicked. And when the rain cleared away our sluice was gone, the dam was nearly gone and the pail which served as our refrigerator had moved on down the creek carrying two pounds of butter with it. This occurred on August 14, about two weeks after we had left Madison. Our cash funds were getting low, and the prospects of replenishing them by sale of gold seemed to us to be about as large as zero divided by infinity. We had determined before we went that we would only take enough money along to last us a few weeks to prevent us staying on and on in the hope of finding some gold "tomorrow", a frame of mind that has ruined many a good prospector. So, as Thrapp so ably stated the case, after having been "betrayed by the fickle finger of fate", we decided to see the Black Hills and then head for home.

Which we did, with gold enough along to partially cover a small size button to the depth of approximately one-sixty-fourth of an inch. And so ended the prospecting trip.

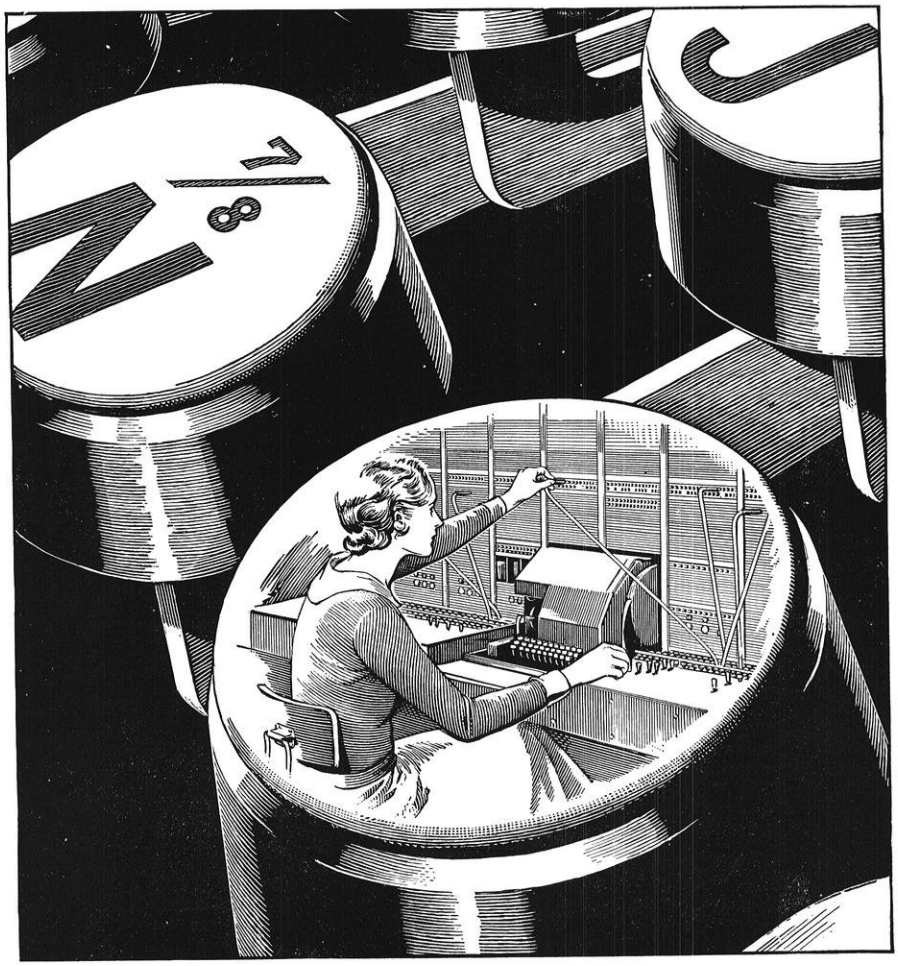
MAKING LIGHT OF THE TIMES

A young bridegroom, after the wedding was over and the bride's father had gone off to the club, began to search anxiously among the wedding gifts.

"What are you looking for, dear?" said the bride.

"That fifty-pound check of your father's," he said. "I don't see it anywhere."

"Poor papa is so absent-minded," said the bride. "He lit the cigar with it."—*Tit-Bits.*



Another aid to business ...a *Teletypewriter* "Central"

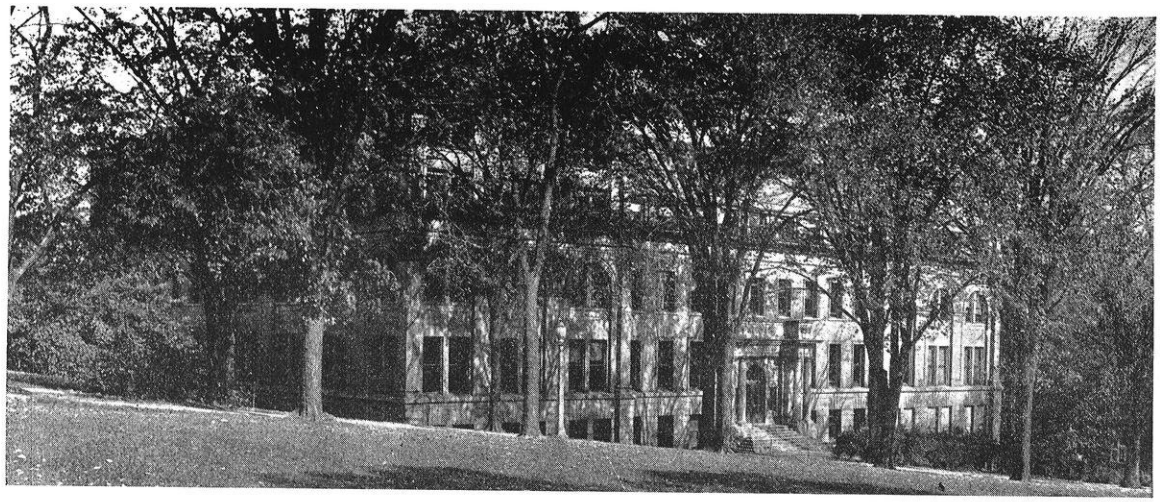
Working out new ways to serve the communication needs of the public is an objective always in the minds of Bell System men. The new Teletypewriter Exchange Service—typing by wire—is an example.

For some years Private Wire Teletypewriter Service has speeded communication between separated units of many large organizations. Telephone men—anxious to make this service more widely useful—have now established Teletypewriter central offices, through which any subscriber to the service may be connected directly with any other subscriber. Both can type back and forth—their messages being reproduced simultaneously at each point.

This new service provides fast, dependable communication and does for the written word what telephone service does for the spoken word. It is one more Bell System contribution to business efficiency.

BELL SYSTEM

TAKE A TRIP HOME BY TELEPHONE
...TONIGHT AT HALF-PAST EIGHT!



« CAMPUS NOTES »

ENGINEER HEADS CARDINAL STAFF

Edward Bachowski, c'34, was appointed business manager for the Cardinal on Tuesday, May 2. Evidently, even the Cardinal has come around to a realization of the fact that it pays to do things correctly. Congratulations, Ed., put the Cardinal on an engineering basis.

WAGNER WINS YEARLY HERFURTH EFFICIENCY PRIZE

Aubrey J. Wagner is the winner in the 1933 Theodore Herfurth Efficiency Award, the judges announced at a recent meeting in the Park Hotel The $100 award, which was established by Mr. Herfurth in 1928, is given each year to the best all around senior man.

SHAKE 'EM UP, GALS!

Now that Haresfoot's "Klipklop" has come and gone, we can give due credit to the engineers actively engaged in the production. Wilbur Engel, e'34; Bill Roper, Ag. e'34; Harold Jury, e'35; and J. Thorel, m'34 were members of the cast. Bob Ball, e'35; Roland Biersach, m'35; and Ken Wollaeger, m'34; were members of the ensemble, the last two as members of the fairer sex. Paul Corp, m'33, formed an integral part of the orchestra. Harold Hansen, '35, played the role of the accordion man in the orchestra for the Prom.

