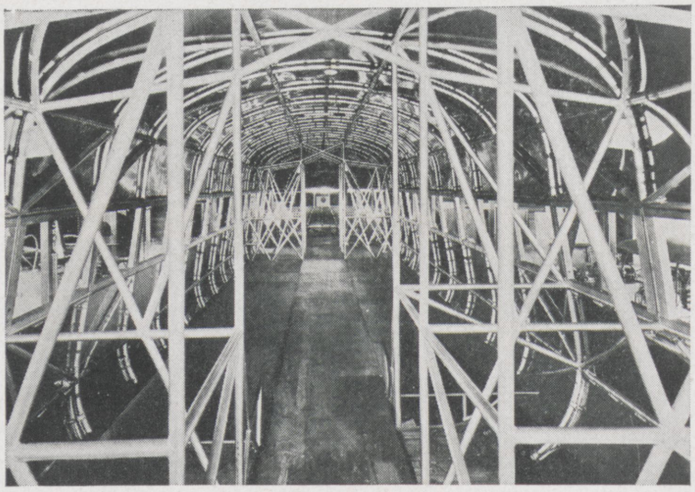
Winter 2-1935

Volume 44 - Issue 6 - February, 1935

Rose Technic Staff
Rose-Hulman Institute of Technology

ROSE TECHNIC

FEBRUARY, 1935
Vol. XLIV Number 6
Member Engineering College Magazine Association
ROSE POLYTECHNIC INSTITUTE, TERRE HAUTE, INDIANA



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

Mastery over all Metals

Welding Makes Jointless Structures Possible in Practically All Commercial Metals and Alloys

By A. B. KINZEL*

One great advantage of using welding is that practically every commercially available metal and alloy can be made by this means into a jointless assembly.

Contributes to Home Comforts

Numerous articles fabricated by welding are found in most homes. Familiar ones cover a wide range of metals—kitchen ware and furniture of aluminum, copper and stainless steel; copper tubing in refrigerators, sheet metal in refrigerator boxes; kitchen cabinets and gas ranges; water pipes of copper, brass, iron and steel; furnaces and hot water tanks of strong heat-resisting irons and steels. Even the tiny alloy wire elements in radio tubes are welded.

Simplifies Automobile Maintenance

Automobile manufacturers use welding for innumerable assemblies where your safety and comfort depend on permanent strength and tightness. The modern automobile repair man also uses welding. With welding he quickly restores broken parts to use again. Steel bumpers, fenders, frames are readily made jointless by welding—as strong as or stronger than the original piece. Cracked cylinder blocks and broken aluminum crank cases are welded. Valves and valve seats are made service free by welding a thin coating of Haynes Stellite to the wearing surfaces to give longer life and added thousands of low cost miles.

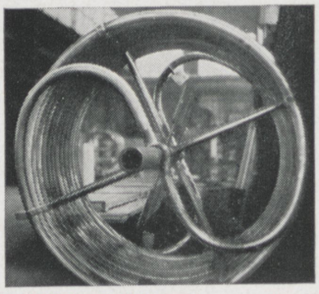
Aids Industrial Users

In industry—for tanks, containers, piping and a wide variety of other machinery and equipment of all sizes, shapes and metals—the use of welding is even more extensive.

Welding Marches Ahead

The wide-spread use of welding for various metals and alloys has been due largely to constant advances in technique and materials. Typical among these is the development of Lindewelding, a procedure for the rapid welding of steel pipe and plate. Speed increases of 50 to 65 per cent and material savings of 25 to 50 per cent over previous methods have been made.

Bronze-welding, welding with a bronze welding rod, is widely used for both repair and production. Smooth joining of metals or alloys of different compositions can be accomplished by bronze-welding. Steel can be bronze-welded to cast iron, bronze and copper can be joined, brass and steel plate can be united.



EVERY METAL—responds to the oxy-acetylene blowpipe. This stainless steel coil for cooling milk has welded joints.

Makes Modern Metal Designs Jointless

Exact procedures for the welding of corrosion-resistant steels and alloys have been developed. Welds so made are sound, strong and ductile. Resistance of the welded joint to corrosion makes it valuable also for use in joining special alloys such as Monel Metal and Everdur. Welded aluminum alloy chairs, tables and other furniture have been made possible through the development of special aluminum welding rods.

At Your Command

Modern welding technique, plus the great variety of metals and alloys on the market today provide many new possibilities for your products. Information and data which will help you use welding to wider advantage may be had from the nearest Sales Office of The Linde Air Products Company, a unit of Union Carbide and Carbon Corporation. These are located at Atlanta—Baltimore, Birmingham, Boston, Buffalo, Butte—Chicago, Cleveland—Dallas, Denver, Detroit—El Paso—Houston—Indianapolis—Kansas City—Los Angeles—Memphis, Milwaukee, Minneapolis—New Orleans, New York—Philadelphia, Phoenix, Pittsburgh, Portland, Ore.—St. Louis, Salt Lake City, San Francisco, Seattle, Spokane and Tulsa.

WELDING ALUMINUM—an architectural plaque, modern in design, is repaired by a modern method.

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

*Chief Metallurgist, Union Carbide and Carbon Research Laboratories, Inc., Unit of Union Carbide and Carbon Corporation.

Surveying This Issue

FOR the past few issues the editor has gone to additional expense to provide campus views and illustrative material. Cuts cost money. Are they worth while? Do you enjoy them enough to warrant the added expense? Please drop me a line or tell me.

ONE of the more recent engineering projects is Madden Dam. Mr. Hamilton tells of some of the problems encountered and their solution in the lead article.

WITH the emphasis placed on speed increasing daily the engineers are using more and more of the lightweight, high-strength alloys. Mr. Averitt tells of the production and uses of one of them, Dowmetal.

—A. W. H.

THE ROSE TECHNIC

Vol. XLIV — Number 6

CONTENTS

Engineering College Magazines Associated
Mr. Leonard Church, Chairman
501 Guardian Bldg., Cleveland, Ohio

Arkansas Engineer
Colorado Engineer
Cornell Civil Engineer
Illinois Technograph
Iowa Engineer
Iowa Transit
Kansas Engineer
Penn State Engineer
Kansas State Engineer
Marquette Engineer
Michigan Technic
Minnesota Techno-log
Nebraska Blue Print
N. Y. U. Quadrangle
North Dakota State Engineer
Ohio State Engineer
Oregon State Technical Record
Purdue Engineer
Pennsylvania Triangle
Rose Technic
Sibley Journal
Tech Engineering News
Villanova Engineer
Washington State Engineer
Wisconsin Engineer

JOHN J. HAGER, *General Manager*
ARTHUR W. HESS, *Editor* GORDON L. BURT, *Business Manager*

Subscription, per year, $2.00. Address all communications to THE ROSE TECHNIC, Terre Haute, Indiana. Entered in the Post-office at Terre Haute as second-class matter, as a monthly during the school year, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized December 13, 1918.

Published Monthly from October to May by the Students and Alumni of Rose Polytechnic Institute.

Madden Dam

MADDEN DAM

An article describing this recent engineering feat by

by

E. A. HAMILTON, c.e., '35

IT is a little more than thirty years since the Panama Canal was first begun. When the original plans were made by De Lesseps, they included the construction of an impounding dam on the banks of the Chagres river about ten miles back from the canal proper; however, it was not until the 1928 session of Congress that any action was taken to carry out this part of his plans. In that session an appropriation of $250,000 was made for preliminary work on the construction of an impounding reservoir to be built at approximately the location selected by De Lesseps and to be called the Madden reservoir after the chairman of the Appropriations Committee of Congress.

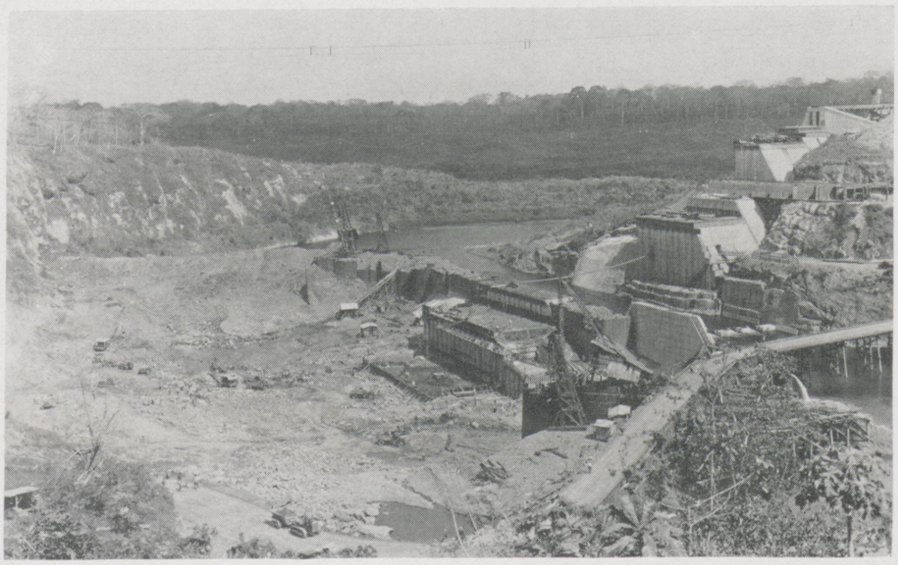
Panama has two seasons instead of the customary four; they consist of a wet season extending from about April 15 to about December 15, and a dry season from December to April. During the wet season the humidity, which greatly affected the work, sometimes rose as high as 100% on rainy mornings, and during the dry seasons it sometimes dropped as low as 50% on hot afternoons. Throughout the year it averaged somewhat above 85%. Such climatic extremes gave rise to numerous difficulties from an engineering point of view. The wet season is accompanied by almost monthly floods amounting to as much as 150,000 cubic feet per second. Gatun Lake, which had been depended upon for storage, possesses a storage capacity of only seven feet of head, while the water which was taken from it for lockage purposes was of necessity wasted into the ocean. Because with a temperature from 75° to 95°, a gentle wind, and a relative humidity above 85%, the storage was soon decreased to a great extent. In fact, during the spring of 1934 when the fleet went through, and during several preceding years, it was necessary to pump large quantities of water into Gatun Lake in order to operate the Canal up to its capacity.

