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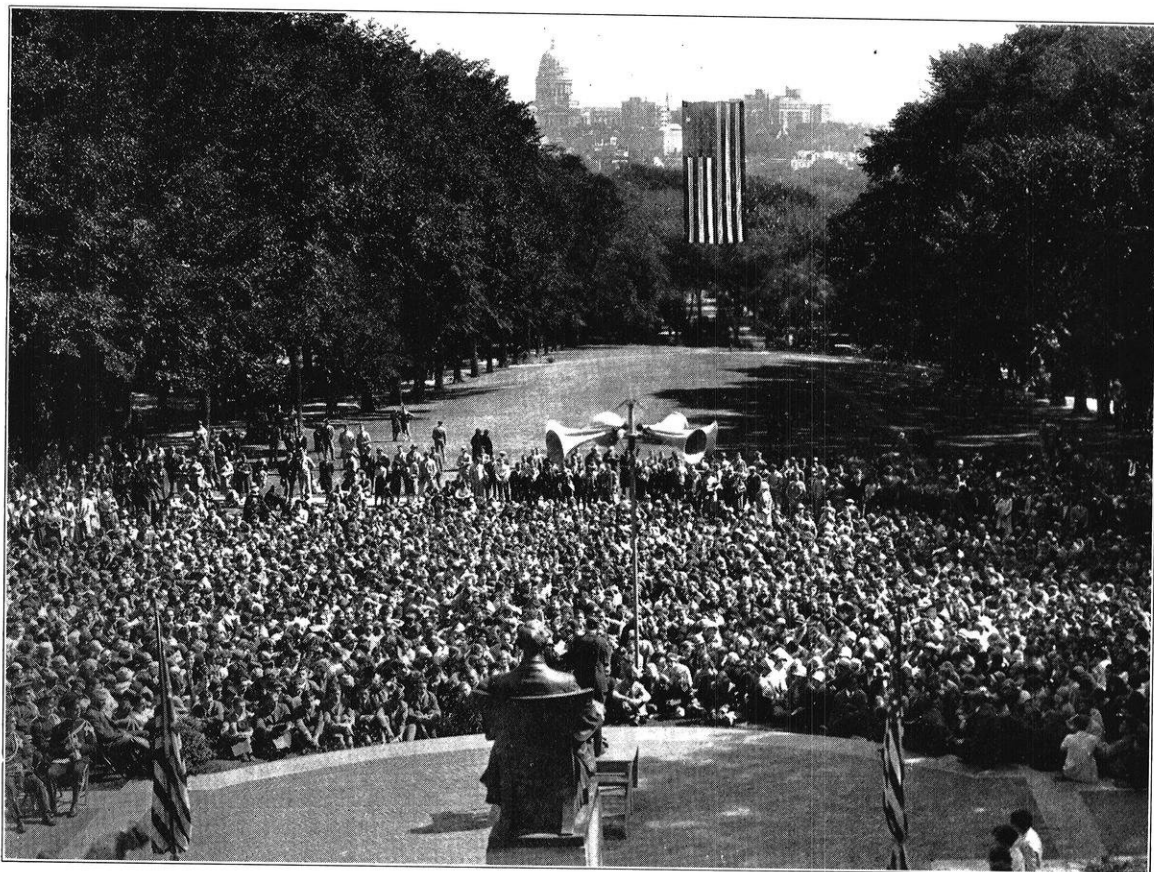
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The Wisconsin Engineer

MEMBER OF ENGINEERING COLLEGE MAGAZINES ASSOCIATED

VOLUME XXXII

NUMBER I



THE 1927 VARSITY WELCOME

PUBLISHED BY THE ENGINEERING STUDENTS
of the UNIVERSITY OF WISCONSIN

October, 1927

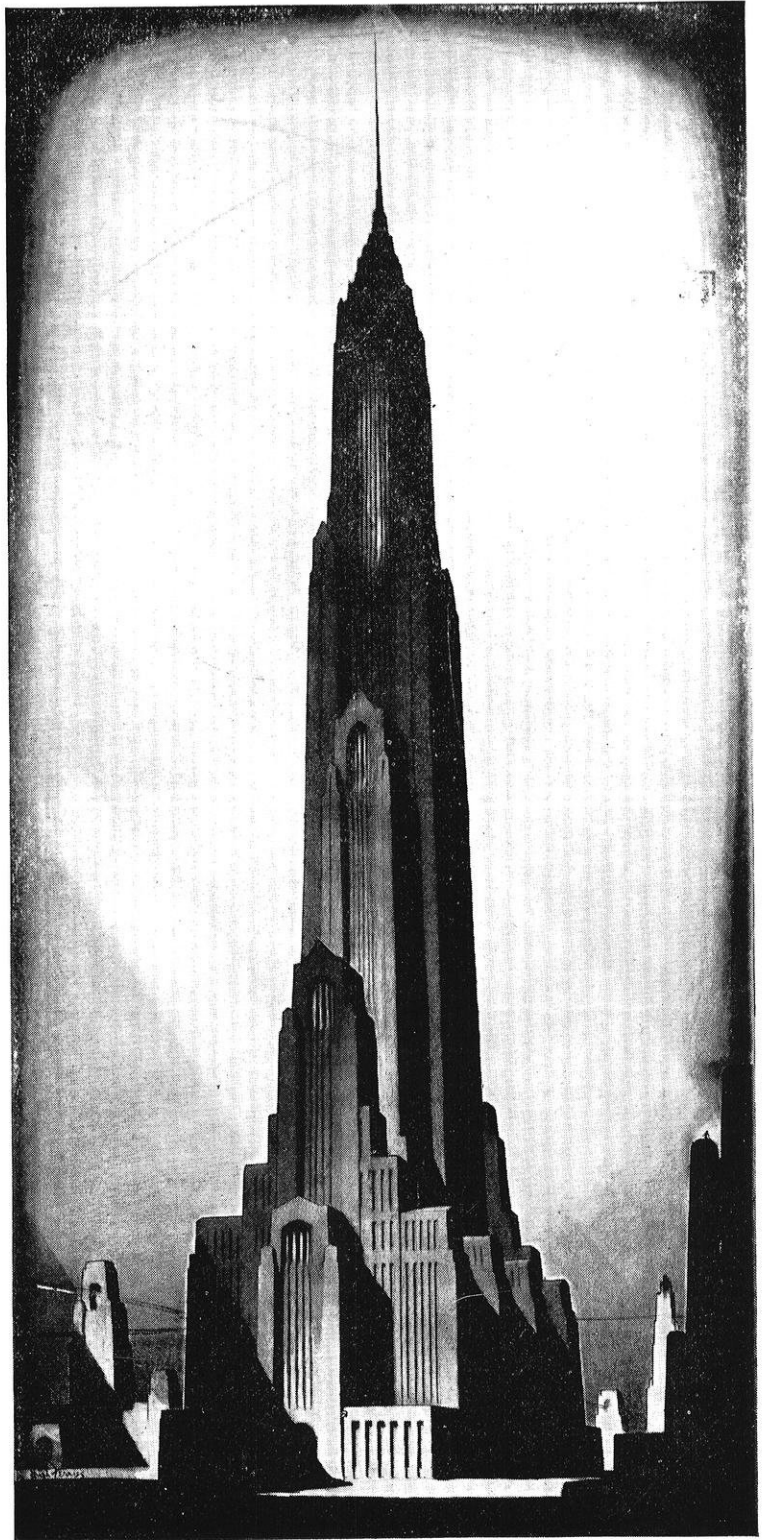
“IF”

AUDACIOUS ENGINEERS are filling our popular publications with descriptions of the cities of the future. We have all seen their prophetic pictures: tiers of gigantic buildings rising one hundred, two hundred, three hundred stories above four or five levels of street.

All the ingenuity of these prophets is required to explain away, even theoretically, certain problems of construction. *IF* this material can be made to bear so much more strain; *IF* means can be devised to ensure a solid foundation — *IF, IF.*

One important detail, however, is always taken for granted. “There will be express elevators,” they say, “from the various street levels to the hundredth and two hundredth floor.” *THERE WILL BE!* We find no “*if*” in connection with the elevators.

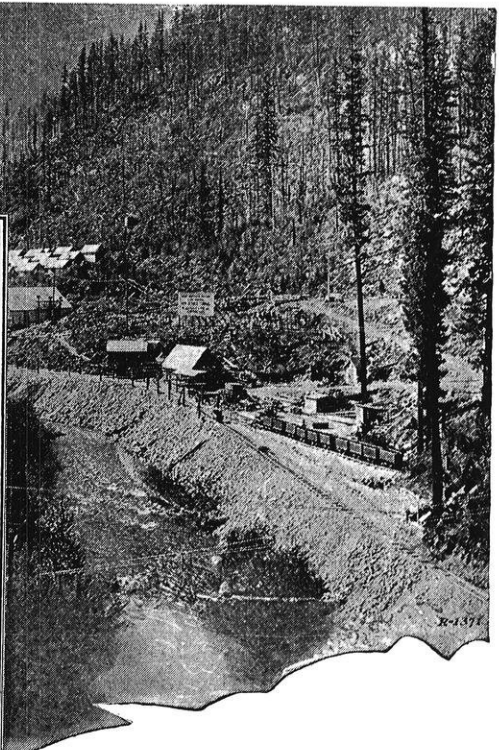
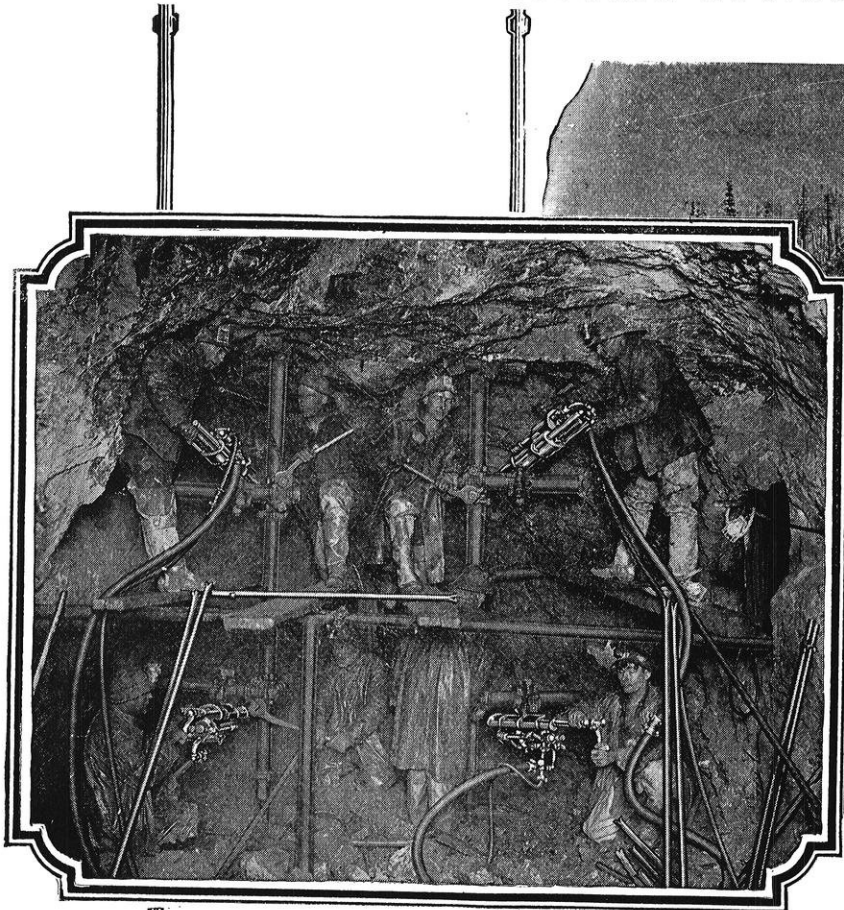
For all builders have come to expect a perfect solution of every interior transportation problem, no matter how audacious. As the cities of the future are being planned, the OTIS COMPANY expects that dependable vertical transportation will continue to be taken for granted by architects, engineers, and the public.



Mr. Hugh Ferriss has visioned many outstanding gigantic “buildings of the future.” This reproduction is particularly appropriate at this time and special permission has been granted to use this illustration in college publications.

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A group of Ingersoll-Rand Drifter Drills at work on the Cascade Tunnel job

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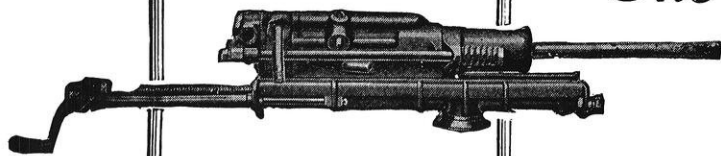
A new 8-mile tunnel, running straight through the heart of the Cascade Mountains, will ultimately save over \$1,000,000 a year for the Great Northern Railroad.

It is the urge of this possible saving that calls for the completion of the tunnel within the amazingly brief span of three years. The contractor has accepted this wager against time and is making records that have already aroused world-wide interest.

At the Mill Creek and East Portal sections of the job, Ingersoll-Rand R-72 Drills are used extensively. These rapid, sturdy, dependable drifters have more than held their own, making it possible to attain a daily footage of sometimes 40 feet.

In every heading, 24 hours a day, the drill crews and muckers are going into and through the rock. The race is one in which the keenest sort of rivalry prevails among the competing crews. It is a sporting contest that never lags—a contest calling for untiring effort and the very finest tools.

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The New U-Approved Suits at The Co-Op.

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The style committee from all the leading schools of the country (our Mr. Ripp is a member) did themselves proud when they designed these things for autumn and winter

. . . . The committee takes the leading style trends as seen in all the big schools of the country and follows those trends in their work of designing smart college clothes.

Well, they did their job well. In fabric, in styling and in general smartness these suits are the best we have ever seen . . . Drop in any time you can spare a few minutes and we'll show you why we are proud of U-Approved for fall.

The UNIVERSITY CO-OP.

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State at Lake

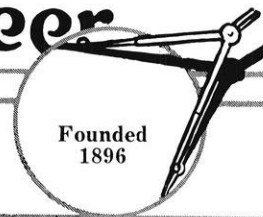
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Published monthly from October to May, inclusive, by
THE WISCONSIN ENGINEERING JOURNAL ASSOCIATION
306a Engineering Bldg., Madison, Wis.—Telephones University 177—277

Founded
1896

\$1.50
A Year

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The Dean's Welcome

¶ It has been customary each year for the Engineering Faculty through its Dean to extend to the new and old students of the College, through the pages of *The WISCONSIN ENGINEER*, its cordial greetings and good wishes for the coming year. This we are happy to do in this the first issue of the thirty-second volume of the magazine. ¶ We wish also to congratulate the magazine upon its long record of useful service and to commend it to the attention of students and alumni of the Engineering College. An engineering magazine published by the students of the College is one of the most important and helpful activities in which they can engage. ¶ This enterprise, together with the various engineering societies, furnishes fine opportunities for the development of talent in ways which will be of very considerable value to the student in his later professional life. ¶ They stand to the student in much the same relation as the professional societies to the man in practice, and one of the important duties the practicing engineer owes to his brothers in the profession is the personal support of such societies. ¶ Participation in their work in and out of college is not only of aid to others but of much direct benefit to the man himself in the training it gives in the powers of expression and analysis and in the conduct of the related business details. Reasonable participation and support of these activities is thoroughly approved and recommended by the faculty. ¶ To the men of the freshman class it might be well to give a word of caution against scattering of spare energies over too many fields. In fact, you will not find much spare time. The main job here is to get a thorough grounding in the principles underlying the work of the engineer, and this requires plenty of hard study. Until you have thoroughly tested your capacity in the regular work of the course, a very cautious attitude towards other activities is in order. Whether or not you attain your object in coming to the University will depend in large degree upon the energy and persistence with which you apply yourself during the first year. We wish you the best of success.

---F. E. TURNEAURE

The Wisconsin Engineer

UNIVERSITY OF WISCONSIN

VOL. XXXII, NO. 1

MADISON, WISCONSIN

OCTOBER, 1927

CHEMICAL ENGINEERING DEVELOPMENTS IN GAS PURIFICATION

By E. W. JEFFREY, *Chemist*
Madison Gas & Electric Company

THE gas industry annually absorbs a great many of the technical graduates from both the chemistry and chemical engineering courses. Gas manufacturing is essentially a chemical process and most gas companies find it advantageous to have on their operating staff men who are trained in the principles of chemical engineering. One of the most recent developments in gas manufacture, the Kopper's Sulphur Recovery Process, is therefore of interest to the chemical engineering student.

Manufactured gas contains a large number of impurities such as hydrogen sulphide, carbon disulphide, hydrocyanic acid, naphthalene, resin forming compounds, water and oxygen. The most objectionable of these impurities is hydrogen sulphide, and when the gas engineer refers to "purification", he usually means that process by which this undesirable constituent is removed from the gas.

