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**THE**

**WISCONSIN  
ENGINEER**

**MEMBER  
E.C.M.A.**



**▼ OCTOBER ▼  
▼ 1932 ▼**

The Editors of the

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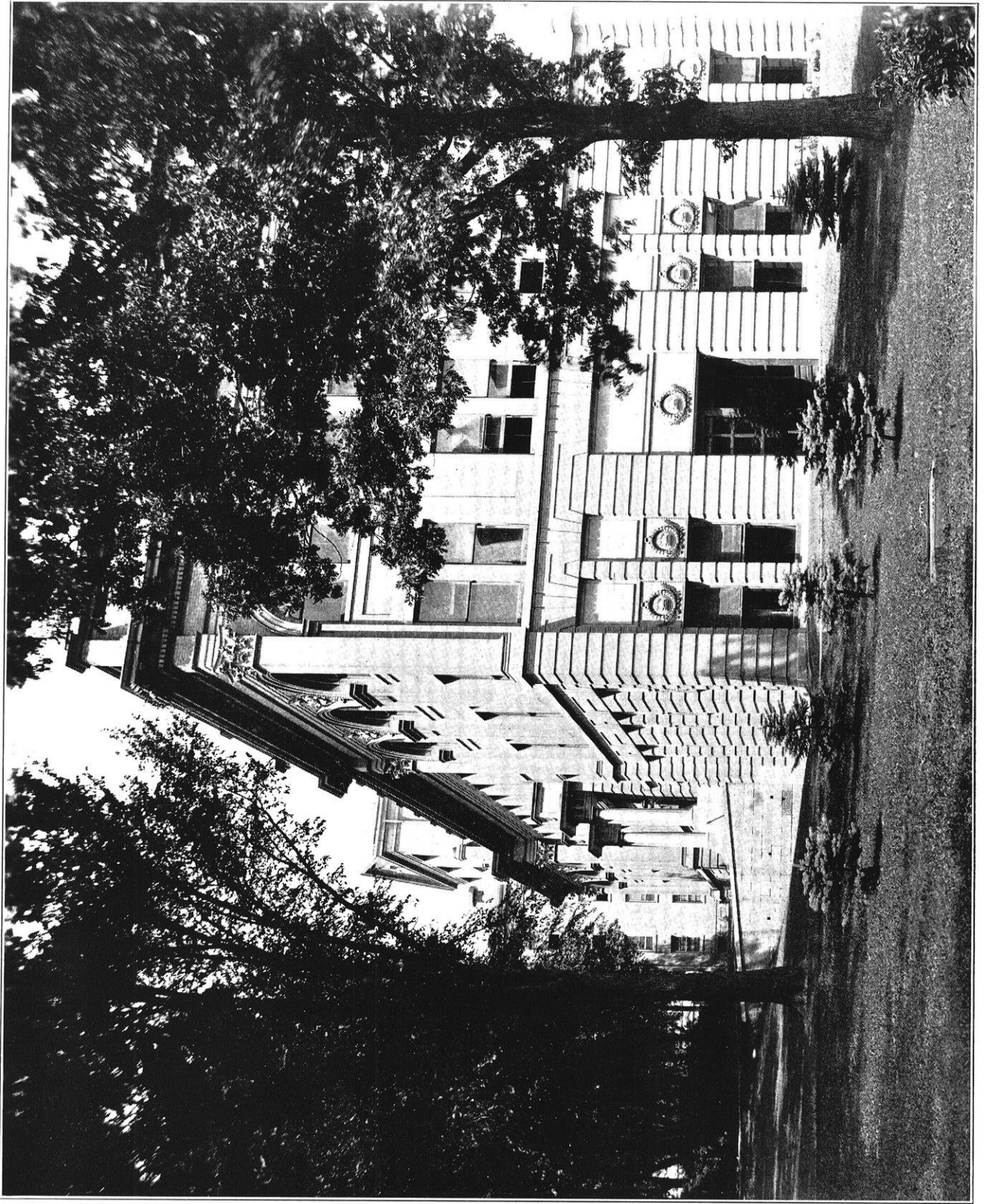
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THE ENGINEERING BUILDING — Looking Up The Hill

# The WISCONSIN ENGINEER

VOLUME 37, NO. 1

OCTOBER, 1932



*A Wisconsin Engineer  
Gives a Review of*

## The Illinois Waterway

By W. Z. LIDICKER, c'27

THE dream of generations for a deep water route from the Great Lakes to the Gulf of Mexico will be realized this fall with the formal opening of the Illinois Waterway. Officially defined as the sixty miles of river and canal extending from the Chicago Sanitary and Ship Canal at Lockport to the navigable part of the Illinois River at Utica, the Illinois Waterway forms the last connecting link in an entire water route across the center of the United States.

Its completion marks the conclusion of years of study and effort and the expenditure of nearly twenty-seven million dollars to provide more economical transportation for the middle west.

When the last pool is filled and the last yard of material excavated, there will be available for traffic a nine foot channel directly through the heart of one of the richest agricultural areas of the United States and connecting two of the greatest natural waterways in the world, the Mississippi River system and the Great Lakes.

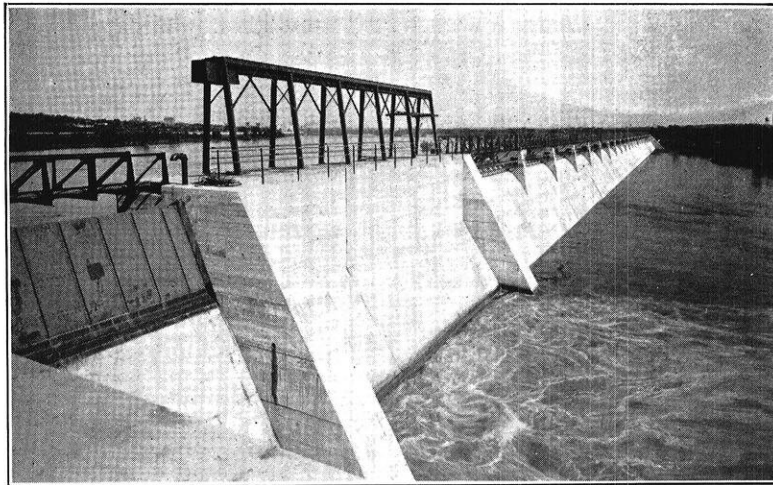
Agitation for a waterway began early in this century and resulted in a definite step forward in 1908 when the people of the state of Illinois voted to bond themselves to the amount of twenty million dollars. A State Department of Waterways was created, and for the next ten years various plans were suggested and studied. Three only were given serious consideration.

The first plan provided for locks and a channel depth sufficient to accommodate ocean going vessels, but because of the excessive cost and the impracticability of maneuvering large ships through a long canal, it was discarded.

The second plan provided for locks 55 feet wide by 250 feet long, and a depth for barge traffic only. This design erred as much as the first one, but in the opposite direction. In addition the War Department, through which the United

States Engineering Office has jurisdiction over navigable streams, refused to approve plans for locks of the size specified.

Finally in 1919 a bill passed the Illinois legislature calling for the construction of plan three which had been previously approved by Chief of Engineers. This scheme provided for the creation of a series of pools by the construction of dams and the dredging necessary to ob-



*Sluice Gate and Tainter Gate Sections of the Brandon Road Dam*

tain a 150-foot channel bottom with a minimum depth of eight feet in earth and ten feet in rock. Actually the channel will be of greater capacity as a draft of nine feet will be available and the width will be 200 feet or more for almost all of the waterway.

The locks specified in plan three will conform to standards on the Ohio River and have a usable length of 600 feet, a width of 110 feet, and a draft over the sills of 14 feet in case that at some future time the waterway should be deepened.

These locks will have a capacity of from 7000 to 9000 tons of cargo per lockage.

The dams are in general concrete gravity structures having enough tainter gates and sluiceways to maintain the pools during floods at approximately their normal levels. Provision was also made for future power development by the state of Illinois by building into the dams at Starved Rock, Dresden Island, and Brandon Road a headgate structure for a powerhouse.

Figure 1 shows the general location of all five locks and dams which constitute the Illinois Waterway. On this map also appears the old Illinois and Michigan Canal which had such great influence on the growth of Chicago 50 to 75 years ago. It is now obsolete and used only by small pleasure craft.

The first survey on the Waterway was made in 1919 and the first contract covering the construction of the Marseilles Lock was let in 1920. From then until 1930 the State of Illinois continued with the construction of Lockport Lock, Starved Rock Lock and Dam, part of Brandon Road Lock and Dam, part of Dresden Island Lock and Dam, and considerable dredging.