Naturally, such conditions gave trouble and uneconomical operation; and consequently plans were made for the construction of an impounding dam to eliminate these troubles and also to care for the previously unregulated discharge of the Chagres river into Gatun Lake. The contract for the construction was let on a joint bid to the W. E. Callahan Construction Company, and to Peterson, Shirley, and Gunther for approximately $4,000,000.

Though the site selected for the dam was only ten miles from the canal, it was a veritable tropical jungle, so that all the materials used had to be brought in through virgin country from Madden Siding, a point on the railroad nearly 12 miles away. By agreement the government cleared a way through the jungle and built a modern Portland cement highway from Madden Siding to the damsite. The area impounded by the dam is about 20.9 miles square, and includes almost all of that area below the 260 foot contour which crosses the Chagres.

The bed rock at the point selected for the damsite is of calcareous sandstone, and is highly impermeable. The general area impounded is floored by cavernous limestone, containing a large percentage of voids. Extensive preliminary investigations were carried out to determine conclusively what type of grout filler would be sufficiently cheap but still effective. Cement grout was impracticable because it offered no bond with the limestone. Asphalt grout was too expensive. Finally, someone thought of using clay, of which there was a plentiful supply in the locality. The Geological Bureau carried on extensive experiments upon the clay to determine its resistance to underground corrosion, its impermeability, how it could best be inserted—in short, everything that would be of interest in placing a grout filler. The tests used included underground observations of the effects of clay grouting and of grouting on a large scale through exploratory holes as well as laboratory tests on the properties of the clay used.

It was finally decided that an unadulterated clear water and clay mix gave the best results. The addition of cement or other material weakened the grout. The clay was screened to remove lumps and was then mixed with water. It was inserted through a one inch pipe at pressures varying from 50 to 110 pounds per square inch, while the quantity of water added was varied from 48% to 60%. Less than 48% gave a mass too viscous to move under obtainable pressures, whereas more than 60% gave too thin a grout. After a great deal of experimentation, a mixture of about 55% was selected as most satisfactory. It was thin enough to permeate into the smallest fissures,

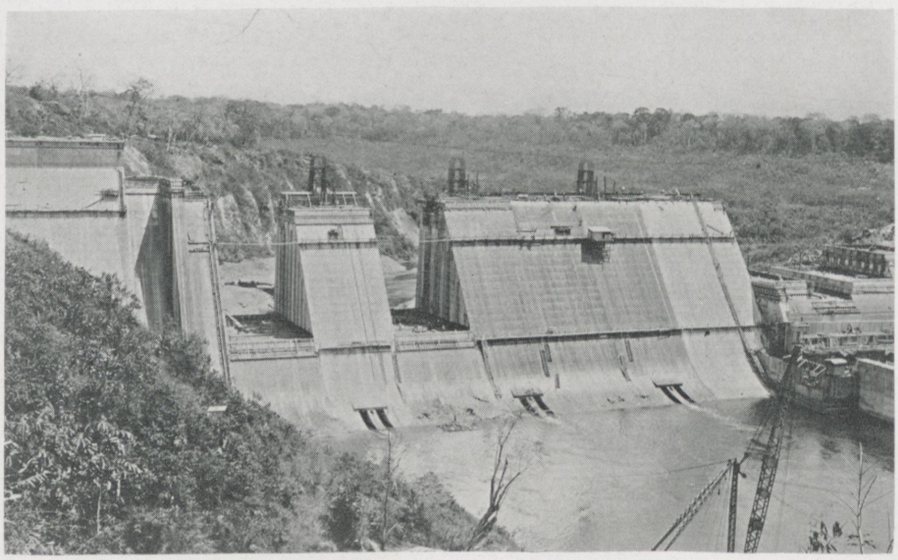


Dam as of March 22, 1933

and yet thick enough to grout properly. Then too, it was found that a thin mix first struck the walls in the form of spray with tremendous force, and by the very force of the blow lost a large percentage of its water. After this mix had been blown in for a short time, the viscosity of the material was increased to sometimes as low as a 43% mix, and the pressures were gradually increased up to about 300 pounds per square inch. A two way cock in the line was closed when this pressure was reached, after which this pressure was held for a time. If any blowouts occurred, those in soil were repaired with tamped earth, and those in rock with concrete. Both materials, tamped, are able to withstand any pressures that will be met with underground.

This grout was very effective in stopping seepage. It was found that under pressure of about 110 pounds per square inch in partially grouted areas, the seepage was 59 cubic feet per minute, but in areas wholly grouted, the seepage varied under this pressure between 1.89 cubic feet per minute and 5.18 cubic feet per minute. Naturally, the principal advantage of this clay grout was in its cheapness, but at the same time there were other advantages. Large amounts of grouting could be done from a single drill hole; the setting time of the grout was easily controlled through pressures; moreover this type of grout was very practicable in areas consisting principally of weathered rocks. Of course this grout has its disadvantages too in that it is practically nonresistant to corrosion and disintegration, but under low groundwater heads such as we find in Panama this objection loses significance. With this type of grout it is impossible to grout openings filled with running water; however, this objection was not of significance here either.

This construction took half a million yards of cement, all of which had to be hauled in from abroad by the government in 12,500 bbl. consignments, unloaded at San Christobal into box cars holding 232 bbls., and hauled to Madden Siding, thirty miles away, to be delivered to the contractors there. The storage facilities of the contractors consisted of two steel silos, each with a capacity of 6650 bbls., which amount was almost enough to last a single shift. The steel silos had joints filled with asphalt to prevent leakage, and were painted with aluminum paint, since it radiates heat from the cement rather than absorbing more heat. The cement mixer was filled by hand from four box cars on either side of a belt conveyor. Native labor was used to place the cement on the belt conveyor fast enough to keep the cement pumps working at rated capacity, 210 bbls. per hour. The cement sacks were drawn up on the belt and then allowed to fall onto a bag cutter, a chute with adjustable sides having at the bottom a projecting row of stationary knives over which the sacks slid with sufficient velocity to cut themselves in four places. The sacks and cement then fell onto a 40″x10′0″ screen making 20 revolutions per minute, which permitted the cement to drop through into a hopper while the sacks were discharged at one end, where native laborers shook the cement from them and took them to a small dump nearby for



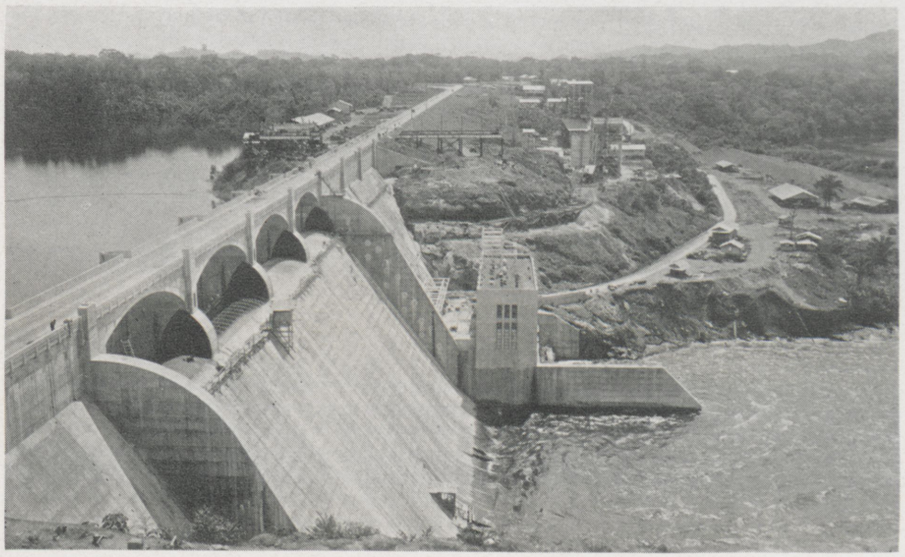
The Mass of Concrete Begins to Take Shape

burning. The cement from the hopper was fed into a pump, and then forced seventy feet vertically into a silo. Throughout the transmittal every precaution was taken to secure a supply of dry air. Tests showed that the use of dry air reduced the humidity of the cement from 100% to 65%.

All the sand, gravel, and cobbles which were used in the construction work were supplied from beds within six miles of the job. In all, about 700,000 cubic yards of gravel were consumed.

Work on the dam began early in 1931. During the first year extensive clearing operations were completed; a modern town with many shops was built; and the coffer dams and all the excavations for the first stage of construction were completed.

The dam consists of a main concrete dam and fourteen saddle dams, constructed at low places in the rim of a natural reservoir. The main dam is of the gravity type, and is 950 feet long and 220 feet high. It was designed by the United States Bureau of Reclamation, with its specifications closely resembling those of the Hoover Dam. Madden Dam has an extensive system for grouting the foundation, and possesses ample cut off trenches. The concrete was placed in 56 foot slabs, (see fig. 3) while the construction joints were provided with an ample system of grout outlets for grouting the joints after the concrete had cooled. A series of uplift pipes and galleries were also installed in the bottom of the dam to take care of uplift pressures. The amount of uplift pressure to be provided for was determined experimentally, as well as the water velocities over the spillway, etc. To the south, along the concrete core wall, the dam was extended by means of a mixture of rolled earth and gravel with a concrete face and topped by a three foot parapet. This portion had no core wall. In this construction the aggregates near the dam were quite adequate, with riprap being found in quantities within six miles of the dam.



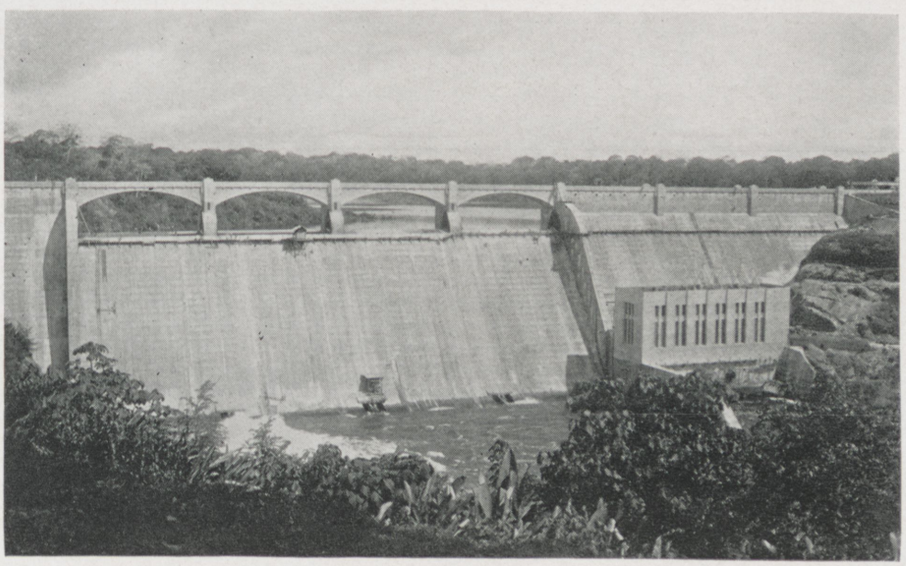
View of Finished Structure as of November 10.