Previous to the development of the Seaboard Liquid Purification Process, of which the Sulphur Recovery Process is a refinement, the universal method used for gas purification was the dry or oxide process. In this the raw gas is brought into intimate contact with finely divided iron oxide. The chemical reactions involved are complicated, but the final effect is to convert the hydrogen sulphide into iron sulphide and thus result in the removal of that sulphur which is present in the

gas in the form of hydrogen sulphide. After the iron oxide becomes inactive it may be revived by exposure to air, and then re-used.

The disadvantages of this process, large ground space required, lack of flexibility, the irregular labor required for emptying and refilling the boxes, and the difficulty of preventing leakage from boxes under high pressures, have led to the development of the liquid purifying processes.

The first of these developments was the Seaboard Liquid Purification Process. This method effects the removal of the hydrogen sulphide from the gas by subjecting it to a thorough scrubbing with a dilute solution of sodium carbonate. The soda solution absorbs 85% to 95% of the hydrogen sulphide, about the same percent of hydrocyanic acid, and part of the carbon dioxide present in the gas. The soda solution containing these impurities is regen-

erated by blowing through it a large volume of air. The air removes the hydrogen sulphide and the solution can be used over and over again. The disposal of this large volume of actifier air contaminated with hydrogen sulphide is in certain localities a difficult problem. In some installations this has been solved by burning the actifier air under the boilers or in the water gas sets, or by using a tall stack to conduct it to the upper currents of air which carry it away un-

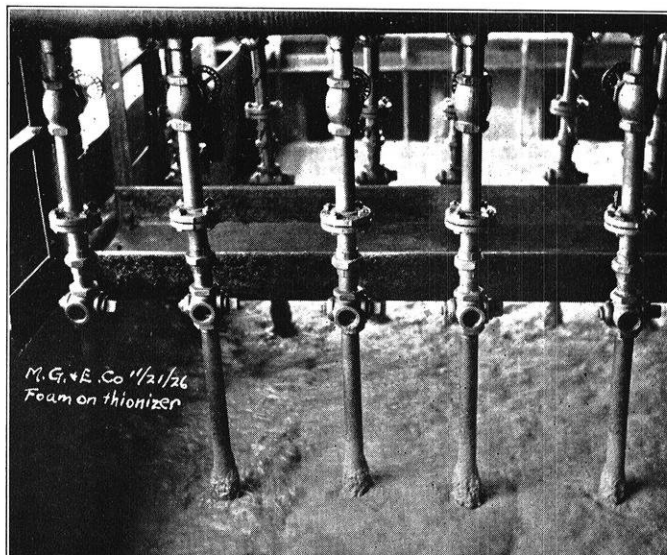


FIG. 1.—*Foam on Thionizer*

noticed. In either case the sulphur is lost and is not recovered as a by-product. The Sulphur Recovery Process was worked out not only to accomplish complete instead of only partial removal of the hydrogen sulphide from the gas, but also to recover the sulphur in a salable form if possible.

The operation of the Sulphur Recovery Process, like the Seaboard Liquid Purification Process, depends upon the fact that an alkaline wash liquor, containing about 1.3% sodium carbonate, (soda ash), will absorb hydrogen sulphide, forming sodium hydro-sulphide and sodium bicarbonate. In this process, however, the sodium hydro-sulphide is oxidized in the presence of a suitable catalyst forming elemental sulphur, the solution thus being regenerated for the absorption of additional hydrogen sulphide. For water gas a nickel salt is used for the catalyst and for coal gas a ferric iron salt is used. The catalyst need be present only in small amounts, 0.2% to 0.5%, but it must be in a very finely divided condition. During the regeneration a side-reaction occurs, resulting in the formation of sodium thiosulphate.

The apparatus used in this process consists of an absorber-saturator in which the gas is brought into intimate contact with the circulating liquor and a so-called "thionizer" or aerating tank in which the solution is subjected to the action of finely atomized air.

The absorber-saturator is nothing more than a counter-flow scrubber which takes the form of a cylindrical steel tower. Figure 2 shows the absorber-saturator installed at the gas plant of the Madison Gas & Electric Company. This unit is 11 ft. in diameter, about 65 feet high, and has a capacity of 5,000,000 cu. ft. of gas per day. The tower is packed with wooden grids, and the solution is pumped through a set of sprays at the top of the tower. The raw gas is admitted at the bottom of the tower, and after bubbling through a seal of the wash liquor where 60% of the hydrogen sulphide is removed, it passes up through the wooden grids and is thoroughly washed by the down-coming liquor.

The thionizer, as shown in Figure 1, is a large rectangular tank about 6 ft. deep and has two compartments so that the solution may be transferred from one to the other. The tank is fitted with baffles to effect a good circulation of the liquor. Between each two baffles at the bottom of the tank there are two cloth tubes. These tubes are made of a good grade of rugged filter cloth and are supplied with compressed air from blowers of the positive type. The purpose of the baffles is to increase the period of contact of the solution with the tubes, thereby improving the aeration.

The air as it bubbles up through the soda solution has two functions to perform. First, it is the oxidizing agent which liberates the elemental sulphur, and second, it assists in the separation of the finely divided sulphur particles from the heavier, coarser impurities present in the solution. In normal operation the sulphur rises to the surface where it forms a blanket of foam from 6 to 18 inches deep. This foam, which contains from 5 to 10 percent sulphur is allowed to over-flow into a storage tank.

The sulphur foam is further purified by filtration. This is usually done in a Kelly filter press. From the fact that the sulphur is so finely divided, it being even finer than Merck's precipitated sulphur, one would expect difficulty in filtering. This, however, is eliminated by the tendency of the air bubbles to attach themselves to the sulphur particles and actually aid the filtration.

The auxiliary equipment of a Sulphur Recovery plant consists of storage tanks, dissolving tanks for making up fresh solution, solution pumps, air blowers, heating units for keeping the solution at a fixed temperature, and the necessary flow meters for regulating the rate of liquor circulation and the amount of air supplied to the tubes.

A Sulphur Recovery purifier has been in operation at the Madison Gas & Electric Company's plant for some time and it seems to have overcome most of the difficulties of the oxide method of purification. Aside

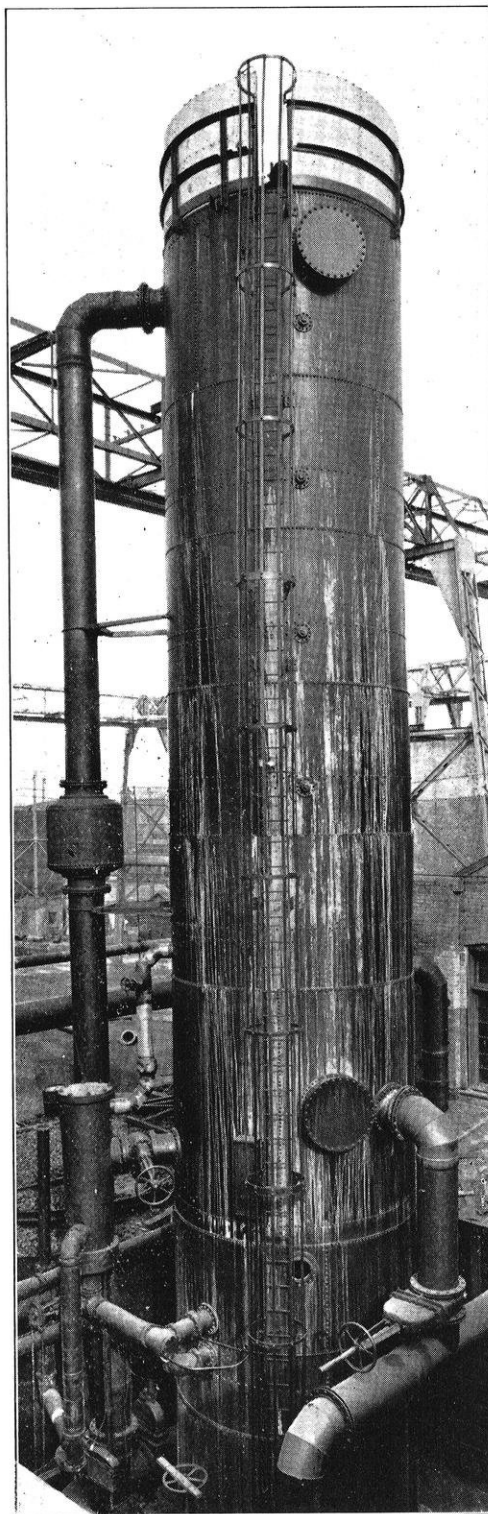


FIG. 2.—Absorber-Saturator

(Continued on page 38)

WHAT '27 IS DOING

By L. J. BECK, c'28

ELECTRICALS

Arter, J. A., is working with the Bell Telephone Co., of Detroit, but we do not know his address.

Bagnall, Vernon B., is working on transmission problems in the district office of the Long Lines Department of the American Tel. and Tel. Co. of Chicago. Bagnall wants his brother electricals to look him up when in Chicago, either at the office or at his room, 2167 Stave St.

Baumgarten, Harry L., maintenance engineer with the Wisconsin Power and Light Co., writes, "It is great to be permanently in the practical field again. Meter testing, installing switchboards, keeping time for a line crew, erecting steel tower substations, testing relays, and starting up small hydro-electric plants are among the jobs which have replaced recitations and laboratory periods. It is still essential to remember the quantity under the radical in the relation of 3 phase circuits, $P = \sqrt{3} EI \cos \theta$, as it was in EE comp. And the mere knowledge that $x^2 dx = \frac{1}{3} x^3 + c$ adds to one's prestige among older engineers who have forgotten it." He is having his "Engineer" sent to his home address, 1125 Vilas Ave., Madison, Wisconsin.

Bollow, Albert, is with the General Electric Company at Schenectady, New York.

Brackett, Max A., is working for the Wisconsin Telephone Company of Milwaukee. His home address is Elk Mound, Wisconsin.

Carpenter, Earl F., is taking the Public Utility Training Course at the H. L. Doherty Co., of Denver, Colorado.

Caton, Dwight, is working for the Wisconsin Telephone Company of Milwaukee. His home address is 634 Chippewa St., Eau Claire, Wisconsin.

Christison, Donald C., started working for the St. Louis Power and Light Co. on October 1. His home address is 626 Lincoln Street, Ripon, Wisconsin.

Churchill, William, is taking the test course at the General Electric Co. His marriage to Miss Lucille Legler took place on September 10.

Cotter, Sylvester D., is anxious to have any Detroit visitors call him at Cherry 9900 or visit him at 11786 Whithorn Ave. He is in the Protective Engineering Department of the Michigan Bell Telephone Co.

Crosby, Murray G., is employed as receiving research engineer for the Radio Corporation of America at Riverhead, Long Island, New York.

Custer, George W., is in Detroit as Transmission Engineer for the Michigan Bell Telephone Co. His address is 1178 Whithorn Avenue.

Damerow, William G., is working for the Wisconsin Telephone Company of Milwaukee. His home address is Greenwood, Wis.

Davis, R. J., is test man for the General Electric Company and rooms at 842 Union Street, Schenectady, New York. In a moment of depression he writes, "Like the work fine but sure miss the gang on the Engineering steps."

De Horn, Conrad E., is doing design, testing, and re-

search work for the Thordarson Electric Co., Chicago. He is making his home at 856 Fullerton Avenue, Chicago, Ill.

Deininger, W. C., is a student in the Crawford Avenue Station Institute of the Commonwealth Edison Company of Chicago. His address is 5909 W. Ohio St., Chicago.

Deist, J. W., was married to Miss Zelma Kincannon on June 25, and after a lake trip to Niagara Falls, became central station inspector for the Wisconsin Telephone Company of Milwaukee. Mr. Deist is stationed at Appleton and resides at 802 E. John St.

Erickson, J. Raymond, 270 Chadwick Avenue, Newark, New Jersey, is occupied in transmitter and receiver development for the Bell Telephone Laboratories of New York.

Everett, Richard E., has a position with the General Railway and Signal Co., Rochester, New York.

Fisher, Walter, has a position with the Wisconsin Power and Light Company, of Fond du Lac.

Frazier, L. B., Jr., is employed by the Western Wheeled Scraper Co. and gives his address as 120 Highland Avenue, Aurora, Illinois.

Galaz, Jose Dolores; according to latest information, Galaz was on his way home, 620 Insurgentes Ave., Mexico City, Mexico.

Gerks, Irvin H., is systems development engineer in the Bell Telephone Laboratories at New York and lives at 113 Tysen Street, Staten Island, New York. He states, "For one thing, I have learned that when one knows it all there is still a lot to be learned, especially in the telephone field. At present, my work consists of strap-hanging in the subways and central office installation work. I am looking forward to the October issue of the 'Wisconsin Engineer'."

Gilster, William H., is with the Wagner Electric Corporation, 7400 Plymouth Avenue, St. Louis, Missouri. His permanent address is R. 3, La Crosse, Wisconsin.

Heian, Theodore, is working in the Plant Department of the Wisconsin Power and Light Company and is making his home at 115 N. Main Street, Clintonville, Wis.

Hermanson, H. P., has been employed by the Wisconsin Telephone Company, at Milwaukee. His home address is St. Croix Falls, Wisconsin.

Highleyman, C. D., has a position in the testing department of the General Electric Company. He says he is waiting for the first copy of the "Engineer" at 3816 Main St., Lawrence Park, Erie, Pennsylvania, but he guarantees that address only until January 1.

Jordan, R. De Witt, is taking the student test course with the General Electric Company of Schenectady. He writes, "Spent most of the summer in the army at Fort Sheridan. Was six weeks with ROTC, then received my commission and served two more weeks CMTC as an instructor. Wore 2nd. Louie bars and acquired a coat of tan." He refers us to his permanent address 1621 Garfield Ave., Marinette, Wisconsin.



I SHALL NOW READ
MY LATEST POME



Koos, Paul V., is engaged in trial installation work with the equipment development division of Systems Development of the Bell Telephone Laboratories of New York. Mr. Koos is now completing a survey course and writes, "In the near future I will spend a month in some machine switching office and will then return to my department at the Bell Laboratories. There my work will deal with the supervision of trial installation of all new developments produced by the other departments of the Bell Laboratories." His address is 55 Hanson Place, Brooklyn, New York.

Kremski, Edward, is with the Wisconsin Telephone Co., and lives at his home 1456 15th Ave., Milwaukee, Wis.

Krueger, Richard, has a position with the Wisconsin Telephone Company, of Milwaukee.

Lillquist, Arvid, is student engineer with the Cutler-Hammer Mfg. Co. He lives at 1425 Cedar Street, Milwaukee, Wis.

Mather, Harold, begins his work with the Wisconsin Bell Telephone Company of Milwaukee on September 19, after a long summer's rest at his home in Merrimac, Wisconsin.

McCoy, Robert C., has just finished three months work at the Commonwealth Edison Company of Chicago and is now in Joliet. He is with the Central Station Institute of Chicago and is living at 311 4th Ave., Joliet, Illinois.

Millermaster, Ralph, is a student engineer with Cutler Hammer Company, Milwaukee, Wisconsin. He is living at 902 19th Street.

Mueller, Rudolf B., is a student in the Junior Engineering Course of the Milwaukee Electric Railway and Light Company. Address 1160 29th Street, Milwaukee, Wisconsin.

Murray, Vernon, is teaching in the School of Engineering of Milwaukee.

Nelson, Walter, is in Green Bay with the Wisconsin Power and Light Company, where he is employed at statistician.

Post, S. B., attended the summer school session and is now with the Long Lines Department of the American Telephone and Telegraph Company of Chicago. His home address is 215 First Ave. S. E., Le Mars, Iowa.

Radtke, L. V., is on the engineering staff of the Newark Lamp Works of the General Electric Company and lives at 771 Kenilworth Place, Orange, New Jersey. He was married to Miss Margaret Benedict of Madison on June 16.

Risser, Andrew, 143 Fourth St., Milwaukee, Wisconsin, is engineer in the fundamental planning department of the Wisconsin Telephone Company of Milwaukee.

Rothermel, U. A., is taking a nine-months training course with the Northern States Power Company of Minneapolis and is well satisfied with his experiences in the training which leads to a permanent position. His address is 1518 3rd Avenue, S., Minneapolis, Minnesota.

Rubinstein, Harry W., is very optimistic about his position as engineer in the Central Radio Laboratories of the Globe Electric Company of Milwaukee. His address is 777 26th Street.

Schmidt, Charles J., is starting his work in plant construction engineering for the Wisconsin Telephone Co., of Green Bay. He is living at the Y. M. C. A.

Scorgie, Robert, has taken a position with the Wisconsin Telephone Company, Milwaukee.

Spees, J. Milton, is cadet engineer with the Seaboard By-Product Coke Company of Newark. He gives his address as 79 Lincoln Park, Newark, New Jersey.