When in 1930 it became apparent that twenty million dollars would not complete the Waterway, arrangements were made for the United States government to take it over, the State agreeing to use the remaining funds on the construction of bridges. By an act of Congress the Illinois Waterway came under Federal jurisdiction on July 3, 1930. Since then and up to this writing the United States has expended about five million dollars and perhaps two million more will be needed to complete the structures and dredging contemplated, making the total cost of the Waterway approximately twenty-seven million dollars.

Physical Features

Included in the work of building the Illinois Waterway was a variety of engineering work such as dredging millions of cubic yards of rock and earth, the construction of 5 locks, 4 dams, 5 miles of retaining walls 15 to 40 feet in height, a tunnel under the Des Plaines River through 400 feet of solid rock, the erection of 12 highway and 5 railway bridges, rerouting the Joliet sewer system, building pump houses, boiler houses, and many other appurtenant works. In addition to the variety of the work many of the structures are notable for their contribution to the advancement of engineering design and construction.

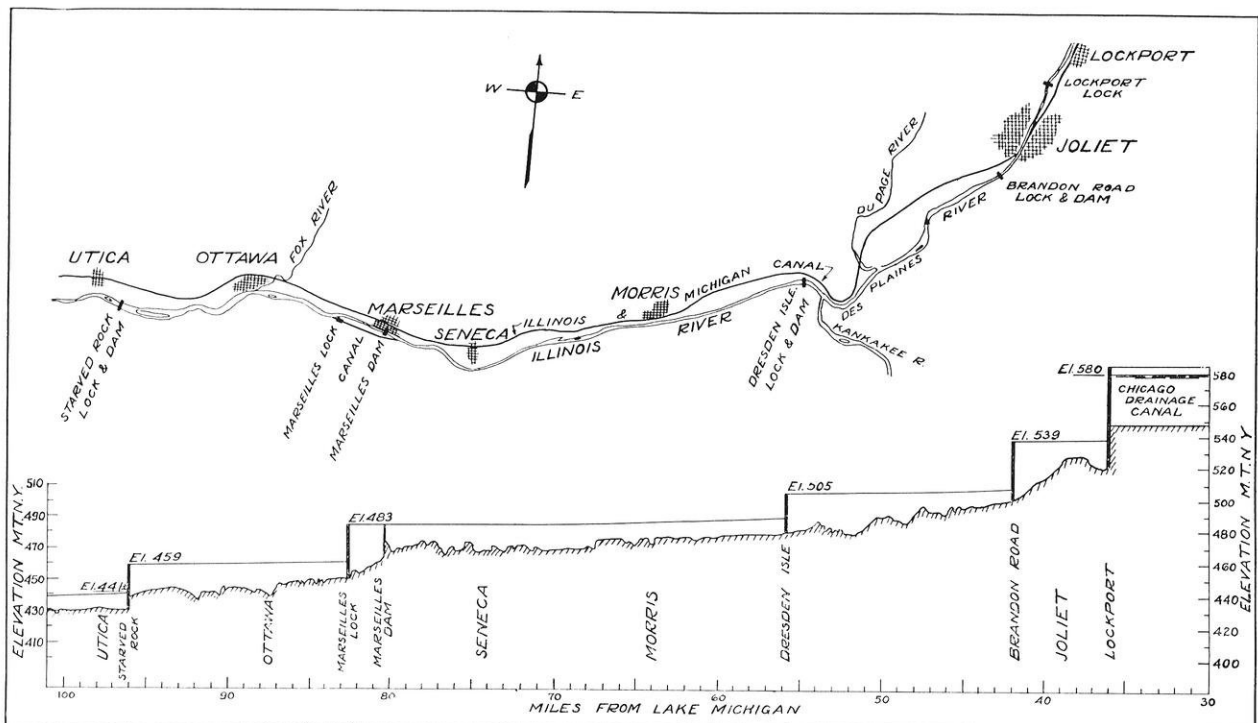
**Starved Rock Lock and Dam:** At the historic Starved Rock State Park is located the Starved Rock Lock and an 18 foot dam consisting of 10 counterweighted, hammer-head tainter gates 60 feet long by 17 feet high and about 600 feet of headgate structure. These tainter gates are believed to be the largest in the country and weigh 80 tons each without the counterweights or counterweight trusses.

**Marseilles Lock and Dam:** At Marseilles an existing power development and a rapids in the river made it most feasible to build a two and one-half mile canal parallel and adjacent to the Illinois River. At the lower end of the canal is the lock, and at the upper end completely submerging the old dam, the new dam is being built.

The Marseilles Dam contains 8 tainter gates in the main river and 3 more in the headrace leading to the Marseilles Land and Power Company. Each gate is 60 feet long by 14 feet high.

**Dresden Island Lock and Dam:** Just below the junction of the Des Plaines and Kankakee Rivers which form the Illinois, the Dresden Island Lock and Dam is located. There are 9 tainter gates the same size as at Marseilles and 300

(Continued on page 15)



Map Showing Route of New Illinois Waterway.

FIG. 1.



Another Chapter in the History of

# Azimuth City

Summer Rendezvous for Engineers

WE, the undersigned, solemnly dedicate this tale to posterity as a true and faithful account of the famous camp of 1932 — the year of the gentlemanly students (according to Professor Owen).

The first day nothing happened; everybody got settled for six weeks of hibernation; the later-to-be-cursed-at knots were tied in the tent ropes. — The first Rails course started under Professor Van Hagan and "Pay Haul" Tacke, while the lucky ones started on their "topog". — The slaves on construction put up the narrow cat walk that served for a pier. — Professor Owen gave his annual talk on the "don'ts" of Azimuth City, and continued with his little dissertation on the habits of that peculiar denizen of the bull pasture — the rattlesnake. — A mess committee composed of Ruff, Pape, and Kroening was elected to confer with Frank Matthias on the handling of the student mess fund. — Paul Schutz was made bugler and immediately started to learn all the calls. — While out on Rails topog, Dibble, Dys-

land, and LeFevre made the celebrated Rattlesnake Club by bringing in "Elmer Zilch", although they admit that when they went back to capture him, they had a long walk from where they stopped running. — "Pay Haul" suggested his famous game of naming the states to pass away the time during a shower. — The camp baseball talent was organized into a five-team league; the Wildcats, Kittycats, Polecats, Bearcats, and Tomcats started on their quest for the mythical pennant. — Bob Merz, our star outfielder, sprained his ankle. — Sherburne bet Tacke a candy bar that Allen's Tables were wrong (Tacke won, incidentally). — The gentlemanly students (according to Professor Owen) began to make acquaintances at the Chateau, especially "Smoothie" Kroening. Unfortunately, however, a boatload of revelers returning from the north end one night were a little too boisterous, and woke up Professor Van Hagan. — The much heralded Azimuth City-Baraboo baseball game was played in Baraboo on Sunday morning, and after trailing for most of the game, the boys awoke, and finally won out, 8 to 6. Ed Borkenhagen pitched a nice game and deserved to win.



Azimuth City Fire Department On Its Annual "Run".

— Claude Lyneis decided to wear long trousers and shoes to supper after Professor Owen gave a lecture especially for his benefit. The next night everybody took extra pains in dressing for supper and Professor Owen wasn't there to see the magic wrought by his little speech. — What is this we hear about LeFevre thinking he was locked out of his tent one night when Englehardt tied the flaps shut? — Rails ended for some and began for others. — Three girls from Chicago tried to lead a horse into Ruff and Harbeck's tent. — Mr. Blake of the Highway Commission arrived, and after

everybody had "ganged up on him" a sufficient number of times, he originated that other famous expression "fake-a-loo" (the spelling is perhaps known only to Mr. Blake). — Election night came and George Kroening was chosen prom king. After much campaigning, Maynard Sherburne was elected fire chief and his assistant and ten horses selected. — The camp began making nightly excursions to the north end to secure prom dates. —

The afternoon of prom the hydrog party decided that they were better landlubbers than seamen, and had to put in to shore to bail out their partially swamped scow. — The girls started arriving from Madison and all points elsewhere to take up quarters in the barn for the weekend. — At eight-thirty Dibble, Paul West, Ruff and several others went up to the Chateau to get dates, and succeeded (according to appearances). — Jim Kaysen designed some clever programs. — The big social event of the year for that part of the state, the Azimuth City Prom, was a huge success. — It rained all day Sunday, and the fellows who had girls staying at camp were hard put to furnish entertainment. — The glorious Fourth arrived with its usual barrage of firecrackers. — The annual fire run was held, to the edification of the neighboring cottagers, and Chief Sherburne led his crew of motley incompetents to the blazing bonfire on the lake front, but the attempt at extinguishing the conflagration was not entirely successful, in spite of the valiant efforts of the horses. — The camp went to the "Pewit's Nest" for the picnic, where Vern Hamel tried fishing in some of the deep six-inch pools.