According to reports, the entire group had a swell beer party on Friday night of show week out at the Watertower. J. Dibble, c'35, head of the stage crew, is of the opinion that they were the homliest bunch of chorus girls he's seen in a long time. The stage crew hollered themselves hoarse trying to get the girls to smile sweetly, which, of course, was practically impossible. The unofficial backstage slogan for the show was "You're a big girl now, keep your skirts down."

ENGINEERS GET "W" AWARDS

Major and minor "W" awards were announced at the meeting of the student athletic board on Wednesday, March 29. The engineers are well represented. Among those receiving awards are: Maurice Jansky, e'35, hockey; Donald Anderson, m'33, gymnastics; Thomas Bardeen, e'33, swimming; Tony Traskell, m'35, swimming; Kenneth Youngchild, ch'33, water polo; Robert Salmon, m'36, Allan Cole, c'36, and Lloyd Severson, m'36, wrestling; and James Gillies, ch'36, hockey.

ENGINEER'S BLARNEY BEST

Arthur B. Magidson, c'34, who recently won the privilege of representing the University of Wisconsin in the Northern Oratorical League finals at Iowa City, also won first place in the finals. Only three other men from Wisconsin have ever taken first place, the men being A. Reis, R. Lafollette, Sr., and S. Tracy.

OUR FACULTY RECEIVES BOUQUET

The engineering faculty of the University of Wisconsin took honors lately when a check of "Who's Who in Engineering" revealed the fact that Wisconsin ranks sixth in the number of outstanding engineers produced in the last decade. The survey covered 130 colleges and universities in the United States and Canada and is therefore extensive enough that the distinction given Wisconsin may be called truly cosmopolitan. In the Middle West, only two schools, Michigan and Illinois, outranked Wisconsin. Their history is much older than that of the Badger campus and therefore we need feel no chagrin that others in the Big Ten have been called better. Massachusetts Tech is first and Cornell is second. Both of these schools concentrate on engineering.

ENGINEER BEST FITTED FOR GOVERNMENT, VIEW

"I want to say to you that the opportunities in public service in the future will be much greater than they have been in the past," said Mayor James R. Law in his address to Tau Beta Pi at the spring initiation held in the Memorial Union on April 25, "for the reason that the people are insisting upon better and more efficient government at lower costs."

The Mayor is himself an architect by profession. He stated that Governor Horner of Illinois recently employed a firm of engineers in Chicago to work out a re-organization of the entire state government. "I feel that an engineer, or an architect, is better trained for governmental work than the lawyer, although, by far the majority of the representatives in our legislative bodies are attorneys. An attorney in trying a law suit, as you are all aware, takes every ethical advantage to win — an engineer, or architect, is trained to take a more judicial viewpoint in carrying out his work. It is no coincidence that the majority of city managers have engineering training, and it is my opinion that one trained engineer in the smaller communities, placed in charge of the operation of all the utilities would result in better service to the public at lower costs.

"Our present municipal organization is inadequate," the Mayor said, "and the correction of it is now my present concern."

ITS A TOUGH LANGUAGE, MATIES

The attempts of the junior civils in Engineering English to define words are good for a laugh even in times like these. The following were perpetrated at a recent class meeting:

Dowel — An important old lady. (We guess he was thinking of "dowager".)

Anomaly — Study of animals.

Camber — To climb (As, He cambered up the hill).

Virgil — Goddess of Greecian mythology.

Debacle — A gay affair (Perhaps he was thinking of "debauch").

Funicular — Comical

Eschew — Off center (The bridge was slightly eschew?)

Actuary — Place where river current meets lake or ocean tides forming a delta.

Proscenium—Pertaining to the nose.

BLESSED EVENTS DEPARTMENT

A daughter was born to Mr. and Mrs. Norman Withey on Sunday, April 16. All of which arranges things so that Professor M. O. Withey am now a grandpappy. When interviewed, Professor Withey refused to quote the views of the young lady, but he stated that she is doing nicely.

— — —

A daughter was born to Mr. and Mrs. F. M. Dawson on March 2. Professor Dawson is hereby accorded honors as a pappy, and again he refuses to quote the young lady. If, in the future, the maidens in question have as little to say as is indicated, we'll be Jonny-on-the-Spot.

— — —

Harvey C. (Red) Parsons, e'34, received his other pair of socks in the last laundry case. The black pair is about ready to hitch hike home, starting as soon as possible in order to reach there in time for the spring cleaning.

POTTER SPEAKS TO ENGINEERS

You fellows aren't going to get real engineering jobs for several years now, said Mr. A. A. Potter, Dean of the College of Engineering at Purdue in an address to a general convocation of engineering students in the Engineering building, April 24.

However, Mr. Potter continued, it is a matter of record that many of the most successful engineers in the country started their careers during depression times. It simply means that they had no jobs, no work, and that instead of sitting around wishing for some, they went ahead and prepared themselves to handle the work that was bound to come.

You will find, concluded the Dean, that the men with whom you will compete are going to do things in a more thorough manner than ever before. Which means, of course, that you too will have to dig into things. Thoroughness is what will be required.

ROCK FORMATIONS

Feridun M. Achki, e'33, of 169 Badet Caddesi, Kuzil Toprak, Constantinople, Turkey, and his partner, Ed Persen, were surveying on West Bluff during the Summer Survey Camp. Said a tourist hiker to the party, "Where is the Turk's Head?" "Right on the shoulder that is carrying that transit," was Persen's reply.

CITIZENS vs. TECHNICAL CLUB

"The Sewage Treatment Problem in Madison" was the general subject of the meeting of the Technical Club on Monday evening, May 1, at the Congregational Church. Some time ago, Mayor Law suggested to the Board of Directors of the Technical Club that the Club interest itself in the proposed transfer of control and operation of the city's sewage treatment plants to the Metropolitan Sewerage District. The committee reported its findings at this meeting. The committee was composed of L. H. Kessler, Chairman; A. Kanneberg, Chairman Statutory Committee on Water Pollution; J. Icke; L. F. Warrick, State Sanitary Engineer; and W. L. Woodward.

After the committee had made its report, the meeting was thrown open to general discussion. Many of the members of the city Council were present, as well as several citizens of Madison. In the course of the evening, it developed that the chief problem confronting the men in charge of cleaning up the lakes consisted of placing their findings and proposals in front of the public. Up until now, although the movement toward better lakes has been in progress for many years, most of the people of Madison do not know what it is all about, and hence are opposed to it.

The committee was instructed to proceed with the problem of placing the matter before the public and was also given authority to represent the Technical Club at future Council meetings. The whole affair was an excellent example of what the Engineer must contend with in practice above and beyond engineering.

DARWIN AND THE CHEMISTS

"The Coming of Darwin" was the topic of a lecture given by Mr. George Wagner, professor of zoology at the University of Wisconsin, on Thursday, April 20, in Bascom Hall. The lecture was the fifth in a series on the history of science sponsored by Phi Lambda Upsilon, honorary chemical fraternity. The lecture traced the development of present ideas on evolution from the times of the Egyptians, laying particular stress upon those experiences in the life of Darwin which brought him to the evolutionary viewpoint.

« ALUMNI NOTES »

ELECTRICALS

Jordan, Roy D., e'27, is in the Chicago office of the General Electric Co., where he will stay until the opening of the World's Fair. He will do general publicity work there and probably enter into the routine of the district office. Mr. Jordan is in the Publicity Department of this company in Schenectady, N. Y.

Hebard, Glen G., e'26, is doing electrical designing for the Century of Progress Exposition at the World's Fair, Chicago.

Rogers, Ross W., e'21, died suddenly on March 12, in Florida. After graduation and until 1927 he was with the Public Service Co. of Northern Illinois. He then became an engineer with Bates and Rogers Construction Co., in New York.

