Spring 3-1932

# Volume 41 - Issue 6 - March, 1932

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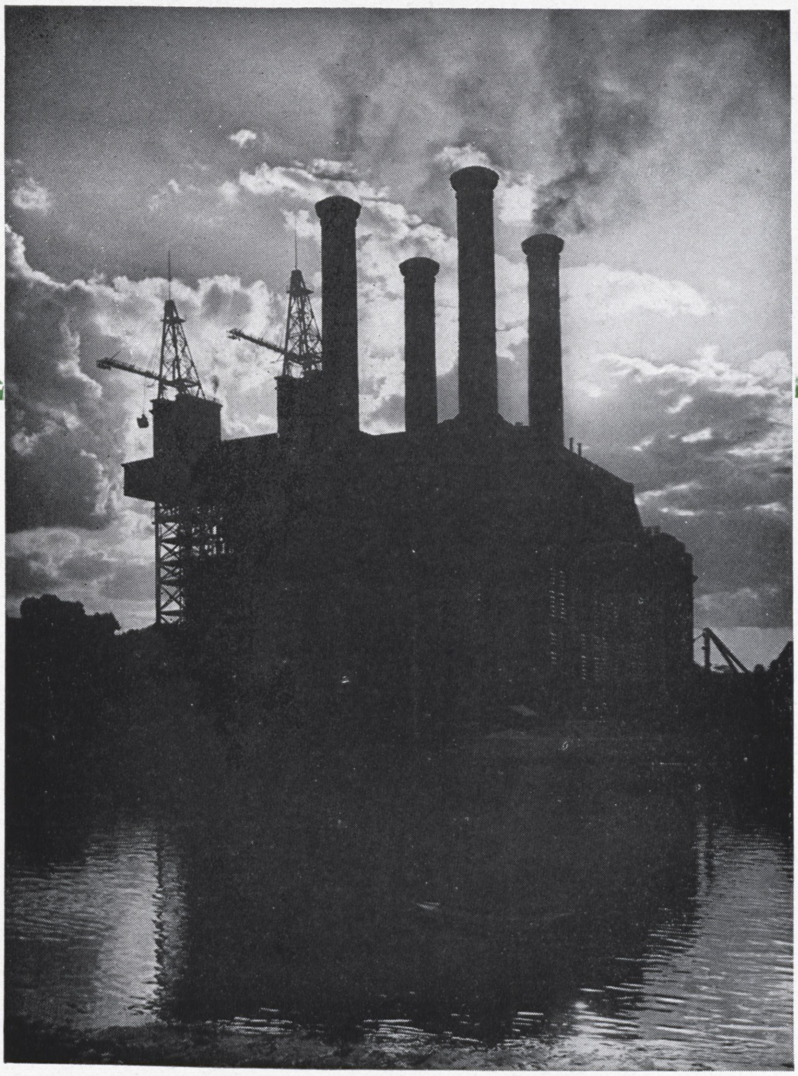
*Rose-Hulman Institute of Technology*



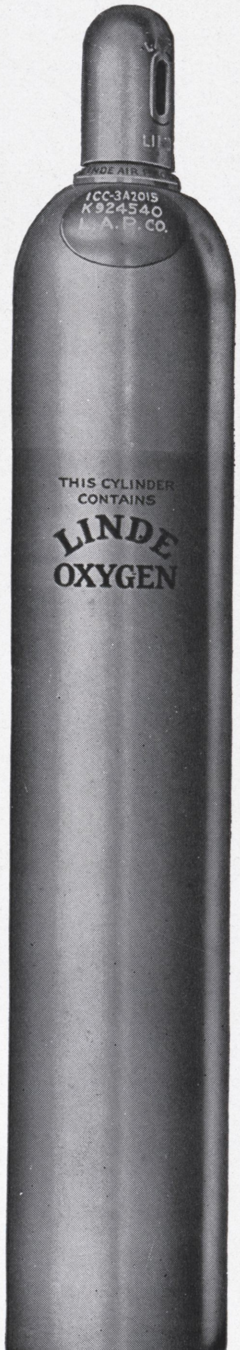
# ROSE TECHNIC

Member
ENGINEERING COLLEGE MAGAZINES
ASSOCIATED
Published by the Students of Rose Polytechnic Institute
Terre Haute, Indiana

MARCH 1932

# In the Mill

# and on the Firing Line

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## From the Editor's Note Book

OUR COVER—A sunset scene of an Eastern power plant.

WITH many new developments entering the highly competitive synthetic chemical field, it is hard indeed to predict the future of any one branch of the chemical industry. The synthetic chemist is continuously at work seeking to produce new products for specialized purposes, or to produce products which can meet competition. In this article P. Arvard Smith, Jr., '32 tells of some of the outstanding features of this new competition among the ranks of chemicals.

BEYOND any reasonable shadow of doubt, it has at last been ascertained, to the satisfaction of all engineers, that St. Pat was an engineer. In an exclusive interview, obtained during St. Pat's last visit to the school, the TECHNIC is able to give its readers an authentic opinion on the matter or something.

WILLIAM H. JUNKER, '21 is the author of the paper on the design of A Sewage Disposal Plant for Lincoln Memorial University. The many problems, both in the design and construction, surmounted in the project form the basis for this very interesting paper.

FACED with a need for more adequate seating facilities in laboratory lecture rooms, the Department of Electrical Engineering has achieved a very striking layout. Prof. Clarence C. Knipmeyer, head of the department, tells of the new lecture room. Sunlight lamps, artificial ventilation, absence of all windows, and many other features are embodied in this new lecture room.

WITH this issue of the TECHNIC, the present Staff will retire. Many of the present members will carry on in various positions on the new staffs. The retiring staff wishes to thank those who have aided in making the publication of this magazine possible.

# THE ROSE TECHNIC

Vol. XLI Number 6

ROSE POLYTECHNIC INSTITUTE · LABOR ET SCIENTIA · 1874

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THE ROSE TECHNIC

THE TECHNICAL JOURNAL OF THE ROSE POLYTECHNIC INSTITUTE

Volume XLI MARCH 1932 Number 6

# Synthetic Organic Chemicals in Competition

By P. Arvard Smith, Jr., ch. '32

ORGANIC chemistry is a branch of the science of comparatively recent development. Its real history began about the year 1830. This statement does not mean that organic compounds were not known prior to that date. Numerous animal and vegetable products, sugar, starch, oils, gums, resins, etc., had been familiar commodities from the earliest times. A knowledge of fermentation and of distillation had produced alcohol, essential oils, turpentine, and acetic acid. Scheele, Lavoisier, and Berthollet, through their investigation and discoveries prior to 1820 laid the foundation for the advance of the science to its present state of development.

Organic materials now produced by the modern synthesis are in heavy competition with each other. It is really a free-for-all battle with "no holds barred." Every commodity is aligned against the others for every type of market. Brothers within any particular scientific family have no hesitancy in striking each other down without warning, in order to obtain new markets. Exclusive markets have become a thing almost unknown in the last few years in this field. Synthetic developments are permeating virtually all branches of industrial practice, even non-chemical industries. A discovery of a new catalyst oftentimes sets in motion a chain of events affecting raw materials, products, processes, and even the earnings of well-established groups.

## Solvent Competition

Solvents were the first conspicuous commodities to enter the lists seeking the favor of the fair lady Profit. This fickle dame has cast smiling glances at first one and then another of the synthetics. In this day and age, one solvent will hardly become established when along comes another to monopolize the attention by offering some new, hitherto unavailable favor.

At first the mere ability to dissolve a substance was regarded as a determining factor in the acceptability of a chemical as a solvent. This property, though now not neglected, is overshadowed in importance by many other considerations. The solvent must not only dissolve the desired wax, lacquer, or other industrial material; it must release the dissolved substance at exactly the desired rate, depending upon the use to which the dissolved substance is to be put. The user will ask also as to the viscosity, the resistance to hydrolysis, the corrosive action, the solvent or destructive action on other substances, including containers and conveying materials. The purchaser is so fussy as to set up a whole list of conditions which the solvent maker must now meet if he is to retain a hold on his market.