— Bob Englehardt was led a merry chase for the whole afternoon. — The log rollers held a convention in Baraboo after the picnic; the convention made Dibble so tired the next night that he slept through Mr. Wesle's talk on the adjustment of a quadrilateral, and consequently had to do one for himself. Ed Niederer also missed the lecture, and also had to do penance. — The baseball league continued, with Tacke's team leading and the Bearcats bringing up the rear. — Cliff Johnson and his little girl friend from one of the nearby cottages surprised Otis Clark while swimming one night. — Somebody blew reveille at two o'clock one Sunday morning. Schutz claimed he wasn't responsible, for there were other fellows in camp who could make a noise on a bugle. — Through the connivance of several of his friends and one of the waitresses, Mr. Wesle was cheated out of his due share of ice cream one night. — Al West, Parsons, Dibble, Merle Owen and Betsy Owen started to swim around the lake, and only the two girls finished. — Paul Schutz finally satisfied Mr. Blake with his rendition of tattoo. — Mr. Lunde gave a talk on his experiences as a topographer for the U. S. G. S., in which he made the statement that when he went fishing, he liked to catch something worth while (page Wesle and Hamel). — Harry Thrapp fell in the Baraboo River and had to lie in the sun and sleep while his clothes dried out. — The plane table party of Parvin, Kay-sen, Lemke, Paul West, Larson, and Pivovarnick proved the most congenial, but slowest, group that Mr. Lunde had come across on the whole summer. — The deadline for all reports was announced to be eight o'clock Saturday morning, a day earlier than usual; the lights to be on until twelve Thursday night and all night Friday night. — The annual banquet was held Friday night, at which "free" pop, cigarettes, and cigars were passed around. — Mr. Owen gave the history of the present camp and called the 1932 camp the most gentlemanly bunch of students he had ever known. — Mr. Wesle told of the earlier camp at the old hotel. — Mr. Blake gave the lowdown on the Portage camp; after his talk there was agitation for a petition to have the camp moved back to Portage again. — Nearly everybody stayed up all night Friday trying to get through, but there were an unusually large number that didn't finish. — Most of the tents came down Saturday. — Almost everybody went to Baraboo or to the Chateau for a final celebration, after which there was another mysterious midnight reveille. — The exodus from camp was complete by Sunday afternoon, with only a few tents left up and only Mr. Wesle and his family remaining behind.

The last chapter in the history has been written; the camp of 1932 will go down in the memories of all of us as a summer well spent. The gentlemanly campers have dispersed, to go back to school, where they will be known again as the uncouth engineers.

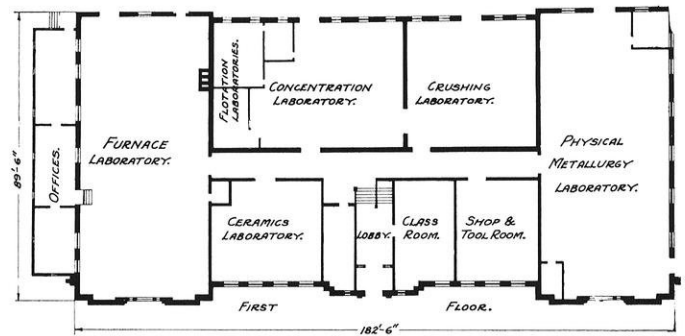
This is a true and faithful account of the history of Azimuth City, and in witness whereof we affix our signatures:

(Signed) Betsy Owen  
 P. H. West Dick Ruff  
 Paul Schutz John A. T. Dibble  
 Maynard Sherburne G. E. Harbeck, Jr.

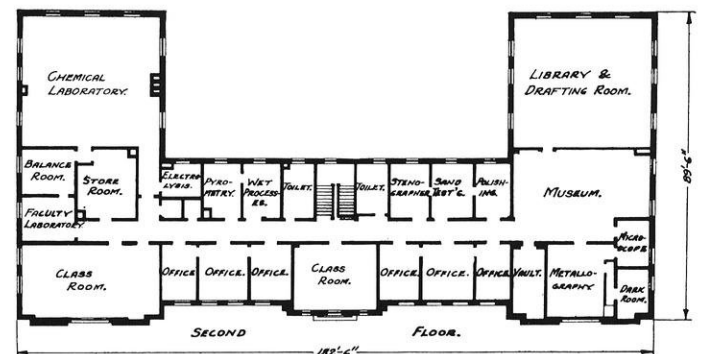
## MINERS MOVE TO NEW QUARTERS

By PROF. R. S. McCAFFERY

The Department of Mining and Metallurgy has moved into its new quarters, the old Forest Products Laboratory, and we are now holding our classes in it, although repairs and painting are not quite completed. When, on arrival in the morning, the members of the staff enter our new front door and look around, they rub their eyes, thinking it is a dream for the contrast between the old and the new is still violent.



In our new location, we have a building that was designed for a laboratory, and little change has been made in layout. The building certainly has a character of its own and back of it is a record of splendid work most ably executed. We hope that in the years to come, the Old Building will be able to say honestly that we have maintained this tradition.



The Building is a better working tool than we have ever had and we will be able to do better work than was possible ever before. The whole personnel, instructors and students, have sharply reacted to the new environment. So far as the Department is concerned, the bottom of the Depression has been passed, and since September 7th, when moving began, our trend line is sharply upward.

The cuts showing the lay out of the classrooms and laboratories do not give much of an idea of actuality, so we hope our friends will come to our house warming in the near future and permit us to show them our new home.

EDITOR'S NOTE:—A view of the new Mining and Metallurgical Laboratory, the new home of Professor McCaffery's proteges, which is the second unit of the future engineering campus is found on the front cover of this issue.

# What the Class of 1932 Is Doing

## ELECTRICALS

**Brown, Archie W.**, is working in the water and light department of the City of Princeton, Illinois. He is in the electrical department doing switch board wiring and converting single phase lines to three phase lines. When calibrating the switchboard meters he used standards from the U. W. Standards Laboratory.

**Brueggeman, Leslie T.**, spent most of his time during the summer doing radio repairing. He seems to have doubts that he'll be a single man much longer.

**Evans, S. O.**, is now part-time assistant at Iowa State College at Ames, Iowa. During the summer he worked as clerk at the Wisconsin Ice and Coal Co., Milwaukee.

**Fredendahl, Gordon**, is back at school for graduate work. He has an assistant fellowship.

**Hall, Alexander G.**, is a salesman for the O-Riginal Products Co., of Wauwatosa, Wis. He is selling in Kansas, Nebraska, and South Dakota, and is having a good time seeing the country.

**Novak, Frank E.**, is busy farming for the present. He claims the hunting is good in his country. He is at New Rome, Wisconsin.

**Ratcheff, Ted N.**, spent three weeks this summer on a trip East and through Canada. He is now back for post graduate work.

**Trusler, John J.**, is working as an attendant in a service station at Mondovi, Wisconsin. He is hoping that Mr. Hoover will prove himself a good engineer and thereby he and his classmates may some day be engineers.

The following men have returned for graduate work: **Bernard Ensmann, Donald E. Graves, Peter G. Killian, John L. Kuehlthau, Gerald A. Larkin, Willard H. Ruess, and Frank M. Weinhold.**

## CHEMICALS

**Dorner, George G.**, ch'31, MS'32, is attending the Michigan State Teachers College at Marquette, Michigan. He is also doing teaching supply work.

**Fritz, Nicholas H.**, is employed as assistant chemist for the Morton Salt Co., at Manistee, Michigan.

**Rummele, Robert W.**, is working as a chemist for the Konrad Schreiber Co., maltsters and millers at Sheboygan, Wisconsin.

**Sterba, Melvin J. and Wenger, Harold E.**, were added to the staff of the Burgess Laboratory at Madison.

**Watson, Charles C.**, is back in school as a fellow in the College of Engineering.

The following men of the 1932 class returned for graduate work: **Louis L. Bambas, Fred A. Mennerich, and Harold Wolf.**

## MECHANICALS

**Dorner, Fred H.**, is working with the test and maintenance crews in the power plant of the Milwaukee Sewerage Commission at the Jones Island plant in Milwaukee.

**Hicks, Stratton E.**, is chief of party of Division No. 2 of the Wisconsin Highway Commission, and is stationed at Milwaukee.