Muir, Roy C., e'05, has recently been appointed manager of the engineering department of the General Electric Company at Schenectady, N. Y. In his new position, Mr. Muir will be in direct charge of the company's designing engineering in all of its plants, the works laboratories, and the general engineering laboratory at Schenectady. Mr. Muir has been with the General Electric Company since his graduation in 1905, at which time he entered the student engineering course of the company. For the past three years he has been assistant to the late C. E. Eveleth, vice president in general charge of the designing department and the works laboratory.

Benedict, R. R., e'25, became the father of a baby boy, Thomas Ralph, on January 7, 1933.

Johnson, Royce, e'24, on February 1, became the father of a baby boy, Stephen Bror.

Johnson, Floyd D., e'24, has his wedding date set as June 5, 1933. He is in the circuit breaker department of the Westinghouse Co. at Pittsburgh. He expects to come to Wisconsin for his honeymoon.

Sharp, H. M., e'22, is now manager of the Lighting Department of the Elmira Light, Heat, and Power Corporation, at Elmira, N. Y.

Ackerman, Adolph J., e'22, has been appointed hydraulic engineer on the engineering staff of the Canal Zone.

RUSSELL EDWARD PUERNER*

Russell Edward Puerner, Assistant Professor of Machine Design, was born September 21, 1896, at Jefferson, Wisconsin, and died at Madison, April 2, 1933. His parents, John W. and Sarah Glaessel Puerner, were among the early German families that settled in that section about 1848. They took an

RUSSELL EDWARD PUERNER

active part in the development of the community in which they lived — Mr. Puerner, Senior, at one time being Mayor of Jefferson.

After receiving his elementary education in the Jefferson schools, Professor Puerner entered the University of Wisconsin in 1915 and received his B. S. degree in Mechanical Engineering in 1919. While he was a University student, he spent a large portion of his summer vacations making land and drainage surveys for Jefferson County. During his University career, he became a member of Theta Xi Fraternity and this bond of friendship and loyalty is best expressed by the deep sorrow of his fraternity brothers when notified of his death. For the past few years and up to the time of his death, he was a faculty adviser for the group.

*From resolution adopted by the University Faculty May 1, 1933.

In 1921, Professor Puerner married Mildred Barney at Fort Atkinson, Wisconsin, and of this union their little girl, Sarah Mae Puerner, was born.

After graduating from the University, he was employed as an engineer by the Milwaukee Electric Railway and Light Company on the development of the Lakeside Power Station, and in the fall of 1920 he was called to the University as an instructor of Machine Design. In 1925, he was promoted to the position of Assistant Professor, which position he held at the time of his death.

For many years, Professor Puerner was an adviser for non-promoted Engineering Freshmen and in 1931 when the new Mechanical Engineering Building was dedicated, he acted as Treasurer and supervised the housing of the 350 guests who were here to attend the dedication and the National Meeting of the Oil and Gas Power Division of the American Society of Mechanical Engineers.

He was an able and popular teacher and a loyal friend to his students as well as to his colleagues on the faculty. He was possessed of a fine memory of names, faces, and facts which enabled him to meet former students and acquaintances without hesitation and with a feeling of mutual friendship.

He was always patient and helpful and never too busy to confer with his students on the subject of their personal and scholastic difficulties and he was always ready to help them with friendly advice and encouragement.

MINING

Link, Marcus W., min'21, was a visitor at the University during the first week of May. He is now mine man-

ager for the Klondike Fluorspar Corporation, Mullekin, Kentucky.

CHEMICALS

Gongoll, Vernon E., ch'33, has been helping a friend at Kewaunee develop a wood stool for use in laboratories.

Dormer, George G., ch'31, at present is vacationing at Ishpeming, Michigan.

He says the winter is a long one there.

Peterson, Chester H., ch'31, visited the University April 28, and reported that the inspection department of the Firestone Tire Co., of Akron, Ohio, continues to keep him on their pay roll.

Riplinger, Ellis C., ch'28, and Miss Lillyan Thelma Black were married April 27, 1933, at the bride's home, 2207 Chelsea Terrace, Baltimore, Md. Mr. Riplinger is a member of the staff of the Seaboard By-Product Coke Co., Jersey City, N. J.

Grenfell, Donald S., ch'14, writes from Potosi, Mo., that manufacturing lithopone is still a going business.

MECHANICALS

Janiskewski, Charles, m'32, is leaving for Russia about the middle of May. He has a contract with the U. S. S. R. His home is at 948 W. Galena St., Milwaukee.

Madell, Frank J., m'24, is now in Oshkosh, Wis. His address is 1030 Algoma Blvd.

Corley, John S., m'14, is in the Farm Loan Department of the Bankers Life Insurance Co., Des Moines, Iowa.

Dorner, Fred H., m'05, was made an honorary member of Pi Tau Sigma, honorary mechanical engineering fraternity at their last initiation in April. He is a consulting and sales engineer in Milwaukee, and is a former president of the Milwaukee Engineers' Society. Last fall the Alumni Association appointed him to the Board of Visitors of the University.

Buerstate, F. W., m'01, died suddenly following a heart attack while driving his car in Seattle, Wash., his home. At the time of his death he was manager of the locomotive department of the Hofius Steel and Equipment Co. Until 1917 when he took this position, he was professor of mechanical engineering at Washington State College.

CIVILS

McMullen, Ralph Earl, c'27, and Miss Edith Marie Miller of Spokane, Washington, were married on March 30 at Spokane.

Hovey, William, c'32, was married to Adele Homann of San Antonio, Texas, on March 31. They will make their home at San Antonio where Mr. Hovey is in the engineering division of the Texas Oil Co.

White, Frank P., c'33, has been appointed construction foreman and engineer in the forest relief service at Munising, Michigan.

Jenks, Robert J., c'33, who completed his course is February, writes that he has connected with an engineering job that pays a salary. He is located at 402 Prospect Ave., Lewiston, Idaho.

Newing, Charles W., c'31, has been appointed surveyor in the forest relief service at Munising, Michigan.

Daggett, Gordon F., c'24, is executive secretary of the Wisconsin Materials Association, with offices in the Empire Building, 710 N. Plankinton Ave., Milwaukee.

Christensen, Nephi A., c'28, has been teaching since graduation at Ricks College at Rexburg, Idaho. He has held the rank of professor of engineering for the past three years.

Mabry, Armon E., c'23, is a member of the firm of Tanner and Mabry engaged in architectural practice at Houston, Texas. He spent the five years from 1926 to 1931 at the Beaux Arts in Paris, where he was married in 1927 to Wally Fredericksen, a native of Mandal, Norway. A daughter, Jacqueline, was born in Paris in 1928. Home address: 1216 Bartlett St., Apt. 10, Houston.

Tschudy, L. C., c'23, can be reached in care of Otto Kubly, Route 5, Monroe, Wisconsin.

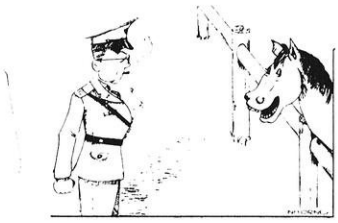
Becker, Elmer W., c'24, has been appointed construction foreman in the forest relief service at East Tawas, Michigan.

Krez, Frederick, c'21, of Plymouth, Wis., was a candidate for the office of county judge of Sheboygan County, but his opponent, Judge Schlichting was re-elected. Krez is also a graduate of the law school and is a former state assemblyman.

Dohm, John W., c'11, died at Hibbing, Minnesota, February 16. He was president and manager of the Dohm Building Co., at Hibbing.

Bates, Onward, C.E.'97, was recently elected honorary member in the Chicago Engineer's Club. Mr. Bates, who is in his eighty-third year, is past president and honorary member of A. S. C. E. and past president and honorary member of the Western Society of Engineers.

Bond, Aubrey H., c'17, captain, Corps of Engineers, U. S. Army, was assigned in August, 1932, to duty as a student in the Army Industrial College



at Washington, D. C. The course consists of advanced research in economics and business administration with special reference to procurement planning for war and industrial mobilization in emergency.