## Lacquer Field

In the field of lacquers, we have low boilers, medium boilers, and high boilers, defined so largely by the shape and position of their vaportension curves and rates of evaporation at the temperatures customary for lacquer application. For a solvent of each group one has to choose from the alcohol, the ketone, and the ester type of solvent, and more recently a new group has been added composed of synthetics which combine alcohol and ester or ketone and ester characteristics and favorable behavior. The earliest of these "combination type" solvents was ethylene glycol monoethyl ether, marketed as cellosolve. This lacquer solvent had a tendency to produce a faint blush under high-humidity conditions of exposure; its makers then advanced to modified forms, including acetate derivatives and others, retaining as fully as possible the original advantages and eliminating the undesirable color or "bloom".

In many cases solvents for lacquer and similar uses are modified by mixture with a cheaper solvent, such as alcohol or toluene, and other organic acetates. The maximum of effectiveness, an approach to ideal performance with a minimum of cost, is being attained. This situation shows that no one of these commodities has anything like a dominating position in the lacquer field. There is not likely to be any outstanding chemical in this or in like application, because of the wide variety of formulas that the ingenious makers of surfacing materials and large users of these commodities are constantly developing.

Everyone is familiar with the vapors connected with a chemical industry, even noticed in any chemical laboratory. The use of benzol in industry has long been hampered by the toxicity of its vapors. The makers of new products thoroughly study the physiological effect of their new products before they are extensively marketed, therefore protecting the employee personnel of user companies. These studies have led to new products being introduced in place of some old standbys. For example, ethylene dichloride and trichlorethane are much more resistant to hydrolysis than carbon tetrachloride and may often be very successfully substituted either wholly or in part for the older compound. The advantage of freedom from corrosion due to hydrochloric acid formed by hydrolysis has been an added incentive to users to make this substitution, since newer synthetics are wholly resistant to such decomposition under ordinary conditions of use in the presence of water or steam. In some cases the slightly preferable odor of the dichloride offers an additional advantage.

## What Toxicity Caused

This matter of toxicity has reached its climax in the controversy as to the qualities of methyl and ethyl alcohols. Anti-freeze applications of chemicals demand consideration of a variety of properties; the lowering of the freezing point of the water must be sufficient. Methyl alcohol, when mixed pound for pound, will produce the lowest freezing point of any anti-freeze used in practice today. Ethylene glycol is a close second, ethyl alcohol, and glycerine about tied for third place. Methanol-water mixtures will give a greater degree of protection against freezing, the vapor loss of methanol-water mixtures giving like protection. Evaporation of a methanol-water mixture is less rapid than of ethanol if mixtures are used giving like protection; this is possible even though the boiling point of the methanol mixture is lower.

● **MANY new and useful synthetic organic chemicals are being discovered every day. It is through these discoveries that the chemical industries have been able to branch out into new fields. The older, natural organic products are finding a new competition.**

Non-evaporating, anti-freeze compound advantages have been widely advertised by the glycol and glycerine people so we will not go into these details. It has been widely advertised that these two chemicals are safer to use if spilled upon a lacquer-finished car, and there is less danger from vapors of overheated radiators damaging the lacquered surfaces than with either of the two alcohols.

In the battle among the four anti-freeze compounds, it is safe to say that the highest priced one, glycol, stands a good chance for maintaining itself in competition because it can be used the year around, giving greater cooling per unit of surface of radiator. The United States Navy has been using it in the Navy aeroplanes to lower the area of its radiator, thus giving greater speeds.

## The Catalyst

A few years ago when one spoke of a catalyst the first thought was of platinum or palladium. Today these precious metals, while still used by the chemical engineer, compete with newer types of catalysts that are more common to industry. Hydrogen making, by the reaction between carbon monoxide and steam, is but one successful development which lies at the root of a new type of organic synthesis. Methanol, one of the first products of such reactions, is made synthetically by direct combination of hydrogen and carbon monoxide and has progressed so far that the "wood alcohol" industry cannot economically come back to do business.

Many like reactions, combining hydrogen, water vapor, carbon monoxide, carbon dioxide, in almost any desired proportion can be accomplished for the production of a wide variety of other synthetics. Satisfactory selective catalysts are not available for all of the reactions or processes. Several developments are now in the making and the new processes of direct combination type will make it rather difficult for the indirect synthesis to remain successful for long, unless the raw material be

very cheap or the process highly efficient.

## High-Pressure Technology

High-pressure technology and catalyst reaction control of direct ammonia synthesis has been responsible for the opening of this new field. It is not unlikely that the natural and indirect sources of manufacture, which are now experiencing vigorous competition from direct synthetic ammonia, will suffer a like attack and in like manner pass from dominating position in the case of many other commodities.

## Comparison of Compounds

Such a comparison as this between methanol and synthetic ammonia leads to an interesting observation as to cost of production. The cost of raw materials, the cost of the catalyst, and the capital charges on equipment required are not very different in the case of methanol made synthetically from those in the case of ammonia similarly produced. Synthetic ammonia can be produced in a well-managed and efficient large-scale plant for a factory cost of something like 3 cents per pound, not including selling expense and profits.

Suppose that methanol could be made and marketed on an analogous basis. This chemical would enter the competition situation on a factory cost basis of from 20 to 25 cents per gallon. Carrying this arithmetic procedure to other synthetic chemicals we get equally startling suggestions regarding the prospective cost of some other products that may appear on the market as a result of commercialization of direct addition procedures.

The ethyl alcohol field is perhaps the best illustration of process competition. Fermentation processes today still dominate the field. Today one cannot limit his consideration to molasses and corn. The advance in price of corn during the past year promptly led the largest manufacturer of fermentation products using the raw material to announce that its processes were adaptable to rye, and that this cheaper grain would be used extensively if the price of corn advanced unduly. Europe uses a variety of agricultural raw materials, particularly potatoes in Germany, is officially encouraged through the requirement that motor fuel must include percentage of alcohol. That is the Continental method of solving farm relief.

The United States uses molasses as its major raw material. The cost of molasses is far from being a fixed thing. Unpredictable swings in molasses price have made the financial condition of the fermentation industry most difficult. At 4 or 5 cents per gallon of molasses delivered at the Eastern or Gulf seaboard ports, this industry can probably make alcohol for just about the figure suggested in an earlier paragraph as the probable cost of methanol. Therefore, since these two related alcohols are highly competitive, it seems that molasses must maintain a low figure or the fermentation division of the alcohol business is going to suffer from synthetic competition as the wood distillation business has suffered. The major factor in this fermentation industry is the sugar manufacturer. Will he be willing to cooperate to give a low priced molasses?

## Denatured Alcohol

An article upon synthetic organic compounds would not be complete without a paragraph upon the subject of denaturing of alcohol. Strangely enough, in this field of denaturant making the synthetic products apparently have lost out to other commodities. Methanol in the form of genuine wood alcohol was recognized as a denaturant but synthetic methanol was not permitted. This latter product, by its very purity, from noticeable odor, and taste characteristic of the wood product did not carry with it its own flag of warning. Federal authorities on this account have never accepted synthetic methanol as a satisfactory denaturant. Wood alcohol has even now lost its place as a denaturant in favor of a new formula using a special odorous petroleum product. The noxious odor and foul taste are intended to make the denatured goods self-warning to those who might be tempted to divert them from legitimate channels. Here an incidental byproduct of the petroleum industry enters in a competitive way and completely supplants methanol.

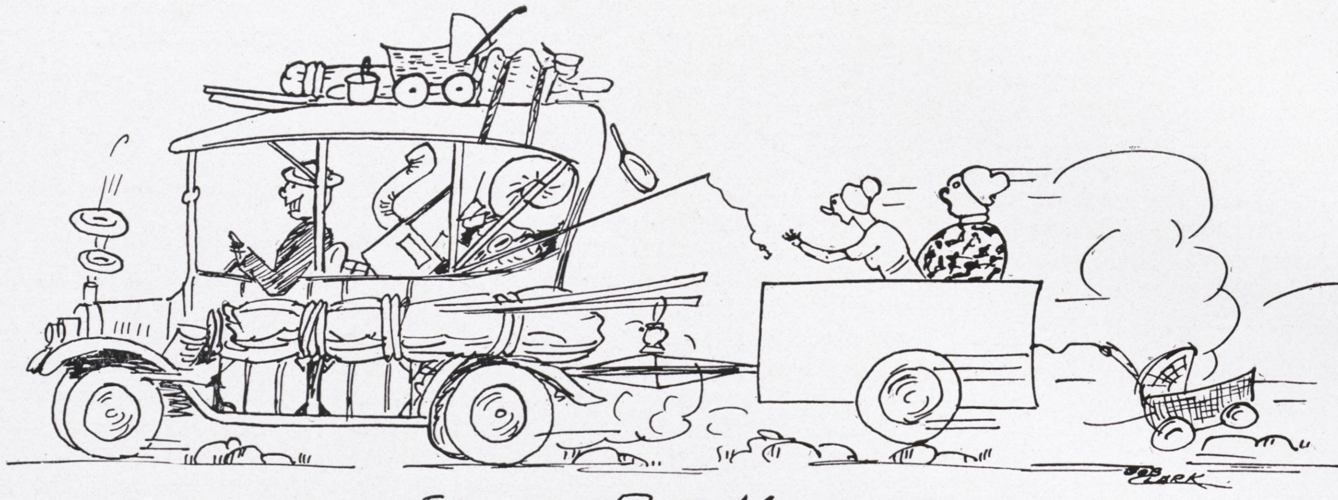
Raw materials of unlimited supply are essential components of most synthetic processes. The material used in synthetic products depends upon the price. One can see how the molasses price affected the market price of ethyl alcohol, thus controlling its competitive power.