**Kehl, Ralph H.**, is employed by the Kimberly-Clark Corporation, at Neenah, Wisconsin.

**Rice, Elbert H.**, is with the Met-L-Woods Corporation of Chicago.

**Wilson, Walter T.**, who received his M. S. Degree last June is now working for his Ph. D.

The following men of the class of 1932 are back for graduate work: **B. W. Hogan, C. H. Novotny, and K. C. Whitefield.**

## MINING

**Granger, Robert R.**, is employed in the Metallurgical Department of the National Steel Foundries.

## CIVILS

**Angoli, Leonard E.**, no information.

**Berg, Louis L.**, has returned to the university for graduate study. He was married in the spring to Elizabeth Moore, daughter of Professor James G. Moore of this university.

**Burmeister, Walter L.**, has a temporary position teaching in a Milwaukee high school.

**Caviezal, George H.**, no information.

**Cortright, Harry M.**, is registered in the graduate school.

**Craven, Jack H.**, no information.

**Davidson, Morris A.**, is located at Cleveland. No information about his work.

**Dodge, Eldon R.**, is senior engineering aid with the highway commission at Rhinelander.

**Eastman, LeRoy I.**, is senior engineering aid with the highway commission at Lancaster.

**Erichsen, Frank P.**, is senior engineering aid with the highway commission at Rhinelander.

**Ferguson, Perry R.**, no information.

**Fuhr, Lawrence**, is senior engineering aid with the highway commission at La Crosse.

**Hagestad, Herman T.**, is with S. A. Sieberts, Jr., consulting and municipal engineer with offices at 454 Sexton Building, Minneapolis. Hagestad has been located at 522 E. Maple St., River Falls, Wisconsin.

**Hamel, Vernon S.**, received degrees in engineering and law at last Commencement. He is located in Madison.

**Herrmann, Otto R.**, no information.

**Hill, Millard M.**, is with the highway commission at Rhinelander.

**Hovey, William B.**, was appointed to the army flying service and ordered to report at Randolph Field, San Antonio, on October 10. He was one of 120 to be appointed out of an eligible list of 600.

**Krasin, Lawrence**, is working in the architectural office of G. A. Krasin in Marshfield, Wisconsin. The job is only temporary while waiting for those better times.

**Locher, Fred**, is working with his father on a farm near Wisconsin Rapids.

**Ludowise, Benjamin F.**, attended summer session. He has considered running for the position of surveyor of Chippewa County this fall.

**McGuire, Francis D.**, has had some work with the Madison Metropolitan Sanitary District. On August 14 he won the city golf championship. It was his third win and gave him permanent possession of the Wisconsin Sporting Goods Company traveling trophy.

**McMicken, Robert H.**, no information.

**Miller, Robert L.**, is engineer with F. A. Christiansen, contractor, on the 35th Street Viaduct in Milwaukee. When Bob went to apply for a job, he intended to be modest and apply

(Continued on page 15)

# Editorials

## THE DEAN'S WELCOME

THROUGH the pages of the *Wisconsin Engineer* we are very glad to extend to all new and all returning students a cordial welcome to the university family at the beginning of another school year. This period of financial trouble and depression brings an increased responsibility to all of us, students and faculty, to make use of our talents and our opportunities to the greatest possible extent. Recognition of this condition seems apparent in the earnestness and diligence shown by the students during the past year. An unusual proportion are working at an honor rate, and there is a tendency on all sides towards more serious working and thinking. This is an admirable attitude.



F. E. TURNEURE  
Dean, College of Engineering

The student just beginning his engineering course is obliged to take a good deal on faith. He is planning to devote four important years of his life to secure an education to fit him for a place in the engineering profession, or, to put it more modestly, to give him a fair opportunity to become an engineer. The courses of study available for the purpose are the result of many years of experience, and the careers of graduates of the various engineering schools indicate that the educational program is reasonably successful. The engineering faculty is here for the purpose of enabling the student to get the most out of his four years in college, but after all, individual success lies almost wholly in the hands of the student. Good work in college is likely to be paralleled by successful work in practice and for this reason, as well as for the satisfaction that comes from doing a good job, we sincerely hope that you will begin the year in the belief that the proper program to follow is to do your level best. We extend to you our very best wishes.

*Promote, then, as an object of primary importance, institutions for the general diffusion of knowledge. In proportion as the structure of a government gives force to public opinion, it is essential that public opinion should be enlightened.—George Washington.*

**ANOTHER YEAR** The beginning of the school year, in our opinion, always contains two elements of a very diverse nature. In the first place, this period is occupied by the exceeding serious and important business of registration. After a preliminary bout with our advisers, an imposing direction sheet informs us that Lathrop Hall is the scene of the next steps in the ritual. Here we are given an array of cards of various colors and dimensions. The information they require rivals a combined income tax return and application for insurance. Following these exercises in penmanship, we blithely skip through the intricacies furnished by the Assignment Committee and end the activities by standing at parade rest for at least an hour at the Administration Building.

On the other hand, the drab game of registration is interspersed with veritable bits of sunshine. Seemingly at every turn we meet old acquaintances and, amid greetings and handshakes, exchange stories of varied summer experiences. Even Old Man Depression comes in for his share of attention. The juniors, confident that two more years will surely see the end of this ogre, merely smile at the mention of his name. The seniors philosophically accept the fact that their heritage is to be the same as that of the class of 1932, but never think of quitting or despairing. And so it goes. Before we know it, a period combining two highly contrasting elements finally comes to an end and the ordinary business of the semester gets under way.

**POLITICAL ENDEAVOR** The names of several engineers appeared on the ballots of the recent student elections. Disregarding the general furor occasioned by the voting, one may select from all student political endeavors an underlying principle which is of such fundamental importance that it is all too often overlooked. Herein is a proposition in which a large number of students wish to be organized to afford them smoothly-functioning social activities and increased general welfare. Here also is an opportunity for students to become acquainted with the real problems of leadership which many will encounter after graduation. Occasionally incumbents in office lose sight of their responsibilities to their constituents and forget that they are in a position of management.

In the case of campus politics their significance to all concerned will increase or decrease with the integrity or dishonesty prevailing in the executive circles. If an executive diligently pursues his duties without lowering his activities to the point of catering to the petty idiosyncrasies and whims of a few individuals, he will not only be serving his classmates better but will gain the valuable experience of leadership in its truer sense.





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Because they apply vision to subscribers' problems, Bell System men continually increase the value of telephone service.

## BELL SYSTEM



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# Campus Notes

## SENIORS STUDY HIGHWAY CONSTRUCTION

The first observational tour taken by engineers for the current year was a trip taken by senior civils through the central part of the state in this vicinity on September twenty-ninth. The group studied highway and bridge construction under the supervision of Professor Janda and members of the Wisconsin Highway Department. The route taken by the buses transporting the students led through Sauk City, Baraboo, Reedsburg and LaValle and return to Madison. Actual paving operations were observed as well as finished projects and pending relocations.

## NEW EQUIPMENT INSTALLED IN MECHANICAL ENGINEERING BUILDING

The Burgess Battery Company of Madison, in conjunction with the Steam and Gas Department is to run several experimental tests on a Burgess muffler which is to be installed on the large Diesel Engine in the Steam and Gas Laboratory.

Since the explosion occurred last June due to an accumulation of gas in the exhaust chamber, separate exhausts are being installed on each gas engine in the Laboratory, eliminating the exhaust chamber entirely to avoid further accidents. With this kind of installation it will be necessary to employ a muffler to deaden the sound of the explosion. While the Burgess muffler is highly satisfactory, the Burgess Company feels that further improvements can be made and accordingly are co-operating with the Steam and Gas Department in running tests on the resonance received for various lengths of exhaust pipe.

## ENGINEERS REPRESENTED ON VARSITY

The new cardinal jerseys are being worn by a number of engineers many of whom are well known by football fans. The list of men on the squad includes the following engineers:

George Thurner, '33; J. Schneller, '33; Robert Schiller, '34; Emil Malesevich, '35; Joe Linfor, '34; Milton Kum-

mer, '34; Harvey Kranhold, '34; Richard Haworth, '33; Gerry Halverson, '35; James Donaldson, '34; and James Bingham, '34.

## BELLS THAT RING

Chemical engineering students will no longer be annoyed by the feeble rattling of the class-announcing bells in the chemical engineering building which have been suffering from laryngitis and more for the past few years. Upon returning to classes this year students were greeted with healthy vociferations from shining new bells installed throughout the entire building.

## OWEN RESIGNS FROM COUNCIL

Professor Ray S. Owen of the Topographical Engineering Department has resigned as an alderman of the city of Madison, since he will no longer reside within the city. Professor Owen will make his future home at his country estate, Bungalowen, which is outside the corporate limits in Frost Woods.

During the period in which Professor Owen served the community as a member of the aldermanic body his official practices have met with the hearty approval and endorsement of his many friends and colleagues. Many city improvements may be directly or indirectly attributed to his efforts.