Stiehm, Floyd M., Johnson Creek, Wisconsin, has been employed as student engineer by the Wisconsin Telephone Company of Milwaukee.

Summers, Erwin R., who took his Master's Degree in Electrical Engineering in June, has been appointed Instructor in Electrical Engineering at the University of Minnesota. He writes, "During the past summer I worked for Mason, Slichter, and Hay, Consulting Engineers of Madison. The first part of the summer I worked in Madison, and during the latter part I went on a field trip into the iron ore region in upper Michigan, near Lake Superior. I will be teaching electrical engineering up at the University of Minnesota until next June, unless I get into an argument with some unusually tall Swede, about who has the best football team. The University of Minnesota has a brand new electrical engineering building, and the department is justly proud of its excellent laboratory and classroom equipment."

Thackberry, F. G., is industrial engineer with the Kansas City Power and Light Co. His marriage to Miss H. Beth Stephens of Kansas City, a former graduate student at Wisconsin, took place September 2. The home address is 205 Brush Creek Blvd., Kansas City, Missouri.

Thayer, Neal B., is taking a training course in public utility operation at the Denver Public Service Co., Denver, Colorado.

Tobey, Silas B. Jr., has returned to the University and the Triangle house to begin his graduate studies.

Tweet, Noel, of Elevo, Wisconsin, is taking the training course of the H. L. Doherty Co., of Denver, Colorado.

Vallee, John W., is in the engineering department of the Newport Company of Milwaukee. His address is 561 Belleview Place.

Vollrath, Bernard H., 11786 Whithorn Avenue, Detroit, is plant engineer for the Michigan Bell Telephone Company. He was married on June 21 to Miss Velma Mary Harrop of Arena, Wisconsin.

R. H. Walvoord; no report received.

Wheeler, Gordon G., is student engineer with the Northern States Power Co. He informs us that he is one of the fortunate few who has won the heart of a Home Ec., in his case Miss Gladys S. Mears, to whom he was married on August 7. The home address is 1815 Hawthorne Ave., Minneapolis, Minnesota.

Whitson, Edward W., is in the station maintenance department of T. M. E. R. & L. Company at Milwaukee. His home address is 1304 9th Street, Milwaukee.

Young, Orris S., is assistant engineer with the Western Electric Company and lives at 4811 Fulton Street, Chicago, Illinois.



MECHANICALS

Benfer, Maurice F., 4633 Horrocks Street, Frankford, Philadelphia, is working as time study man in the Miller Lock Works of the Yale and Towne Co. His work consists in timing and setting rates on piecework jobs throughout the factory.

Braatz, Chester, has been made assistant in the Steam and Gas Department at the University and plans to earn his Master's Degree this year. He is living at 1814 Chadbourn Avenue, Madison.

Brooks, Luther, according to his plans this summer is with L. S. Ayres & Co. of Indianapolis, Ind.

Cleveland, Leslie J., is mechanical engineer engaged in general testing and engineering for the Pacific Pump Works of Los Angeles. His address is 219 E. Clarendon Ave., Huntington Park, California.

Davis, Elmer, has not thus far affiliated with any manufacturing company. He is living at his home, 143 W. Gilman St., Madison.

Davis, K. C., is with the General Electric Co. at Schenectady, N. Y.

Deering, Otto F., is designing heating systems for an oil

burner corporation in Minneapolis. His address is 28 N. 2nd Street, Minneapolis, Minnesota.

Ellicott, Ernest E., is draftsman in the office of H. L. Clute, Chicago, Consulting Mechanical Engineer. His address is 1106 Judson Ave., Evanston, Ill.

Fulwiler, Roy, is experimental engineer for the Evinrude Motor Company of Milwaukee. His address is 584 9th Avenue, Wauwatosa, Wisconsin.

Hansen, Claude S., is sales engineer for Fuller and Johnson of Madison and lives at the Sigma Phi Epsilon house at Madison.

Ho, Hsu Tsan, has taken a position as draftsman with the American Bridge Company at Trenton, New Jersey. He is one of the corps of six Chinese students who are employed at the Trenton plant and is living in the Y. M. C. A.

Jahn, Carl W., is working in the testing department of the General Electric Company as part of his student engineers training course. He lives at 208 Union Street, Schenectady, New York.

Jaseph, Lawrence F., is assistant engineer for the Western Electric Company and lives at 166 So. Delaplaine Road, Riverside, Ill. He likes his work for he writes, "The job is a lot of fun — designing automatic devices for inspection purposes. A year from now I ought to know better just how good a job this is, but it surely looks O. K."

Johnson, Clarence, is working for the Wisconsin Telephone Company at Milwaukee. He is living at his home, 1844 Taylor Ave., Racine, Wis.

Little, George, has a position with the Ingersoll Milling Machine Company at Rockford, Illinois, and is living at 823 Bruce St.

King, Kai Yung, has returned to his native country and is living at his home, 55 Paoshan Road, Shanghai, China.

Soulen, Roger J., is taking the student course of the White Motor Company and is living at 8419 Euclid Avenue, Cleveland, Ohio.

Traver, Clarence, is in the employ of Leach & Co. of Oshkosh, Wisconsin.

Vilter, Ernest F., sends us his best wishes from Pine Lake where he has been "officially doing nothing, and yet working all the time." His permanent address is 564 Summit Ave., Milwaukee, Wis.

Warner, Nathaniel S., of Elgin, Illinois, spent the summer touring Europe with a week in England, a week in Scotland, a fjord trip in Norway, a trip through Germany where he intended to stop at a number of the factories in the large industrial centers, and two weeks in Austria on a mountain climbing trip. He expected to take a position in a farm implement factory on his return to the states.

Williams, Millard J., "Mike", sends us his subscription from 97 South Arlington Avenue, East Orange, New Jersey, but does not tell us much about himself except that he does not intend to get married "for a long, long time". He is employed by the Worthington Pump and Machine Corporation of New York. Mike was last year's Business Manager of the "Engineer".

MINERS

Crawford, H. D., is chemist with the Anaconda Copper Co., Toelle, Utah, but expects to go to Arizona with the United Verde Copper Co. He writes that he is a member of a Country Club where there is no grass on the golf course. "As a substitute the fairways are kept in trim with

cactus and rattlesnake bones. After about a month of practice one can hit his ball instead of the fifth vertebrae of a rattler, once out of eleven tries."

Dukelow, L. N.; no report received

Levering, Lee, is not yet employed. He is at home at Granville, Ohio.

White, Roland F., has become assistant field engineer for Mason, Slichter, and Hay, consulting engineers, at Madison, Wisconsin. His address is care of the firm, 1821 Monroe St., Madison.

Whittingham, Percy, is assistant research engineer for the Anaconda Copper Mining Co. and lives at 317 West Third Street, Anaconda, Mont.

Yundt, Evan R., has a position in the Blast Furnace Department of the Illinois Steel Co., at South Chicago. He is rooming at the Y. M. C. A. of that city.

CIVILS



Abbott, Clark H., is enjoying his work as assistant superintendent of construction, on a factory building, with the Fluor Bros. Construction Co., of Oshkosh. We take it upon ourselves to warn him of the evils of bad company when he writes us, "I imagine the brotherhood of St. Pat

will disown me for I am rooming with one of the lowly lawyers from across the campus." His address is 37 Church Street, Oshkosh, Wisconsin.

Abendroth, Emil A., has taken a position as designing engineer with the Ward and Allen Company of Milwaukee. He is residing at his home, 1064 Booth Street, Milwaukee.

Anderson, Ben, is in the office of the Superior Division of the Wisconsin Highway Commission and is living at his home, 514 3rd Ave., East Superior, Wisconsin.

Birkenwald, Edward, has had an enviable summer abroad and is taking up graduate work in the Massachusetts Institute of Technology. He is living in the school dormitories, Cambridge, Mass.

Blunt, Albert E., is engaged in highway work for A. F. Baumgartner, 213 S. Barston St., Eau Claire, Wisconsin.

Boeck, Ralph E., spent the summer as bridge inspector for Ozaukee County and entered the Massachusetts Institute of Technology, at Cambridge, on September 18.

Brandenberg, William, Jr., is working for the Illinois Bell Telephone Co., at Chicago. He is living at the Del Monte Hotel, 454 Melrose Street.

Buckmaster, James L., has given us no word of his whereabouts or doings. His home address is Marshfield, Wisconsin.

Buttles, Earle T., of Lake Beulah, Wisconsin, is engineer for the L. L. Tindall Paving Company, of Waterford, Wis.

Chadwick, William J., is assistant in the office of the City Engineer of Racine and lives at his home, 1709 Park Avenue, Racine, Wisconsin.

Chase, Herman, was in the office of the Supt. of Buildings and Grounds at the University until August 1, when he left for his home at Alstead, N. H.

Chellman, Ellis, is with the Wisconsin Highway Commission at Superior, Wisconsin.

Hastings, W. Harold, has become building superintendent for the Tibert L. Teisinger Co. of Milwaukee. He is now working in Waukesha on a five story reinforced concrete hotel building which will be completed about the first of the year. Until that time his address will be 221 E. Park Avenue, Waukesha, Wisconsin.

Heimerl, George J., is working with E. B. Parsons, Con-

(Continued on page 32)

MEASUREMENT OF COMPRESSED AIR BY THE AIR ORIFICE METHOD

By GEORGE J. HEIMERL, c'27, and WILLIAM Z. LIDICKER, c'27

IN making a thesis investigation of an air lift pump at the Oscar Mayer Packing Company's plant at Madison, Wis., the writers found it necessary to measure the compressed air used in the operation of the pump. The standard orifice method was used with a 6-inch drum. As no published coefficients of discharge for the 6-inch drum were available, the writers determined the coefficients by experiment and present them herewith. Attempts were made during the investigation to calibrate a 3-inch drum, but the results were not entirely satisfactory.

beveled, usually installed in a 3 or 6-inch drum.

The outstanding work on the calibration of air orifices was done under the direction of R. J. Durley, a Canadian engineer at McGill University. It is described in the A. S. M. E. Transactions for 1906. A mathematical treatment of the problems arising in air measurement is given in the book *Compressed Air* by Professor Elmo G. Harris, of the Missouri School of Mines. Experiments have also been made at the University of Wisconsin, which are available in the form of bulletins and theses.

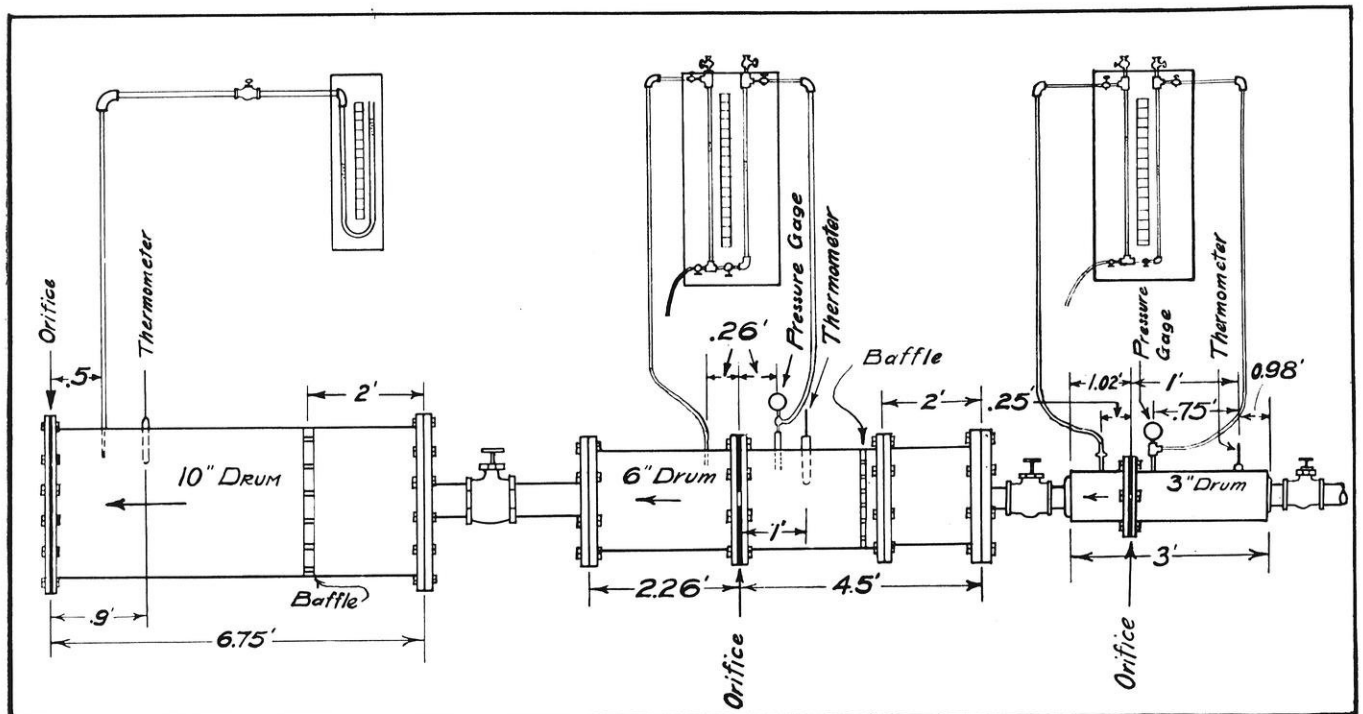


FIG. 1. SET-UP FOR CALIBRATING ORIFICES FOR MEASURING AIR. The coefficients of discharge for the 10-inch drum being known, coefficients for the other two drums were readily determined.

No exact method of measuring the total weight or volume of air flowing through a pipe has been devised. It is customary to make an approximation by determining the rate of flow at intervals and applying the average rate so determined. The following methods have been used for determining the rate of flow: Volumetric efficiency of compressors, venturi meter, swinging gate, thermal, mechanical meter, and standard orifice. The measurement has frequently been based upon the volumetric efficiency of the compressors, but as that efficiency has been known to vary as much as thirty per cent from the true efficiency, the method is not a reliable one. Present practice tends toward the use of the standard orifice because of its accuracy, simplicity, and economy. The apparatus consists of a thin plate, having a circular orifice with the edge

Durley's coefficients were obtained using a 10-inch by 10-inch by 6-foot, wooden, gaging box. The orifice plates were 0.057 inches thick, unbeveled, and fastened tightly to the end of the box. The quantity of air passing the orifice was calculated from the initial and final pressures and temperatures of a reservoir of known volume. The drop in pressure across the orifice was measured with a glass U-tube, using water for the fluid; the temperature of the air by standard mercury thermometers, which were inserted through rubber packing so that the bulb came into actual contact with the air; and the pressure by standard Crosby gages. The time was taken in such a way as to incur a maximum error of only one-sixth of one per cent.

A 10-inch drum is too large for convenient use in the field, so the writers determined the coefficients for

the orifices in the 3 and 6-inch drums. Durley's coefficients of discharge were accepted as the standard in the calibration of the smaller drums. The air used in the experiments was obtained at a constant temperature from large storage tanks used in the university pneumatic-pressure water system. It was passed through orifices in a 3-inch drum, a 6-inch, and finally, a 10-inch drum. The set-up is shown in Fig. 1. The drums were of wrought iron and were circular in cross-section.

The pressure-drop in inches of water across the orifice, the temperature, and the air pressure above the orifice, were measured for each drum. The thermometers were placed in wells, and did not come into direct contact with the air, as they did in Durley's tests. The runs were about 5 minutes in length, and were so regulated that only once did the pressure-drop across the orifice in the 10-inch drum exceed the 6-inch limit of Durley's tests. The pressure-drop could be varied for a given discharge by changing the size of orifice, a larger orifice giving a smaller drop.

Coefficients of discharge for the orifice in the 10-inch drum were selected from Durley's curves shown in Fig. 2. The actual pounds of air passing the orifice per second are given by the equation

$$W = 0.1639 C d^2 \sqrt{\frac{P_i}{T}}$$

- where W = actual pound of air passing per second
- C = coefficient of discharge
- d = diameter of orifice in inches
- P = absolute pressure above orifice in lb. per sq. in. abs.
- i = inches of water on differential fluid gage
- T = temperature of air in degrees Fahrenheit abs.

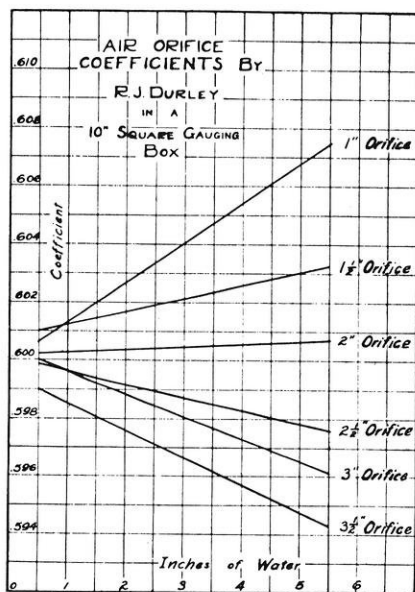


FIG. 2. THE RELATION BETWEEN DIFFERENTIAL GAGE READING AND COEFFICIENTS OF DISCHARGE AS DETERMINED BY R. J. DURLEY.