The availability of a by-product furnishes in some unrelated industry a new raw material of highly competitive form. The gas man's desire to lower the oxygen content of natural gas, to prevent corrosion of pipe lines, has led to the making of methanol and formaldehyde from natural gas.

## Conclusion

In this short article it is impossible to cover all the cases and types of competition in the organic synthesis field. One can see that the best research skill and plant management must be obtained to remain in business today. Business today is not necessarily business of tomorrow.

# St. Pat Visits Rose



SAINT PAT MUST HAVE BEEN AN ENGINEER!

AS HAS been his custom for some years, St. Michael Aloysius Patrick Doheny visited the Institute on March 16. He arrived in Terre Haute very early in the morning and immediately upon alighting from his train, asked the Technic reporter who met him, for directions to the nearest wild animal with defective vision. "I must be in condition to consort wid the byes tymorrie," said the congenial old boy, "and as well ye know, it takes a lot o' doin' t' make a good Oirishmon feel in true celebratin' form." So the reporter took him down to Seventh and Main as he asked.

## Makes the Rounds

After Pat had been oiled (he insisted that the reporter call him Pat, and sure it would have seemd quare to call sich a fine ould boy Mister. Faith and he's got me talkin' in his brogue now. We took him out to school and he started to make the rounds of his old friends. His first visit was to Prentie.

"Hi there, Donnie, ould bye," shouted Pat as he ambled through the door of the office. "Sure and its glad I am to see you in that chair young feller, me lad. Ye're the mon fer it and no mistake."

The reporter was "called away" here, it being born in on him that it was not for him to witness such a meeting, where Prexy was taken so far from his dignity. When Pat came out of the office, though, his face was beaming in a way that made it quite apparent that he hadn't been snubbed. The reporter decided that Prentie wasn't such a bad scout after all.

Next Pat went across the hall to "see Mary and Ben". This time the reporter discreetly remained outside the door, but from the modulation of the old boy's tones, he decided that Pat was a bit less jovial with the newer of his friends.

In the logical order of events, Pat went next into the library with a jovial shout of "Hello, Faurot, you youngster. What d'ye mean by hidin' out on me this way? Come out here once 'till I wring the hand off ye." Honest, fellows you'd never have known your Nemesis. The way he thawed out —. Well, the reporter had a hard time himself believing his eyes, and when the staid Professor actually told a story that made the old Saint almost tear down the building with his roar of laughter, the reporter decided that he must have taken on too much lubrication himself. That last simply wasn't possible.

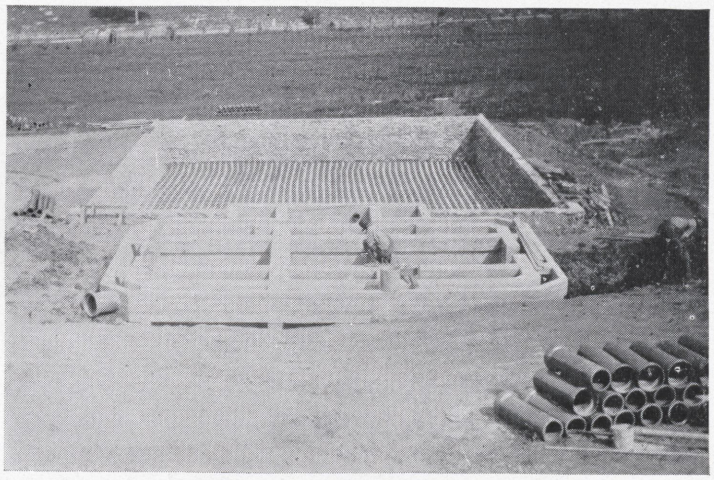
## Wischy Complimented

In a few moments Professor Wischmeyer wandered into the library. St. Pat's whole manner changed as Professor Faurot introduced him. His brogue disappeared, and in the best English he congratulated Mr. Wischmeyer on his position in the Institute. "I hear that President Prentice finds you invaluable aid in the administration of school affairs,' 'he said. "In fact, the President told me that it would be absolutely impossible for him to conduct the assemblies were it not for you." Professor Wischmeyer accepted the compliment with a modest smile, making no comments. "I have nothing to say for publication," he told the reporter.

From this stop, the Saint ambled on down the runway, complaining good naturedly about the necessity for climbing the steps.

On the runway we met several of the Profs., and nothing would do but that we must stop while Pat passed a little good-natured

(Continued on Page 26)



View of the Imhoff Tank.

THE ARCHITECT of today has evolved from the long haired peculiar sort of man who groped over a drafting board, under a single drop-cord lamp, into a balanced organization of executives, artists, designers, structural, mechanical, and electrical engineers, draftsmen, expert accountants, field superintendents, etc., capable of executing in their entirety the construction of widely diversified projects.

Mr. Junker is a member of the staff of of Harry Hake, Architect, Cincinnati.

# A Sewage Disposal Plant for Lincoln Memorial University

By W. H. Junker, '21

★

THE Lincoln Memorial University is located about three miles south of the historically famous Cumberland Gap, where the states of Kentucky, Virginia and Tennessee use a common bench mark. The population of the campus is about 450 including faculty, students and workers in residence. Water is supplied to the premises through a six inch underground main from a cave under Cumberland Gap, terminating with an average static head pressure on the campus of sixty pounds. The supply is abundant and no special precaution is taken for its conservation except during occasional extreme dry spells during the summer months.

Several of the older buildings were originally a part of an enterprising resort hotel and the sewage system at that time consisted of a septic cistern which no doubt discharged into a pond nearby. However, upon investigation, it was found that this cistern was by-passed and all sewage from the university was emptying directly into the pond without any treatment. The pond had no apparent outlet except through sink-holes to sub-surface channels. Due to possible contamination of sub-soil water supply of the rural folk in the near vicinity, it was necessary to adopt other means of sewage disposal.

After making a careful study of the existing conditions, the problem of maintenance and the convenient source of supply of construction materials, it was decided that an Imhoff tank and sprinkling filters were the best suited and most economical for this institution. The disposal plant is located about 2500 feet south of the campus and receives sewage from all the buildings located thereon, through a new 12 inch main sanitary sewer. This direction is the natural drainage outlet from the campus and the effluent of the filters discharge into a small drainage canal and is carried to a point about one-half mile south where it disappears into a subterranean passage. It must be remembered that there is no stream of any nature available in the vicinity which could be used for sewage disposal.

## Capacity of Plant

Although the present population is 450, the ultimate expected is 1500 and it was thought advisable to design the plant for a population of 1000 people. Since there was no means of checking the flow of water it was assumed that not less than 60 gallons per capita per day would be used, giving a total sewage flow of 60,000 gallons per day, which would be concentrated during a period of 16 hours.

## The Imhoff Tank

The fundamental principle of the Imhoff tank is to pass raw sewage through a sedimentation chamber as quickly as possible consistent with the time required for the settling of a large portion of the solids therefrom, and preventing the gases emitted from the solids during digestion from coming into contact with the raw sew-

age. This principle, of course, requires a two-story chamber arrangement and the flow through the upper chamber should be quiescent and the average detention period not greater than two hours, thereby preventing the sewage from becoming stale or septic. The settling solids fall into the lower compartment through slots in the bottom of the sedimentation chamber, and the slot construction is such that the gases which are emitted from the settled solids or sludge during biological decomposition, do not pass through the raw sewage.