The main dam is provided with six sluice gates 5′ 8″x10′ 0″ and with two needle valves 84″ in diameter and extending through the power house. Through the power house also were installed 3 penstocks, eleven feet in diameter, which together with the tubes for the needle valves are fitted with butter-fly valves. The sluice gates are operated by a hydraulic piston which has an allowable pressure of 2000 pounds per square inch.

The spillway is 400 feet long. It can hold water at an elevation of 250 feet above sea level, but its normal crest is only 232 feet. The crest is controlled by four automatic drum gates, 100′x18′, which rise to hold the water up to a 250 foot elevation. These gates are also manually controllable by remote control from the power house. These gates are said to be the largest of their type in existence.

At the south end of the dam, and forming a part of the main dam, there was inaugurated a new type of dam, consisting essentially of gravel-like material, and faced on the downstream side with concrete. The downstream slope is 2 to 1, while that of the upstream is 1¾ to 1. The face slab is reinforced

(Continued on Page 18)



Downstream View. November 10.

DOWMETAL

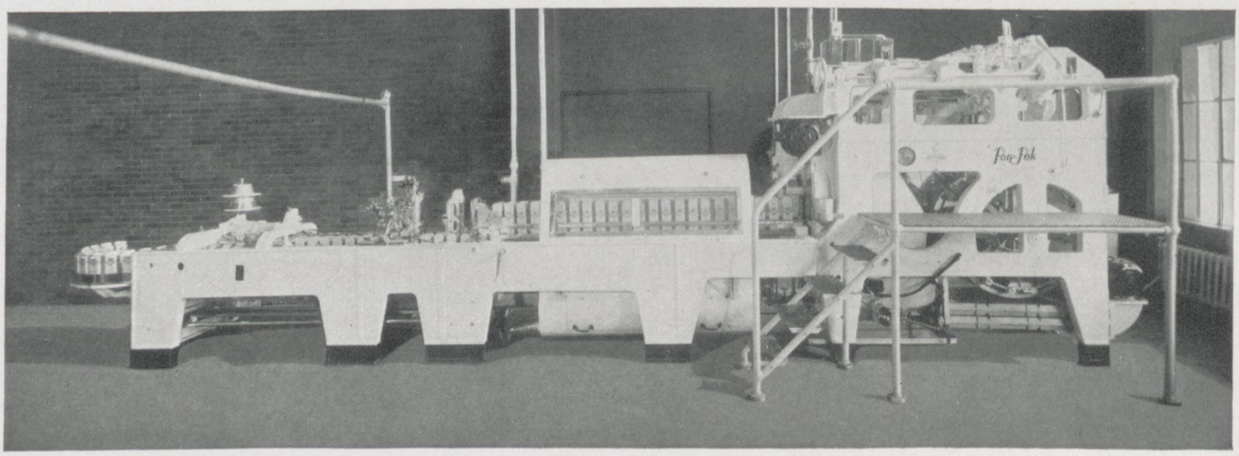
by

Robert Averitt

ONE of the newer alloys which has become more predominant of late as an engineer's material, and which therefore should be of interest to all engineers, is the alloy commercially known as Dowmetal. Dowmetal is the name given to the magnesium base alloys manufactured by the Dow Chemical Co. These alloys, because of their rapidly expanding uses, are largely responsible for the present commercial importance attached to the metal magnesium. All of the alloys known as Dowmetal contain more than 85 percent magnesium. Pure magnesium, like many other pure metals, is comparatively soft and does not possess the properties which fit it for structural uses. However, it forms alloys with other common metals, yielding products having a wide range of properties. All of them are characterized by their extreme lightness. A great amount of research work has been done and is being done to develop new magnesium alloys which will possess combinations of properties to fit them for further industrial uses.

There are seven alloys in the group of magnesium base alloys commercially known as Dowmetal. Their average specific gravity is 1.8 Dowmetal is very strong and tough, and therefore has become an important engineering material without sacrificing the basic lightness of magnesium itself. To an engineer the many advantages of light weight, coupled with great strength need no elaborate discussion. Engineers everywhere are redesigning their products to avoid the superfluous waste of excess weight. Power costs are greatly reduced, vibration is reduced, more useful work is effected, and replacement costs are reduced to a minimum. Recent tests have shown that Dowmetal can be machined faster and better than any other ordinary metal. This feature is especially important in cases where the machining expense is a large percentage of the manufacturing cost. Although Dowmetal is more expensive than some other industrial materials, it more than compensates for this added expense in some cases by its rapid and excellent machinability.

In central parts of the United States, Dowmetal, when left in a free exposed condition, withstood atmospheric corrosion for a number of years. The surface of the metal becomes dark and is covered by a film of oxide. However, the corrosion process is very slow when compared with the rusting of mild steel in the same atmospheric conditions. In districts where the atmosphere is excessively humid or salt-laden, some form of protective coating is desirable, otherwise corrosion troubles will eventually develop. Dowmetal is resistant to the attack of most alkalies and many of the more common organic chemicals, including hydrocarbons, acetones, alchohols, phenols, and amines. Although re-



sistant to bases, Dowmetal is attacked by most acids and should not be used where acid conditions prevail. Dowmetal is also corroded by most aqueous salt solutions, brines and chlorides being particularly harmful.

Because of the useful characteristics of Dowmetal, it is evident that its commercial possibilities are manifold. By the utilization of Dowmetal, the aircraft industry has been able to accomplish many feats heretofore considered impossible. The reason for this is evident. In the modern aviation industry, probably more than in any other, light weight and great strength are an absolute necessity. A recent example of this application is to be found in the Century of Progress

Strength

Stratosphere flight. The gondola of the balloon used in that flight was made entirely of Dowmetal. In commercial aviation the use of Dowmetal in machine parts has greatly increased efficiency by increasing pay-load capacity and lowering operating costs without sacrificing strength and endurance.

Dowmetal is becoming more and more prominent through its use in the manufacture of such transportation units as trucks and trailers. Through its use, weight reductions of approximately 75% are possible over the wood-steel type of construction. The advantages offered by Dowmetal are recognized by truck and trailer manufacturers, particularly with respect to the replacement of dead weight by pay-load.

Transportation is by no means the only field in which Dowmetal is being utilized. Machine parts constitute an equally important field. Vibration is greatly reduced, and the cycle of operation is materially speeded up when useless inertia is removed. Furthermore, rotating parts can be started and stopped in much less time with a correspondingly lowered reactive shock on accompanying parts.

In addition to the uses of Dowmetal that have been mentioned here, there are many other fields in which its use has proved very successful. Meanwhile research is daily finding further uses for this remarkably alloy.

A Dowmetal Auto Carrier

THE ROSE TECHNIC

Member Engineering College Magazines Associated

WARREN S. SENTMAN ..... *Assistant Editor*
DANIEL OVERHOLSER ..... *Assistant Editor*
EARLE B. BUTLER ..... *Advertising Manager*
WILLIAM KASAMEYER ..... *Circulation Manager*

Assistants

ROBERT A. AVERITT, J. ROBERT MARKS,
ALDEN B. FOLEY

DR. PAUL G. HOEL AND MR. HENRY C. GRAY ..... *Faculty Advisers*
ALLEN G. STIMSON ..... *Alumni Adviser*

Fraternities

Now that rush week is a thing of the past, the freshmen Greeks are getting their first real experience with a college fraternity. Membership in any group is not a one sided affair, but is rather a joining of efforts on behalf of the individual and of the group. There are certain fundamental principles of fraternity existence that the neophyte is likely to forget unless he is reminded of them at the outset. The most important of these is that the pledge owes an obligation to his fraternity, and that the fraternity in turn owes an obligation to its pledges.

Every worthwhile social fraternity is founded upon the highest of ideals; and every fraternity is obligated to teach its pledges its history, traditions, and ideals. It is an obligation a fraternity must assume; and if it fails to do so it is cheating its pledges and members.

The word fraternity means brotherhood, and that is what every fraternity should offer its members. The knack of getting along in a group should be constantly impressed upon pledges and members. In order to fulfill this obligation a fraternity must at all times make predominant the feeling of fellowship and brotherhood.

At the present time fraternities are laying a large amount of stress upon scholarship. A fraternity should constantly be trying to improve its scholastic standing at every institution at which it has a chapter. The upper classmen must stand ready at all times to willingly assist a freshman pledge over any difficulties he may meet in his studies. If every fraternity will attempt to meet these obligations, it will mean more to its members, and it will be more of a benefit to its pledges.

In addition to the obligations which the fraternity owes its pledges, there exist certain fundamental obligations on the part of the pledge to his fraternity. If the neophyte wishes to be a credit to his group, he must learn and practice the ideals and traditions of his fraternity. When a man pledges a Greek letter organization he automatically assumes the responsibility of maintaining the standards of that group. Consequently, it is up to the pledge to maintain his personal scholastic standing on the same level as that of his fraternity. If he fails he is acting as a detriment to his organization. If he succeeds he is contributing to the life and advancement of his fraternity.

Just as a fraternity is expected to offer the advantages of fellowship to its members, so also is the pledge expected to enter into the group and take advantage of this comradeship. A pledge should endeavor to meet his group members at least half way in making himself one of the group. The proper way to do this is to make use of his fraternity house at all times and to take an active part in the life of his fraternity.

Laboratories

Laboratory work is an essential part of every engineering college curriculum. Since this is true, the student in the laboratory should endeavor to acquire a maximum amount of value from it. Whether or not this will be accomplished lies mainly in the hands of the student himself. But the majority of students cannot be relied upon to use their initiative in the laboratory; hence, the usual practise of laboratory instructors is to assign definite experiments for each laboratory class. As a result, students are not apt to put their whole-hearted work in on experimental practice. What then, we may ask, is the alternative?