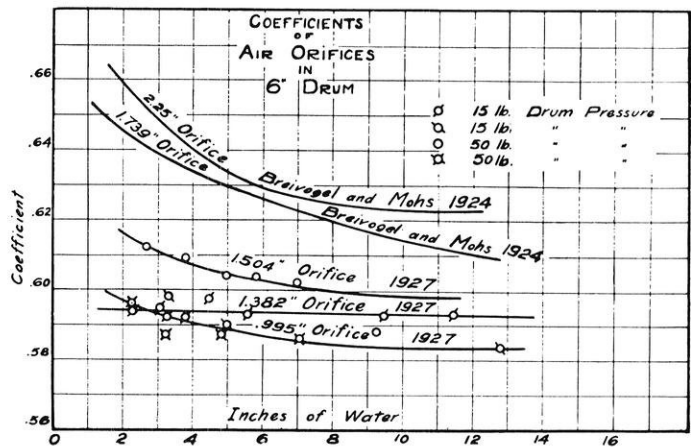


FIG. 3. RELATION BETWEEN DIFFERENTIAL GAGE READING AND COEFFICIENTS OF DISCHARGE AS DETERMINED IN THESE TESTS.

orifices ranging from 0.995 to 2.25 inches, and 2.2 per cent for the latter, with the orifices ranging from 1.0 to 3.5 inches. In general, the smaller the drum, the greater will be the range of the coefficients for various sized orifices.

The coefficients for the 3-inch drum exhibited no definite relationships. Further tests are needed on this sized drum. An objection to the use of the 3-inch drum arises because of the large size of orifice usually required. Although the ratio of orifice to drum diameters should not exceed a certain unknown maximum of about one-ninth, this limit had to be exceeded in order to pass a sufficient amount of air to operate the air lift pump; however, by using two 3-inch drums in parallel, this ratio could be reduced, and the air measurement would then be more accurate. The 3-inch drum, being easier to handle, less bulky, and less costly than the 6-inch drum, is more advantageous for field tests and should receive further investigation.

The writers learned some things of importance by making mistakes. The sharp edge of the orifice should be placed up-stream. The accidental placing of the sharp edge down-stream gave coefficients that were about 16 per cent too high for a 1 1/2-inch orifice in the 6-inch drum. Again, the standard set-up was varied by adding an extra fifteen inches of pipe below orifice in the 10-inch drum where it discharged into the atmosphere. The effect of the extension was to decrease the coefficient for a 1 1/2-inch orifice in the 6-inch drum by about 13 per cent, showing that the standard set-up should be duplicated exactly.

Fig. 3. indicates that variations in drum pressure have practically no effect on the coefficients. The tests, however, are not conclusive on this point.

The differential gage reading should not be over 12 inches. For greater pressure drops it would be necessary to consider the velocity of approach; furthermore, the change in temperature due to expansion would cause a change in density and probably introduce some error.

(Continued on page 32)

THE GREAT AZIMUTH CITY BOOM!

By MARVIN HERSH, C'29

AT LAST! Camp was in sight. The advance party of the 1927 Civil Engineers' Summer Survey camp, arriving Friday noon, June 10, drove around the bend, coasted down the hill, and then stopped and



The Frog Pond

gazed with apprehension at the road flooded by Messenger Creek which was reacting to the high water level of Devils Lake. How to get across. Some one wanted to know when the Messenger Creek ferry came along. Finally the car was urged across and the party landed in camp. Soon the air was filled with—"Where are the tents?" "Do we eat in that place?" "How do we get in?" "Any chance of getting anything to eat now?"—and a thousand other questions.

Dixie, Professor Owen's German police dog and an important member of the advance party, her motherly instincts thoroughly functioning, gathered together her quartet of month old pups and led them on a tour of inspection over their new "home grounds".

Saturday morning found the fellows trooping into camp in two's and three's, those not coming on the train arriving in all sorts of conveyances ranging from decrepit Fords to more substantial vehicles. No one claimed the distinction of hiking. Aune and Arnold rattled into camp (in one of the decrepit Fords mentioned above) on Friday night about eleven o'clock and slept out under the stars because Dixie was faithfully guarding the barn and wouldn't let them in without the proper password (which they found later to be two growls and a woof).

Under the direction of Mr. Wesle, the fellows pitched in and little by little the place began to assume the appearance of a camp. The tent floors, it was soon found, were the queer looking boards propped up against the mess hall, and their weight seemed to increase with every additional tent floor a fellow helped carry. In due time the tents were up, the commissary opened, the mess hall arranged, the electric wires strung—and

Azimuth City became established.

The arrival of the big truck from Madison was a signal for all hands on deck to unload the trunks and instruments. The use of the truck was a departure from previous years. Formerly, a freight car, attached to one of the trains that comes roaring into Devils Lake station—and then doesn't stop very long—was unloaded in the supposedly record time of sixty seconds. However, under Larry Beck's expert direction, the truck was unloaded so fast that it was empty before the driver had time to shut off the engine. No doubt, if a stop watch had been used, this year's record would have been the best.

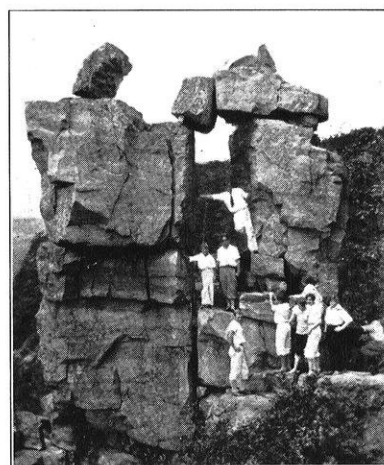
By nightfall everybody was happily settled in a tent—even Anderson and Fitton had developed a home instinct and had tried to find a cat to put on their door-step before they went to bed. Some of the fellows were worried that the tents still unoccupied had been put up for nothing, but they were assured that the Sunday arrivals would fill them all.

Mrs. Mahoney's ability as a cook became established the very first day. The way the fellows emptied the dishes that day and every day thereafter was evidence enough of the good meals provided.

Bright and early Monday morning the work began. A few of the T. E. men were assigned to topog while the rest were unfortunate enough to have to continue on construction. The men on railways started the spurs to the Bularena Mine and before nightfall two

rows of stakes along the Messenger Shore road (the presence of which motorists cursed when they failed to miss a lowly stake) gave evidence to the fact that the spurs were started.

By night everybody in camp was in high spirits—the legitimate kind, of course. In little gatherings here and there, some one fellow was holding forth, claiming that



The Devil's Doorway

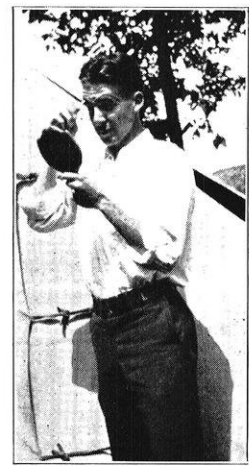
his topog area was the hardest—or maybe it was the best—or his spur line the worst. Some of the more ambitious topog men started to reduce side shots, while Bliffert, Lucht, and Stupecky decided to verify a rumor about camp that the north end of the lake possessed certain attractive diversions.

During the first few days the blankets and quilts that the fellows were warned to bring along—and did not—began to arrive, and soon no one in camp was complaining about the “winter nights in June”.

The rumor that rattlesnakes were active was met with many misgivings. Alperovitz decided he had a solution to the rattlesnake problem when he took some tarred paper and fastened it around his legs when he went out on his topog area. No one in camp was willing to follow suit until Alpy had absolutely demonstrated the effectiveness of his anti-rattlesnake apparel.

Aune has the honor of “getting” the only snake that was killed during the six weeks. He came back to camp one afternoon exhibiting a set of rattles. He had three witnesses to the killing! After being questioned, he admitted that the snake was asleep on a rock when he saw it. He confessed that he had wanted to wake it, but not being versed in the habits of rattlesnakes, he thought it best to insure permanent slumber by dropping a stone on its head. Undoubtedly the snake departed to the land where all good rattlers go.

When Bundok saw the rattles, he made a bee line for the bulletin posted on snake bites, and it is said, made careful inquiries in regard to making the six



Pre Prom

weeks pass quickly.

The first week everybody came to the breakfast table on time—that is everybody except Bill Taylor. A self appointed committee decided to take matters in hand and one morning the commissary horn was accompanied by a merry chorus of ten voices who sang, “Taylor, Taylor, time to get up.”

After several mornings of this, Bill gratefully thanked the camp for its interest in his welfare and promised to be up in time every morning. He was—a few times.

Baseball, the old standby, had flourished the first two weeks. Every one in camp joined in the twenty inning games. The much talked of Milwaukee vs. the Rest of the World game failed to materialize because the Rest of the World had hurled their challenge when they knew that nine-tenths of the Milwaukee gang were out of camp.

The work progressed rapidly. Hydrographic surveys were made, triangulation done, the current meter rated, and the discharge of the Baraboo River measured. The railways men changed places with the other six weeks men and two more spurs to the Bularena Mine were started. Very little rain had fallen to hold up the work or dampen the spirits of the fellows, and so the camp rolled merrily along.

On Sunday morning, the commissary horn failed to arouse more than two or three. Even Professor Owen’s

enticing call, “The pancakes are getting cold. Come and get ‘em,” was unappreciated. Then somebody whispered that there wouldn’t be any breakfast—there was not a fellow in bed after that.



Back to Nature

Sometime during the third week, Sally Owen reported that some bananas were missing from the mess hall. Suspicion seemed to point to Bamberry and Fiebrantz when it was reported that they had been up until

twelve o’clock the night before; but after an investigation of some tracks found on the mess hall floor it was decided that they were not guilty unless they were in the habit of walking on their hands. Since nobody had ever seen them walk in that fashion and all doubted whether they could, no action was taken.

All suspicion was removed several nights later when Dixie found a racoon in the mess hall helping himself to the contents of a sugar bowl and some bananas. The racoon must have been offended at the rude interruption of his meal because he refused to visit the camp again.

The crew races at Poughkeepsie was the topic of conversation for several days and so, on the eve of the races, the following telegram was sent to the Wisconsin Freshman crew:

“The student body and the faculty at the university summer survey camp at Devils Lake is with you and pulling for you. Show the old Wisconsin spirit and row like hell!”

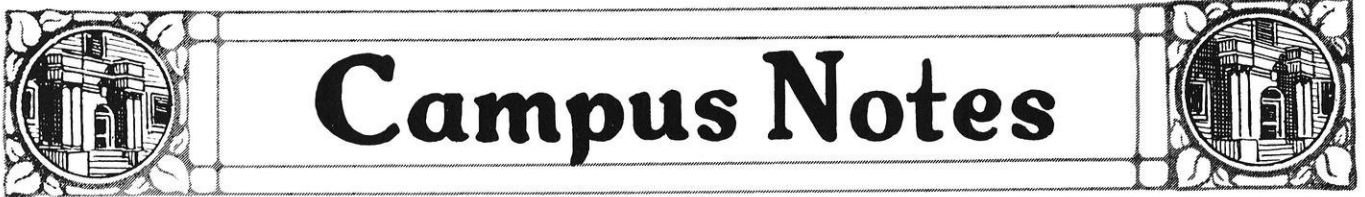
Saturday night, July 2, was set for the annual snipe hunt. It was reported by the farmers around the lake



The Bularena Mining Co.

that chances for a good catch were excellent. A selected party of twenty, under the direction of Mr. Wesle, set out and in the dark of night Hutton, Hersh,

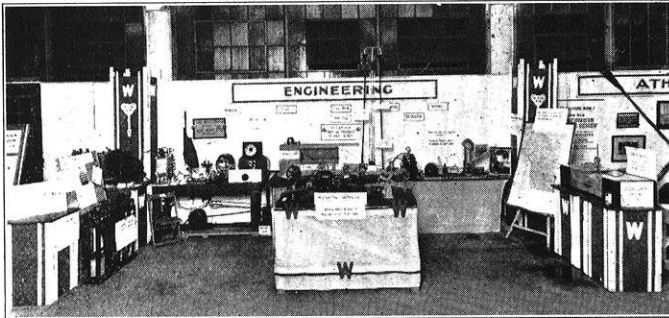
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Campus Notes

ENGINEERING BOOTH AT STATE FAIR IS MOST POPULAR EXHIBIT

The College of Engineering was represented in the University exhibit at the Wisconsin State Fair in Milwaukee by a booth that proved to be the most popular and which drew the largest crowd in the



Exhibition Building. The chairman of the engineering exhibit was L. H. Kessler, assistant professor in hydraulics and sanitary engineering.

The exhibit was planned to show in an appeal to the fancy of the average layman what is being done in engineering practice, research, and instruction. A model, built by the Machine Design Department, showing all forms of mechanical movement attracted the most attention. The apparatus demonstrating the floating process of lead mining astounded many when they saw lead floating on water.

The corner that invariably appealed to the women visitors was given over to an arrangement whereby each housewife by turning a switch could determine the relative cost of operating the modern electric household appliances. The cost of using the new curling iron, toaster, waffle iron, percolator, vacuum cleaner, bathroom heater, fireplace log, and all of the other electrical attachments was recorded on a meter calibrated in cents per hour.

Of interest to professional men and for which many made special trips to the booth was the testing machine used by Prof. J. B. Kommers in his work on fatigue of metals. Tests were made on specimens of brass during the exhibit.

A large map of the state was prepared by Prof. A. V. Millar, assistant dean of the College of Engineering, showing the scholastic standing of the freshmen all over the state.

EASILY SATISFIED

Chief Engineer: "No, sir, I can't give you a job. There is hardly work enough in sight to keep the men I have busy."

'27 Grad: "Oh, that will be all right. The little I'd do wouldn't make any difference."

LEGISLATURE PASSES BILL FOR NEW MECHANICAL ENGINEERING BUILDING

The state legislature has appropriated \$577,000 for a new Mechanical Engineering building which is to be built near the Randall Shops. It will be the first of a group of new Engineering buildings to be located there.

The appropriation provides that \$250,000 is to be available in 1927-28, and the remaining \$327,000 in 1928-29. In addition, a sum of \$30,000 has been set aside for moving and setting up the present equipment in the new laboratories.

The new building will have a gross volume of approximately 1,750,000 cubic feet, and a net floor space of 95,000 square feet. The space will be divided as follows:

Engineering Shops	42,000 sq. ft.
Steam and Gas Dept.	40,000 sq. ft.
Machine Design Dept.	7,000 sq. ft.
Engineering College Mechanician	6,000 sq. ft.

The erection of this building will not only relieve the present overcrowded conditions of the Mechanical Engineering laboratories, but it will make space available for the laboratories of the Mechanics department, which will occupy the present Steam and Gas laboratory space when the new building is completed.

A. S. M. E. SPONSORS CONTEST ON ARC WELDING

The American Society of Mechanical Engineers is sponsoring an open competition on ideas, advantages, or economics gained in arc welding. The sum of \$17,500 has been donated by the Lincoln Electric Co. of Cleveland. The three best papers submitted to the society will receive prizes of \$10,000; \$5,000; and \$2,500.

A bulletin has been placed in the Engineering library by the A. S. M. E. for all those interested.



First Litigant: (Angrily) "I'll see you in the Circuit Court!"

Second Litigant: "I'll be there!"

First Litigant: "I'll see you in the Supreme Court!"

Second Litigant: "I'll be there."

First Litigant: "I'll see you in Hell, if I have to!"

Second Litigant: "Well, in that case, my lawyer will be there."

FACULTY CHANGES AND APPOINTMENTS

Several changes and appointments in the faculty of the College of Engineering have been announced. The following have been advanced from:

Instructor to assistant professor—J. D. Livermore, department of drawing; L. H. Kessler, hydraulics department; and D. W. Nelson, steam and gas department.

Assistant professor to associate professor—F. E. Volk, librarian; O. A. Hougen, chemical engineering department; and E. R. Shorey, mining engineering department.

Associate professor to professor—J. B. Kommers, mechanics department.

The following have been appointed instructors: R. T. Homewood, hydraulics; D. H. Pletta, K. F. Wendt, and Hugh Turrittin, mechanics department, taking the place of C. A. Wiekping and R. S. Phillips who have resigned; and Edward Landwehr, railways, taking George Abendroth's place.

The new fellows appointed for the year are Wm. Lidicker, hydraulics; and W. H. Gamble and S. B. Tobey, Wisconsin Utilities fellows.

MONTHLY PLAY

SCENE: Courtroom. Engineer on stand being examined.
Lawyer standing before the bar, slowly filling cuspidor and waving arms.