The tank is circumvented with a a flow channel provided with a combination of sluice gates so arranged as to cause the influent to enter either end and the effluent to discharge at the opposite end. The direction of flow is reversed monthly to avoid overcharging of one hopper.

The sedimentation chamber is 7 feet wide, 7 feet deep and 24 feet long with the bottom sides sloping in the ratio of 1.25 to 1.00, which permits the solids to settle into the lower chambers without difficulty. A triangular beam is constructed at the open bottom of the settling chamber to provide 6 inch wide slots with the sloping side walls of the upper chamber, thereby preventing the escape of gases from the lower chamber from entering the upper or flow through chamber. The capacity of the upper or settling chamber is approximately 1000 cubic feet, derived from the following data.

Population served ........1000 people
Sewage flow per capita per day...60 gal.
Period of sewage flow per day...16 hours
Detention period in flow through chamber ..................2 hours
Capacity of settling chamber=

$$=\frac{1000\text{x}60\text{x}2}{16\text{x}7.5}=1000 \text{ cu. ft.}$$

The average velocity of the sewage through the sedimentation chamber is 12.5 feet per hour which is considered exceptionally low although this rate becomes much higher during peak periods.

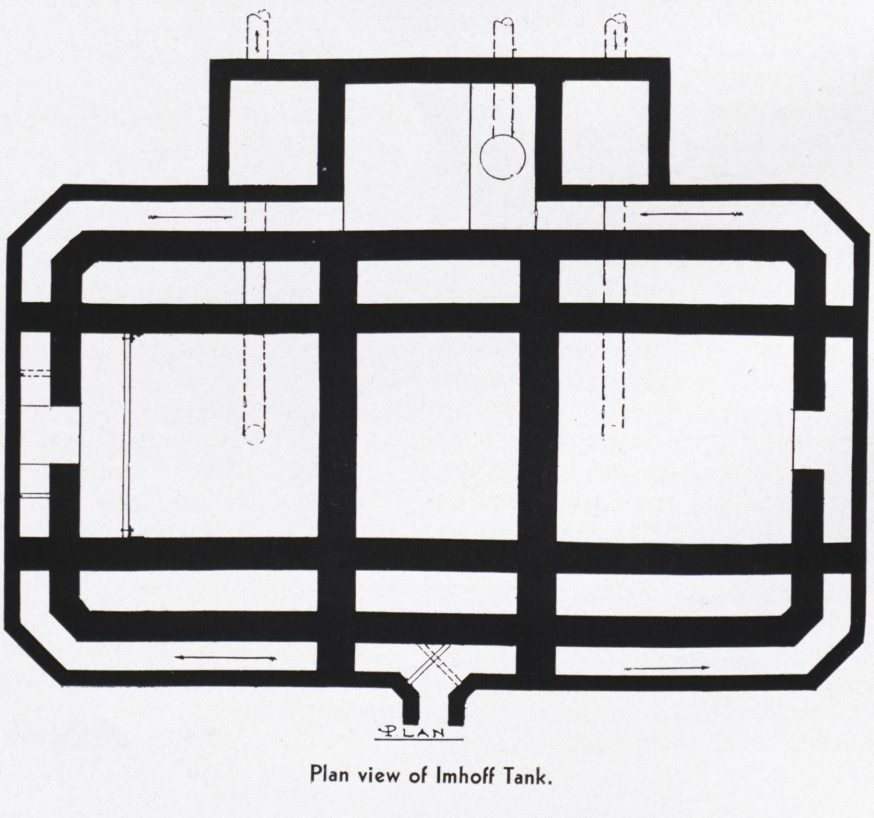
The sludge hoppers are two inverted pyramids with 45 degree sloping sides and 9.5 feet deep from the under side of the "baffle beam" to the bottom. The combined capacity of both hoppers is approximately 1400 cubic feet to within a foot of the underside of the beam. The volume of sludge space based upon an 80% moisture content is assumed at 5.25 cubic feet per day per thousand population. The period of detention is 180 days or in other words, the sludge is drawn off semi-annually.

Required storage capacity= $5.25\times1.0\times180=945$ cu. ft. Although the capacity of the sludge hoppers is 50% in excess of the calculated requirements, this permits the withdrawal of sludge at greater intervals, which may be desirable due to unfavorable climatic conditions at the regular date of removal.

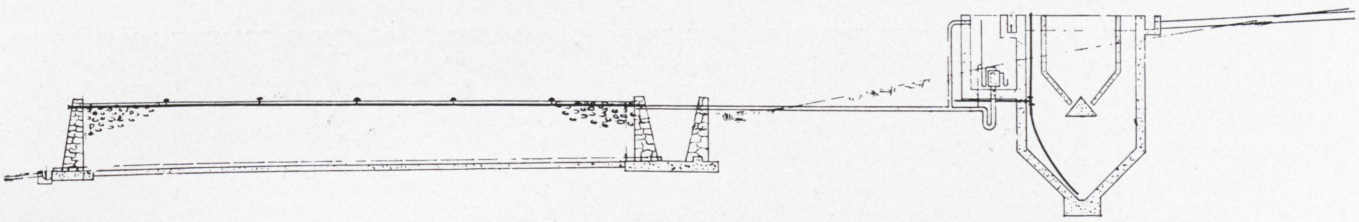
The gas vents are 56.8 sq. ft. net horizontal area, which is 20% of the total area of the sludge hoppers. The vents are 22″ wide thereby permitting access to the hoppers and extend 18″ above the sewage flow line which prevents the scum from overflowing into the flow channels and sedimentation chamber. The scum has a tendency to raise a foot or more above the level of the sewage on account of its lesser specific gravity and also due to the ebullition of gases from the sludge chambers. An 8″ drawoff pipe extends to the bottom of each hopper and the flow is controlled by gate valves located in compartments adjacent to the dosing chamber. The hydrostatic head causes the sludge to be ejected to the drying basin when the valves are opened. In order to effect a thorough cleaning of the sludge hoppers, a 1½″ diameter brass flushing pipe with 5/32″ holes on 12″ centers facing down is provided at the four upper edges of the hoppers. Water under pressure is applied to this pipe during the period of sludge removal.

## The Dosing Tank

The dosing tank is adjacent to and an integral part of the Imhoff tank. The sewage flows into this tank after leaving the sedimentation chamber and is provided with an intermittent acting air-lock automatic siphon, controlling the discharge to the filtering bed. The bottom of the tank is sloped to proportionally reduce the volume as the head pressure falls off during discharge. This arrangement accomplishes a uniform distribution of sewage from the spray nozzles over the surface of the filtering bed, between maximum and minimum heads.




Plan view of Imhoff Tank.



Cross section of Sewage Disposal Plant.

The active volume of the dosing tank is 145 cu. ft., requiring 16.5 minutes to fill under normal flow and 3.5 minutes to empty, resulting in a 20 minute cycle.

## The Trickling Filter

The purpose of the trickling filter is to subject the settled sewage to large exposed surfaces where aerobic action may take place. Although the removal of bacteria in this type of filter is not as great as the intermittent sand filter, the construction and maintenance costs are much lower. The filter is 54x60x7 feet average depth filled with broken stone varying from 1½ to 2½ inches in size and offering a large contact area. The active area (85% of the total) of the filter bed is .06 acres resulting in the rate of 1,000,000 gallons per day or 89 gallons per cubic yard per day. The filter bed is underdrained with 6″ half round slotted tile laid on 12″ centers. These tiles can be rodded or flushed from the flushing chamber at one end for which water is piped to this channel.

The sewage is sprayed over the bed from a number of fixed nozzles through a distribution system of piping immediately below the surface and connected to the automatic siphon through a 6″ pipe. A full sized by-pass is provided to divert the settled sewage from the dosing tank directly into the drainage ditch in event repairs are necessary to the distribution system. Cast iron pipe for permanence is used in the distribution system. The use of steel or wrought iron pipe was not considered desirable under conditions of alternate wetting and drying.

## The Sludge Drying Basin

Sludge is discharged from the tanks semi-annually on an underdrained bed where it is allowed to dry by contact with the atmosphere. The day of sludge removal depends on the temperature, direction of wind, and relative humidity, all of which must be favorable. The drying bed contains 900 cubic feet and with an average depth of 12″ provides .9 sq. ft. per capita. Due to the difference in elevations of the Imhoff tank and the drying bed, the sludge is removed by gravity.