During the convention of the Engineering College Magazines Associated, which was held on the Rose campus last October, the writer learned of a possibly more effective type of laboratory procedure, which is in practice in one of the eastern schools. The scheme amounts to this. The students are sent into the laboratory for a three hour period, and during this time they may perform any experiments they choose. The results obtained are reported to the instructor when the experiment has been completed. In grading the student, the instructor considers not only these results, but also the value of the experiment which the student elected to perform. Again

(Continued on Page 14)

A reporter for a metropolitan daily asked a number of persons on the street, "What is the biggest buy for a nickel?" Two-thirds promptly replied, "A telephone call."

Americans throughout the country evidently agree with this judgment of value received from the telephone. For each day they hold more than 57,000,000 conversations over Bell System wires.

Year after year Bell System planning extends the telephone's reach—increases its speed—makes it more convenient, more *valuable* to everybody.

Why not telephone home one night each week? For bargain rates, call by number after 8:30 P. M.

BELL TELEPHONE SYSTEM

An Unusual View of the Main Building

CAMPUS

R. O. T. C. Appointments

Appointments for cadet officers and cadet non-commissioned officers in the R. O. T. C. Engineer Battalion were announced by the Professor of Military Science and Tactics on February fourth. The policy of the Military Department in the matter of appointments is to rotate the seniors in the various positions of command as officers, the juniors in the positions of sergeant, and the sophomores in the positions of corporal during the fall term, and at the beginning of the spring term, to make permanent appointments and assignments based on the demonstrated ability observed during the preceding terms. This policy was followed this year as in the past, except that the choice of the cadet major and the cadet adjutant, and the designation of the company commanders were deferred until some time in April. Four cadet captains were appointed. They will rotate in commanding the battalion and the companies, and in serving as adjutant; and from them will be appointed the cadet major, the adjutant and the company commanders of Companies "A" and "B." This slight departure from the procedure of previous years will, it is believed, result in sustained competitive interest and in the best selection of a cadet major to command the R. O. T. C. Battalion.

In addition to the four cadet captains appointed on February fourth, two additional appointments as cadet captains will be made in April from those who are now appointed as cadet first lieutenants. Until that time the lieutenants will be rotated with assignments in the companies; and the two outstanding men will receive the honor of promotion, one to cadet captain in command of Company "C," the outline company, and one to cadet captain and battalion supply officer.

The appointments as made were as follows: Cadet Captains—Butler, E. B., Cromwell, N. H., Richardson, F. H., Richardson, H. H. Cadet First Lietuenants—Hager, J. J., Hall, J. F., Hess, A. W., James, A. L., McIntyre, B. F., Pratt, W. S., Reintjes, H., Trusler, N. B., Welsh, J. H. Cadet First Sergeants—Creal, W. R., Kasameyer, W. E. Cadet Staff Sergeants—Bennet, P. D., Duenweg, L., Garmong, H. E., Sentman, W. S. Cadet Sergeants—Campbell, J., Leever, E. B., Overholser, D., Walker, J. H. Cadet Corporals—Averitt, R. A., Blount, F., Carroll, L., Coons, E. A., Cromwell, C. E., Giffel, P. E., Hughes, J. A., Rich, C. F., Sears, R. I., Snedeker, W. R., Stineman, J. B., Wells, T. N., Wischmeyer, C., Wodicka, E. J. Cadet Lance Corporals—Bond, R. E., Brosey, O. M., Cox, S. L., Cromwell, E. T., Foley, A. B., Fox, J. W., Garzolini, A. F., Halberstadt, H. J., Libbert, R. D., Lotze, A. W., McCullough, D. E., Ricketts, J. T., Sonnefield, J., White, R. W.

Rifle Club Notes

The Rose Rifle Team has been considerably handicapped during the last two months by the absence of Warrant Officer "Sarge" Kearns, the team coach, who has been ill at the Fort Benjamin Harrison Station Hospital. He was recently operated upon for mastoid. Lieutenant Garges has been acting as coach during the absence of Mr. Kearns, but he too was called away for a week because of the recent death of his father in Washington, D. C.

During the months of February and March, in addition to the intercollege postal matches to be fired by the varsity rifle team, the R. O. T. C. team will engage in the Fifth Corps Area Intercollege Match, the Society of American Military Engineers Trophy Match for R. O. T. C. units, and the William Randolph Hearst Trophy Match.

The intercollegiate postal matches which have been scheduled include competition with the following colleges and universities: Syracuse University, Washington University, Cornell University, Carnegie Institute of Technology, University of Dayton, Alabama Polytechnic Institute, University of Iowa, University of Kentucky, North Dakota Agricultural College, University of South Dakota, New Mexico College of Agriculture and Mechanical Arts, Oregon State University, University of Alabama, University of

ACTIVITIES

Edited by

Carl Wischmeyer, e., '37

Missouri, and Polytechnic Institute of Brooklyn.

The R. O. T. C. Rifle Team representing Rose in the Fifth Corps Area Match is as follows: Campbell, Coons, Eckerman, Giacoletto, L. J., Halberstadt, Hall, Hughes, James, McIntyre, Pratt, Reintjes, Snedeker, Trusler, Wells, and Wolf. The personnel of the teams firing in the postal matches varies each week depending on the scores made during the preceding week. Men who are not members of the team for a certain week but whose firing is better than that of a team member will replace that member on the team the following week.

All members of the student body and the faculty are invited to come down to the rifle range and try their skill at this interesting sport. Hours during which the range is open for firing are as follows: Monday 1:00 to 2:00 P. M.; Tuesday 12:40 to 5:00 P. M.; Wednesday 3:30 to 5:00 P. M.; Thursday 8:30 A. M. to 5:00 P. M.; Friday 3:30 to 5:00 P. M.

Radio Club

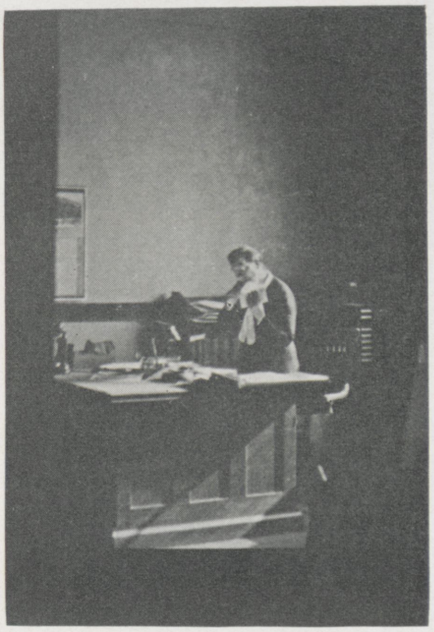
The Rose Radio Club has ordered a new receiver for the club station. The receiver is to be a communications type superheterodyne of modern design. Its purchase was recently made possible through the contributions of students and faculty members, as well as through the club's allotment from the student fund. The club hopes to have the station in operation in the near future.

* * * *

Fraternity Rush Rules Revised

The fraternity rush season of 1935 was the first to be held under the revised rules. These changes were adopted recently by the Interfraternity Council, composed of representatives of each of the fraternities on the Rose campus. The length of the rushing season was changed from three days to two days. The time for each date was specified, with afternoon dates lasting from one until four and evening dates from eight until eleven. This arrangement supplanted the practice of luncheon and dinner dates.

To avoid rushing any man who had no intention of joining a fraternity, an assembly was held shortly after the Christmas vacation, at which time the freshmen were required to designate in writing whether or not they wished to join a fraternity. Further rules stipulated that the men who had signified their intentions of joining were to be divided into four groups chosen by lot. Each group had an assigned time for dates with each fraternity, thereby giving each man an opportunity to become acquainted with all the chapters by which he was being rushed. Any man refusing a date with one organization could not accept a date with any other. Furthermore, no fraternity was allowed to pledge more than one-third of the new unorganized men in any class. A system of preferential bidding was also inaugurated. After the close of rush week, each organization made up a "Preferred List," which consisted of the names of the men whom it desired to pledge. The rushees

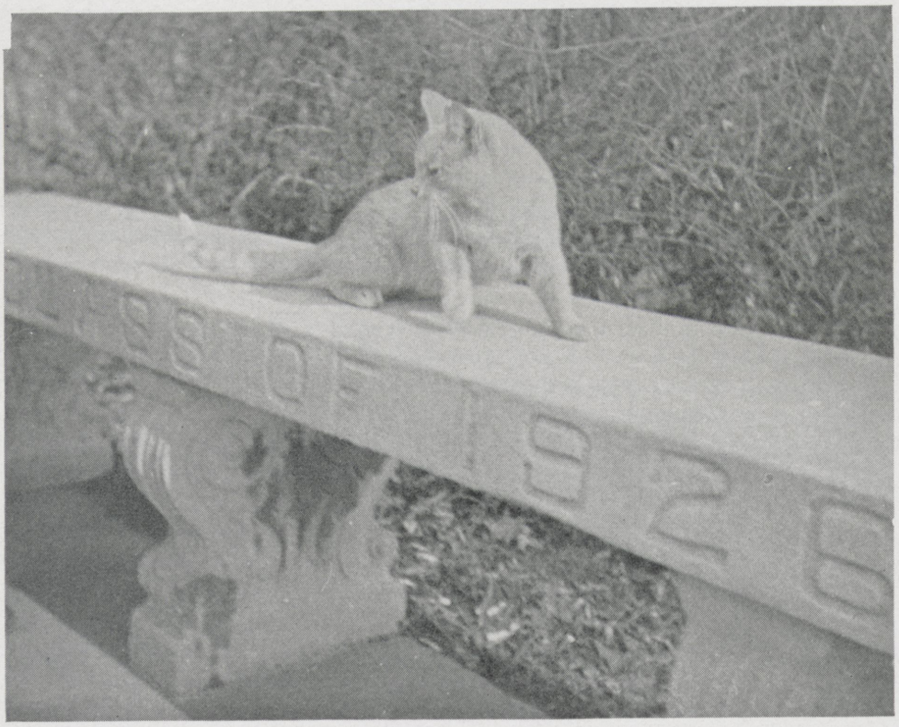


Our Friend

then listed the fraternities in the order of their preferences. Each rushee whose name appeared on the preferred list of the organization of his first choice automatically became a member of that group. If his first choice did not offer him a bid, then he became a member of his second, or third, or fourth choice fraternity, depending on which fraternity offered him an invitation. The paramount purpose of the revision of the old system of rushing was to place all the fraternities on an equal rating for rushing.