LAWYER: "You are a laboring man, are you not?"
ENGINEER: "I am."
LAWYER: "Do you ever work with the pick and shovel?"
ENGINEER: "Sometimes, but those aren't my chief tools."
LAWYER: "Well then, what are your chief tools?"
ENGINEER: "I'm afraid it would do any good to tell you, as you'd not understand what they were or their uses."
LAWYER: "That makes no difference, what are they?"
ENGINEER: "Brains!"

CURTAIN

REGISTRATION COLLEGE OF ENGINEERING 1927-28

Course	Freshmen	Sophs.	Jrs.	Srs.	Grads.	Totals
C. E.	93	68	51	31	4	247
M. E.	72	53	36	37	3	201
E.E.	96	100	66	75	11	348
Ch. E.	32	26	19	28	4	109
Min. E.	8	5	9	7	4	33
Misc.	1	0	0	0	0	1
Totals	302	252	181	178	26	939

The present enrollment in the College of Engineering totals twenty more than that of last year at this time. All except the junior class increased in number; the frosh class increasing its number by fifty while the juniors suffered a loss of twenty. The percentage of students in each course remains approximately the same as last year. They are: electricals, 37 percent; civils, 26 percent; mechanicals, 21 percent; chemical, 12 percent; and miners, 4 percent.



PROFESSOR ROARK BAGS LION ON AFRICAN TRIP

Prof. R. J. Roark of the mechanics department and Dr. G. S. Bryan of the botany department are back from their trip to the extinct volcano, Norongoro, in eastern Africa. Chief among their trophies is the head of a great lion in whose pursuit they found the greatest thrill of the trip. The beast measured ten feet, six inches from the tip of his nose to the end of his tail.

While hunting on the Serengeti plain, the men heard the roar of a lion close by. Rather than wait until nightfall to get the beast when it would come to one of the water holes, they set out in pursuit. Firing both of their guns when they espied their prey, the hunters were rather surprised to see the lion turn and flee instead of attack them. They stalked it by the blood traces on the ground for quite a ways when suddenly, without warning, the lion reared himself from the bushes ten feet away and before he could spring, Professor Roark shot, the bullet piercing the beast's throat.

Trekking almost 500 miles from the coast of Africa by rail, motor, and on foot, and accompanied by their safari of fifty-five negroes, the men reached the crater region. The specimens collected on the trip were for the university.



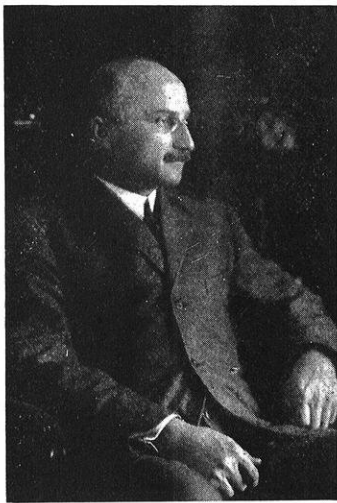
Have you heard of the frosh engineer who received a theme back with the following on it: D--- pool paper; and then went to the instructor and asked, "Please, may I know the mark?"

(Continued on page 20)

SCHOOL FOR ENGINEERING TEACHERS HELD AT MADISON

By LESLIE F. VAN HAGAN, *Professor of Railway Engineering*

FORTY teachers of mechanics and allied subjects in engineering colleges throughout the country spent the period from July 11 to 28 at Madison in attendance at the first Summer School for Engineering



PROF. E. R. MAURER

Teachers ever held in this country. An equal number of teachers were in attendance at Cornell University, both schools being conducted by the Society for the Promotion of Engineering Education, aided by a special appropriation from the Carnegie Corporation of New York. The school was an experiment based upon the precedent of somewhat similar schools that are conducted in Great Britain.

For the benefit of readers who are not in a position to follow closely the developments in engineering education, a little explanation of present conditions will be given. The engineering teachers of the country are organized into the above-mentioned Society for the Promotion of Engineering Education, which has been conducting an intensive investigation into all phases of engineering education under the immediate direction of Prof. W. E. Wickenden, who was, at one time, a member of the faculty of this college. Recently he has been an engineer for the A. T. & T. The Investigation has involved the active participation of many of the engineering schools of the country and the questioning of many alumni and students. Our own alumni and students and faculty members have contributed their share to the progress of the work.

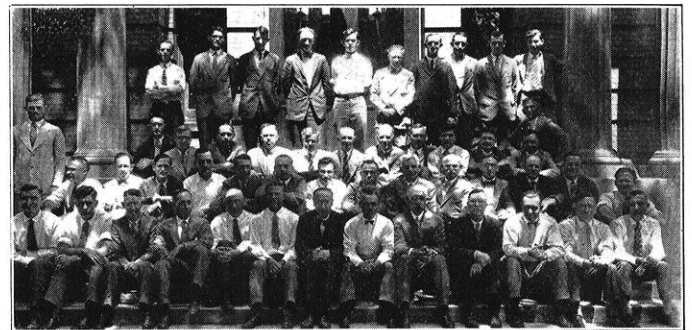
The investigation has been both broad-visioned and searching. Higher education of all kinds has been attacked so viciously within recent years that educators have been disturbed about their own work, feeling that perhaps they had an entirely wrong conception of the training of youth and that it was time for something revolutionary in educational methods. Many experiments have been and are being conducted in our engineering colleges at the present time in a search for better ways of teaching. One of them that may be mentioned is the scheme of assigning students to class sections upon the basis of their scholastic ability. This is being tried in a number of institutions including Wisconsin.

The Summer School for Engineering Teachers was an experiment proposed by the Investigation and carried out under the immediate direction of Prof. H. P. Hammond, associate director. Mechanics was chosen as the subject about which the work of the school should center for the reason that it is a subject common to all engineering courses and one with which all engineering teachers are familiar to some extent. Cornell and Wisconsin were selected as the places at which to hold sessions because of the attractiveness of their surroundings, the opportunities they offer for recreation, their housing facilities, and the strength of their departments of mechanics.

Methods of Schools are Varied

The term *school* does not indicate accurately the nature of the sessions. The gathering was really a conference between teachers who were upon much the same ground so far as teaching experience was concerned. A valuable feature of the Wisconsin Session was the committee work, which gave those in attendance an opportunity to present and discuss their ideas about various phases of the teaching of mechanics. The reports of the committees, representing the boiled-down opinions of the majority of the teachers present, should be of value to all teachers of mechanics.

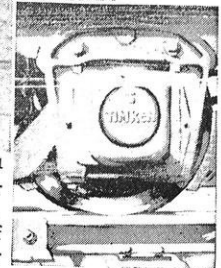
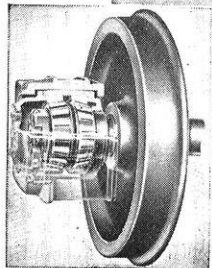
There were usually two, and often three sessions each day. Sometimes members of the staff of the school would give demonstrations of their teaching methods, which would be followed by general discussion. Several sessions were spent in laboratories watching and discussing demonstrations. Lectures were numerous. Outstanding among them were the addresses of President Frank and Mr. Wickenden. Both speakers avoided



S. P. E. E. SUMMER SESSION

platitudes, offering instead something of a challenge. President Frank challenged the proponents of scientific education with the statement that such education is failing to train men and women to think scientifically

(Continued on page 26)



International Newsreel
Viewing a Timken railroad bearing application on display in the baggage car of the "Pioneer Limited." From left to right: President H. E. Byram of the Milwaukee Road; Mr. H. H. Timken, President of The Timken Roller Bearing Company; Mr. J. T. Gillick, Chief Operating Officer of the railroad; General Passenger Agent W. B. Dixon; and the Engineer of the train, Mr. Nicholas Kaiser

Railroad History in the Making

A new epoch in railroad history started when the "Pioneer Limited" and the "Olympian" of the C. M. & St. Paul R. R. entered regular service with every car on Timken Bearings.

Never before, anywhere in the world, have any anti-friction bearings been used throughout any Pullman train. These famous flyers of the Milwaukee Road are destined to make momentous and enduring railroad history.

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inating wear, hot boxes, and by far the greater part of lubrication costs, Timken Bearings with their tapered design, Timken-made Electric Steel and *POSITIVELY ALIGNED ROLLS* have brought a new day in railroading.

As in every other field of engineering, Timken Tapered Roller Bearings are effecting both mechanical and economic improvement. The use of Timken Tapered Roller Bearings has come to be a proof of sound, progressive design. That is why Timkens are of vital concern to all engineers of the future.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

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Editorials

HOW MUCH THEORY?

"Our training of engineers is far too academic and presses a brake on the wheel of engineering progress," writes C. B. Gordon-Sale, an English engineer, in an article published in *The American Machinist*. "When does theory come in with the average engineer?" he asks, and answers himself: "Very seldom, so seldom as to constitute a rarity when it has application." He is all for a thorough knowledge of the basic principles of mechanics, but turns thumbs down on "the involved theories, embodying yards of calculations and liable to warp the mental outlook."

Probably the average student would like to frame these sentiments and hang them in the office of the Dean. It is easy to become impatient with training in theory whose application is not readily apparent. Having the mastery of any art or a science is most agreeable; but the process of gaining that mastery is most disagreeable, being filled with hard work and many disappointments. Gaining a mastery of engineering is a tough job at best. If one can be gained without wrestling with theory, why wrestle?

The situation is about like this: Theory in mathematics, physics, chemistry, electricity, and mechanics goes far beyond anything that the average engineer needs. The teacher might go to any specified point in theory, or he might go farther. Who can tell just where to stop? Opinions on this matter are bound to differ as between various teachers and as between teachers and students.

This further thought presents itself: In the world at large are many people who are completely ignorant of the three Rs and yet live highly satisfactory lives. They have learned how to live without education. In the world of engineering there are men who are almost completely ignorant of theory and yet find useful work to do; such a state of affairs is entirely possible. Nevertheless; it is the general experience, both in the world at large and in the world of engineering, that the man who has a real *mastery* of a certain craft or knowledge uses it. The engineer who has never mastered calculus will get along somehow with his algebra, but the engineer who *has* mastered calculus feels that he could not get along without it. The engineer who has mastered certain theory will usually move up in his profession to a point at which he will find use for that theory. If there is any criticism to be made of engineering education, it is not that it goes too deeply into theory, but rather that it does not give the student a real *mastery* of theory.

FOR BIGGER AND BETTER TEACHERS

The experiment in teaching engineering teachers how to teach, which was conducted simultaneously at Cornell and Wisconsin this summer, and which is described elsewhere in this issue, may prove to be an epoch-making event in engineering education.

Almost without exception, the men who become teachers of engineering are without formal training in pedagogy. One reason is that they rarely plan deliberately to become teachers and therefore do not train themselves for the task during their college years. Another reason is that the teacher of engineering must have had experience in the practice of engineering. He is designing and building when he might be working for a Ph. D. The lack of pedagogical training is an undoubted handicap. Not that engineering teachers are not good teachers, as a rule they are. Engineering students have a way of eliminating the unfit teacher. But the poor teacher might have been a good one, and the good one might be better if they knew more about the science, or art, of teaching.

Normal schools, teachers' colleges, and many of the ideas and methods of the professional educationalist would not appeal to the engineer-teacher. His common sense and his familiarity with mathematics makes him impatient with much of the pseudo-science that permeates education today. Nevertheless, he recognizes that there is probably room for great improvement in his teaching and he would like to find a way to achieve that improvement. These summer conferences may offer the solution.

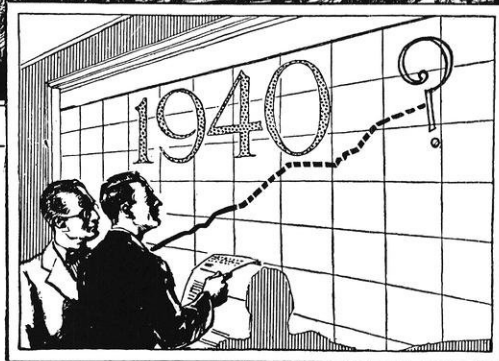
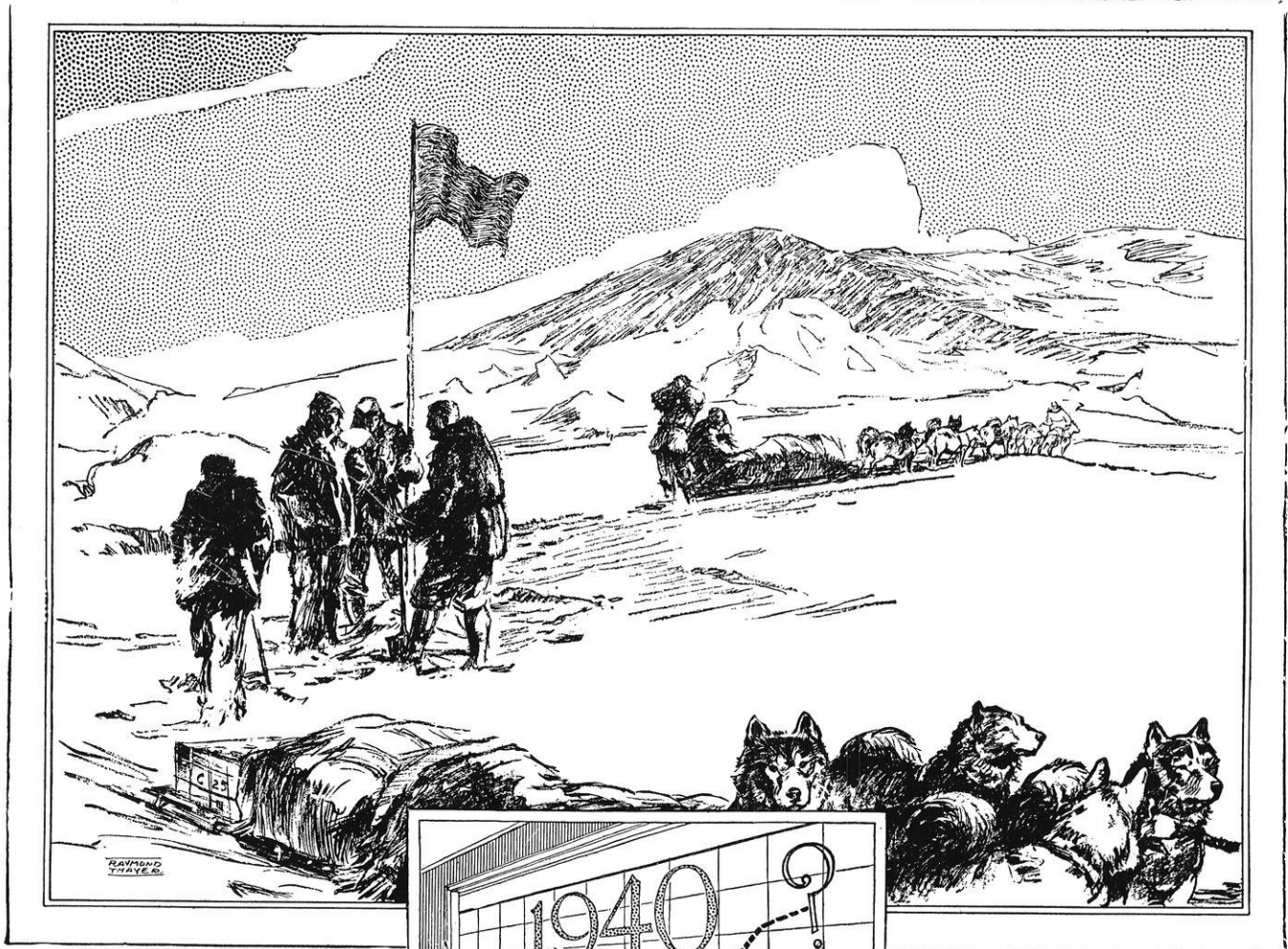
GRAVITATION

Power gravitates to the hands able to wield it, as naturally as the apple falls to the earth.

It is possible to interrupt the apple's fall, but as soon as the interruption is withdrawn, it continues on its way to the earth.

So it is possible to put power into weak hands, but it will not remain there long unless it is usefully employed. This is an unailing law and one that we should heed when surveying a situation. It is the weak man—the man who doesn't fit, who passes along and gives place to him who can perform.

In our haste and out of the fullness of our ignorance, we often appraise situations unwisely and attribute our failures to things outside our control. A more accurate estimate of our limitations would give a different answer. A more comprehensive knowledge of our powers and a finer grasp of a situation would enable us to conquer our environment.



Undiscovered country in industry

The globe's surface no longer holds much undiscovered country, but the pioneer-minded man can still find plenty of it in industry—particularly in the telephone industry.

In the Bell telephone companies throughout the entire country, men are now exploring the 1930's and 40's

and 50's, charting the probable trend of population and the requirements for service.

In research and development, and in telephone manufacture as well, the Bell System takes seriously its responsibility to give adequate service now and to gird itself for a long future.