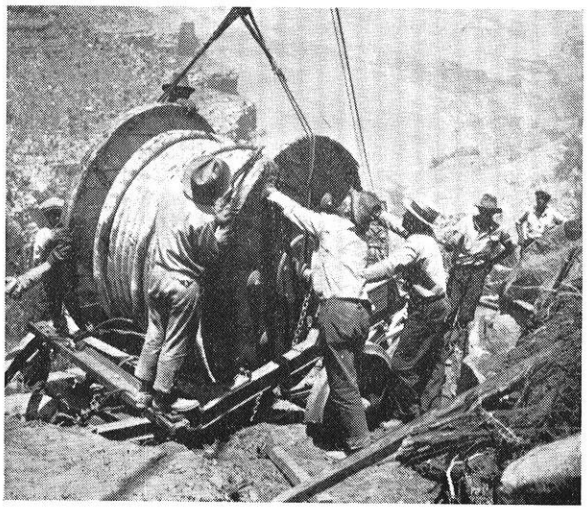
Kirchoffer, W. G., c'97, C.E.'01, hydraulic and sanitary engineer of Madison, is the designer of a new type of heater house for elevated water tanks. In cold climates it is often advisable to provide elevated water tanks in small waterworks systems with some type of heating arrangements to keep the risers from freezing during the times when there is little or no water being used. A new 50,000 gallon tank at Verona, Wisconsin is equipped with the heater designed by Mr. Kirchoffer.

A joint meeting of the Engineering Society of Milwaukee and the Engineering Faculty of the University of Wisconsin was held at the new Mechanical Engineering Building on April 28th. Those who attended were:

W. D. Bliss, ch'13
F. K. Brainard, E. E.'08
H. E. Czerworky, m'24
Fred H. Dorner, Sr., m'05
Fred H. Dorner, Jr., m'32
H. W. Dow, m'02
M. K. Drewry, m'22
Wm. Hammann, c'24
H. R. Heintzen, e'18
L. W. Heise, m'26
H. W. Hiemke, ch'26
Frank A. Kaiser, c'18
C. H. Krueger, e'16
W. C. Lindemann, m'08
E. A. Longenecker, m'22
B. V. Nordberg, m'07
F. K. Quimby, c'20
Sam Snead, 13
G. J. Weckmueller, '32
H. W. Wesle, c'15
R. E. Wolff, '31
all of Milwaukee, and
Robert C. Johnson, c'17
of Fond du Lac.

PUMPING STATION CONTROLLED FROM RIM OF GRAND CANYON

There is a town in Arizona which has for years been shipping all its water in by railroad tank cars, although it is on the bank of a foaming, rushing river. The trouble is, the banks are nearly a mile high; for the river is the Colorado, and the town is on the rim of the Grand Canyon. Now the Atchison, Topeka and Sante Fe tank

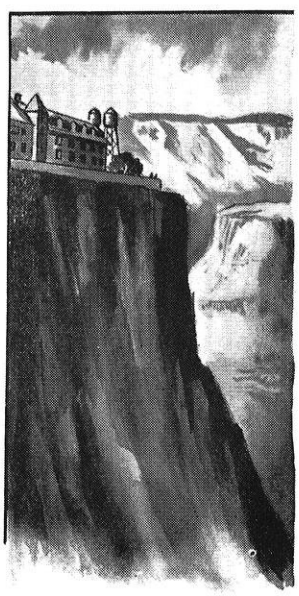


—Cuts courtesy Atchison, Topeka and Santa Fe Railway Co.

cars which have been hauling in an average of 70,000 gallons each day can go elsewhere, for electric pumps are being installed, by which all the behavior of the machinery far below will be evident from the control point above. Control wires are buried under ground so as not to deface the scenery.

Water pumped 3000 feet high is a precious commodity; packed with energy it takes more than 6 horsepower to supply a single faucet, and an ordinary bucket emptied into the abyss could generate a horsepower for a minute or so if it hit a waterwheel at the bottom.

The unsatisfactory and expensive importation of water has been eliminated by the installation of a remotely controlled pumping station at Indian Garden Springs, 3000 feet below the rim of the canyon. The Indian Garden Springs on a plateau within the canyon, collect water in a 70,000 gallon reinforced concrete reservoir. Other water from below the springs is caught by a submerged dam built at the lower end of the plateau, 200 feet below the reservoir and 2000 feet distant. Two vertical turbine pumps lift this water to the reservoir.



The main pumps are located 3153 feet in vertical distance below the top of the tanks on the canyon rim with a total pipe length of 12,000 feet.

SECOND ANNUAL YEARBOOK SUPPLEMENT

A Review of the Past Year

By Dean F. E. Turneaure

In looking over the activities of the College of Engineering during the past year, there seem but few things worthy of special comment. The every-day work of the faculty and of the students has been done quietly and effectively, and there has been no letting down on the part of the students in the quality of their work because of any influence the present depressed condition of industrial life may have, although such condition is a serious matter to them. These every-day activities have indeed been rather overshadowed by our general interest in what is happening in the country at large: The presidental campaign, the bank holiday, the hard times, the legislative program in Congress, and our own University budget. All of these are of interest to all good citizens, and in view of the relation of the engineer to this industrialized civilization, some of the economic questions should be of special interest to engineering students.

Dean F. E. Turneaure

One of the results of the present disorganization and unbalanced condition of our economic relations will doubtless be to place more emphasis on the study of economic problems in the engineering courses throughout the country. Much attention has been given to this question by engineering educators, and it is likely that some modifications of the programs of study will be made. The primary purpose of the course will, however, not be lost sight of, that is, to give a thorough grounding in the fundamental theory underlying engineering practice; and engineering graduates will in the future, as in the past, seek their first employment in subordinate engineering capacities. A better understanding, however, of the engineer's relation to other forces in our economic society should be of decided value not only to the individual himself but also to the general public welfare.

Notable research has been continued in various departments. The large program of steel column investigation on behalf of the American Society of Civil Engineers has been completed and the final report presented at the annual meeting in January. This work has already led to the modification of column formulae used in practice. Other laboratories have conducted their regular research programs and are publishing valuable results. Special notice should be taken of the service courses given in the Hydraulic Engineering Department for master plumbers and for sewage plant operators. These have involved a large amount of extra work on the part of the staff of that department, much of it having been done during the Christmas vacation.

Two important meetings of engineering educators will be held here in July: From July 5 to 25, a Summer School for teachers of Mining and Metallurgical Engineering; and from July 3 to 7, a Conference of Administrative Officers of Engineering Colleges. Both of them are under the auspices of the Society for the Promotion of Engineering Education.

We are especially pleased to extend our congratulations to three engineering students who have recently received special University honors. They are: Aubrey J. Wagner, senior civil, who received the Herfurth efficiency prize for the best all-around senior man at the University; Arthur B. Magidson, junior civil, who won first place in the Northern Oratorical League Contest; and Edmund Bachowski, also junior civil, who has just been appointed business manager of the Cardinal. This is an exceedingly fine showing for the College of Engineering. An unusual burst of enthusiasm this spring led the students to restore the custom of a St. Pat's parade. After considerable maneuvering to prevent the enthusiasm from boiling over too greatly, the parade was held, and in spite of some rather raw items, was rated as highly satisfactory.

One of the high points during the year was the address of Dean A. A. Potter of Purdue, President of the American Society of Mechanical Engineers. His picture of the situation with respect to employment and future prospects of the engineering graduate was thoroughly sound, and I am sure gave a great deal of encouragement to upper classmen.

The economic skies appear to be getting brighter and I urge all students now completing their university work to continue their studies, if possible, and to improve their preparation for engineering service.

ROYAL H. WOOD
Edgerton, Wis.