His resignation will undoubtedly be regretted by all who came in contact with his office officially or unofficially.

## ENGINEER COMES TO GRIPS WITH HOLDUP MEN

Wayne G. Bryan, c'33, was rather unpleasantly surprised when two armed bandits held him up in his parked car in Shorewood Hills on the night of August 21. As one of the thugs attempted to rob him Bryan struck his offender, tearing off his mask and causing the hold up men to abandon their objective and flee. The second bandit fired a shot, however, wounding Bryan in the back. The wound did not prove to be serious.

How many, if any, of the readers of the *Engineer* can relate a like experience?

## ENROLLMENT STATISTICS SHOW UNUSUAL TREND

The enrollment lists show that the greatest decrease took place in the enrolling Freshman class. A substantial increase was listed under Senior and Graduate School enrollments which bears out the contention that many upper classmen and graduates find it more profitable to return to the university than to remain at home due to the lack of employment.

The drop in enrollment has not affected classroom routine in any appreciable manner.

Following is a table containing preliminary statistics of the registration as furnished by the office of the Dean of the Engineering College:

REGISTRATION ENGINEERING COLLEGE 1932-33					
	C. E.	M. E.	E. E.	Ch. E.	Min.
Freshmen	36	45	45	33	3
Non-Prom.					
Fresh.	9	10	11	5	1
Sophomores	50	74	60	49	12
Juniors	60	69	76	32	8
Seniors	67	67	66	36	8
Graduate	16	10	19	12	21

*had been noted*

## ENGINEER HAS NEW HOME

Before beginning another year of activity the staff of the *Wisconsin Engineer* moved its headquarters from room 306A to room 219 Engineering Building. Wrestling with the heavy cabinets and desks afforded staff members a bit of pleasant exercise after a more or less leisurely vacation spent in fishing, golfing, and longing for a job.

The new quarters are larger and are situated at the front of the building affording the staff a new 'outlook' on the situation in more ways than one.

## ENGINEER NOMINATED FOR OFFICE ON TWO TICKETS

Milton W. Schaefer, c'34, West Bend, seems to have no political machine working against him for he was endorsed as a candidate for the office of County Surveyor by both parties in Washington County.

**CLASS OF 1935 HONOR LIST**

A list of sophomore engineers who have been working at the high honor and honor rates during their first year in attendance at the university has been submitted by Professor A. V. Millar, adviser of freshman engineers. The records speak for themselves as to the caliber of men represented on the list and should serve as an incentive to all engineers who realize the significance of scholarship attainments.

*High Honor Rate:*

	Credits	Points
Goldberg, Harold	34	97
<i>Honor Rate:</i>		
Kuehn, F. J.	34	92
Van Ryzin, W. J.	34	92
Lund, Nean	31	85
Burnham, T. W.	34	91
Bechtel, F. J.	34	90
Sturdy, O. T.	34	90
Matzat, A. R.	34	89
Reynolds, W. F.	34	89
Knake, R. J.	36	93
Norton, H. W.	34	87
Ryden, L. A.	34	87
Gay, W. W.	34	85
Mercer, Robert	34	85
Fiedelman, Chas.	34	84
Janett, L. G.	34	83
McMahon, W. R.	34	83
Bidwell, L. E.	35	85
Guilfoyle, E. J.	34	82
Kaska, R. C.	34	82
Soule, J. W.	34	82
Wendt, H. C.	34	82
Koch, P. L.	34	81
Comer, R. G.	32	76
Jones, R. D.	34	80
Rhodes, J. A.	34	80
Kniskern, C. B.	33	77
Wink, K. R.	30	70
Helom, H. M.	34	79
Seaborn, B.	34	79
Wiegert, L. O.	34	79
*Pfanku, H. D.	16	37
Albright, C. B.	34	78
Gapen, C. C.	34	78
Henry, J. E.	34	78
Jansky, M. M.	34	78
Huegel, R. J.	34	77

The following students, although not working at honor rate, are in highest 15% of class:

	Credits	Points
Dietrich, A. B.	34	76
McCauley, H. J.	34	76
*Rutter, Dick H.	17	38

\*2nd semester only.

No, Louise, the University doesn't train all of those engineers to run locomotives.

**FACULTY REPRESENTED AT COMMEMORATION**

Professor E. Bennett, accompanied by R. E. Johnson and E. D. Ayres, attended the commemoration of the 50th Anniversary of the establishment of the first hydro-electric plant in the world which was held at Appleton, Wisconsin in September.

**ENGINEERING LABORATORIES ARE MOVED**

The Sophomore and Junior Laboratories of the electrical engineering department have been moved to the east wing of the electrical engineering building. New equipment has been added, and the galvanometers have finally been permanently mounted.

**JEWELS ARE OBJECTS OF STUDY FOR ENGINEER**

Philip H. Werner, e'33, is making an individual study of jewels used for meter bearings. He is endeavoring to ascertain the desirability of synthetic as well as natural jewels in precision instrument construction. In addition, he is studying the natural axes of jewels and their proper positions in instruments to insure long life.

Lorenz A. Leifer, e'33, and Peter B. Killian, Grad, are doing research work on phasing transformers and polyphase watt-hour meters, respectively, to satisfy their requirements.

Once upon a time there was a civil engineering student who would not study in railway engineering because Prof. Van Hagan said that low grades were most desirable.

"Where do you sit at the games?"  
 "My seat is right on the fifty-yard line."  
 "Goodness, doesn't the whitewash ruin your trousers?"  
 —*Ohio State Sun Dial.*

E. E.: "What makes you think my head is a cork?"

C. E.: "Because it's always at the neck of a bottle."

—*The Technograph.*

"Dark and stormy night and the old engine was coming down the track whistling, puffing and flapping its ears—"

"Hold on, Pete; an engine doesn't have ears."

"Certainly it has, engineers."

**SOPHOMORE ENGINEERS AWARDED HONORS**

Below is a list of engineering students who have been awarded Sophomore Honors and Sophomore High Honors upon completing two years of university work. A student earning 135 grade-points, plus 1/2 grade-points for each credit above 60 which he has taken, is awarded Sophomore Honors and similarly, a student earning 165 grade-points, plus 2 grade-points for each credit above 60 which he has taken, is awarded Sophomore High Honors.

**Sophomore High Honors**

*Civil Engineering:*

	Credits	Points
Charles Otis Clark	73	192
Burr H. Randolph, Jr.	68	204
Joseph W. Zack	68	196

*Mechanical Engineering:*

John Edward Brennan	74	197
Orville C. Frank	68	181
Henry Leroy Mohn	69	186

*Chemical Engineering:*

Margaret A. Bardelson	70	185
Robert G. Matters	70	185
(as of Feb. 1932)		
Abraham Mones Max	83	214

*Mining Engineering:*

William H. Horton	76	202
-------------------	----	-----

**Sophomore Honors**

*Civil Engineering:*

Lloyd Sanders Dysland	68	151
Robert Lee Engelhardt	68	179
Winfred C. Lefevre	68	168
Robert Alfred Schiller	73	164

*Mechanical Engineering:*

Donald B. DeNoyer	77	194
(Inc., Ch. E. 8, 2 cr.)		
Joseph J. Ermenc	77	166
Joseph John Peot	68	147
Robert Mackey Rood	71	154
Luverne F. Lausche	97	218

*Electrical Engineering:*

August Otto Bartel	68	148
(as of Feb. 1932)		
Wallace G. Gates	69	171
John Hancock Hinman	70	166
Robert Ingersoll Howes	69	151
Leslie Valentine Killam	70	151
Alvin Oliver Lund	69	168
Frederick E. Seifert	69	162
Melvin William Stehr	70	171
Albert Lee Topp	77	185

*Chemical Engineering:*

Arnold John Hoiberg	70	167
Wayne Kenneth Neill	70	179

*Mining Engineering:*

Howard Gustav Holm	75	178
--------------------	----	-----

# ◆ Campus Organizations ◆

## POLYGON

Polygon is a committee of student engineers chosen for the purpose of representing the College of Engineering in their faculty relations and social activities. This committee consists of two representatives from each of the student branch engineering societies at the University of Wisconsin. Each society elects one senior member and one junior member, the latter having a term of office of two years.

The members for the school year 1932-33 are:

*Electrical:* Herbert Kieckhefer, and Walther Wyss.

*Civil:* James Kaysen and Vernon Palmer.

*Chemical:* Alfred Brandlhofer and Walter Woods.

*Mechanical:* Arnet Epple and Gilbert Bayley.

*Mining:* Jack Eisaman.