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“OUR PIONEERING WORK HAS JUST BEGUN”
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CAMPUS NOTES

(Continued from page 15)

TWENTY-ONE ENGINEERS RECEIVE SOPHOMORE HONORS

Sophomore high honors were awarded to the following five engineers for excellence in scholarship: W. W. Behm and Marvin Hersh, civil engineering; R. G. Jewell, electrical engineering; and T. A. Geissman and E. C. Ragatz, chemical engineering. To merit sophomore high honors a student must make 165 grade points for sixty credits, and at least two grade points per credit beyond sixty.

The following men received sophomore honors: civil engineering, O. J. Knechtges, D. H. Kuenzli, J. H. Kulp, T. D. Peppard, and G. C. Ward; mechanical engineering, R. V. Brown, H. G. Hyland, H. E. Rex, and M. H. Rutherford; electrical engineering, G. W. Curran, R. G. Garlock, F. A. Maxfield, H. L. Stokes, A. L. Sweet, and E. A. Wegner; chemical engineering, J. N. McGovern. Sophomore honors are awarded to those students who secure 135 grade points and one and one-half grade points per credit above the required sixty.

STEAM AND GAS DEPARTMENT TO CONDUCT CO-OPERATIVE RESEARCH

An agreement to carry on co-operation research has just been completed between the Steam and Gas Department of the Engineering College and the American Society of Heating and Ventilating Engineers. The agreement is for one year, with the understanding that it will be continued indefinitely if the results are mutually satisfactory.

The purpose of the research is to study the infiltration of air through the various types of walls that are used in building construction, and to ascertain the amount of air that leaks into a building around windows and doors, both with and without weather-stripping. Such fundamental data is very much needed by engineers in the heating and ventilating profession.

The agreement provides that the American Society of Heating and Ventilating Engineers shall furnish \$1,000 a year for carrying on this work. An equal amount will be provided by the College of Engineering research fund. The funds furnished by the Society may be used for Fellowships, salaries of part time assistants, or for the purchasing of material, or the building of test walls.

The Steam and Gas Department is very well equipped for carrying on such work, the apparatus being located in the Camp Randall Shops. Tests on a number of types of windows have been carried on during the past two years.

A general program of tests will be developed by the Infiltration Committee of the American Society of Heating and Ventilating Engineers. The Committee is composed of the following men:

Professor A. C. Willard, Chairman.

(Head of Mech. Eng. Dept., Univ. of Ill.)

D. Knickerbocker Boyd, Philadelphia, Pa.

L. A. Harding, Buffalo, N. Y.

E. B. Langenberg, St. Louis, Mo.

W. S. Timmis, New York City.

Prof. A. P. Kratz, Univ. of Illinois.

Prof. G. L. Larson, Univ. of Wisconsin.

The actual test work will be conducted under the direction of Professor Larson.

Last spring Professor Larson was appointed a member of a Committee of the American Society of Heating and Ventilating Engineers to prepare a code for Testing Building Insulation. The other members of this committee are Prof. A. P. Kratz of the University of Illinois and Prof. J. C. Peebles of Armour Institute.

The Committee prepared a tentative code which was presented to the Society at its summer meeting in June. On September 27, this Committee held a meeting in Chicago with representatives of eight different insulation manufacturers to further discuss the code before presenting it for final adoption.

FROSH HONOR AND HIGH HONOR RATE STUDENTS ANNOUNCED

The list of last year's freshmen whose work was at the honor or high honor rate has been announced. To secure honors, the student must earn two and one-quarter grade points per credit; for high honors, two and three-quarter grade points per credit.

Those at the high honor rate were R. J. Kraut, E. A. Johnson, G. C. Roeming, and E. R. Sanner; honor rate—M. J. Scott, Charles Schwartz, E. W. Howes, R. W. Kubasta, W. A. Kuelthau, R. S. Plotz, C. A. Silcott, J. A. Lester, D. L. Botham, J. B. Catlin, S. K. Guth, R. W. Fairweather, D. M. Erickson, F. F. Hornig, S. L. Johnston, J. R. Mueller, Martin Joos, E. G. Heberlein, J. H. Lacher, and A. H. Benesh.

MECHANICS PROF: "What is your idea of a two force member?"

WISE SOPH: "A guy who belongs to the police and fire department at the same time."

BLAST FURNACE ASSOCIATION TO MEET HERE

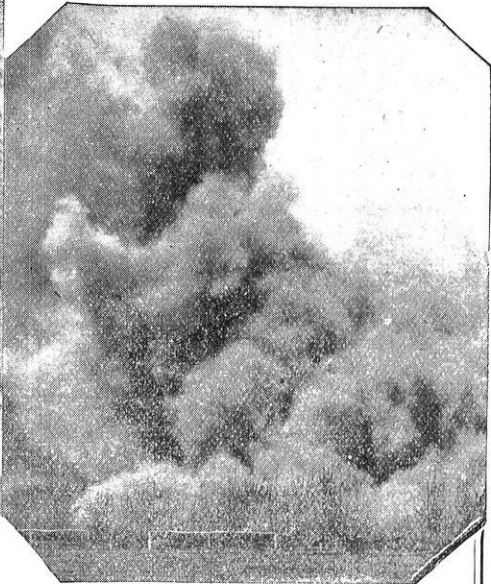
The Chicago Blast Furnace Association will meet at the university October 14 and 15 to discuss blast furnace problems and confer with department of metallurgy. One hundred seats for the Michigan game have been reserved for the members of the Association and their families.

WISCONSIN ENGINEER IS READ IN AUSTRALIA

That the articles published in the Wisconsin Engineer are more widely read than many students appreciate is shown by the letter recently received from Mr. Geo. Groom of the Herald, published at Melbourne, Australia, in which he says, "I very much appreciate your courtesy in sending the copies of the article by Mr. W. E. Wines on 'The Mechanical Equipment of the Modern Newspaper Plant'. They have aroused a great deal of interest here."



Roger Bacon was thought to be in league with the devil and thrown into prison for his scientific researches which included the development of gunpowder.



Magic— Old and New

A LITTLE less than six hundred years ago, Europe learned of gunpowder. Friar Roger Bacon, the "admirable doctor" of thirteenth-century England, a Franciscan monk who was finally thrown into prison for commerce with Satan, mixed saltpetre, sulphur and charcoal, and made "thunder and lightning" to his own great entertainment and his neighbors' terror. The worthy friar did not put gunpowder to more practical use than magic. It never occurred to him that, confined, the gases from a flash of powder would exert great force that could be applied to many purposes of war and peace. It was not long, however, before someone stripped away the supernatural, and in 1346 firearms are said to have made their appearance, at the battle of Crecy. Equally early, gunpowder must have been applied to blasting purposes.

From this humble and quaint monastic beginning, explosives have steadily increased in use and importance. Chemistry has made one improvement after another. Engineering has found a multiplicity of new uses. Hercoblasting is an example in point.

E. M. Symmes, an explosives chemist of the Hercules Powder Company, devised a new blasting method by which Friar Bacon might have performed real miracles for his gaping contemporaries. It is called Hercoblasting. And it consists of column-loading black blasting powder of special granulation in well-drill holes and firing with Cordeau-Bickford detonating fuse. Where this method is applicable, it has accomplished remarkable results at great savings.

Hercoblasting is only one of the new methods at the command of the explosives engineer. In the list of booklets on the right you will find a wealth of up-to-date, practical information that will be of value to you. Check the ones you want and mail the coupon. They are free.

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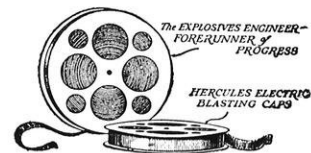
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Engineering Review

THE EARTH INDUCTOR COMPASS

Lindbergh attributed his success in keeping on his outlined course to his earth inductor compass. Regarding this instrument he wrote: "Laymen have made a great deal of the fact that I sailed without a navigator and without the ordinary stock of navigation instruments, but my real director was my earth inductor compass. I also had a magnetic compass; but it was the inductor compass which guided me so faithfully that I hit the Irish coast only three miles from the theoretic point that I might have hit if I had had a navigator. The inductor compass was so accurate that I really needed no other guide."

The earth inductor compass, instead of depending upon the interaction of two magnetic fields as does the magnetic compass, depends upon electromagnetic induction. In the case of the earth inductor compass the electric conductor consists of a rectangular armature which is driven by a windmill; and the magnetic lines of force that are "cut" are those of the earth field. The E. M. F. generated by an armature depends upon the position of the brushes in relation to the magnetic field; when the brushes are in a line parallel to the magnetic lines of force the potential is zero and when they are perpendicular the potential is maximum. The compass is a sensitive galvanometer; the brushes are moved by a "controller" on the instrument board so that they can be in any desired position in relation to the plane. The course of flight is maintained by putting the brushes in position and steering so that the galvanometer reads zero.

—*Scientific Monthly*

AUTOMOTIVE STANDARDIZATION

The elimination of unnecessary sizes and varieties of spark plugs, pistons, piston-ring oversizes, brake linings, and roller bearings will be considered at a conference of manufacturers, distributors, and users in Detroit. There is an important movement taking place now in many lines to eliminate so much waste caused by so many sizes of every individual part.

NEW ROOM HOIST MOTOR FOR MINES

A new type of enclosed motor, rated at 5 hp., 15 minutes, 55°C temperature rise, 1150 rpm., compound wound, 115, 230 or 550 volts, has been developed for use on portable type room hoists in mines. Many design and operating features make it especially applicable for this kind of service. Across-the-line starting is permitted with negligible disturbance at the commutator.

The armature coils are so constructed and installed that a single coil can be replaced with a minimum disturbance of the other coils. Each coil is specially in-

sulated and the completed armature is thoroughly impregnated and baked, giving assurance of freedom from insulating troubles. The shunt and series coils for one pole are assembled as one unit and are dipped and baked in this form. Special precautions are taken to insulate the coils from each other and from ground.

The motor is rugged in construction, having a rolled steel frame and drop forged steel feet which are welded to the frame. The bearings are heavy duty roller type and the motor can be operated in an inclined position. The enclosing covers are hinged to the bracket and can be raised for inspection of the brushes and commutator by simply loosening one screw. There are a total of four covers, giving good access to these parts.

NEW TYPE BUSHINGS PLACED ON MARKET

Unusual corrosion-resisting properties are claimed for the new "CWP" stamped electric conduit bushings which have been recently perfected and placed on the market. These bushings are cadmium plated instead of being galvanized or enameled, and due to the inherent properties of cadmium, these bushings will remain unaffected under conditions which would speedily destroy galvanized ones. The cadmium coating, moreover, has a more attractive appearance and being strongly adherent, has no tendency to flake off or to disintegrate.

—*Electric West*

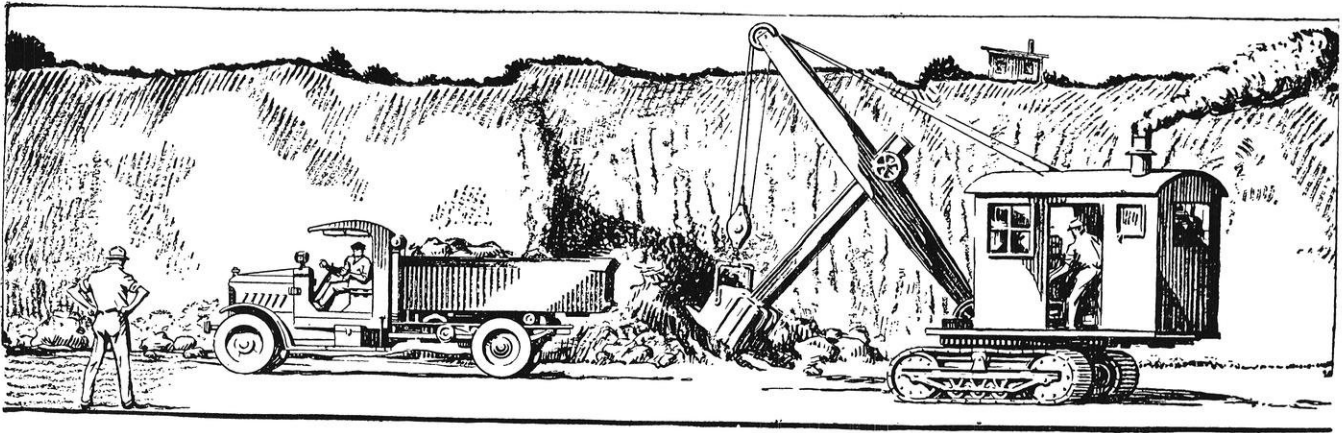
NAVY DEPARTMENT ORDERS NON-CORROSIVE AIRPLANE PROPELLERS TO INCREASE SAFETY IN OPERATION

High powered airplane propeller blades made from ordinary canvas compressed into a non-corrosive product of metallic strength, which greatly enhances the degree of safety in operation, will be used by the Navy Department on its training planes. The new material known as Micarta is likewise used for the manufacture of pulleys and fair-leads required in the construction of airplanes, and because of its water resisting and moisture proof nature, makes it unusually suitable for use in unusually damp climates where moisture would weaken any other type of material.

RED LINE POSITIVE PRINTING PAPER

A new type positive-print paper has been recently put on the market. The print can be produced from the original tracing without the use of a negative, and gives a dark red line on a light cream background. The paper is printed in the same manner as are blueprints, but is developed dry by a brief exposure to ammonia-water vapor. Because of this method of development, it is said that the paper does not shrink or wrinkle, and is true to scale.

—*Industrial Engineer*



Explosives are Tools

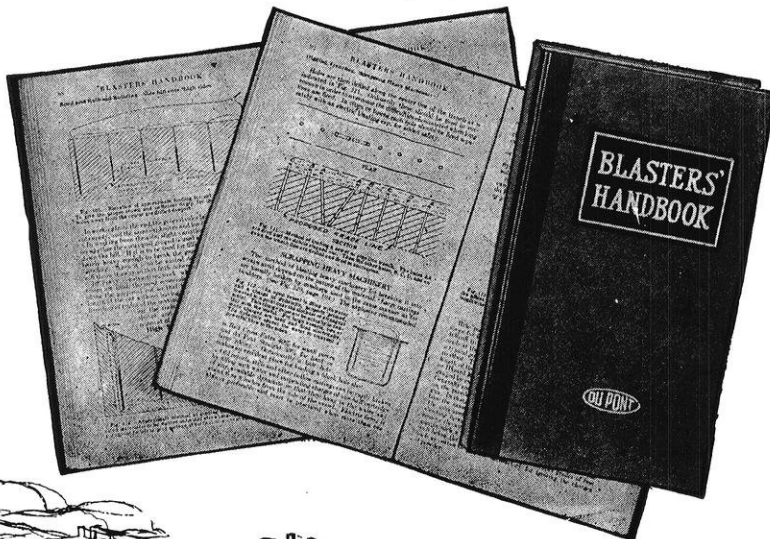
Use the right one for each job

WHEN constructing highways, explosives should be selected with the same foresight as is used in choosing equipment to meet the contract's requirements. Are you thoroughly familiar with the special explosives designed by du Pont for the building of highways?

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—will not freeze in weather permitting road building;
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Strength—20 to 90%
Du Pont—25 to 90 strengths
—water-proof;
—plastic;
—practically non-freezing;
—least volume of noxious fumes.
Quarry Gelatin—25 to 75% strengths
—recommended for open work where shattering is required;
—not adapted to underground work.
Blasting Gelatin
—the strongest and quickest explosives known;
—absolutely water-proof;
—NOT low-freezing.
- 3 DU PONT STRAIGHT DYNAMITE**
Strength—15 to 60%
—quick, shattering action;
—more sensitive than other dynamites;
—practically non-freezing;
—resists water.



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Alumni Notes

ELECTRICALS

Donaldson, Chase, e'20, is a member of the firm, Bertles, Rawls, and Donaldson, underwriters and distributors of investment securities, which has opened its offices at 120 Broadway, New York City. The firm has offices also in Chicago and Detroit.

Helleo, H. L., e'06, is in the real estate business at 288 E. Water St., Milwaukee. His home address is 512 Bradford Ave., Milwaukee, Wis.

Goldhammer, Charles, e'17, is proprietor of the Schwartz Hotel, a large summer resort hotel at Elkhart Lake, Wis.

Natwick, J. J., e'09, general manager, secretary and treasurer of the Kelvinator-Leonard Corporation of Pittsburgh, attended the commencement exercises in June. His address is 205 N. Highland St., Pittsburgh, Pa.

Palen, Vernon W., e'25, junior engineer for the New York and Queens Electric Power and Light Company of Queens, New York, is the author of an article on Sectionalizing Circuits in Case of Trouble, which appeared in the May issue of Power Plant Engineering. The article is a description of the operating procedure used by the company to isolate damaged sections of its distribution system. Mr. Palen has had experience working on primary circuit sectionalizing instructions, secondary network design, voltage complaint work, budget work, particularly load concentration studies and design of new feeders, and miscellaneous primary and secondary work.