Business Manager of *The Wisconsin Engineer*, President of Tau Beta Pi, Phi Kappa Phi, Pi Tau Sigma, Sophomore High Honors, Vice-President of A. S. M. E., Finance Chairman of Engineers' Parade Committee, President of Triangle.

AUBREY J. WAGNER
Madison, Wis.

Phi Kappa Phi, Phi Eta Sigma, Secretary of Tau Beta Pi, President of Chi Epsilon, Sophomore High Honors, Captain of Scabbard and Blade, Assistant General Chairman of Engineers' Parade Committee, Rifle Team, Drill Team, Cadet Major, Chairman of O. R. C. Arrangements Committee of the 1933 Military Ball, Herfurth Efficiency Prize Winner, Lambda Chi Alpha.

HERBERT H. KIECKHEFER
Milwaukee, Wis.

Editor of *The Wisconsin Engineer*, Phi Kappa Phi, Secretary of Eta Kappa Nu, Vice-President of A. I. E. E., Polygon, Sophomore Honors, Badger Editorial Board, Publicity Chairman of Engineers' Parade Committee.

CLYDE F. SCHLUETER
Wausau, Wis.

Phi Kappa Phi, Treasurer of Eta Kappa Nu, Phi Eta Sigma, Scabbard and Blade, Pi Tau Pi Sigma, Sophomore Honors, Managing Editor of the 1933 *Badger*, Assistant General Chairman of the 1933 Military Ball, Cadet Captain, President of Alpha Chi Rho.

WHO'S WHO IN THE CLASS OF 1933

(Recommended by Senior Advisors)

WALTHER E. WYSS
Medford, Wis.

Phi Eta Sigma, Phi Kappa Phi, Secretary of Tau Beta Pi, President of Eta Kappa Nu, President of Polygon, President of A. I. E. E., General Chairman of Engineers' Parade Committee, Sophomore High Honors, Varsity Wrestling, Triangle.

THOMAS BARDEEN
Madison, Wis.

Tau Beta Pi, Eta Kappa Nu, Phi Kappa Phi, President of Athletic Board, Dolphin Club, Varsity Swimming, Sophomore Honors, Delta Kappa Epsilon.

MAXWELL H. BOYCE
Wausau, Wis.

Business Manager of The 1933 *Badger*, A. I. Ch. E., *Badger* Staff, 1, 2, 3, 4, Vice-President of Tau Kappa Epsilon.

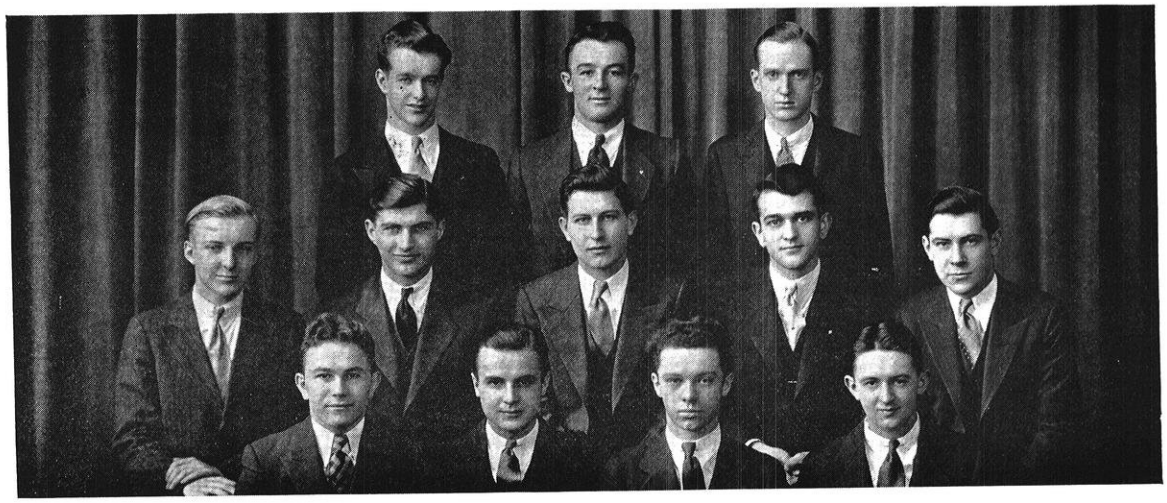
CLAUDE A. LYNEIS, JR.
Fond du Lac, Wis.

Phi Kappa Phi, Vice-President of Tau Beta Pi, President of Chi Epsilon, National Advertising Manager of *The Wisconsin Engineer*, A. S. C. E., Sophomore Honors, Vice-President of Kappa Sigma.

THE WISCONSIN ENGINEER

Through which engineers extoll, expound, exhort, and explain.

Kieckhefer Wood



Englehardt Clark Wood Halamka Liska Lyneis Kieckhefer Van Hagan Neill Janett Meythaler Klein

POLYGON

Object: To have at all times an organized body of representative students which can act for the interests of the College of Engineering; present to the faculty matters of special interest to the student body; and assist in organizing the various activities in the College of Engineering.

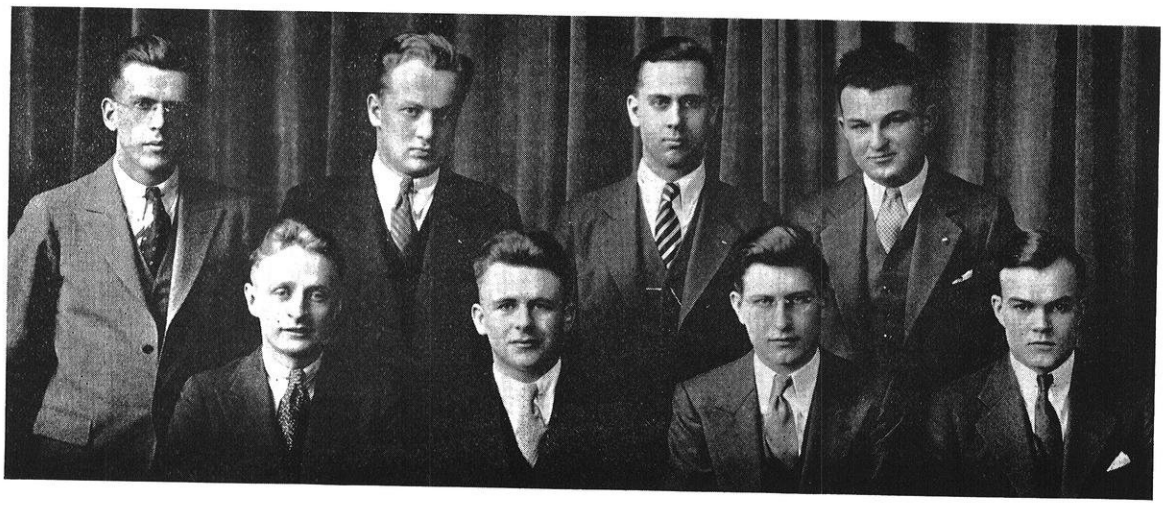
Members in University

Class of 1933

Gilbert Bayley
Alfred Brandlhofer
Jack Eisaman
Arnet Epple
James P. Kaysen
Herbert Kieckhefer
Vernon Palmer