## Acknowledgment

The Department of Public Health of the State of Tennessee approved the working drawings of this project and the author is deeply indebted to Mr. Roy J. Morton, Associate Sanitary Engineer of that department for his assistance and constructive criticism during the progress of design. Valuable information was provided by Mr. C. P. Williams, Business Manager of the University, who furnished surveys, levels and soil data for the construction of the sewage disposal plant and sewer system. The construction of this entire project was done principally by student labor under the supervision of Mr. Williams and his associates.

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## Flue Gas Analysis

A mechanical chemist analyzes flue gas uses no test-tubes and no chemistry, and does the work more quickly and more efficiently than could a man. This robot analyses flue gas for carbon-dioxide, reporting constantly to the fireman just how efficiently the boiler is operating.

The instrument operates on the principle that the specific weight of flue gas increases in proportion to its carbon dioxide content, carbon dioxide being about 50 percent heavier than the other constituents of flue gas. The instrument contains two chambers, the upper an air chamber and the lower a gas chamber. Gas to be analyzed passes continually through the gas chamber. A motor-driven impeller rotates at one end of the gas chamber, imparting a whirling motion to the gas, which transmits a turning motion to an impulse wheel at the other end of the gas chamber. The extent of this imparted rotation is proportional to the percentage of carbon dioxide in the gas.

Exactly the same thing happens in the air chamber, except that it contains air instead of gas, and the impeller is driven in the opposite direction. The two impulse wheels therefore tend to rotate in opposite directions, but they cannot rotate because they are coupled together by means of two levers and a connecting link. This coupling system prevents complete rotation of the impulse wheels, but the difference in the two opposing torques causes a limited movement of the system which is transmitted to a pointer which travels over a scale calibrated in terms of $CO_2$ content of flue gas. At the same time, a clear continuous record of the results is made on a circular 24-hour chart eight inches in diameter.

The use of the air chamber eliminates the influence of changes in impeller speed, temperature, humidity, and atmospheric pressure.

—Scientific American.

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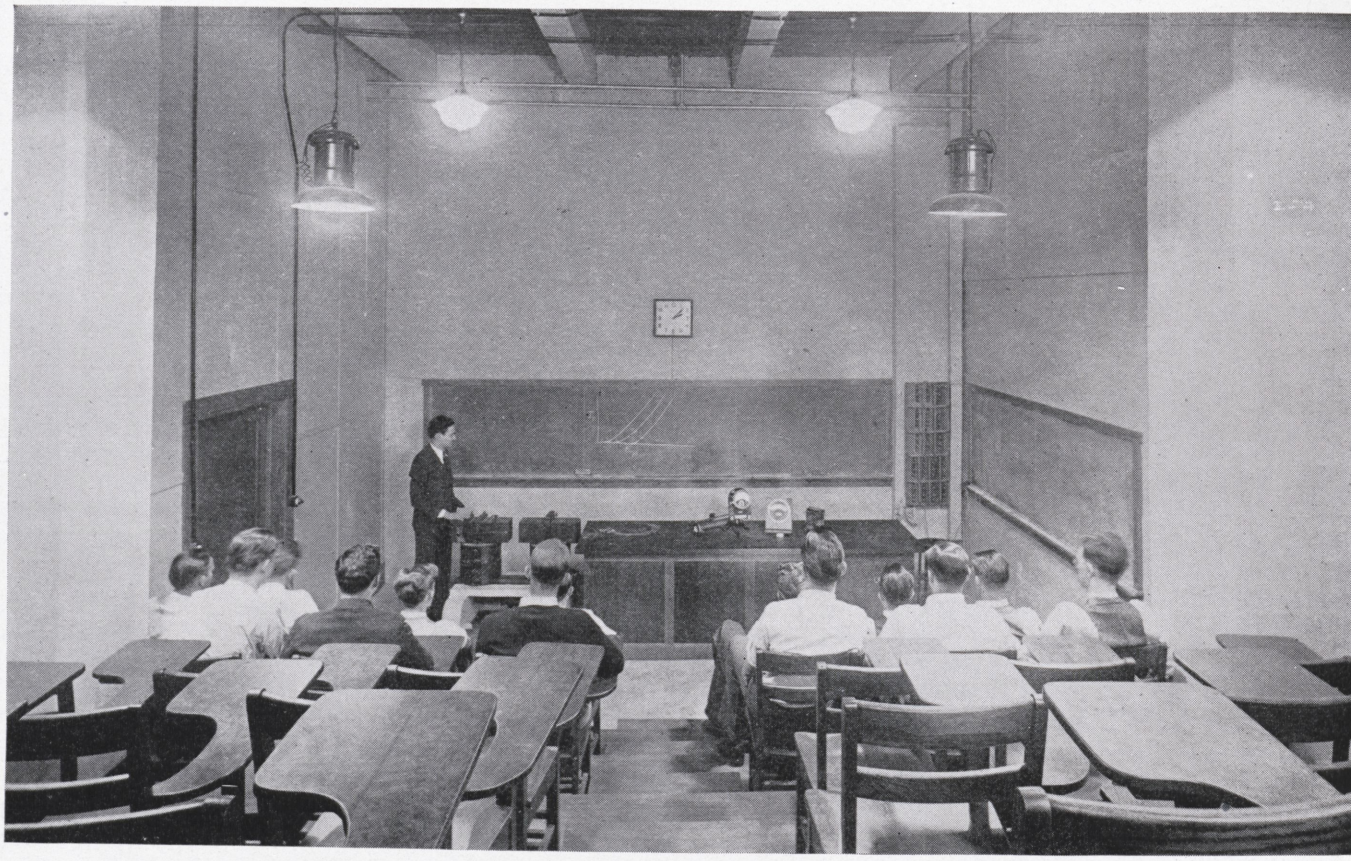
He: Say, I've got a girl that's only been kissed by two parties.

Also he: Yeah? I know that kind, by the Republicans and Democrats.



The new Electrical Engineering Lecture Room.

# A Lecture Room Problem

By Prof. C. C. Knipmeyer
of the
Department of Electrical
Engineering

THE Electrical Engineering Department of Rose Polytechnic Institute needed a lecture and demonstration room. It was necessary not only that this lecture room be near the Electrical Engineering Laboratory but also that equipment from the laboratory could readily be moved to the lecture room table and back again. Space for such a lecture room on the laboratory level was definitely not available and there was no floor above. The basement, then, offered the only solution. Space here was, for the most part, an excavation with a concrete retaining wall at the back and side walls also of concrete. Only the outer or front wall had windows.

It was decided that the rear half of this basement would provide for a sufficiently large lecture room and would allow an easy entrance from a landing in the basement stairway. Morever it was so situated that the natural location for the lecture table would place an overhead trap door in a very satisfactory position in the laboratory floor for lowering equipment on to the lecture table.

## Lighting and Ventilation

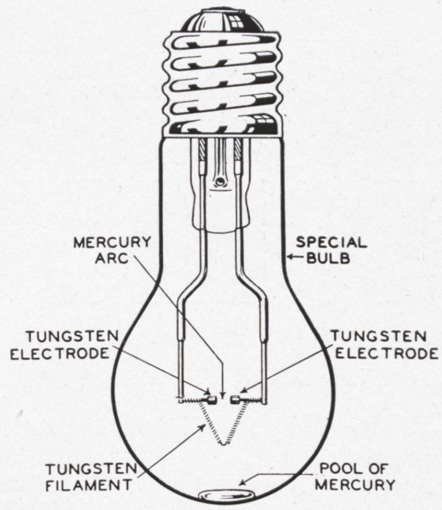
To partition off this part of the basement as a lecture room meant the shutting out of all natural light and the shutting off of all natural ventilation. Apparently this was a sorry prospect. The considerable height of the ceiling, twenty feet, seemed the one favorable feature, yet the reaction to this might to some only have suggested greater depth to a dungeon instead of greater height to a lecture room ceiling.

Windows are primarily intended to give ventilation and light. To this fact all will promptly agree. That they do not perfectly serve these purposes will also be accepted as a fact. To say that they are so poor a makeshift as to warrant their elimination might call forth some challenge. As ventilators, windows let in uncertain amounts of air in wrong places. The air movement is concentrated in spots producing harmful drafts and its temperature at entrance is not controllable. When it is considered that proper ventilation can only be accomplished by having a definitely controlled volume of air of definitely controlled temperature moving at a uniform slow speed throughout the entire room giving a complete change of air in from five to ten minutes, it must be that windows for ventilation purposes are indeed makeshift.