Alpha Tau Omega

Gamma Gamma chapter of Alpha Tau Omega announced the pledging of 17 members of the class of 1938 following the rush activities on January 28th and 29th. After a banquet at the chapter house in their honor, the pledging ceremony was held for the following: Kenneth L. Bius, Terre Haute; Wendell Carroll, Terre Haute; Conrad J. Causen, Jr., Buechel, Ky.; Richard E. Dennis, Terre Haute; J. Allan Greenland, Terre Haute; G. Russell Hammerling, Terre Haute; John B. Hunter, Terre Haute; Clemens W. Lundgren, Terre Haute; Tom



Tabby on the Senior Bench

Merrill, Terre Haute; Robert E. Pearce, Terre Haute; Adam H. Romeiser, Chicago, Ill.; Merton B. Scharenberg, Terre Haute; Robert H. Trueb, Terre Haute; Charles Van Treese, Robinson, Ill.; Norman G. Wittenbrock, Terre Haute; Gail Wright, Terre Haute; Lewis Wright, Tipton, Ind.

Actives and pledges are planning to attend the state banquet and dance on March 9 at the Lincoln hotel in Indianapolis. This is an annual affair attended by alumni, actives, and pledges from the chapters at Purdue, Indiana, DePauw, and Rose.

Sigma Nu

With excitement of exams and rush week over, the members and pledges of Beta Upsilon are now ready to begin the new semester.

Beta Upsilon is pleased to announce the pledging of five men to Sigma Nu. They are J. Page Wheeler of Sioux City, Iowa, John Hayes of Indianapolis, Harland Vondersaar of Southport, Charles Fuller of Chicago, and Wayne Alexander of Terre Haute.

Kay Kyser and his orchestra, who have been playing at the Black Hawk Restaurant in Chicago, stopped in Terre Haute to play an engagement at the Trianon on Saturday, January 26. Kay, who is a Sigma Nu from the University of North Carolina, was welcomed heartily by this chapter at the Trianon. Beta Upsilon reserved a table large enough to accommodate fifteen couples. Kay came over to the table during an intermission to meet the Sigma Nu's from Rose and to chat with them.

Beta Upsilon had a distinguished guest at its meeting on Tuesday, February 5, in Charles Edward Thomas. Mr. Thomas, who is editor of the Delta and Assistant General Secretary, gave a very interesting talk during the meeting. He is the only living man who has visited all ninety-seven of the Sigma Nu chapters. He related how being a Sigma Nu had been the means by which several prominent men had received their start, particularly in obtaining political positions. He also told of many humorous incidents that he had met with during his extensive travels. Beta Upsilon enjoyed Mr. Thomas very much and hopes that he will return soon.

Alpha Chi Sigma

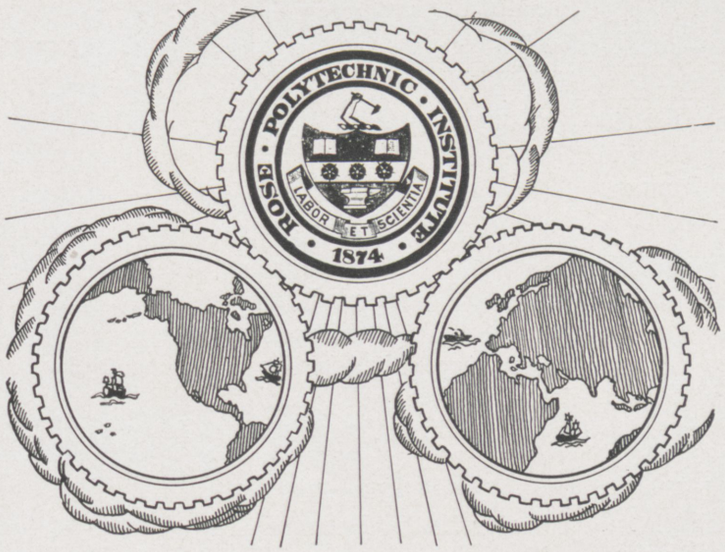
On January 18, Iota chapter held its annual pledge banquet at the Elk's Club. The forty-three men served at this banquet included members and pledges of Iota chapter, the members of the faculty of the chemistry department, and members of the Terre Haute professional chapter. Doctor White expressed his welcome to the pledges for the department and the chapter. The pledges then supplied the entertainment for the evening by reading humorous papers which they had prepared.

Richard K. Toner, '34, and the M.A. of Iota chapter last year, visited Rose on February 1. Brother Toner, who is taking graduate work at Purdue University, is teaching ten hours each week in the chemistry laboratory there. He is working for his master's degree at present, but he plans to continue working for his doctor's degree.

Tau Nu Tau

Friday night, February 8th, Tau Nu Tau military fraternity held its annual dance in honor of the newly initiated members. The dance was held in the main dining room of the Terre Haute House and was cabaret style. Excellent dance music interspersed with classical numbers was furnished by Leo Baxter and his orchestra. Chaperones for the occasion were Captain Stevenson and Miss Roedel, Lt. and Mrs. Garges, and Dr. and Mrs. Prentice.

The newly initiated men in whose honor the dance was given are: Paul Bennett, James Campbell, William Creal, Louis Duenweg, Harry Garmong, William Kasameyer, Ed Leever, Dan Overholser, Warren Sentman, and Joseph Walker.



WILL YOU BE READY?

Industry is awakening. Already it is demanding technically trained men, men with engineering educations. Will you be called? Will you be ready?

Since 1874 Rose Polytechnic Institute has trained men for Industrial leadership. Well planned courses in Civil, Chemical, Electrical and Mechanical Engineering are offered. For complete information, write to the registrar.

ROSE POLYTECHNIC INSTITUTE

Terre Haute, Indiana

Blue Key

De Forest Colburn, '35, Nelson B. Trusler, '35, and Sam Tait, '36 were initiated into Blue Key National Honor Fraternity following a banquet in their honor at the Elk's Club on January 16.

Plans are now being made for the annual Blue Key dance to be held on Saturday, March 2, in the gym. The dance was also held in the gym last year and had for its purpose the raising of funds for a recreation room in the main building. The school has provided room B for this purpose and has placed ping-pong tables in it. Present plans call for finishing the walls of the room, laying a new floor, and providing furniture for it. The proceeds of this year's dance will also be used for the recreation room.

Theta Kappa Nu

Pledge services were held February 4, 1935 for the following men: E. K. Newton of the class of '36, Craig Reynolds, William Shake, and William Serban of the class of '38. All of the actives and pledges and several of the alumnae were present.

An election of the officers for the new term was held Feb. 5, 1935 and the following men were elected: William Lindeman, president; John Sonnefield, treasurer, and Paul Bennett, secretary.

Willis Biggs of the class of '34 is working for a firm in St. Louis. Paul Froeb formerly employed in Chicago has gone to Cleveland as a sales engineer.

Theta Xi

With the close of the rushing season, Kappa Chapter of Theta Xi takes pleasure in announcing the pledging of the following men: Max Stanfield, Martinsville, Ill.; Charles Cantwell, Carbon, Ind.; Harland Sims, Terde Haute, Ind.; Robert Dispennett, Robinson, Ill.; Max Yeley, Marshall, Ill., and Chester Sears, Danville, Ill.

These men were formally pledged at the pledge banquet which was held at the chapter house on Feb. 8, an occasion which will long be remembered by those who were present.

The annual pledge dance was held on Sat. Feb. 16. Music was furnished by Paul Stuart's orchestra. The affaid was attended by many long absent alumni and was declared a big success.

The chapter is planning to attend in a body the annual Founder's Day Celebration in April at Danville, Ill. Other chapters attending will be Theta of Purdue and Alpha Beta of University of Illinois also the Theta Xi Clubs of Indianapolis and Terre Haute. Plans are already under way and a record bdeaking celebration is promised.

The officers for the Spring Semester are Wells, Lyon, Kroesch, Mayrose, Price, and Trusler.

The chapter congratulates Mr. Trusled on his recent election to the Rose Polytechnic Chapter of Blue Key.

Editorials

(Continued from Page 8)

recalling the fact that many students cannot be relied upon to work on their own initiative, it seems evident that this type of student probably would accomplish nothing in such seemingly liberal assignments. Therefore, only a portion of the laboratory periods are conducted in this way. During these free assignments, the reliable student can perform a series of experiments which will be not only interesting to him, but which also will be of practical value. Furthermore, by the time he becomes a senior he will undoubtedly be better able to select a suitable subject for his thesis.

Remember Fellows, St. Pat was an Engineer

Students! Alumni!

Plan to Attend the

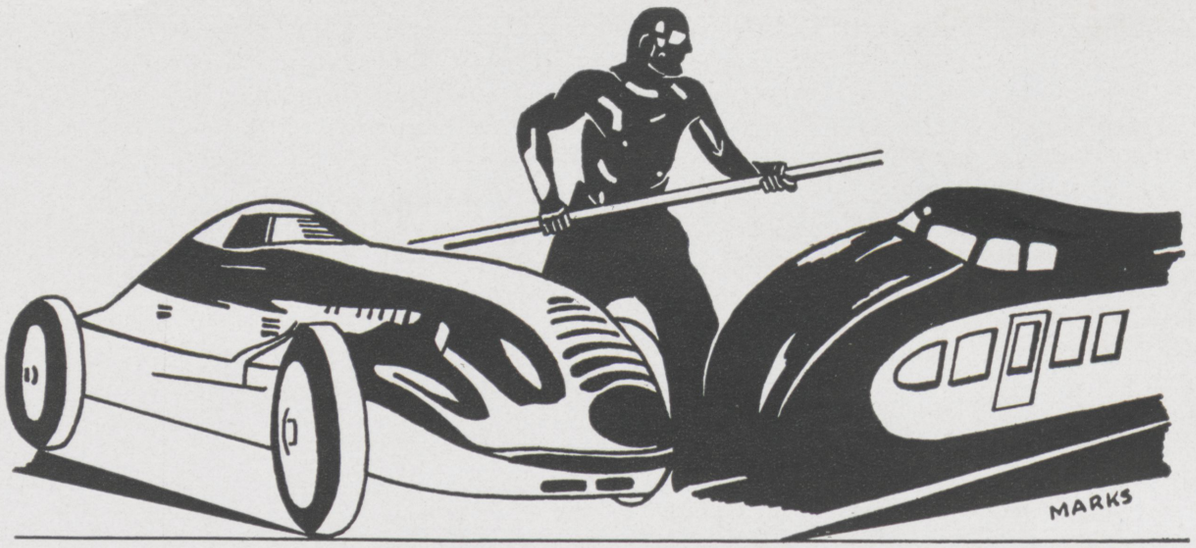
ST. PAT'S DANCE

Saturday, March 16

at the

Trianon

$1.00 Per Couple **Reservations 25c Each**



Research and Progress

Edited by Albert V. McEowen, c., '35

Air Cushioning Pipe Lines

PIPE lines carrying crude oil from distant fields to the refinery operate under unthought of pressures, extremes of 1000 pounds per square inch having been reached in eight inch mains. The oil is usually moved with plunger pumps, whose valves cause a pounding effect that is audible fully eighty miles from the pump if one's ear is placed on the pipe. This incessant hammering is dangerous since it causes crystallization at clamps, welds, junctions, etc.