Class of 1934

Walter Woods
Walther Wyss



Bayley Palmer Kaysen Wyss Epple Kieckhefer Brandlhofer Woods

HONORARY ENGINEERING FRATERNITY

Founded 1885
Lehigh University
56 Chapters

Local Chapter
Wisconsin Alpha
Established 1898

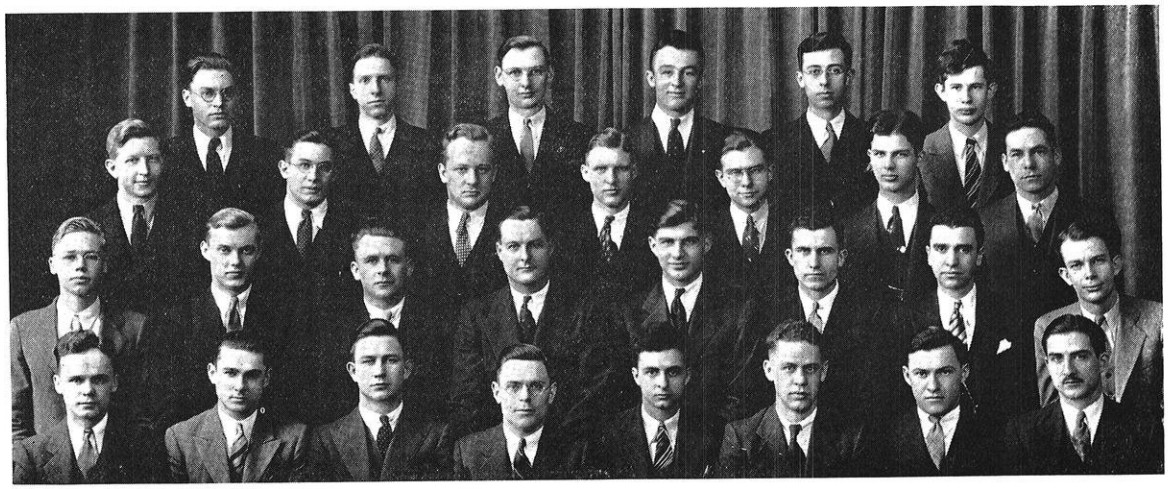
TAU BETA PI

Class of 1933

Donald W. Anderson
Ernest G. Anger
Thomas Bardeen
Walter M. Borer
Bernard Ensmann
Alan D. Freas
William H. Fritz
Hyman Ginsberg
Willard E. Grundman
Roy H. Holmquist
Robert Howell
John O. Iverson
Elmer R. Kaiser
Anton A. Kalinske
James P. Kaysen
Gerald E. Kron
Norman Kuehlman
Russell W. Lange
Thomas J. Lambeck
Claude A. Lyneis, Jr.
Thomas M. C. Martin
Philip S. Miller
Robert E. Moe
Clarence W. Ottensman
Adolph Peters
George C. Schmid
Gordon O. Stromberg
Aubrey J. Wagner
Clarence O. Wagner
Roy H. Walters
Philip H. Werner
Harry E. Wolcott
Royal H. Wood
Walther E. Wyss
Delbert E. Zilmer

Class of 1934

John E. Brennan
Robert L. Engelhardt
George M. Hausler
Arnold J. Hoiberg
William A. Horton
O. Robert Howell
Robert G. Matters
Henry L. Mohn
Burr H. Randolph, Jr.
Philip Rosenthal
Melvin W. Stehr
Robert F. Stoessel
Joseph W. Zack



Holmquist Randolph Walters Lyneis Kaiser Borer
A. Wagner Peters Kaysen Ottensman Moe Wolcott Kuehlman
Kron Bardeen Wyss Schmid Wood Kalinske Miller Martin
Stromberg Lange Anderson Zilmer Freas Lambeck C. Wagner Ginsberg

Founded 1904
University of Illinois
23 Chapters

Local Chapter
Theta
Established 1910

ETA KAPPA NU

Members in Faculty

Edward Bennett
Ralph Benedict
Royce E. Johnson
Ludvig C. Larson
John R. Price
James W. Watson
Grover C. Wilson

Members in University

Class of 1933

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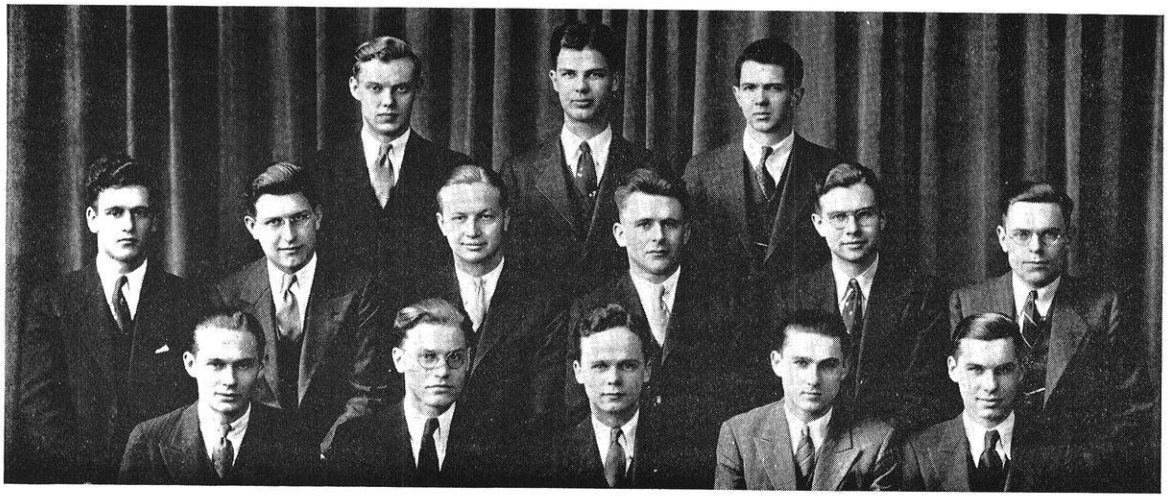
Ernest Anger
Thomas Bardeen
William H. Fritz
Roy H. Holmquist
Herbert Kieckhefer
Russell W. Lange
Robert Moe
Clyde F. Schlueter
Gordon O. Stromberg
Alfred B. Ueker
Philip Werner
Harry E. Wolcott
Walther E. Wyss
Delbert E. Zilmer

Class of 1934

August O. Bartel
Wallace G. Gates
Shirley A. Heider
John H. Hinman
Robert I. Howes
Karlton A. Krasin
Alvin O. Lund
James C. Lyke
Harry G. Sellery
Melvin W. Stehr



Stehr Kieckhefer Gates Bardeen Holmquist Schlueter Wolcott Stromberg Wyss Hinman Lang Moe Howes Zilmer

Founded 1922
University of Illinois
11 Chapters

Local Chapter
Wisconsin
Established 1925

CHI EPSILON

Members in Faculty

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F. M. Dawson
L. F. Hillis
H. F. Janda
L. H. Kessler
W. S. Kinne
A. T. Lenz
F. T. Matthias
E. R. Maurer
D. W. Mead
R. S. Owen
W. H. Tacke
F. E. Turneaure
H. L. Turritin
L. F. Van Hagan
G. W. Washa
K. F. Wendt
M. O. Withey

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Graduates

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R. J. Buehler
L. G. Signell
P. Thern
H. F. Thrapp
R. L. Van Hagan

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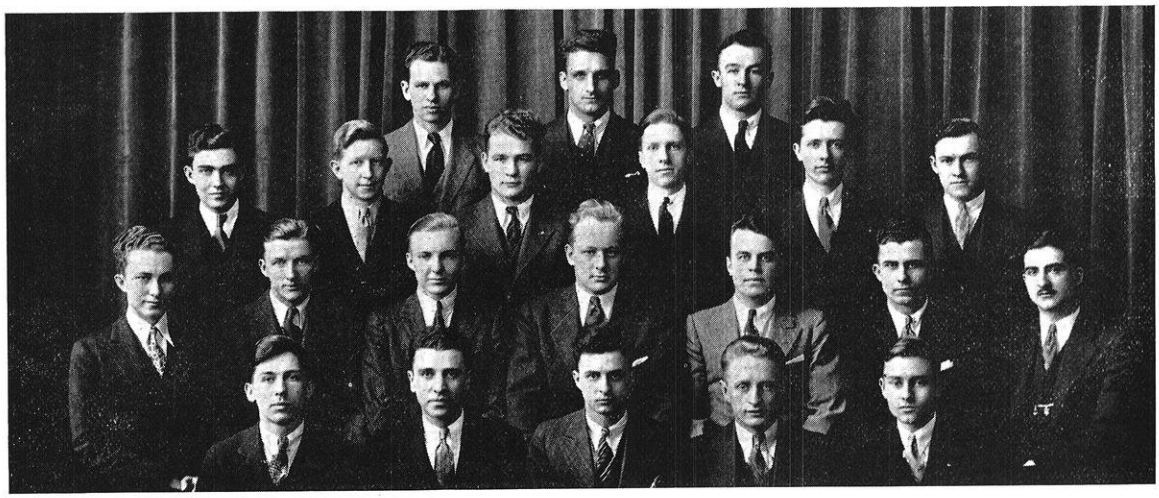
H. Ginsberg
G. E. Harbeck
H. F. Hoffman
R. J. Jenks
A. A. Kalinske
J. P. Kaysen
C. A. Lyneis, Jr.
P. S. Miller
P. F. Morgan
V. J. Palmer
E. A. Schellin
A. J. Steffen
G. Thurner
A. Wagner
C. O. Wagner