The present officers are:

*President* ----- Walther Wyss  
*Sec.-Treas.* ----- Vernon Palmer

A few years ago the greatest single duty of Polygon was to organize and carry out the annual St. Pat's Day Parade. Each one of us can recall stories of the combats, both verbally and physically, which took place between the lawyers and the engineers on the day of these parades. The engineers, however, are becoming more socially inclined and Polygon now serves as an organizer and sponsor for social functions. Polygon last year gave two dandy parties, a Christmas Ball and a Spring Dance which proved very successful both financially and socially. Also, the engineers gathered at several smokers in Tripp Commons of the Memorial Union and were entertained by such men as Professor Louis Kahlenberg of the Chemistry Department and Professor F. M. Dawson of the Hydraulics Department.

This year dances are being planned and smokers organized in an effort to bring the entire engineering body into a single organized unit capable of promoting the best interests of the engineers.

## TAU BETA PI

The Tau Beta Pi Association was organized at Lehigh University in South Bethlehem, Pennsylvania in 1885 "to mark in a fitting manner those who have conferred honor upon their Alma Mater by a high grade of scholarship as undergraduates, or by their attainments as alumni, and to foster a spirit of liberal culture in the Technical and Scientific Schools of America. . .".



*The Wisconsin Engineer, striving at all times to present the news of this college to its readers, feels that the organizations within the college have not held the high interest of the students in the past as they deserve due to an insufficient knowledge of the societies and their functions. It will be the purpose of this section to introduce you to the societies and their officers and to keep you posted on their activities in the future.*

— EDITOR.

Membership is open to male students in the technical and scientific courses of the schools who, up to the beginning of last year of their course have maintained an average rank in scholarship in the first quarter of the class. The student must have completed at least one year of work at this institution before becoming eligible. The chapter at Wisconsin is especially strict in its elections, since it limits them to the first one-eighth of the class, instead of taking all those eligible. This is being done to maintain an especially high standard at Wisconsin and to render membership in the society eminently desirable.

The officers of the Wisconsin chapter "Tau Beta Pi" for the year 1932-33 are:

*Pres.* ----- Royal H. Wood, m'33  
*V. Pres.* ----- C. A. Lyneis, Jr., c'33  
*Cor. Sec.* ----- Alan D. Freas, c'33  
*Rec. Sec.* --- Walther E. Wyss, c'33  
*Treas.* ---- George C. Schmid, m'33  
*Cataloguer* ---- A. N. Kalinski, c'33

## A. S. M. E.

The aim of the society is to promote knowledge, interest and activity in all things pertaining to Mechanical Engineering, and to promote a spirit of comradeship among its members. Any student in the College of Mechanical Engineering having completed the first year of the prescribed course is eligible for admission into the Society as a Student Member. The society holds its meetings the first and third

Tuesday of each month at the new Mechanical Engineering Building.

At the first meeting of the year Mr. Ernest Hartford, assistant secretary of the parent society, and Mr. William Abbot, past president of the parent society, were speakers. They outlined a new policy which is being started this year in connection with the student branches in this part of the United States.

The officers of the society are:

*President* ----- Arnet Epple  
*Vice President* ----- Royal Wood  
*Treasurer* ----- Gilbert Bayley  
*Secretary* ----- Lawrence Allan

## PI TAU SIGMA

The Alpha of Wisconsin Chapter of Pi Tau Sigma, Honorary Mechanical Engineering fraternity, is a society whose primary aim is the promotion of scholastic ability, and whose secondary aim is the promotion of fellowship among



the mechanical engineering students and faculty. Approximately 25% of the Juniors and Seniors of the College are eligible for election to the fraternity either in the fall or the spring.

Pi Tau Sigma has ten chapters, Illinois and Wisconsin being the Alpha chapters. "The Condenser" is a Pi Tau Sigma magazine.

The first meeting of the year was held Thursday, October 6, 1932, at 7:15 P. M. at the Mechanical Engineering building for the purpose of organization and the formulation of a program of activities for the coming school year.

Officers of the chapter are:

- President ----- Elmer R. Kaiser
- Vice President ----- Donald W. Anderson
- Treasurer ----- George C. Schmid
- Corres. Secretary ----- Arnet B. Epple
- Recording Secretary ----- Milton R. Paulsen

**ETA KAPPA NU**

The purpose of Eta Kappa Nu is to establish a closer union among those men in the profession of Electrical Engineering, who, by their attainments in college or in practice, have shown a genuine interest and a marked ability in their chosen life work. There are chapters of Eta Kappa Nu in most of the leading universities and colleges who offer at least a four-year course in electrical engineering. The chapter at the University of Wisconsin is Theta chapter.



The members are chosen by election from among the junior and senior students pursuing a course in electrical engineering. Scholastically, the students eligible for election must be the highest in their class.

The officers of Eta Kappa Nu are:

- President ----- Walther E. Wyss
- Vice President ----- Robert E. Moe
- Secretary ----- Herbert Kieckhefer
- Treasurer ----- Clyde F. Schlueter
- Corres. Secretary ----- Delbert Zilmer
- Publication Correspondent --- Roy H. Holmquist

**CHI EPSILON**

Chi Epsilon is the honorary civil engineering fraternity. Its purpose is to grant recognition to the undergraduate civil engineering student of high scholastic ability. It stands for the high ideals of scholarship, character, practicality, and socialbility.

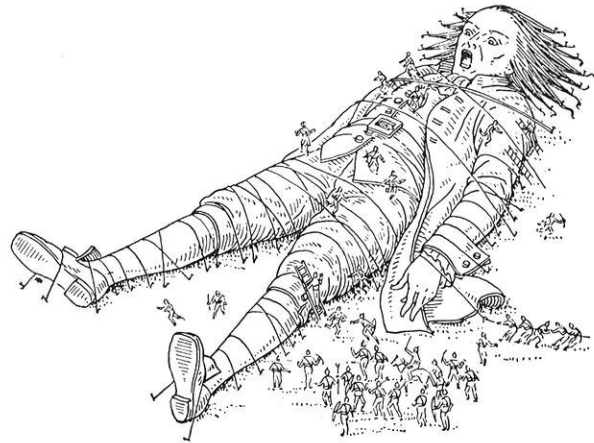


The officers of the Wisconsin chapter for the present semester are:

- President ----- Claude A. Lyneis, Jr.
- Vice President ----- James P. Kaysen
- Secretary ----- Anton A. Kalinski
- Treasurer ----- Alan D. Freas
- Associate Editor of *Transit* ----- Earl Harbeck

(Continued on page 15)

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# Alumni Notes

## ELECTRICALS

Dack, Michael L., Kuehlthau, John L., Havalon, Edward S., and Miller, G. W., all of the class of 1931, are back for graduate work.

Jones, John L., e'31, has returned to school and is doing part time experimental work.

Brown, George H., e'30, is back in school. He has a research fellowship.

Querino, F., e'29, who was with the Cutler Hammer Company of Milwaukee is now in school for graduate work.

Norton, Paul T., e'17, is now editor of a monthly publication, "Technical Topics", at the Virginia Polytechnic Institute, Blacksburg, Virginia.

Tuffnell, Wm. L., e'30, is with the Bell Telephone Laboratories at New York.

Tyler, Edward M., e'30, has left New York and is now living in Detroit.

Holder, L. F., e'26, has recently invented a new electric tachometer for testing purposes. Mr. Holder is an employee of the General Electric Company.

Dick, Walter E., e'22, who organized the Dick & Blake Construction Company for general contracting in 1928, is now in business for himself as contractor. He has built a number of bridges for the Wisconsin Highway Commission and has done some important work for the water works department of Milwaukee. His address is: 4610 W. Lisbon Avenue, Milwaukee.

## CHEMICALS

Kinney, Harold J., ch'30, visited Madison in September. He is still in the Patent Division of the Atlantic Refining Company at Philadelphia.

Owen, F. J., ch'27, has discontinued his connection with the Proctor and Gamble Company to assume the position of superintendent of the new refinery of Lever Brothers, Edgewater, N. J. Lever Brothers are also manufacturers of soap.

Hansen, Russell E., ch'26, was married to Ann Cooper at Lakewood, Ohio, June 30. He is employed as a sales engineer for Leeds and Northrop Company.

## MECHANICALS

Cowie, Alex, m'31, is in the Engineering Department of the Westinghouse Company, at South Philadelphia.

Resan, S., m'31, is back in school studying for his Master's Degree.

Stetson, G. L., m'30, has returned for graduate work.

Brown, Robert V., m'29, MS'30, has left his job with the Bell Telephone Laboratories, in New York. He is now living at Beaver Dam, Wisconsin.