To prevent this effect, air chambers are placed in the line near the pump to absorb and cushion the pulsations. These air chambers are iron tubes resembling acetylene tanks mounted on a pipe fitting, and contain compressed air which cushions the beat of the pump quite efficiently. Naturally, air at normal pressures would be compressed so much that it would have no helpful effect, so the tanks are filled with compressed air before being cut into the line. Most pumping stations have available a compressor that will furnish 250 pounds pressure, and this can be used, although there are certain objections. When the chamber is cut into the line, the sudden increase in pressure up to about 1000 pounds will compress the air rapidly, and since it is enclosed in a thick metal container, the heat generated cannot escape, and the mixture of air and oil vapor is ignited explosively as in a Diesel engine with catastrophic results.

After several such happenings, some studies were made of the causes for these explosions and a simple remedy was introduced. While sudden compression generates heat, sudden expansion of a gas in such conditions will absorb heat. This principle was applied by adding, at a small additional expense, a multi-stage compressor which stepped up the air pressure in the chamber to 1200 pounds instead of the former 250. Thus, when the valve was opened, the air expanded and the temperature of the vapor mixture was lowered, thereby efficiently safeguarding against explosions. By a simple change in air pressure equipment, the entire procedure was protected and much danger was eliminated.

High-speed Problems

The introduction of high-speed, stream-lined trains has necessitated some investigation into the existing track systems, as well as their condition and maintenance. The new trains are designed so that their weight is less than that of the usual steam train, but their extreme speeds place more importance on surface inequalities and degree of curvature than ever before.

When the Burlington Lines brought out their stream-lined train, the Zephyr, they made exhaustive studies of the track to be used by this train, with the result that several changes were made in it. All curves must be super-elevated for high speed travel, the amount varying with the speed expected on the line. The introduction of such new equipment brings an increase of some 50% to top speeds. The answer to this problem is not, as it might appear, simply a matter of increasing the super-elevation to that required for the higher velocities, because not all trains travel that fast, and an excess of elevation would have as bad a negative effect as would too small an amount, since the procedure is intended to increase both safety and comfort. The line between Chicago and the Twin Cities was covered carefully, and as a result a schedule of speeds was developed for the various zones along the

way. A few curves and grades were relocated, but in general the old line was taken as it lay, with a few minor changes being made in super-elevation and in transition curves. Curves up to 2 degrees were elevated for the zone speed limit, while sharper ones were adequately marked for slow zones. To insure that slow trains would not be affected too much, a maximum super-elevation of 5 inches was adopted; consequently in the case of sharper curves which would require more than that, it was necessary to reduce speeds to conform to the curves.

Other problems presented by the new equipment had to do with track maintenance and signal provisions. The higher speeds of the new and lighter trains required a much smoother track surface, because inequalities were magnified a great deal by the fast moving machines. Since the track and roadbed then in place were sufficiently heavy, the only need was increased care in maintenance to insure a smooth surface. Most block signals were found to be satisfactory, only a few cases requiring any extensive changes. The new trains increased their braking power, so that they are now capable of being controlled as quickly from a speed of 90 m.p.h. as are ordinary trains from 60 m.p.h. The lighter weight of the new engines also meant much when it came to controlling measures. Grade crossing signals did require some changes, since rating regulations usually call for about a twenty second signal interval before the train reaches the crossing. Based on the ordinary 60 m.p.h. speed, the controls were located about 1800 feet from the crossing, but the new trains necessitated a location a half mile away.

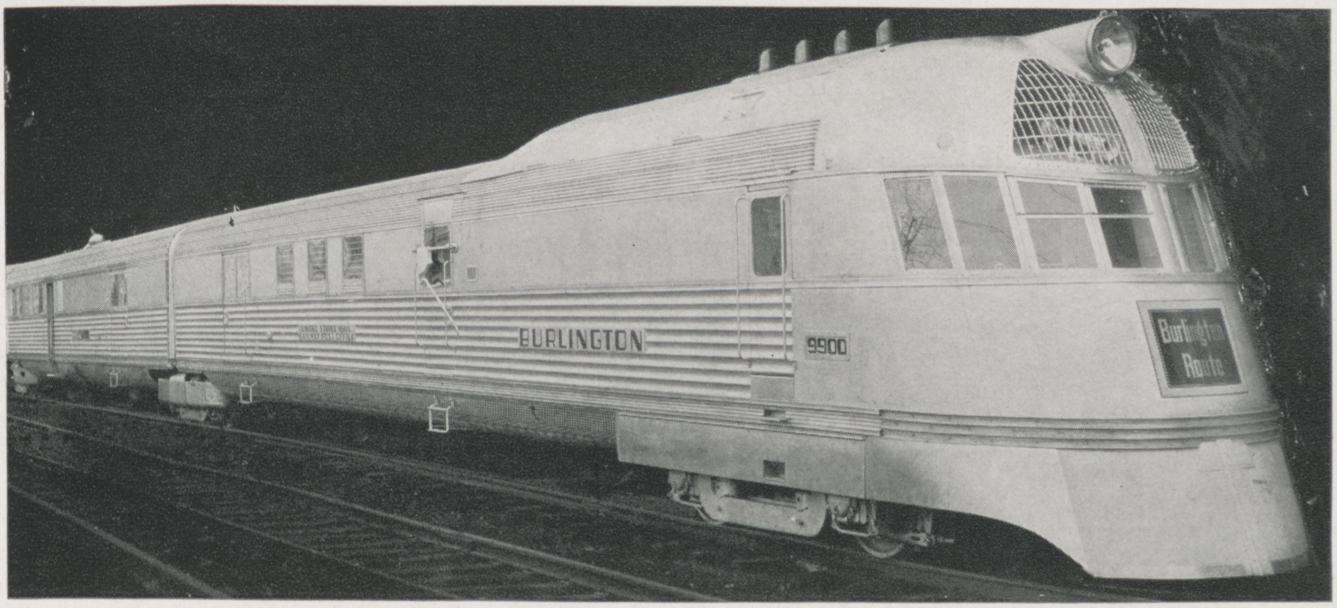
The above are a few of the problems encountered by the engineers who had the job of putting the new equipment into service after the desk work and manufacturing had been completed. They do not come up in the usual discussion of stream-lined trains, but without their solution the new lines and super-power plants would find little application. A railroad right-of-way presents a variety of difficulties; and the design, laying, and maintenance of a roadbed must be kept in touch with modern improvements at all times, both in the interests of safety and comfort.

110,000 *Kilowatt Turbine Generator*

A new 110,000 kilowatt turbine generator is to be installed soon at the River Rouge power plant of the Ford Motor Company. This unit, which will be one of the largest of its type in industry, incorporates several new points of interest, its most important feature being that it operates at a pressure of 1200 pounds and a temperature of 900 degrees Fahrenheit. It is a vertical compound unit, with the high pressure turbine and generator mounted over the low pressure system. Steam enters the upper unit at 1200 pounds pressure and 900 degrees temperature, there producing 55,000 kilowatts, after which it is led to the lower unit where another 55,000 kilowatts is produced. Because of the high initial temperature of the steam, it is not necessary to reheat it before it is used by the low pressure unit.

The entire installation is quite compact, the length 57 feet, width 23 feet, and height 21 feet being quite small, a fact greatly appreciated in most power house designs. The space taken by the equipment is less than one-quarter of a cubic foot per kilowatt output. Along with this economy of space, the units bring other appreciable savings, particularly in coal consumption. Less than a pound of coal will be used to produce one kilowatt hour of electricity.

The rating of the new machine is 110,000 kilowatts, 80% power factor, 13,800 volts, 1800 r.p.m., 3-phase, 60 cycles, with steam conditions 1200 pounds gage pressure, 900 degrees F. total temperature,



The Burlington Zephyr

and one inch absolute back pressure. The installation weighs approximately 1,000 tons.

Telescope Disk

The Corning glass works has been successful in casting a perfect 200 inch disk for the world's largest telescope. The properties of the glass used made this achievement particularly difficult. The highest temperature that could be practicably used was about 2800 degrees, at which temperature the glass was only bright red and flowed through the molds like cold molasses. Four-hundred pound ladles were used, and the casting was heated by gas flames until some 100 ladles had been poured. The mold contains 115 cores, which form ribs in the back of the disk and lighten the weight from a possible 40 to an actual 18 tons. The first disk was poured about a year ago but contained flaws where the cores in the back came loose and floated in the casting. However, it can be used and is now on hand at the plant. Now that it has cooled completely, it has a very deep blue color, which appears rather remarkable to the casual observer who is unaccustomed to glass castings of such dimensions. The further grinding of the mirrors will present more interesting problems.

High Intensity Mercury Vapor Lamps

An installation made recently at Lynn, Massachusetts, is the first on record to be made using high-intensity mercury vapor lights for the lighting of streets. These lights indicate a note-worthy forward step in lighting design, since they add some fifty percent to the output of the units.

There are two lamps within each globe; one, a typical incandescent lamp, is rated at 200 watts and produces 3400 lumens, while the other, the mercury vapor lamp, rates 400 watts and 14,000 lumens. The mercury vapor lamp is about a foot long, consisting of a glass tube two inches in diameter containing within it another bulb seven inches long and one and three-eighths inches in diameter, within which the arc is drawn. The incandescent lamp is mounted just above the mercury lamp. When first receiving current, the mercury lamp glows with a greenish blue light, operating at 20 volts and 5 amperes as a low intensity and low pressure arc. As the heat builds up the pressure, the light output becomes brighter and whiter, until it is a pencil-like beam the length of the inner bulb, operating steadily at 155 volts.