## Variation in Natural Light Intensity

The light furnished by windows depends upon the intensity of illumination out of doors. This illumination varies from zero on a cloudy moonless night to 20,000 foot-candles on a sunny day with freshly fallen snow on the ground; a foot-candle being the intensity of light from a standard candle at a distance of one foot. At noon on a bright June day the intensity is about 10,000 foot-candles and on a cloudy June day often less than 3,000 foot-candles. At noon on a bright December day the intensity is less than 4,000 foot-candles and on a cloudy December day often much less than 1,000 foot-candles. It should be remembered, too, that June daylight lasts nearly twice as long as December daylight.

To tolerate this wide divergence of illumination intensity by windows is bad enough, but in addition to having the light come into a room from the side, making shadow and glare, instead of from above is adding insult to injury or, perhaps better said, injury to insult. There are indeed just two reasons why we can tolerate window illumination. One is that in the average room there is enough

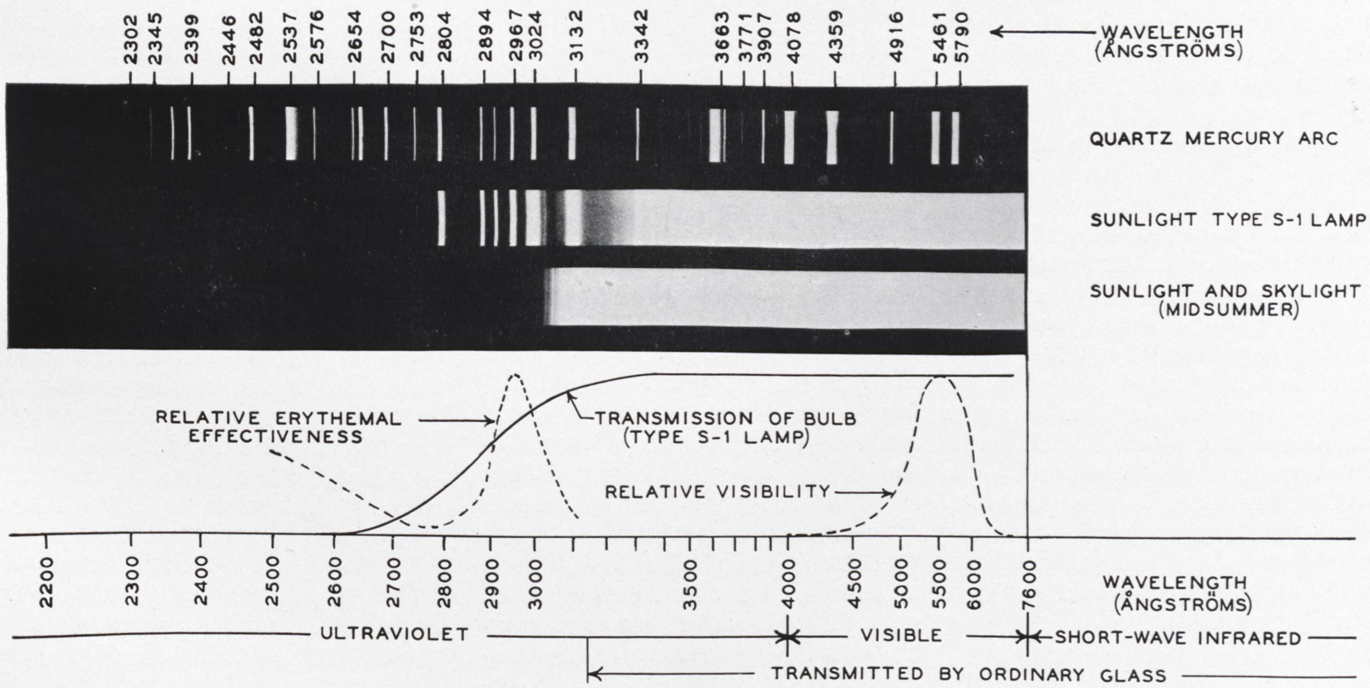



**The argon filled (Type S-1) Sunlight Lamp.**

reflection and diffusion that, the light, in spite of its coming in only from the side, becomes fairly well scattered throughout the room. The other reason is because of the truly marvelous adaptability of the eye to a wide range of light intensities. This adaptability of the eye will be appreciated when it is understood that full moonlight is less than one-half millionth as intense as bright sunlight, yet it is possible, though of course not easy, to read by either.

With these thoughts in mind as well as some others yet to be mentioned, the lack of windows for our basement lecture room produced no discouragement. The seats were planned in tiers, as they should be in a good lecture room, so that a good view of the lecture and demonstration table could be had from every chair. These tiers naturally resulted in the formation of an enclosed chamber underneath, which was easily made air tight so that it could be used as a plenum chamber. In the ceiling of the basement outside the lecture room was mounted a one-third hoursepower motor and fan capable of delivering 1100 cubic feet of air at one-quarter inch water gauge pressure. This fan receives air through conveniently arranged dampers, either directly from out of doors or through a steam radiator, and delivers this air to the plenum chamber. Some seventy-five holes, each one and one-quarter inches in diameter, located in the vertical sides of the tiers allow the air, controlled in amount and temperature, to filter into the lecture room evenly into all parts and without draft. The exhausted air is allowed to go into the large laboratory above. By various combinations of open and closed lecture room doors on stair landing and into basement proper, various air movements and temperatures can be effected. Thus the ventilation and heating prob-

(Continued on Page 25)




**The spectrum of midsummer sunlight extends almost to λ2900, but the energy diminishes so rapidly beyond λ3000 that this portion the spectrogram is lost in reproduction. The spectra of radiation from the quartz mercury arc and from the Sunlight (S-1) lamp with a thin Corex D bulb are also shown. There are two important spectral regions in artificial sunlight for general use—the biologically-active radiation (chiefly λ2800 to λ3100) and the visible radiation (λ3900 to λ7600).**

Diagram Courtesy Lighting Research Laboratory.

Published Monthly by the Students of Rose Polytechnic Institute

# The Rose TECHNIC

A Magazine Pertaining to Engineering and Allied Sciences

*Member of Engineering College Magazines Associated*



WARM weather is approaching and with it the possibilities of tennis competition. With our new concrete tennis courts, which are available for play so much earlier than the best clay courts, some sort of organized tennis seems desirable. Perhaps a tennis team and intercollegiate competition are a little too much to expect for a year or two, but school and class tournaments offer a great deal of valuable competition, which must be provided if any good players are to be developed. It is useless to postpone competition until we have a few champions enrolled, the only way is to develop them. Judging from the numbers using the courts last fall it is evident that quantity is not lacking even if quality does seem to be somewhat deficient. These men will not improve a great deal if they do nothing but play among themselves without making an effort to play a better game. Nothing is more stimulating to good play than having some end in view, such as winning a cup or making a team.

Tennis should offer as much attraction as the rifle team or even the major sports of football and basketball, and, as its season will not conflict with any of these, it should be carefully considered. As a sport along with golf it is of greater value after graduating than other collegiate forms of athletics and as valuable exercise for many who do not participate in the heavier forms, it merits attention.

## The Autogiro

It is certainly a far cry from the frail craft of the Wright brothers to a modern multi-motored cabin airplane, but in fundamental principle there is little difference. Aviation has succeeded in refining the auxiliaries, adding new accessories and improvements, but the lifting principle is almost unchanged. This principle has several basic drawbacks, probably the greatest of which is the high speed required.

Therefore, a great deal of discussion and interest was aroused with the introduction a few years ago of the autogiro, along with a multitude of doubts and questions. For a long time this plane was confused with the helicopter, which had so often failed to be satisfactory, and it was not realized that this was radically different. Demonstrations and repeated successful proofs of its practicability have finally established a position for the autogiro. Its very low speed, ease of handling, lack of tendency to stall, and stability in the air have given it a great deal of popularity and it now appears to have a tremendous future.

A very apt analogy might be drawn from the train and automobile. Rail transportation was a very important invention, but popular transportation was not begun till the advent of the automobile. Locomotives require trained men to drive them, represent a huge investment, and in all ways are undesirable for the average man to use. The automobile, on the other hand, can be driven by anyone in a short time, is a great deal more convenient and economical, in short makes personal transportation possible for the public.