Davis, Elmer L., m'27, spent part of the summer touring Great Britain. He has been doing research work at the Falk Corporation in Milwaukee. His address is: 1301 West Capitol Drive, Milwaukee.

Jahn, Carl W., m'27, who has been in the Research Department of the A. O. Smith Corporation at Milwaukee, is enrolled as a graduate student in metallurgy.

Clark, H. L., m'26, is now a graduate student in the Mechanical Engineering Department.

Naujoks, Waldemar, m'26, became the father of a daughter, Phyllis Irene, on June 15, 1932.

Richtmann, Wm. M., m'25, has accepted a position in the

School of Engineering at the Texas College of Arts and Industries, at Kingsville, Texas.

Mulholland, Clifford A., m'24, visited Madison in September. He is living in St. Louis, Mo.

## CIVILS

Buehler, Robert, c'31, was married August 1, 1931, to Miss Evelyn Owens. The marriage was a secret for a year. Buehler will return and work for his Master's degree in Civil Engineering.

Hutton, Robert W., c'30, assistant superintendent for the Great Lakes Dredge and Dock Company, has been transferred to a dredging job in the Soo River.

Plotz, Resin S., c'30, was presented with a daughter, Evelyn Ruth, on July 15. Plotz is working in the Inspection Engineering Department of the Bell Telephone Laboratories in New York.

Poss, Robert J., c'30, Fischer, Frank A., c'29, and Baillies, Duncan, c'29, were in the crew working on the Frankfort North Breakwater job at Frankfort, Michigan. Baillies has transferred to the U. S. Lighthouse service with headquarters at Milwaukee. At present he is making surveys for the new lighthouse to be built at North Manitou Shoal in Northern Lake Michigan.

Tacke, Walter, c'30, instructor in Rails here was married to Polly Sue Watt of Shreveport, September 12, 1932, at Shreveport, La.

Blanchar, John E., c'29, has transferred from the U. S. Engineer Office at Milwaukee to the U. S. Engineer office at New Orleans.

Junkerman, Charles G., c'29, was drowned, September 19, in the Fox River near De Pere, Wisconsin. He was Chief of the party taking soundings on the river. Jentz, G. L., c'30, assisted in rescuing four others of the party.

Abbott, Clark, c'27, and Thomsen, Darrell, c'27, have formed the Thomsen-Abbott Construction Company with headquarters at Marshfield, Wisconsin. Their business is general building and contracting.

Lindner, Clement P., c'26, who was attending the Law School at Wisconsin during the first semester of 1931-32 is now with the Mississippi River Commission with headquarters at Vicksburg, Tenn.

Homewood, R. T., c'27, C.E.'29, is Assistant Sanitary Engineer with the State Health Department of Virginia with headquarters at Richmond. His address is: 3414 Monument Avenue, Richmond, Va.

## MINING

Archie, G. E., min'31, has returned to the department to secure his Master's Degree. Archie has been with the Highway Commission until late in August.

Ramsay, Robert H., min'31, who spent last year at the University of Colorado in graduate study, is back to continue his study of mining engineering.

Krause, Daniel E., min'30, MS'31, has resigned his position as metallurgist for the Brillion Iron Works, Brillion, Wisconsin, to become Research Associate with the Battelle Memorial Institute at Columbus, Ohio.

Roden, Philip, min'30, who has been with the Braden Copper Company at Sewell, Chile, since graduation, has recently returned to this country.

Schmedeman, O. C., min'30, is now located in Morococho, Peru, S. A. He is working for the Cerro de Pasco Copper Corporation as a geologist.

Fritsche, O. O., min'26, Ph. D.'32, holds one of the special Post-Doctorate Associateships recently created by the University.

Bemis, Reginald, min'29, has returned to the department for his Master's Degree. Since graduation he has been with the Braden Copper Company at Sewell, Chile. He spent the summer in several of the western gold camps.

**THE ILLINOIS WATERWAY**

(Continued from page 4)

feet of headgate structure. There is also built into the dam the upper end of an extra lock in case at some future time traffic would warrant a second lock.

*Brandon Road Lock and Dam:* This unit of the Waterway is located about two miles downstream from Joliet, Illinois on the Des Plaines River. At this dam, floods are passed by 21 tainter gates 50 feet long by 27 inches high, six sluice gates, and six emergency gates in the headgate structure. Since the pool elevation established by the Brandon Road Dam would flood a considerable area in the lower part of the city of Joliet, the water is confined to the river by over five miles of retaining walls varying from 15 to 40 feet in height. An interesting angle on the construction of these walls is that for most of the distance the rerouted Joliet intercepting sewers are carried in the base of the walls.

*Lockport Lock and Dam:* At Lockport the Chicago Sanitary District already had a dam and powerhouse to utilize the diversion from Lake Michigan. It was necessary only to build a lock, a lock which had a lift of 41 feet, the greatest of any on the Waterway, and a greater lift than any single lock in the Panama Canal. The lower gates at Lockport are 65 feet wide, 60 feet high, and weigh 320 tons each.

*General Features:* The main gates of all the locks with one exception are steel miter gates operated by large gear wheels called "bull wheels". Each bull wheel is 19 feet in diameter weighing 13 tons, and imparting to the gate leaves the desirable feature of slow motion as the gate approaches either the mitered or open position. The upper gates at Lockport are counterweighted vertical lift gates, made necessary by the limitations of existing structures.

The locks are filled and emptied in from seven to twelve minutes by two circular lock culverts twelve feet in diameter. All operations of the lock are completely motorized and under convenient control by the operators.

TABLE I

Canal	Length	Width	Draft	Maximum Lift
Illinois Waterway	600	110	14	41
Panama Canal	1000	110	40	31
New York Barge Canal	300	45	12	40.5
Welland Canal	820	80	30	46.5

To obtain a perspective of the size of the locks of the Illinois Waterway a comparison is made in Table 1 of these locks and the locks of three other canals. At least four dimensions may be used as a basis for comparison namely length, width, draft, and lift. From Table 1 it can be seen that the locks of the Illinois Waterway can be included

among the largest in the world. At the present time channel limitations necessarily restrict navigation to river barges, but should a deepening ever become feasible the draft through the locks is sufficient to permit the passage of ships and barges able to navigate the Great Lakes.

**WHAT THE CLASS OF 1932 IS DOING**

(Continued from page 7)

as a laborer, but the long line of applicants made him change his mind and apply as engineer. He got the job.

Obma, Chester A., no information.

Paddock, Robert H., worked as chemical aid in the materials laboratory of the highway commission during the summer. He has registered for graduate work.

Platz, George A., has not found work.

Redeen, Byron O., went West to pan gold during the summer, but found it unprofitable.

Reeves, Harry M., is working for the Madison Water Department, making a water service survey and bringing the records up to date.

Reinke, Raymond J., is chemical aid in the material laboratory of the highway commission at Madison.

Renner, Edwin Ross, has not found work.

Senn, Charles L., is senior engineering aid with the highway commission at Rhinelander.

Strand, John A., worked for three weeks as sewage plant operator for a pea cannery at Ripon. More recently he has been working part time as librarian at Wauwatosa.

Thompson, William E., Jr., is chief of party with the highway commission at Superior.

Thrapp, Harrison F., is student assistant in topographic engineering in this college. He is registered in the graduate school. He tried the gold-panning idea during the summer.

Tourville, Clarence W., no information.

Van Hagan, Robert L., is chief of party with the highway commission at Wisconsin Rapids. Bob finally drove his famous old Hup into the scrap pile and had to get a new car to tote his party around.

Weidenkopf, Stanley J., is senior engineering aid with the highway commission at La Crosse.

Wheeler, Earl W., is candidate for surveyor of Rock County on the Democratic ticket.

Wilde, Walter E., no information.

Withey, Norman H., worked for the Immel Construction Company on a building at Reedsburg during the summer. He was married on September 19 to Marion Zoe Mathews, daughter of Prof. J. Howard Mathews of this university.

**CAMPUS ORGANIZATIONS**

(Continued from page 13)

**A. S. C. E.**

The officers and active members of the American Society of Civil Engineers extend a hearty welcome to all civil engineering students and invite them to make application for membership. The monthly gatherings of this organization give opportunity for social intercourse, professional recognition, and professional education that potential civils cannot afford to miss.