Richards, J. T., e'95, designing engineer for the Eastman Kodak Co., Rochester, N. Y., was a visitor in Madison during commencement week.

E. R. Summers, e'26, has resigned his position as Research Fellow in the Electrical Engineering at the University of Wisconsin to accept a position as instructor at the University of Minnesota. Summers was at one time editor of the "Engineer."

Wise, Edmund, e'19, is metallurgist for the Wadsworth Watch Co., of Cincinnati and lives at 950 E. McMillan St. In June, he attended the graduation exercises in Madison.

Wolfe, Harry C., e'26, former distinguished editor of our magazine, has left Westinghouse Electric to take a position with the Chromium Corporation of America, where he is to do engineering work in connection with chromium plating installations. His new address is care of the company, Waterbury, Conn.

MINERS

Howes, M. H., min'23, is assistant engineer with the Tintic Standard Mfg. Co., of Dividend, Utah. Howes attended the 1927 commencement at Madison. His address is care of the company at Dividend, Utah.

Lawson, Stuart C., min'17, is in the sales department of the Otis Electric Company of New York. His address is 270 So. Clinton St., East Orange, New Jersey.

MECHANICALS

Aanesen, Finn, m'21, of Oslo, Norway, who was one of the group of Norwegian boys who came over to Wisconsin to study engineering during the World War, has written Prof. Corp early this summer concerning the general condition prevailing in Norway. The present cost of living is very high and times are not very good on account of the tremendous rise in the value of their currency in the past year or two. However, Mr. Aaneson writes that he is still equal to the big task of providing for a wife and two daughters.



Clark, H. L., m'26, sent us the following, too late for insertion in the May issue, "I am leaving New York on May 19 for Chile, South America, where I will be engaged in the mining and concentration of sodium nitrate. The job promises experience in many varied lines, and should prove quite interesting. My address will be care of Anglo-Chilean Consolidated Nitrate Corporation, Casilla 17, Tocopilla, Chile, South America. Please send future copies of the "Engineer" to me at this address." We hope that we will hear more from Clark in the near future.

Gunther, G. A., m'24, is now in charge of the Chain Belt Company's Buffalo office. Mr. Gunther was taken directly into the Company from school, and in the time that he spent in their Engineering Department, he gained a practical working knowledge of its products, which with his work in the Sales Department at Milwaukee, fitted him well for the position as head of the Buffalo office.

Hanson, Malcolm P., m ex'18, e'24, was united in marriage to Miss Euphrasie Jeanne Raffo, of Washington, D. C., on June 9. Mr. Hanson is associate radio engineer in the aircraft radio section of the Naval Research Laboratory, at Anacostia, D. C. They are making their home at 2920 Ontario Road, Northwest, Washington, D. C.

Mantonya, William G., m'19, former poet laureate of the "Wisconsin Engineer", is assistant engineer on special improvements for the Board of Local Improvements of the City of Chicago. His business address is 532-160 N. La Salle St. His home address is 6221 N. Oakley Ave., Chicago. He writes: "I am engaged in very interesting work at the present time. We are building one new street, half a mile long, through the middle of one of the International Harvester Co. grounds, in fact, right through the middle of their buildings. The La Salle St. bridge is nearing completion on one side of the river, but on the other side is just at the caisson stage. The street car tunnel is directly beneath, so both the cofferdam and the bridge pit offered design problems that were out of the ordinary."

Naujoks, Wald, m'26, has left Cudahy, Wisconsin, and the Ladish Drop Forge Company, and is now living at 1303 E. 134th Street, Cleveland, Ohio.

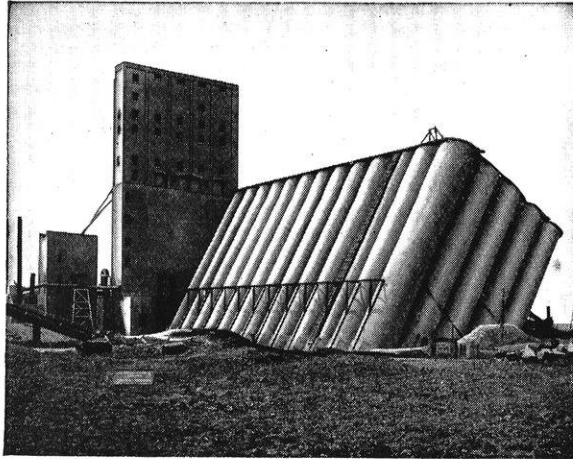
Plaenert, Alfred B., m'26; announcement has been made of the engagement of Miss Ellen Beatrice Henshall to Alfred B. Plaenert, of Madison. Mr. Plaenert is engineer for the Pharo Heating Company, of Madison, and is a member of Beta Kappa fraternity.

Verner, James, m'26, and Miss Ethel Seaver of Oakmont, Pennsylvania, were united in marriage at Oakmont on September 3.

1902

1927

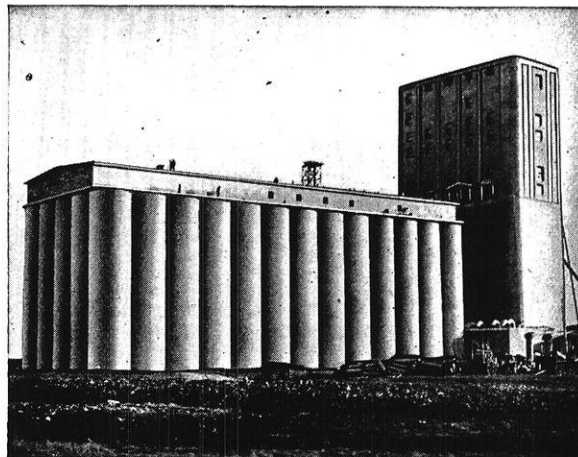
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CIVILS

W. G. Kirchoffer, c'97, CE'01, consulting engineer of Madison, describes an investigation into the possibility of using porous concrete in place of well screens and as pipe manifolds and strainers in filter bottoms in an article that appears in the September number of "Water Works". Porous concrete slabs, he states, were used for filter bottoms at Wausau, Wisconsin, with success.



J. F. Kunesh, c'14, is now in Honolulu as hydraulic engineer for the Water Resources Branch of the U. S. Geological Survey in co-operation with the Honolulu Sewer and Water Commission, and will have charge of the investigations, designs, and comparative estimates of various surface water supplies for the city of Honolulu.

Lathers, Victor, c'26, is still in the Philadelphia office of the Johnson Service Company of Milwaukee. Vic has chosen heating and ventilation as his life work and writes Prof. Larson, "A few months ago I had the pleasure of meeting George Breitenbach at a meeting of the American Society of Heating and Ventilation. At the time, he was here in Philadelphia at a convention of the Trane Company. It surely did seem like old times to see him again and talk over heat losses and good old Wisconsin. --- I have made up my mind to make this game my bread and butter maker, for better or for worse ---."

(Continued on page 38)

S. P. E. E. SUMMER SESSION

(Continued from page 16)

as a matter of habit. A scientist, he said, may follow scientific methods in his researches, and still use mental processes that might be expected of a stable boy in the ordinary affairs of life. Even a scientist may be swayed by prejudice, whim, and passion when he turns his mind to public affairs and politics.

Prof. Wickenden attacked the claims of art, literature, and music to a monopoly upon Culture. Without disparaging the cultural values of those things, he advanced brilliantly the cultural values of an engineering training, which teachers of engineering have almost completely overlooked.

Educational Adviser Interests Teachers

Curtis Merriman, associate professor of education at this university, was educational adviser to the school and brought in the viewpoint of the student of educational methods. His interest, energy, and enthusiasm met a quick response from the engineering teachers. He presented the results of a survey he had made of actual practices in the teaching of mechanics in some of the nearby institutions, outlined the general laws of learning, and acted as critic of the proceedings.

Most of those in attendance roomed at Tripp Hall and ate at the Refectory. This resulted in an informal and very enjoyable intimacy and in enthusiastic and protracted "bull sessions." There were opportunities, of course, for all kinds of recreation.

Toward the close of the session, the members created

a permanent organization to arrange for future conferences among teachers of mechanics, thereby putting the stamp of approval upon the experiment. Undoubtedly, the idea will take hold, and teachers of engineering can look forward to something permanent in the way of summer schools adapted to their needs.

A number of the members of our own faculty were active in the affairs of the Wisconsin Session. Prof. Maurer was director; Prof. Van Hagan was secretary; Prof. Withey was a member of the staff; Dean Turneure, Prof. Bennett, Prof. Terry, and Dean Slichter were special lecturers. Mr. Norton, Mr. Turrittin, Mr. Wendt, Mr. Weipking, and Prof. Pulver were registered in the school. Among the Wisconsin graduates who registered were H. J. Kersten, E. E. Moots, B. Spieth, G. P. Stocker, and I. F. Waterman.

THE GREAT AZIMUTH CITY BOOM!

(Continued from page 13)

and Yonker were stationed at advantageous points while the rest spread out to do the beating. The snipe were plentiful and the successful hunters returned to camp in the early hours of the morning fully prepared to enjoy the excellent snipe breakfast. Hutton claimed that somebody had monkeyed with the north star because after orienting on it he said he found himself almost at Merrimac before he realized that he was headed south instead of north towards camp.

Among those missing at the snipe hunt was Alperovitz. An important engagement at the north end had kept him busy. After the hunters had straggled into camp a whispered conference was held and a reception committee appointed to meet Alpy who was just returning. He was seized, placed under arrest, and brought before "Judge" Bamberry and charged with evading the call to participate in the snipe hunt. The judge ordered the culprit placed under heavy guard, called the court to order, and directed a jury to be empaneled. Witnesses testified that the accused had signed up for the hunt in their presence; and the hunters verified that he had wilfully failed, refused, and neglected to attend it. Alpy pleaded a conspiracy against him, claiming that he had never signed any paper regarding the snipe hunt, and asked the court for a handwriting expert to verify the signature. This being refused by the honorable judge because it was a reflection on the veracity of the state's witnesses, the defendant charged the court with prejudice and asserted his constitutional right to a new trial because he was not represented by counsel. The judge ruled that he had his night in court and referred the case to the jury. These "twelve and true" after due deliberation, pronounced Alpy guilty. The judge sentenced the culprit to a trip through the frog pond in front of the commissary, warning him not to disturb or shock the inhabitants thereof unnecessarily. So with due regard for the majesty of the law, the frog pond was traversed — sans trousers.

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out the camp. A meeting followed and after the smoke had cleared away it was found that Summeril was the “people’s choice” for prom king. The prom committee got busy and soon announced that the event would be held on Saturday, July 9, and that a marvelous six piece orchestra from Baraboo would furnish the music. Interest became more intense as the week progressed. The number of recruits for the event increased from day to day as each batch of mail brought happy expressions to the fellows’ faces making it known that “she” was coming. The unattached took interest in young ladies from Baraboo and Madison who were invited to attend by Mrs. Owen and Sally and so none were looking for partners.

Prom day dawned with the rain coming down in torrents, bringing gloomy expressions to every face. By noon, however, it had stopped and the long faces disappeared, one by one. With a zeal unheard of, the decoration committee under the direction of Spen Merz had the mess hall transformed into a miniature forest paradise by means of oak branches, fern leaves, and Japanese lanterns. Sally Owen, as prom queen, and Summeril led the thirty-five couples in the grand march.

The prom was an appropriate ending to the four weeks, and will always stand out as one of the most enjoyable events of camp.

With the four weeks’ men gone and the prospect of finishing in the two remaining weeks alluring, the camp settled down and with unforetold ambition attacked the routine of work. Even “Lindy” Austen, (he hails from St. Louis) the premiere third baseman lost interest in baseball; and after Christy refused to catch the flies out in left field, the sport degenerated into a mere game of catch.

Mr. E. L. Hain, a 1910 Wisconsin grad, was sent to the camp by the United States Geological Survey as plane table instructor. Using the 1”=1000’ scale, the fellows would come back to camp displaying a square inch of map on their plane tables and to remarks would say, “Yep, that’s a whole day’s work.”

After Mr. Hain had told about the 1”=24000’ scale used by the U. S. G. S. on their surveys, somebody suggested that it be tried but no one could be found willing enough to do it.

As in former years, the highway work was under the direction of Mr. H. D. Blake, of the Wisconsin Highway Commission. He took the entire camp on an inspection trip and led the grand procession of twelve cars up and down the highways around Baraboo. Every time a stop was made to look at some relocation, passing motorists slowed down to investigate what they thought was an accident, and when they saw Chief Oakey cavorting about on the road wondered which Chamber of Commerce was out on a spree. Sanborn volunteered to lie down on the ground in order not to disappoint the motorists if somebody would pass the hat and give him the proceeds.

Dick Reinke came back to camp one day claiming that he had fallen into a bed of poison ivy. The worthy

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physicians (?) could find only the right shoulder and one side of his right arm affected. Somebody ventured to remark that it was a d--- funny way to fall into a bed of poison ivy—but who can doubt Dick's word.

Elleson, not content to be the camp's prize acrobat and tumbler, climbed Turk's Head and Cleopatra's Needle. He does not advise anybody else to try it, although he admitted that such practice might enable many to scale the walls of the Engineering Building and thus solve the problem of crowded halls.

The difficulty in getting the fellows up mornings prompted some drastic actions. The horn was removed from the commissary and fastened to a tree near the tents. Aune and Arnold objected strenuously to its location above their tent, claiming that they did not need the horn as much as some of the other fellows. However, there it remained and proved very effective.

Lou Beebe's and Rosie Pickford's mechanical boats furnished some of the after dinner recreation. Somebody would borrow the boat from Lou with a pretense of showing him how to make it run. Soon half the camp would be gathered around the frog pond cheering the boat on as it steamed around the water fountain.

On one of the water power surveys, it is claimed that Yonker tried to row a boat up the city power house dam on the Baraboo River. The rest of the gang stood on shore cheering him on, but after a most noble effort Yonker decided that he did not care to go up the dam anyway.

Dr. Bastin of the University of Chicago geology camp at Kirkland came over with one of his classes and told the camp how and why Devils Lake is where it is and not somewhere else. A driving rain offered a good excuse for the fellows to linger in the mess hall after the lecture—incidentally, of course—to see what the Chicago girls looked like.

As part of the construction work, a large screened-in porch and an enormous new commissary was built. Those who lent their willing hands in its construction hope that the fellows in future years will appreciate the fruits of their labors.

The formal opening of the new commissary was attended by the faculty and members of the S. P. E. E. summer school for mechanics instructors held at the University in Madison. They stopped off on their way to the Dells.

The annual banquet, held on Friday night of the last week, was a huge success. The tables were arranged in a big square, with everybody sitting around the outside. Chief Oakey, with long sideburns, and appropriately dressed as a Southern gentleman, was toastmaster. Talks were given by Professor Owen, Judge Halstead, Bill Taylor, who lived up to his usual Irish wit, "Dean" Homewood, Mr. Wesle, and Mr. Beebe.

After his enjoyable talk—and it was found that the twinkle in his eye was not there for nothing, Mr. Beebe distributed gifts to everybody. An air cushion was given to Lou Lembcke; Jim Bamberry received a toy boat—so he wouldn't have to borrow Lou Beebe's

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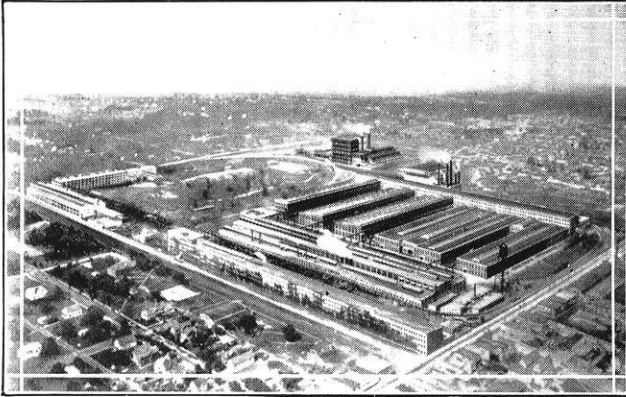
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anymore; Bill Taylor was presented with a reducer; Bob Homewood received a new pair of knickers which if fitted with Fiebe's gift of a new pink undershirt (to take the place of his old one which was torn) would make a perfect suit of unmentionables.

The most remarkable event of the evening was Spen Merz' and Arno Lenz' first cigar—no apparent after effects were reported!

Camp ended on Saturday, July 23. Reports were handed in or laid aside to be finished later, tents were taken down, tent floors were removed, the electric wiring system dismantled—and Azimuth City became no more. Soon the fellows began to leave and before long the camp presented its customary deserted appearance.

Mingled with the joy that six weeks of work was over was the regret that the wholesome comradeship developed during that period was disrupted. All that transpired will hold a lasting place in the memory of those who attended the best summer survey camp—that of 1927.