The autogiro does exactly the same thing for air transportation. Large planes of the ordinary type have their place for long passenger lines, mail and rapid freight delivery, but seem to have little use for a business man for going to and from work, or for the housewife to use for shopping, whereas the autogiro makes these and all other types of business and pleasure flying possible. Simplicity of design and mechanism keeps the price below that of other types of planes, and "lizzie" flying seems at last possible.

## Electives

The student response to the several new elective courses offered this year at Rose has been a very good indication of the need of more in the past. All the classes are well filled, some almost too large. A small school is usually at a great disadvantage in attempting to offer electives, because of lack of competent instructors and the few students interested. For this reason the course is much more prescribed and less flexible than that offered at a large university. This year has been a great step in overcoming this condition.

Students often have the attitude that it is foolish to overburden themselves with courses not required for graduation. They think with horror of taking twenty or twenty-one hours of work. These are the students whose objective is to obtain their degree with the least possible amount of effort, and then through some magical process receive an offer for a job, after which they can forget everything they have learned and relax for the rest of life. On the other hand the ones who recognize the value of extra work, even at the cost of a few more hours a week, are the ones who realize that the chances for getting a job are almost directly proportional to their school record, that everything they learn in school will be of value to them, and that they must continue to work and to learn even after graduation.

Without a doubt it is easier to get the degree with the minimum of work required and have a good deal of free time in which to do nothing. After finding a job it is also easier to do only the minimum of work, but that is not the best way to make rapid progress or to make a great success of one's life. The man who voluntarily takes extra work for himself is the one who gets ahead the fastest.

Twenty or twenty-one hours is not enough to harm anyone; a little more planning and effort achieve success, and the feeling at the close of such a semester is a great deal better than after one of sixteen or seventeen hours.

The moral is not to consider electives as additional burdens, but as opportunities for further and more complete education.

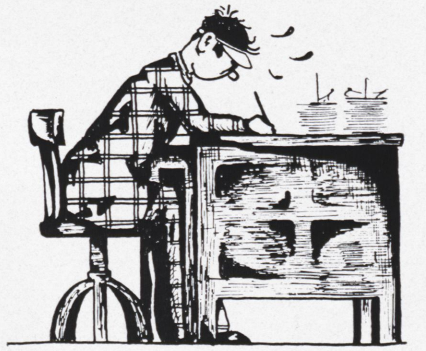
## Electronics

The new courses in electronics offered at Rose this year are particularly valuable when the enormous field of applications of vacuum tubes is considered. The phenomenal success of radios alone has established the industry on a firm basis; now newer applications will continue its growth.

Even in radio itself a new field has developed, radios for automobiles. With over two million automobiles being sold each year and the rising demand for new and more efficient receivers the tube manufacturers have a great opening.

Increased demands on car batteries due to radios, cigar lighters, and other attachments, and with the shorter charging periods due to free-wheeling auxiliary chargers using vacuum tubes may become necessary.

The photo-electric tube with its



countless uses is one of the more spectacular and at the same time highly important inventions in the field of electronics. Along with the neon tube, it is finding applications in television, sound photography, automatic traffic control, and dozens of other uses.

The new thyratron tube has amazing possibilities in power work and may revolutionize a great deal of electrical engineering.

These few examples serve to prove that the fields of electronics cannot be overlooked by modern engineers. In the future entire courses may be offered in "electronic engineering."

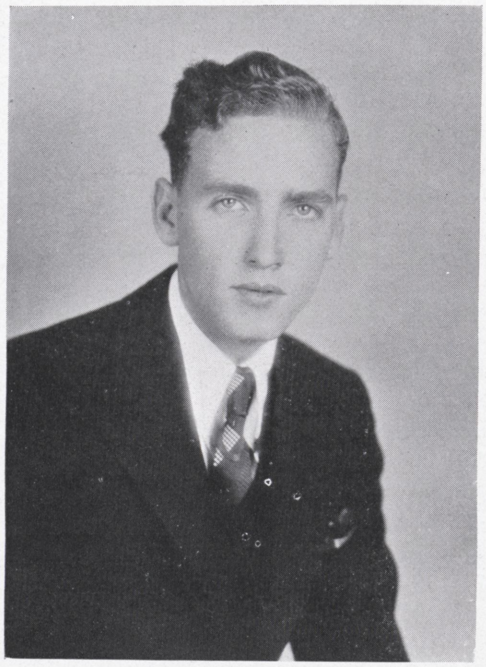
## Scholastic Work First

Much stress is always laid upon extra-curricular activities in college life and what a mistake it is to concentrate entirely on scholastic work, often to such an extent that the idea is left that they are more important than regular studies. While there is much truth in this, certain facts brought out by the current depression indicate that it is a bit overdone. In times like the present when men are holding jobs on sheer merit alone, it is almost always the men who made high scholastic grades in undergraduate work who hold their places. Industrial concerns are not particularly interested in one's ability to edit a newspaper, to debate effectively, to shoot remarkable scores on the rifle range, or to outclass opponents on the football field, except where these have a direct bearing on one's work. Doubtless, a man who made equally good grades and had an array of extra activities to his credit would be preferred to one with no activities, but between one with outstanding success scholastically and one who sacrificed some grades for the sake of the activities the favor is strongly for the higher ranking man.

The industrial attitude is that the formal education is the student's job while in school and the grades received are a fairly accurate measure of the success in doing that job, and also an indication of the results to be expected from the man if put on their job.

Using extra-curricular activities as a justification for somewhat lower grades, as is often done, is like using one's health, pleasure or family life as an excuse for not quite filling a position. It may be a good explanation, but the company is not interested in anything except what is actually done for them. A man may have many extenuating circumstances for falling a little short of expectations, but it is likely to cost him his job regardless of this.

This does not mean that outside activities do not have their place, but if a choice must be made between grades and activities, the grades should come first every time.



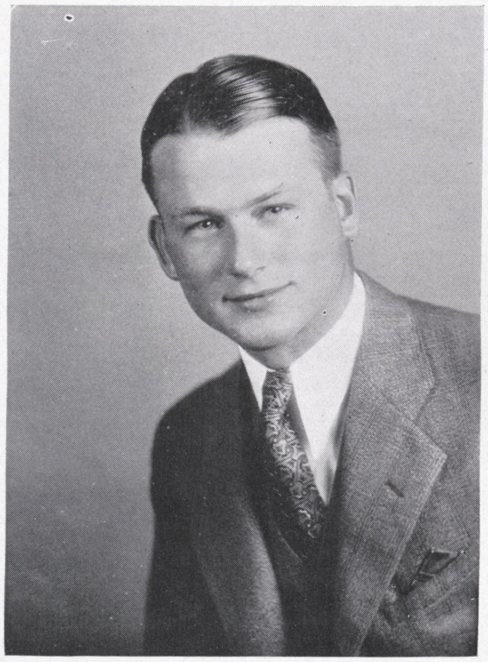
Albert L. Ahlers

'32 Mechanical

Tau Beta Pi, Tau Nu Tau, Theta Kappa Nu

A. S. M. E. 3, 4, Rifle Club 1, 2, 3, 4, Radio Club 1, 2, 3, 4, Camera Club 2, 3, 4, Modulus 3, Technic 3, 4, Student Council 4. R. O. T. C.