The other lamp within the globe produces noticeable and necessary effects, chief among which is its corrective action upon the color of the light produced. The mercury lamp by itself gives out a bright, slightly bluish green, white light, to which the incandescent lamp adds some yellow and reddish light, so that the combination more closely approximates daylight. This lamp also supplies heat to the mercury lamp, acting as a starter to facilitate cold weather lighting; and in a third capacity it acts as a safety guard, avoiding dark lights should the mercury lamp fail. The mercury vapor lamps have a characteristic which shows up to disadvantage in that they have a tendency to delay restarting until they cool off if they happen to be cut off for a moment by some failure or voltage drop.

The new units give a type of light which is well adapted to lighting traffic thoroughfares and business districts, and which does so quite efficiently.

Madden Dam

(Continued from Page 5)

throughout with ¾ round bars, and is without expansion joints. There is also a parapet wall of a design as shown in figures 1 and 2, and a concrete paved roadway 20 feet in width.

The remaining 13 dams necessary to wall Madden Reservoir, with the exception of numbers 5 and 8, were constructed of clayey material with upstream slopes of 4 to 1 and face slopes of 2 to 1. The faces were covered with rock and gravel. Numbers 5 and 8, which are saddle dams of a special design, had concrete core walls and upstream faces with 4 to 1 slopes covered with heavy riprap.

A power house (see figures 1 and 2), 45 feet by 150 feet and 90 feet high, was constructed also at the south end of the dam. The balance of the work was done by the contractors, but the electrical equipment was all installed by the government.

The minimum rainfall of 89″ for this area occurred in 1922, and the maximum of 152″ in 1909. In every month of the year excepting February and March there occur serious floods amounting to sometimes as high as 150,000 cubic feet per second. The two most serious floods which were encountered during construction occurred on November 28, 1932. At that time work was being carried on in the lowest portions of the foundation. The first flood broke at 2 A. M. with a discharge of 56,000 cubic feet per second; the second, and by far the more serious, broke about 3 P. M. with a discharge of over 120,000 cubic feet per second. The second flood was more than the diversion channel capacity; and consequently the coffer dam flooded, with the result that the tramway was seriously damaged and operations were delayed, thereby occasioning considerable loss.

Throughout the project it was necessary at all times to be properly prepared to protect freshly placed concrete from the heavy and sudden rains. For this purpose 4 foot by 8 foot frames covered with heavy canvas were prepared. These were placed shingle-like over the freshly placed concrete on collapsible "horses," thus leaving only a small easily covered area exposed at any one time.

In spite of these weather conditions, and contrary to common belief, conditions in the Canal Zone are healthful. During the whole

(Continued on Page 20)

ANNUAL BLUE KEY

DANCE

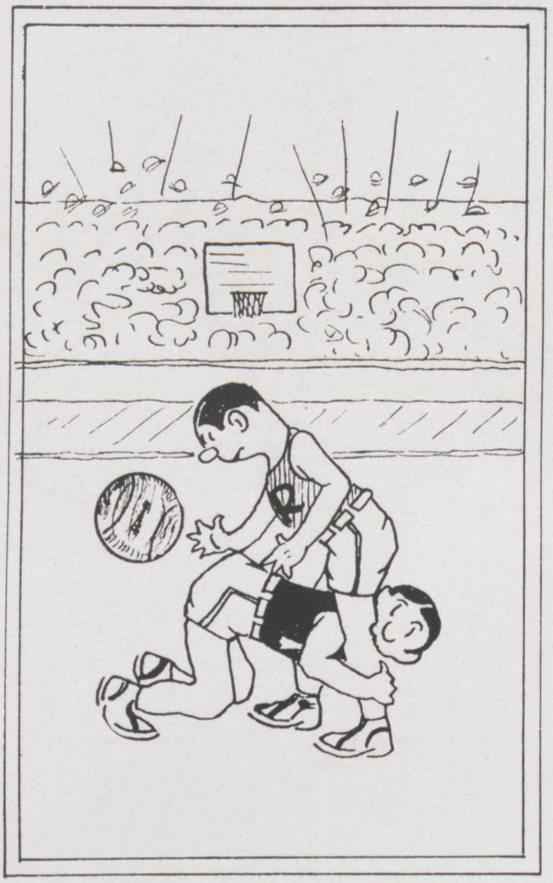
Proceeds will be used to finance decoration and furnishing of the recreation room in the main building.

Saturday
March 2nd
$1.00 per Couple
Gymnasium

SPORTS

Edited by

Harry Richardson, m., '35



Rose is now in the midst of its intramural basketball season. Despite the fact that the rosters of some of the teams have been somewhat depleted, the games are still going strong. The team most seriously crippled is the Mechanical A team, which lost two of its men. There has been some talk of combining the two mechanical teams into one, but nothing definite has been done along that line at the time of this writing, despite the fact that the two teams recently combined in an effort to defeat the military team.

Nine games have been played to date, with two teams still being undefeated in the league race for the championship. These two teams are the Chemical team and the Military team, the Chemicals having won two games and the Militarists three. The Mechanical B team is the next in percentage standing. They have won two out of three games played, their only loss being to the Military team. The Mechanical A team is next with an even split in two games. Their only loss was to the Chemical team. The Electrical B team boasts a percentage of .333 by virtue of a victory over its departmental rival, the Electrical A's. The Civils and the Electrical A's are fighting it out for the cellar position, with the Electricals having the edge as they have lost three games to the Civils' two.

The Military team is leading in total points scored and points scored per game. They have scored a total of 122 points in three games for an average of 40⅔ points per game. The two Mechanical teams split honors in the point scoring department. The B team has scored a total of 60 points in three games for an average of 20 points per game, while the A team has scored a total of 44 points for an average of 22 points per game.

The Chemicals led in the column of opponents points with a total of 32 points in two games for an average of 16 points per game. The Military team equals this average with 48 points in three games, while the Mechanical A team is second with 41 points in two games for an average of 20½ points per game.

Handball

The handball court at the east end of the gymnasium has been the scene of a great deal of activity during the past month. Although there is no definite intramural program, handball has risen to great heights of popularity among the athletically inclined students. This sport has been a great help to those who do not seem to care for continuous laboratory work, if any, in that the handball court is located in an out-of-the-way place in the building. The equipment necessary for the playing of the game is always obtainable in the athletic office.

More Basketball

During the past month Rose has been conducting what might be termed an unofficial basketball season. With an eye to the future, Coach Brown has assembled some of the better basketball players in the school into a squad, which at present numbers fifteen men. These men have all demonstrated their basketball ability in some manner, some by their play on the Rose varsity three years ago, some by their play in the intramural games, and some by their play in high schools. Games have been scheduled with teams in the Terre Haute Industrial League at the college gym for Thursday and Friday nights. Only two or three practice sessions have been held because of the intramural basketball schedule, but the Rose All-Stars have been defeated only once and that was in their first start.

To date the All-Stars have won five out of six games and have scored 166 points to their opponents 102 for averages of 27⅔ and 17 respectively.

All of the games are arranged by the managers of the industrial teams, but the All-Stars have agreed to play any and all comers at the Rose gym.

Madden Dam

(Continued from Page 18)

project, the number of cases of illness was no greater than on any corresponding construction project

in the United States. A few cases of malaria occurred; however the government maintains a rigid sanitary supervision of the residents, and when these cases were treated promptly no serious effects resulted.

This project was begun on December, 1931, and was completed in November, 1934, eight months ahead of schedule.

NOTE: The greater part of this information was made available through the courtesy of the W. E. Callahan Construction Company, and the photographs were also furnished by them. The rest of the information was secured from articles of Adolf J. Ackerman, Chief Engineer on Madden Dam, in the Engineering News Record.

Alumni

Edited by
Jay F. Hall, e., '35

Here and There with the Grads

'92 William J. Fogarty is President and General Manager of The Fogarty Manufacturing company of Dayton, Ohio. This company manufactures signs, name plates, and display stands.

'97 Maurice C. Rypinski is a dealer in Auburn and Reo automobiles in Pasadena.

'05 Charles B. Trowbridge is an Engineer with The Iron Fireman Manufacturing company in Chicago.

'08 Walter W. Willison is President of the American Anagraphic corporation in Long Island City, N. Y.

'09 Henry J. Bargert is doing consulting work for Tanneries at Cincinnati.

'10 Nathan A. Bowers has been made Pacific Coast Editor of the Engineering News-Record.

Joseph V. Davidson is Secretary-Treasurer of Davidson and Company Inc., refrigeration and air conditioning engineers, of Miami, Florida.

'11 David J. Johnson is the Engineering Inspector for the Sanitary District of Chicago.

Thomas D. Maddex, who is with the Central Illinois Public Service Company, was recently transferred to Matton.

George T. Christopher is assistant to the Vice President in charge of Manufacturing of the Packard Motor Car Company of Detroit.

'12 Captain John H. Becque of the U. S. Chemical Warfare Service is stationed at Fort Riley, Kansas.

Warren T. Reddish is Vice President of Emery Industries Inc. in Cincinnati, Ohio.

'13 Hubert B. Deming, who is a Chevrolet dealer, has moved to Orange, California.

'14 Warren F. Turner, who is with Wisconsin Power and Light, has been transferred to Fond du Lac.

'15 Harold R. Woodward has taken a position with the Marathon Oil Company in Wichita, Kansas.

'16 Frederick W. Kingery has taken a position with M. T. Epling, Sand and Gravel Producer, at Gallipolis, Ohio.

'17 Donald B. Weaver, aeronautical engineer, is at Wright Field, Dayton.

'18 Wayne C. Woodling is President and General Manager of Factory Service Inc. at Indianapolis.

Robert P. Long, who is with the Wabash Railway Company, has been transferred to Lafayette, Indiana.

'19 Alvin N. Barnes, who is with York Ice Machinery has been transferred to Brooklyn.

Arthur L. Ervin is connected with the Air Reduction Sales Company of San Francisco.

Lester S. Stinson is Sales Engineer for the Elliott Company of Jeannette, Pa.