The officers of this organization are:

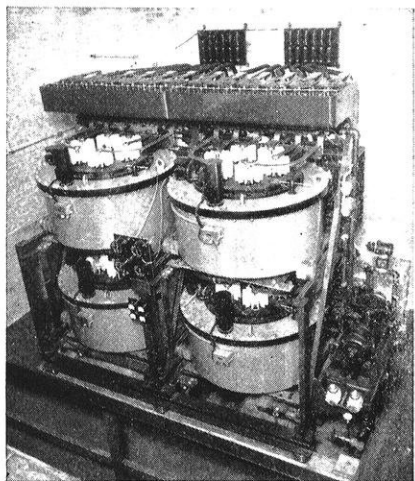
- President ----- Vernon Palmer
- Vice President ----- Philip Morgan
- Secretary-treasurer ----- Roy Weston
- Polygon representative ----- James Kaysen
- Publicity chairman ----- Herbert Ferber



# Engineering Review

## 3000 KW. SECTIONALIZED RECTIFIER SEES SERVICE

Operating at the Cedar Manor Station of the Long Island R. R. is the first 3000 KW. mercury arc rectifier of sectionalized design. This recently



*Sectionalized Rectifier.*

installed 3000 kw. unit is completely automatic and is made of four new interchangeable 750 kw. sections, integrally mounted, fed from a single transformer and easily withdrawn on rollers.

## RADIO COOKERY

Radio engineers cook a hot-dog sandwich by placing it in a field of radio beams. The two discs between which the beams pass convey no sensation of heat to the human hand.

## RIVER ON DETOUR

Four circular tunnels, 56 feet in diameter and 4,000 feet long are carrying the obstreperous Colorado river while the Hoover dam is being built in Black Canyon. Electric shovels made the long cuts through solid rock cliffs.

## TESTS WITH MODELS MOST ADVANTAGEOUS

Certain engineering knowledge can be obtained only by means of experimental tests of models, according to Dr. Oskar G. Tietjens, who read a paper on "The Use of Models in Aero and Hydrodynamics," at the semi-annual meeting of the American Society of Mechanical Engineers at Bigwin

Inn, Lake of Bays, Ontario, June 28.

Electrical data necessary for the design of an electrical machine may be obtained by applying the theory of electro-dynamics, according to the speaker, but he pointed out that it is out of the question to apply the theory of hydrodynamics in a similar way to the calculation of air flow necessary to ventilate that machine.

Copper losses and many other details can be determined theoretically with approximate accuracy, he continued, whereas the pressure drop of the cooling air through the machine and any detail of the air flow through the various ducts must be based entirely on experiments.

For this general reason Dr. Tietjens declared model testing for those branches of engineering based on aero- and hydrodynamics is probably more important than in any other field of engineering.

Usually it is better to use small scale models, he said. However, there are cases where it is necessary to use models of greater size but of the same geometrical proportions. Studies of the flow of steam between small turbine blades was cited as such an example. Or if the performance of the wing of an insect were under investigation it could be done advantageously by testing a wing 100 times as large as normal and in thick oil instead of air.

He said the purpose of testing models is to apply results obtained from the models to normal scale practice and he gave an exhaustive description of various laws of mechanical similarity and their relation to model testing practice. Many mathematical formulae, charts and curves were used to illustrate the technical portions of his paper.

In conclusion Dr. Tietjens said one of the most difficult phases of experimental practice in aero- and hydrodynamics is to know for each particular case which of the various laws of similarity to take into account and how far it is safe to neglect others.

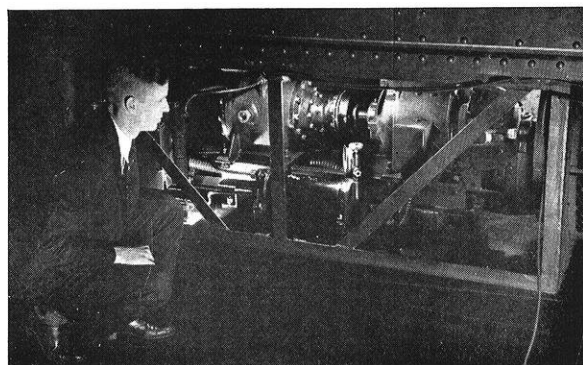
## ILLINOIS CENTRAL'S DE LUXE CARS TO BE COOLED

The Illinois Central Railway System has ordered ten Westinghouse air conditioning units for cooling cars this summer on their Day Light Special trains running between Chicago and St. Louis. The ten units, each producing a cooling effect equivalent to melting six tons of ice in 24 hours, will be installed on dining, lounge, parlor, chair cars and coaches.

The air conditioning unit consists of a self-contained high-speed motor driven compressor and condenser mounted under the car body, similar to the familiar battery box. A gear-driven axle-generator, twice as powerful as the usual railway belt-driven type, can supply power for car lighting, battery charging and the air conditioning system. The electrical control is arranged to give constant voltage at any train speed from 20 to 90 miles an hour.

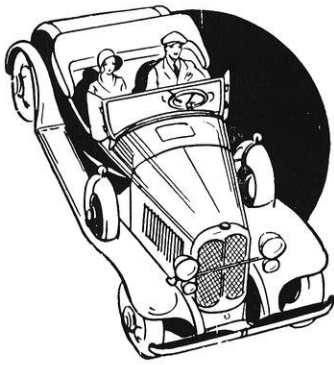
A unique arrangement will permit the cars to be cooled in the yard before a run by merely plugging the system into an existing alternating current power supply. While this is taking place, batteries may be charged without change in connections. When the cooled train is ready to start out, the service can be switched over to the direct current power supply carried on the cars.

The ten 6-ton cooling units to be used in connection with the air conditioning systems are being installed by the Illinois Railway at their shops in Chicago.



*Cooling Equipment Suspended Beneath Car.*





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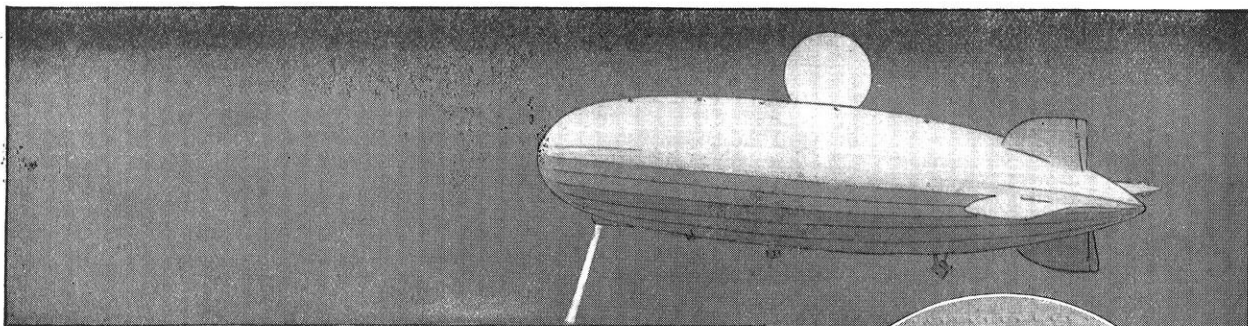
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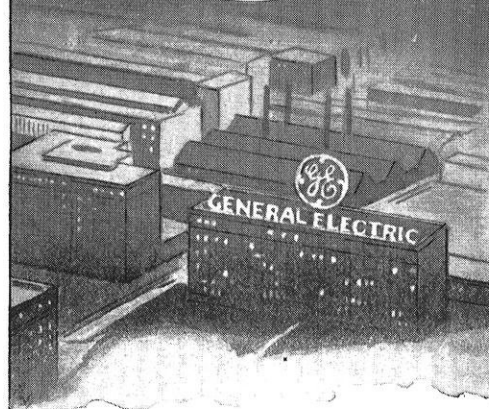




## Talking from the sky on a beam of light

THE huge U. S. Navy dirigible, Los Angeles, is roaring above the General Electric Research Laboratory at Schenectady. On board the airship, an almost invisible beam of light is aimed at a 24-inch mirror-target a half-mile below. The mirror, turning as it follows the dirigible's course, catches the slender beam. Voices transformed into electric impulses in the airship are carried to the mirror by light waves. A photoelectric cell picks up these waves and they are reconverted into sound, which is broadcast to the world by radio.

A "voice on the air," with a "voice from the air"—the official opening of radio station WGY's new 50-kw. transmitter is taking place. One millionth of a watt—generated from the blast of a police whistle in the dirigible—is transmitted to the ground on the beam of light and to a Thyatron tube. The tube magnifies the whistle energy 50,000,000,000,000 times to operate the switches that start the transmitter, five miles away.



*(Insert) John Bellamy Taylor, General Electric research engineer, operating projecting apparatus*



*Receiving mirror on roof of General Electric Research Laboratory*

Thus was "narrowcasting," a possible means of secret communication, recently demonstrated to Military and Naval experts by General Electric engineers. The future will demonstrate its commercial value. Electrical developments such as this are largely the accomplishments of college-trained engineers. They are leading the way to even greater progress in the electrical industry and are helping to maintain General Electric's leadership in this field.

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