MEASUREMENT OF COMPRESSED AIR

(Continued from page 11)

The effect of other possible errors with the 6-inch drum is as follows: An error of 10 degrees in temperature will cause an error of one per cent in the coefficient; an error of 5 pounds in the pressure reading will cause an error of 3 per cent; an error of 0.01 inch in the diameter of the orifice will cause an error of 1 per cent; and an error of 0.50 inch in the differential gage reading will cause an error of 5.5 per cent. The above figures are only approximate, but serve to indicate the magnitude of possible errors which might be incurred by the use of inaccurate or uncalibrated instruments. Under average conditions and with a similar set-up, measurements of air made in the field should be correct within three or four per cent.

WHAT '27 IS DOING

(Continued from page 9)

sulting Municipal Engineer of Watertown, Wisconsin. Home address, 220 34th Street, Milwaukee.

Homewood, Robt., has been appointed instructor in the department of Hydraulics and Sanitary Engineering to replace Mr. Lindner.

Horst, Arthur J., is working in the east according to unconfirmed reports. His home address is 334 N. Madison St., Chilton, Wisconsin.

Janicki, Harry R., is practising with H. C. Webster, consulting engineer of Milwaukee. His home is at 877 Weit St.

La Chapelle, M. P., is in Pittsburgh, Pennsylvania, with the Armstrong Cork and Insulation Company but expects to be transferred to the midwest this fall. His present address is 331 Melwood Street.

Landwehr, Edgar A., has replaced G. A. Abendroth as instructor in the Railways Department at the University. He is living in Tripp Hall at the Men's Dormitories.

Lembcke, Louis W., gives his home address as 915 Chambers Street, Milwaukee, Wisconsin.

Levin, Jacob, writes that he is timekeeper on construction of an 8-story apartment hotel building and previous to this was foreman in charge of wrecking and clearing the building site. He is with the Theodore Stark and

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Company, General Contractors, and lives at his home, 599 Maple St., Milwaukee, Wis.

Little, George F., is Assistant Engineer in the Engineering Service Company of Muskegon, Michigan. His home is at 382 Prospect Street, Muskegon, Michigan.

Lidicker, William Z., has a Regent Research Scholarship and is doing his work in the Hydraulics Department. He is living at the Triangle house, 438 N. Francis.

McMullen, Ralph E., former assistant to Prof. L. S. Smith, writes of his experiences running a party for the Wisconsin Highway Commission at Superior, "I have one man on my crew who thinks he is a 'plumber' because he spends so much time plumbing the rod." His home is at 1411 21st Street, Superior, Wis.

Meeuwssen, Quinten, of Oconto, Wisconsin, has not yet informed us about what he has been doing since he graduated.

Myers, James W., is assistant city engineer at Kenosha, Wisconsin. He makes his home at 5016 4th Avenue, Kenosha.

Oettmeier, Arnold G., gives his home address as 608 West Sherman Ave., Fort Atkinson, Wisconsin.

Piltz, Arthur, has been appointed instructor in civil and structural engineering in the University Extension Division at Madison. He is living at 140 W. Gilman Street.

Prochaska, Victor H., is working in the bridge department of the Wisconsin Highway Commission, Madison Division, and is living at 250 Langdon St.

Reader, Jay, has embarked with Harold Zilish in the firm of Reader & Zilisch, Builders, at Janesville, Wisconsin. The address of the firm is 533 South Bluff Street.

Reinhold, Carl J., 603 Farwell Avenue, Milwaukee, is working with Division No. 2 of the Wisconsin Highway Commission but does not say just what kind of work he is doing.

Severson, Norman A., spent the summer with the Jefferson County Highway Commission. His home is at Cambridge, Wisconsin.

Shafer, S. Parker, is employed by the Dane County Highway Commission as Bridge and Culvert Inspector and lives at 1226 W. Dayton Street, Madison.

Singer, Ben E., is employed by the American Bridge Co. of Gary, Indiana. He lives at Riverside Hall, No. 77, Gary, Indiana.

Thomsen, Darrel, is working in Fond du Lac with the Hutter Construction Company, General Contractors. His home address is 54 Amory St., Fond du Lac, Wis.

Ulrich, Spencer E., is employed by the Chicago and North Western Railroad and lives at 4556 N. Paulina Street, Ravenswood, Illinois.

Wendt, Kurt F., has been appointed Instructor in the Mechanics Department at the University. The marriage of Mr. Wendt and Miss Adelaide Jandre of Chicago was solemnized early in summer. They are making their home in the Capital Hill Apartments in Madison.

Westrich, Charles J., is training for store manager in the retail store department of Sears, Roebuck and Company, at Chicago. His home address is 367 Monroe Avenue, River Forest, Illinois.

Zeugner, O. K., is taking the Sales Engineering Training Course at the Timken Roller Bearing Co. and gives his address as 1222 Park Avenue S. W., Canton, Ohio.

Zilisch, Harold, has gone into business with Jay Reader in the firm of Reader & Zilisch, Builders. They are located at 533 South Bluff Street, Janesville, Wisconsin. Zil's home address is 760 37th Street, Milwaukee.

Zola, Stanley P., is associated with Division No. 4 of the Wisconsin Highway Commission and stays at 531 Birch St., Wisconsin Rapids.



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CHEMICALS



Asplund, Arne, holds, as far as we know, the long distance record for the class of 1927. He is chemist for Mo-Domsjö Aktiebolag at Husum, Sulphate Mill, Sweden, with a permanent address at Norr Mä Larstrand 32, Stockholm, Sweden. In going home, Arne "crossed the Atlantic as motorman on a Diesel-engined freight steamer, and arrived in Gothenburg on

August 28, oily but happy. Sweden is the same half-wet country as before, but children under 25 years of age cannot buy drinks." He wishes us "Med Utmärkt Hogaktning" for which we thank him most heartily, at least until someone translates it for us!

Herried, Francis W., 1847 Lake Park Ave., Berwyn, Ill., is at the Chicago By-Product Coke Company as a cadet engineer. His marriage to Miss Selma Nygard of Mt. Horeb, Wisconsin, took place July 19.

Hrubesky, George H., is in charge of the chemical laboratory of the John Strangs Paper Co., Neenah, Wisconsin.

Jeffery, E. W., 125 E. Gorham Street, Madison, is results engineer for the Madison Gas and Electric Co. He has been engaged in research work on gas purification.

Kullman, Earl, is employed by the Wadhams Oil Co., Milwaukee, Wisconsin.

Maresh, Frank, is enrolled in Chicago as a student in medicine.

McFarlane, Donald J., is employed by the Standard Oil Company of New Jersey but gives us no particulars concerning his job. His address is Elizabeth, New Jersey.

Owen, Folkert J., is busy learning the details of vegetable oil refining at the Proctor and Gamble Company at Cincinnati. Owen tells us that there are fifteen alumni employed in the plant and that a Wisconsin Club was organized among them recently.

Preu, Fred, has been made foreman in the packing department of Proctor and Gamble Company of Cincinnati. His address is 4332 Tower Avenue, St. Bernard, Cincinnati, Ohio.

Richardson, Francis J., is in the employ of the National Aniline and Chemical Co. On July 30, he was united in marriage to Miss Grace R. Kendall of Glen Ellyn, Illinois. Mr. and Mrs. Richardson are at home at 1011 Amherst Street, Buffalo, New York.

Ridgeway, Lyle C., is cadet gas engineer for the Wisconsin Power and Light Co., Fond du Lac, Wisconsin. Address 325 S. Main St., Fond du Lac.

Robinson, H. P. Jr., is working in the Traffic Department of the Wisconsin Telephone Company and gives his address as 362 Wauwatosa Avenue, Wauwatosa, Wisconsin.

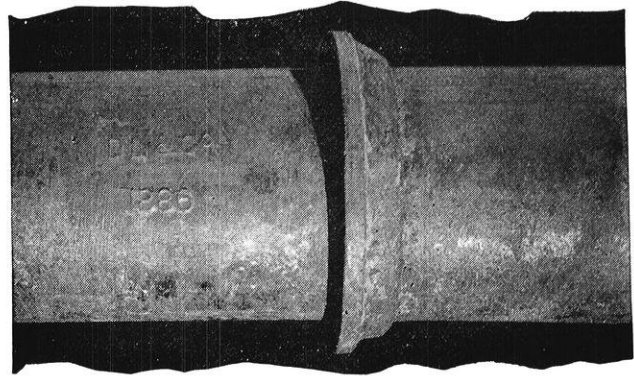
Ross, George H., obtained employment in the engineering department of the Illinois Power and Light Co., Chicago. He is living at 139 E. Livingston St., Monticello, Ill.

Ruhnke, Carl H., is engineer with the Seaboard By-Product Coke Company, Jersey City. His address is 79 Lincoln Park, Newark, New Jersey.

Scheil, Merrill A., is metallurgist for the Gisholt Machine Company of Madison and is living at the T K E house, 216 Langdon Street.

Schwengel, Christian, is in the Chemistry Department at the University and is living at 609 S. Few Street, Madison.

Toner, Harold J., is in the chemical department of the Continental Can Co., South Ashland Blvd., Chicago.



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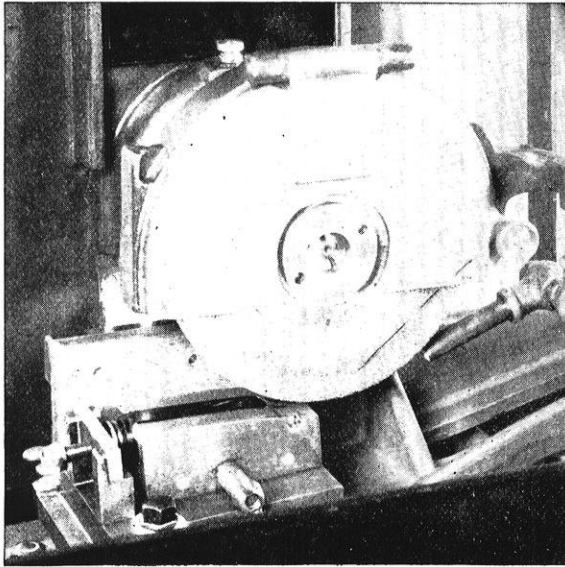
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Tupper, A. D., of Plymouth, Wisconsin, has taken a position as chemical engineer in the research department of the Hamilton Coated Paper Co., of Hamilton, Ohio.

Zinn, Robert E., has become chemical engineer for the Victor Chemical Works of Chicago. He is residing at 1132 Union Avenue, Chicago Heights, Illinois.

Zodtner, Lysle L., is sales engineer for the Pennsylvania Salt Company. His address is care of Michigan Electrochemical Company, Menominee, Mich.

ALUMNI NOTES

(Continued from page 26)

F. F. Mengel, c'11, has resigned his position as division engineer of the Wisconsin Highway Commission at Wisconsin Rapids to become a member of the contracting firm of Mengel & Vogt at the same place.

Reuben S. Peotter, c'05, CE'08, vice-president of the Second Ward Savings Bank at Milwaukee, broke 100 targets for a perfect score in a Milwaukee Gun Club Sunday shoot not long ago. Mr. Peotter was a member of the staff of the "Engineer" while he was in school.

Rumsey, Spencer, c'97, whose death this summer was greatly regretted by his large circle of friends in Madison and Duluth and by his professional associates in Wisconsin and Minnesota, was, at the time of his death, chief engineer of the Oliver Iron Company of Duluth. Mr. Rumsey gained fame in this section of the country through laying out several model mining towns on the Minnesota shore of Lake Superior and for years has held high office with the Oliver company. He was a member of the Psi Upsilon fraternity.

P. K. Schuyler, c'21, has an article in the issue of "Engineering News-Record" for Sept. 1 on "Wind Velocities in the United States from long time records." Mr. Schuyler, who is with the U. S. Bureau of Public Roads has been making an investigation in the toll bridge situation throughout the country. His itinerary brought him to Madison and he called on Prof. Van Hagan to gossip over affairs in Mexico. Mr. Schuyler, during his stay in Mexico City in 1926, occupied a room in the same building where Prof. Van Hagan had an apartment in 1910.

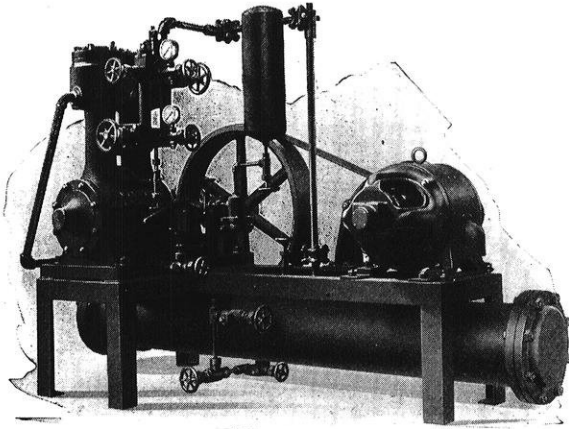
Edmond H. Thwaits, c'25, is with Wood and Weber, Inc., engineers, at Denver, Colorado. His business address is Midland Savings Building.

DEVELOPMENTS IN GAS PURIFICATION

(Continued from page 6)

amount of labor necessary to operate the plant, another advantage of this system is that 100% capacity is available at all times, whereas, in the oxide method, the capacity decreases as the iron oxide becomes less active.

At the present time the high cost of recovering the sulphur by the above process will prohibit its use where sulphur produced from deposits will suffice. However, it is very probable that certain properties which this sulphur possesses, due to its fine state of division, will encourage its use for special purposes. Some of these applications are in the preparation of lime-soda sprays and other insecticides, and to counteract soil alkalinity. In the latter, the fineness of the sulphur particles is necessary to insure their rapid oxidation to the acid. from the reduced ground space required, and the lower



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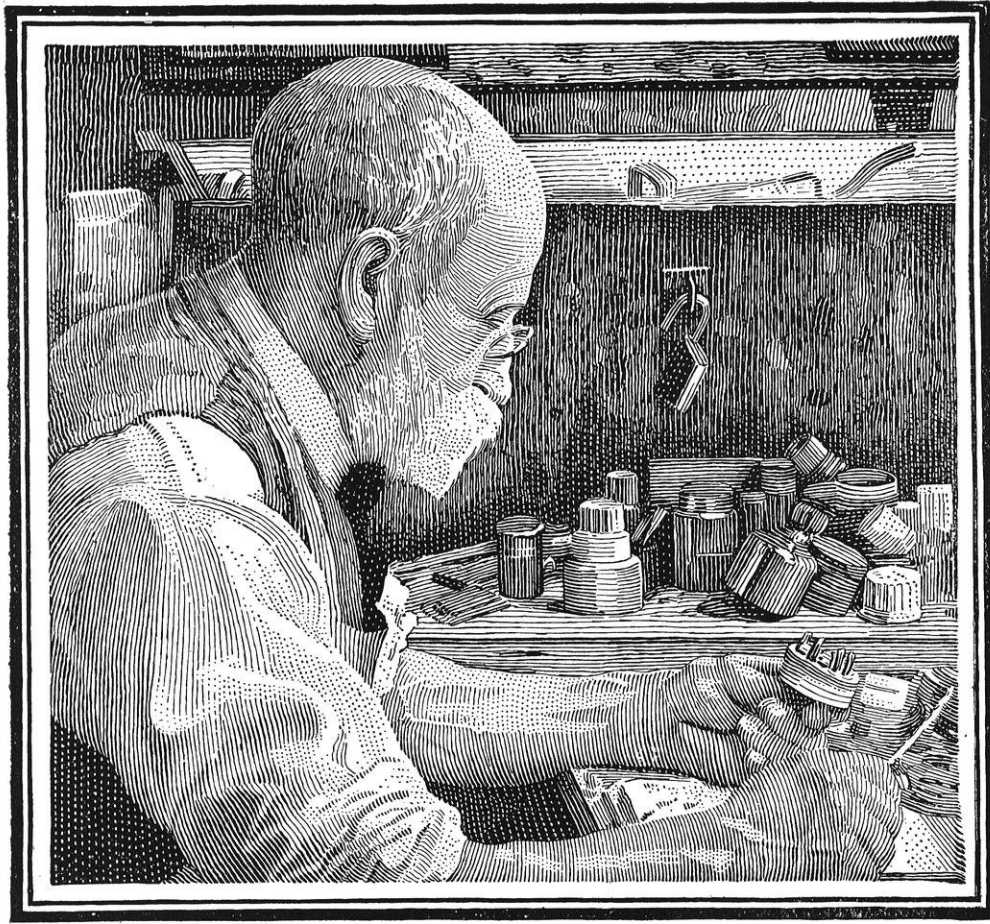
"Grad" has passed away
But temporarily, we hope,
He'll be back Homecoming, we pray,
Ol' school will impart new dope.

Now who can take "Grad's" place?
They sent a man called "Frosh",
We'd like to see his face,
And help him if we can, bigosh.

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