'23 J. Russell Snyder, who is with the Kentucky Actuarial Bureau, has been transferred to Paducah.

Clyde G. Raeber is Agent for the Southern and Western Life Insurance Company at South Bend, Indiana.

Jesse L. Tygart is with the Pennsylvania Railroad at Baltimore as inspector on construction work.

'24 John W. Fitterer is Lecturer in Metallurgy at the University of Pittsburgh and Consultant for the Blaw-Knox Company also of Pittsburgh.

'27 Edwin S. Booth plans to open a law office in Chicago on the first of March. He is now in Washington, D. C.

'29 Wayne E. Dodson, who is with General Electric, has been transferred to Cleveland, Ohio.

Ralph Bailey of Ohio Bell was recently transferred from Youngstown to Cleveland.

'30 Harry E. Stock is Associate Structural Engineer in the Treasury Department in Washington, D. C.

Glenn J. Sampson is at the Acme Station of Toledo Edison Company at Toledo, Ohio.

John W. Trueb is Inspector of Catenary Structures for the Pennsylvania Railroad at Baltimore.

'31 John D. Anthony, who is with Carbide and Carbon Chemicals, is Production Engineer at Whiting, Ind.

Stanley H. Davis, who is with General Electric, has been transferred to Philadelphia.

'32 Albert L. Ahlers with C. C. C. is at Wawona, California.

Paul F. Froeb has been teaching Mechanics in night school at Englewood, Chicago, but very recently he accepted a position with Elwell-Parker Electric Company of Cleveland.

Carl Kraemer is Principal of the Oliver School.

John H. Montgomery is with the

Illinois State Highway Division.

Abraham H. Goodman, who is with the American Maize-Products Company, is arranging to enter Chicago University for advanced study in connection with his work.

P. Avard Smith, who is also with Carbide and Carbon Chemicals corporation, has been transferred to Whiting, Indiana.

'33 Edward G. Weinbrecht is Assistant Head of the Induction Motor Section of the General Electric Company in Schenectady.

Edwin J. Withers is now with Inland Steel in East Chicago, Indiana.

Frank Crawford recently accepted a position with the Cadillac Company at Detroit.

Charles Sipple is a research assistant with Sinclair Refining Company at East Chicago.

'34 Frank Mansur is a student engineer with the Anaconda Wire Company of Orange, California.

Marriages

Mr. Virgil Martin was married last December to Miss Margaret Farrington of Universal. Mr. Martin graduated from Rose in 1928 and is now employed in Grove City, Pennsylvania.

Mr. Eugene Scofield of Peoria, Illinois, was also married last December. His wife was formerly Miss Ruth Modesitt of Corey, Indiana. Mr. Scofield graduated from Rose in 1930, and has since been employed by the Illinois highway department.

Mr. John D. Anthony was married January 26, at Paris, Illinois, to Miss Louise Scott. Mr. Anthony graduated from Rose in 1931.

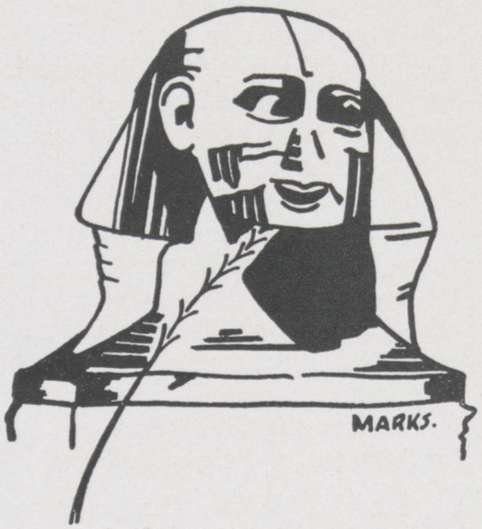
Mr. William H. Hineline of Terre Haute was married in August, 1933 to Miss Leora Branson, also of Terre Haute, but the marriage was kept a secret until last Christmas. Mr. Hineline graduated from Rose in 1932, and is now employed by the Mid-Continent Petroleum corporation.

Deaths

Mr. Robert D. Valentine, pioneer developer of stationary and traction gasoline engines, died December 21, 1934, at Tracy, Minnesota. Mr. Valentine was formerly chief of the mechanical drafting department of Minneapolis Honeywell Heat Regulator Company, with whom he was identified at the time of his death. He graduated from Rose in 1893, and received his post graduate training in engineering at the Westinghouse Electric and Manufacturing Company shops at Pittsburgh, Pa. Mr. Valentine, who has been a resident of Minneapolis 40 years, entered the electrical manufacturing business there with his brother in 1900. Their firm, the Imperial Machine Company, is still engaged in business in northeast Minneapolis. He was active in promoting the development of gasoline engines, the first gasoline propelled fire engines, the overboard motor, and other mechanical inventions. Surviving him are his wife, a son, and three brothers.

Gerald D. Reece, who graduated from Rose in 1933, died at his home in Corey on January 26, after a two weeks illness.

OBNOXIOUS PRECIPITATES



Edited by

Edd A. Coons,
Ch., '37

The poor mathematics sufferers were mired in the bottomless sea of Mr. Hoel's vivid explanation of how to save money (You can see the results of following his training); and so, slightly regusted, he exhorted, "Now watch the board while I run through it again." I guess these Minnesotans are all tough.

Two couples were riding around the countryside late at night. The driver being unfamiliar with the terrain, shouted inquiringly toward the back seat, "Shall I take the next turn?"

A smothered voice from the rear came back with, "No, you tend to the driving."

Doc: "Where shall I vaccinate you?"

Girl: "Oh, anywhere; it's bound to show."

Waiter (while serving soup): "It looks like rain, doesn't it, sir?"

Waitered: "Yes, but it tastes like dishwater."

Have you ever noticed what big feature shoes go on?

Rose certainly is a wonderful place at which to learn. Why only yesterday I learned that damn and Democrat are two different words.

To prove: A ton of coal is a chicken thief.

Proof: 1. A ton of coal is 2000 lbs.

2. 2000 lbs. is a weight.
3. A wait is a short stop.
4. A short-stop is a baseball player.
5. A baseball player is a foul catcher.
6. A foul catcher is a chicken thief.
7. Therefore a ton of coal is a chicken thief.

Conclusion of a typical senior thesis: The floor will generally stop falling hair.

Dedicated to those jokes that didn't pass the Censor. For further information see the Editor.

'Twas in a restaurant that first they met
Our Romeo and Juliet;
And there he first went into debt
For Romeo'd what Juli-et.

"Every knock is a boost," said Hubert as his merry "blimp" pounded noisily up the hill.

Dot: "Did he Russia?"
Not: "No, Jew?"

For Sale—Washing machine in good condition by woman in poor health except for slight warp.

Butler: "Whatcha running a thesis on?"

Shaw: "Concrete engineering."

Butler: "Well, you've got the head for it."

" I want a pair of shoes for this little girl," said the mother.

"Yes, Ma'am," answered the clerk, "French kid?"

"Well, I guess not," was the answer. "She's my own child, sir, born right here in Indiana."

I guess they call a sailboat she because it makes a better showing in a breeze.

Love and sausage are full of mystery.

We could tell you some more jokes but what's the use, you'd only laugh at them.

G-E *Campus News*

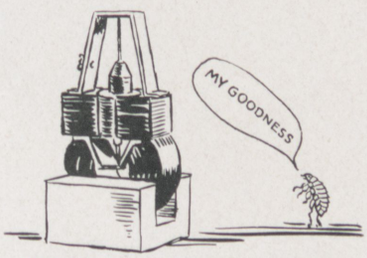
HEATING WITH COLD WATER

Reversible air-conditioning equipment, which may be adapted to either heating or cooling, depending on the season, is now in operation in a new building in Salem, N. J.

Reversing the cycle of the ordinary household refrigerator, the refrigerant absorbs heat from the water of a well which is at least 52 degrees even in coldest weather. This heat is added to that created by the work of the electrically driven compressors, and the refrigerant at 135 degrees gives up the total heat to the air of the building. Thus it is possible for an expenditure in electric energy equivalent to 100 heat units to obtain a total of 300 or 400 units for heating. Physics students will recognize this system as the heat pump.

During the summer, the process is reversed. The heat is absorbed from the air of the building. Then this heat and the heat from the compressors is dissipated in the water from the well, which then can be used for bathing, or washing dishes.

The building is completely equipped for year-round air conditioning. Besides heating and cooling, the equipment automatically controls the humidity, and cleans and circulates the air. The engineering and the planning for the installation were done by engineers of the American Gas and Electric Company and the General Electric Company, and the equipment was built and installed by General Electric.



FLEA-POWER MOTOR

New photoelectric cells, recently developed in the General Electric Research Laboratory, furnish enough energy to operate a tiny electric motor rated at four ten-millionths of a horsepower.

These "cells" differ from photoelectric "tubes" in that the cells convert light energy into electric energy, whereas phototubes do not themselves generate electricity but instead control the amount of current permitted to flow through them according to the amount of light they receive. The cells are of the selenium type, the selenium being coated with a film of platinum so thin as to be semitransparent.

Four of the cells are used to operate the motor, which in direct sunlight turns at about 400 rpm. But enough light energy is converted into electricity, when a 75-watt incandescent lamp is lighted eight inches away from the cells, to turn the motor at good speed, using three ten-thousandths of an ampere. One watt of power can be obtained from about 15 square feet of cell area in direct sunlight.

Dr. C. W. Hewlett, North Carolina State, '06, Ph. D., Johns Hopkins, '12, of the Research Laboratory was in charge of investigations that led to the development of the cells and the tiny motor.

GREEN BLUES

When the G-E "House of Magic" was exhibited at the Franklin Institute in Philadelphia not long ago, the cathode-ray oscillograph was one of the most popular features. This device, as you undoubtedly know, shows the wave shape of any sound, music, speech, or just plain noise—in the form of a moving, pale greenish-blue line on the end of the tube.

Rubinoff, the well-known radio violinist and orchestra leader, came down to see how his violin notes looked in the device. He had only a few moments in between engagements. But he became so interested after watching the gyrations of the dancing green line when he played "Humoresque" that he stayed for half an hour. He played on, and found that his violin produced green notes—even when he played the blues.

R. H. Mighell, U. of Denver, '29, of the G-E Research Laboratory, was in charge of the exhibit.

96-124DH

GENERAL ELECTRIC