Class of 1934

R. F. Dittman
L. S. Dysland
R. L. Engelhardt
E. W. Gradt
W. C. Lefevre
A. A. Lemke
R. C. Price
B. H. Randolph
R. A. Schiller
H. C. Trester
J. W. Zack



Trester Thurner Lyneis C. Wagner
Harbeck A. Wagner Schiller Randolph Steffen
Schellin Zack Englehardt Kaysen Lefevre Kalinske Ginsberg
Price Miller Freas Palmer Morgan

Founded 1915
University of Illinois
and
University of Wisconsin
10 Chapters

Local Chapter
Alpha
Established 1915

PI TAU SIGMA

Members in Faculty

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B. G. Elliott
R. S. Hartenberg
P. H. Hyland
R. W. Kubasta
G. L. Larson
J. W. McNaul
D. W. Nelson
H. D. Orth
K. G. Shiels
G. C. Wilson
L. A. Wilson

Members in University

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Stewart C. Anderson
Robert S. Beverlin
Hjalmar D. Bruhn
Jerome F. Cline
Arnet B. Epple
Ellis P. Hansen
Peter P. Hnath
Elmer R. Kaiser
Norman V. Kuehlman
Arthur E. May
Raymond A. McCreary
Charles K. Otis
Milton R. Paulson
Henry E. Peck
John B. Schifflin
Ben J. Schmid
George C. Schmid

Class of 1934

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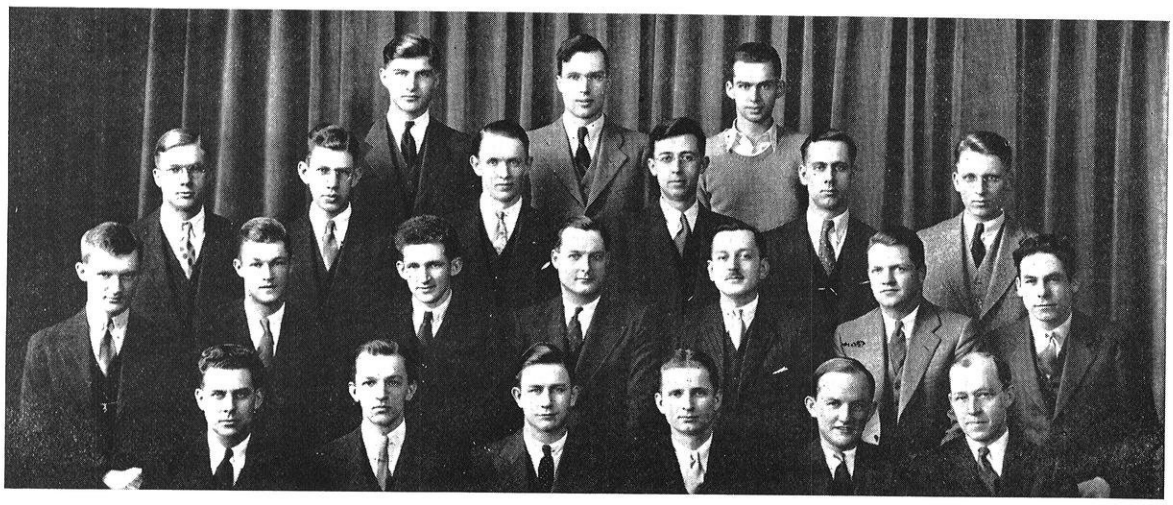
Donald B. DeNoyer
Joseph J. Ermenc
Douglas N. Evans
Orville Frank
George M. Hausler
H. Leroy John
Luverne F. Lausche
Salvatore A. Mollica
Joseph J. Peot
Robert M. Rood
Robert F. Stoessel



Brennan, S. Anderson, B. Schmid, Schifflin, Wood, May, Frank, Ermenc, Paulsen, G. Schmid, D. Anderson, McCreary, Kaiser, Hnath, Cline, Mohn, Epple, Beverlin, Otis, Hansen, Bruhn, Kuehlman

A. S. C. E.

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Roy L. Weston . . . . . *President*
Harold J. Behrens . . . . . *Vice-President*
Philip L. Morgan . . . . . *Secretary and Treasurer*

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Edward Borkenhagen
Wayne Bryan
Robert Buehler
Kenneth De Young
Alan Freas
Charles Holst
Anton Kalinski
James Kaysen
Claude Lyneis
Roy McDonald
Robert Merz
Philip Morgan
Vernon Palmer
Walter Rasmuessen
Elmer Risseeuw
Francis Robbins
Ervin Schellin
Alfred Steffen
George Thurner
John Viereg
Clarence Wagner
Donald Webster

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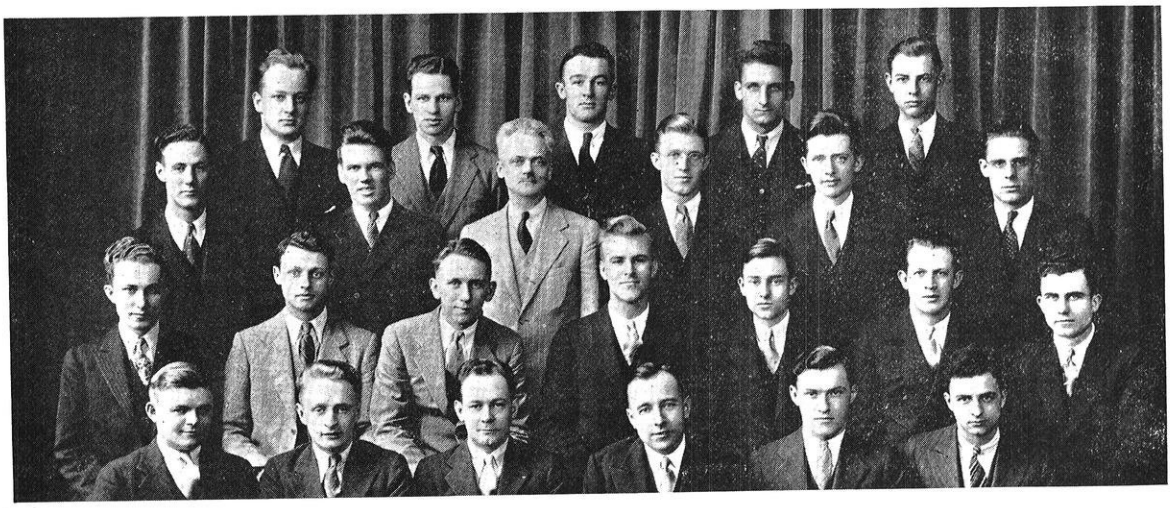
Charles Clark
Richard Dittman
Robert Engelhardt
Winfred Lefevre
Harold Meythaler
LeRoy Moore
Harold Trester
Nicholas Zokovetz

Class of 1935

Fred Busch
Everett Henry



Kaysen Trester Lyneis Thurner Behrens
Bryan De Young Van Hagan Rasmussen Steffen Robbins
Schellin Holst Borkenhagen Weston Morgan McDonald Kalinski
Bachowski Palmer Ferber Zokovetz Wagner Freas

A. S. M. E.

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Joseph J. Ermenc . . . . . *President*
Lawrence H. Allan . . . . . *Vice-President*
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Robert F. Stoessel . . . . . *Treasurer*
Royal G. Thern . . . . . *Polygon Representative*

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Gilbert G. Bayley
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Theo. R. Coker
Paul M. Corp
Arnet B. Epple
Theo. F. Eserkaln
Roland H. Goetsch
Ralph E. Grobe
Ellis P. Hansen
Chris Hanson
Lawrence E. Heger
Elmer R. Kaiser
Herman H. Koerwitz
Paul J. Jenny
Philip M. Judson
Thomas J. Lambeck
John S. Leontieff
Keith C. Martiny
Richard J. Matteson
Arthur E. May
Leo W. Meyer
Charles K. Otis
Alberr F. Poock
Charles J. Quinn
Bengt G. Sandstrom
John B. Cchifflin
Ben J. Schmid
George C. Schmid
Gilbert W. Schubert
John F. Siegel
Royal G. Thern
Royal H. Wood

Class of 1934

Chester W. Adams
Lawrence H. Allan
Charles W. Bloedorn
Kenneth H. Boller
John E. Brennan
Christian E. Clausen
Joseph J. Ermenc
Felix P. Gnauch
George M. Hausler
George J. Kostal
Luverne F. Lausche
Harold W. Leu
Donald MacArthur
Henry L. Mohn
Salvatore A. Mollica
Russel T. Moyle
Milton R. Paulson
John F. Robertson
Robert M. Rood
Max E. Ruess
Robert F. Stoessel
Robert C. Strassman
Chester W. Wagner
Kurt F. Wehle

Class of 1935

Frederick Bechtel
Gordon E. Brotz
Ralph T. Brotz
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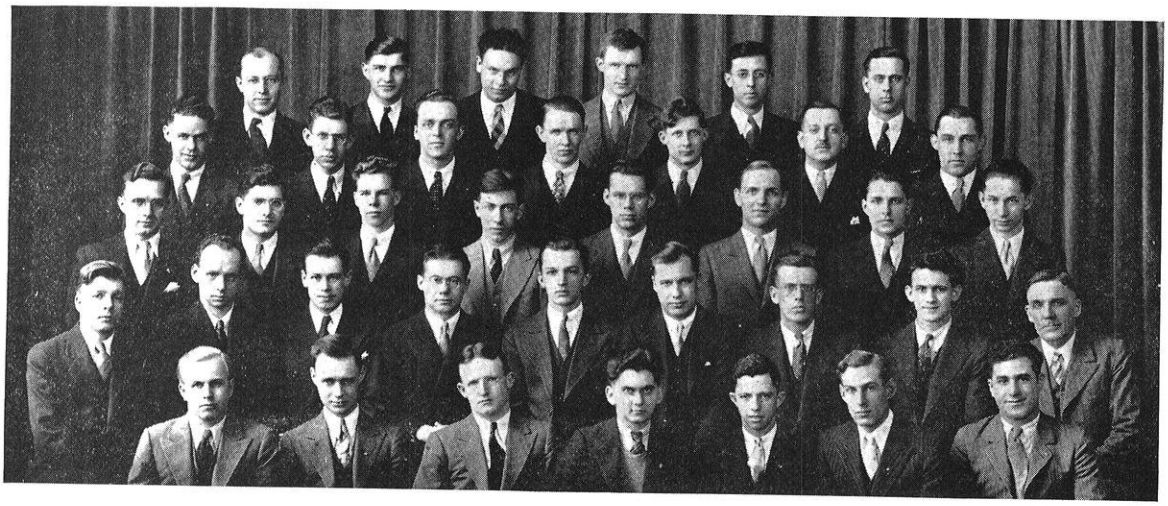
Bradford C. Kniskern
Harry R. Maytum
William W. Meade
Walter M. Nielson
John F. O'Connor
Wilfred A. Pollock
Herbert D. Wake
Burt J. Zien



Bruhn Wood Bloedorn Brennan Kaiser Epple
Lambeck May Eserkaln Paulson Wagner Mohn Martiny
Gnauh Matteson Rood Wehle Allan Judson Leu Hausler
Clausen Meade Ruess Leontieff Ermenc Sandstrom Bayley Pollock Elliot
Strassman Mayle Boller Stoessel Siegel Thern Mollica

G-E *Campus News*

IN A PADDED CELL

RESEARCH moves in devious ways its wonders to perform. G.E. has a padded cell in its general engineering laboratory at Schenectady—for the isolation of extraneous sounds. Confined in it, at intervals, are motors, fans, and other equipment which serves best when heard least. The cell is a room within a room. The outer wall is of sound-absorbing plaster; then come hollow tile, air space, felt, another layer of plaster, more air space, sheet iron, air space, lathwork, and a thick layer of cotton waste. Total thickness, a foot and a half. Within the chamber a "noise meter" tracks down outlawed decibels.

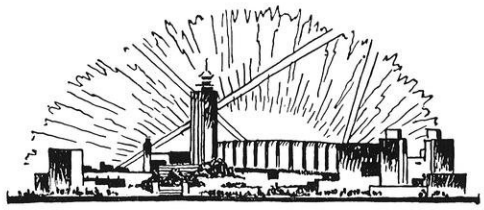
Last year, the noise meter left its padded cell and traveled to Manhattan's Metropolitan Opera House. Ensconced in a grand tier box next to that of Manager Giulio Gatti-Casazza, it measured voices, orchestra, and applauding hands while "Rigoletto" was sung. The meter discovered that Beniamino Gigli registered 77 decibels,—a street car in full progress makes only 65. Laboratory devices do have their big moments.

FORE!

"WOW! What a drive! If I could hit 'em like that, I'd sure break a hundred." Just a few comments as a national driving champ smacked a golf ball out of sight. Occasion—the demonstration of a new G-E device for measuring speeds heretofore not measurable because of their nature. The apparatus registered the speed of the champ's club head at 125 miles per hour; an average player is lucky to register 70. No wonder the champion can hit them so far.

The ball is driven from a low platform. Just back of the ball, two parallel beams of light are at right angles to the path of the club head. Each beam hits an "electric eye" or photoelectric tube. A split second before striking the ball, the driver cuts the first beam, and almost immediately afterwards cuts the second beam. Both phototubes operate Thyratron tubes, the first one causing a condenser to begin charging and the second one stopping it. The charge is measured by a meter which is calibrated in terms of miles per hour.

And don't worry about swinging too fast. H. W. Lord, who perfected the apparatus, says it will measure speeds up to about a thousand miles per hour. What a drive that would make! Incidentally, Lord is a '26 grad of the California Institute of Technology.



"A CENTURY OF PROGRESS"

THIS summer, if you go to Chicago, you will visit an Aladdin fairyland; "A Century of Progress" will be the greatest night exposition ever held. You will see a veritable aurora borealis, artificially produced. Walter D'Arcy Ryan, veteran G-E illuminating engineer, is working in Chicago to help make the exposition the most spectacular ever seen. And well qualified for the job he is. An engineer-artist—schooled at St. Mary's, in Halifax—he has directed the illumination for many similar events. When you go to Chicago, you will agree that a masterpiece has been created.

And you should not miss the G-E "House of Magic," the most amazing part of the General Electric display at the exposition. There, recent discoveries and developments of our Research Laboratory will be presented in a fascinating manner. "Bill" Gluesing, a '23 grad of the U. of Wisconsin, will have charge of the lectures and demonstrations. In addition, many G-E machines and appliances in the great circular hall of the electrical building will dramatize the rapidity of electrical progress. We'll see you at the exposition. Remember, it's from June 1st to October 31st.