Rose Honor Man



Frederick J. Bogardus

'32 Mechanical

Tau Beta Pi, Tau Nu Tau, Alpha Tau Omega

A. S. M. E. 3, 4, Radio Club 3, Camera Club 2, 3, 4, Rifle Club 2, 3, 4, Football Manager 2, 3, 4, Technic 2, 3, 4, R. O. T. C., Chairman Rose Show 4, Polyphase Club

Rose Honor Man 2, 3, 4

Scholarship 1, 2, 3, 4

# OUR CONTE

Hans M. F. Fischer

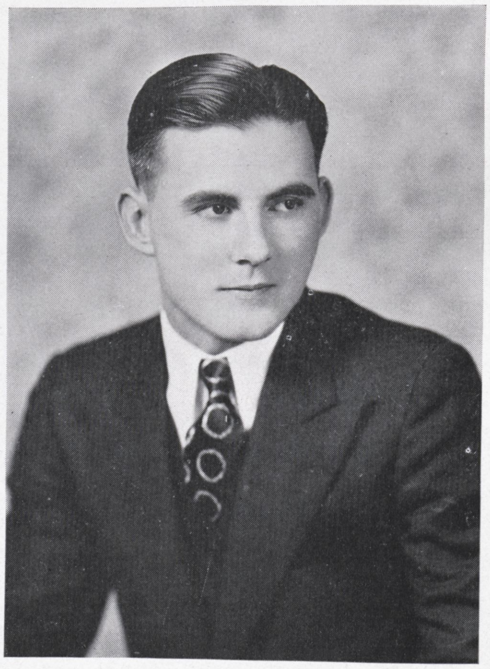
'32 Chemical

Tau Beta Pi, Alpha Chi Sigma, Alpha Tau Omega

Vice-President Class of '32 1, 2, Financial Secretary of Student Council 3, Technic 3, 4, Modulus 3, Chairman Rose Show 2, Debate Club 4, Polyphase Club

Rose Honor Man 3, 4

Scholarship 1, 2



P. Arvard Smith, Jr

'32 Chemical

Tau Beta Pi, Tau Nu Tau, Alpha Tau Omega

Football 1, 2, 3, 4, Track 1, 2, 3, Camera Club 1, 2, 3, Rifle Club 1, Technic 4, Chairman Rose Show 4, R. O. T. C.,

Rose Honor Man

Scholarship 2, 3, 4, Honorable Mention 2, 3, 4

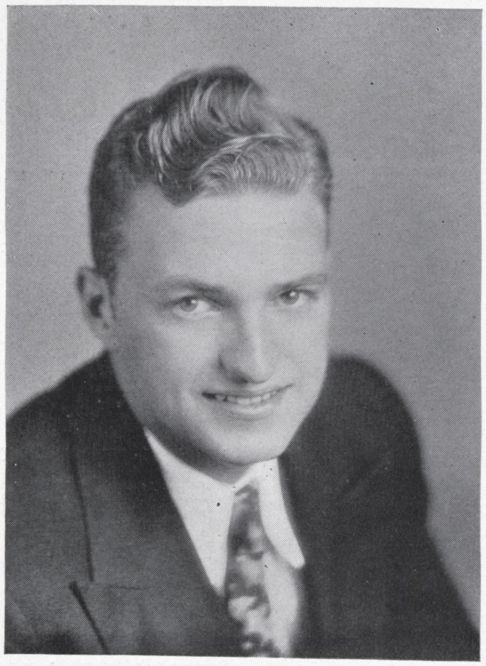
### obert M. Clark

'32 Electrical

Tau Beta Pi, Alpha Tau Omega

A. I. E. E. Radio Club 1, 2, Camera Club 1, 2, 3, 4, Modulus 3, 4, Technic 3, 4, Chairman Rose Show 2, 4, Student Council 3, Polyphase Club

Scholarship 2, 3, 4



### Robert J. D. Finfrock

'32 Architectural-Civil

Sigma Nu

A. S C. E. 2, 3, 4, Debate Club 1, 2, 3, 4, Camera Club 2, Vice-President Class '32, 3, Technic 2, 3, Modulus 4, Football 3, St. Pat's Committee 3, 4, Student Council 3, 4, Polyphase Club

Rose Honor Man 3, 4

# MPORARIES

### hester C. Stock

'32 Chemical

Tau Beta Pi, Alpha Chi Sigma, Theta Kappa Nu

President Class of '32 2, A. C. S., Technic 2, 3, Modulus 4, Handbook 3, Student Council 2, 4, Polyphase Club

Scholarship 1, 2, 3, 4, Honorable mention 1, 2, 3,

Heminway Medal

### Howard L. White

'32 Civil

Tau Beta Pi, Sigma Nu

Rifle Club 2, A. S. C. E., Modulus 2, Chairman Rose Show 4,

Scholarship 2, 4

# ALU  MNI

Robert G. Laatz, m. '32

## Chicago Rose-Tech Club

In a recent letter from K. E. Harmas of the Chicago Rose Tech Club, we received the following:

On June 20, 1931, the Chicago Rose Tech Club held a meeting at Lincolnshire Country Club, Crete, Ill. The following men were present:

'91 W. H. Boehm, '92 W. A. Layman, '92 H. L. Wetherbee, ex-'93 W. Mills, '96 H. J. McDargh, Sr., '97 W. G. Arn, '22 K. E. Harmas, '23 E. F. Donham, '25 C. D. McDargh.

This crowd enjoyed a round of golf, a well arranged dinner and a splendid meeting. Mr. Boem, our guest from New York, suggested a secretary write to you regarding additional books for the library. He believes that considerable material could be secured from various publishers (he mentioned Wiley Co. and McGraw Hill) as donations merely by indicating the donor on the book shelf.

## Who's Who

Among the Rose graduates are a number of men who have so distinguished themselves in their profession as to be included in the *Who's Who of Engineering*. Following, is the list by classes, of men who have achieved this signal honor.

**'85** Ozni P. Hood, M. S., '95; M. E., '98 is Chief mechanical engineer, U. S. Bureau of Mines, Washington, D. C.

**'86** Herbert W. Foltz, F. A. I. A. of Foltz, Olser & Thompson, Architects; vice-chairman Indiana Board of Registration for Professional Engineers, Indianapolis, Ind.

Charles M. Sames, Associate Editor of Publications, The American Society of Mechanical Engineers, New York.

**'87** Frank P. Cox, manager West Lynn Works, General Electric Company, West Lynn, Mass.

**'88** John B. Peddle, M. S. '95; M. E., '00; Professor of Machine Design, Rose Polytechnic Institute.

**'89** Alonzo J. Hammond, Heminway Medal, M. S., '94; C. E., '98; consulting engineer, Chicago, Ill.

Victor K. Hendricks, M. S., '00; with Walter A. Shaw, consulting engineer, Winnetka, Ill.

Herbert H. Holding, E. E., '26; general power representative, Public Service Electric & Gas Co., Newark, N. J.

**'90** Theodore L. Condron, M. S., '94; C. E., '18; of Condron & Post, Chicago.

George R. Putnam, Heminway Medal, M. S., '95; Sc. D., Stevens, '22; Construction Engineer, New York, Commissioner of Lighthouses, Washington, D. C.

**'91** William H. Boehm, M. M. E., Cornell, '93; vice-president, Fidelity & Casualty Co., New York.

**'92** W. Arnold Layman, M. S., '94; E. E., '99; consultant, Industrial Finance & Management; special partner, Nash, Cloud & Isaacs, New York.

**'94** Edward D. Frohman, vice-president and chemical engineer, S. Obermayer, Co., Pittsburgh, Pa.

Austin V. H. Mory, Ch. E., '14; associate director, The Bakelite Corporation, Bloomfield, N. J.

**'95** Harrison W. Craver, director, Engineering Societies Library, N. Y.

Francis H. Miller, E. E., '99; M. E. '14; vice-president and general manager, Louisville Ry. Co., Louisville, Ky.

William S. Speed, M. S., '97; M. E., '99; president, Louisville Cement Co.; president, North Jelli-Coe Coal Co.; and president, Beaver Dam Coal Co., Louisville, Ky.

**'96** Uhel U. Carr, M. S., '99; vice-president and general manager, The Diamond Machine Co., Monongahela, Pa.

Orange E. McMeans, M. S., '00; M. E. '01; consulting Industrial Engineer, Indianapolis, Ind.

George E. Wells, M. S., '99; E. E., '01; consulting engineer, Chicago.

**'97** William G. Arn, assistant chief engineer, Chicago Terminal Improvement, Illinois Central R. R. Co., Chicago.

Arthur F. Gordon, senior highway bridge engineer, Bureau of Public Roads, Washington, D. C.

Roger M. Newbold, M. S., '07; E. E., '08; Fellow, A. I. E. E.; Sales Engineer, Chicago.

**'98** Shelby S. Roberts C. E., '07; LL.B., Washington Law, '25; assistant director, Bureau of Finance, Interstate Commerce Commission, Washington.

Frank A. Whitten, M. S., '02; chief engineer, McCord Radiator & Mfg. Co., Detroit, Mich.

**'99** Frederick H. Froehlich, E.E., '22; President Froehlich & Emery Engineering Co., Toledo, Ohio.

**'00** William H. Insley, M. S., '02; C. E., '10; president and general manager of the Insley Mfg. Co., Indianapolis, Ind.

Sidney J. Kidder, E. M., Columbia School of Mines, '04; manager, Consolidated Copper & Sulphur Co., Eustis, P. Q., Canada.

Curtis A. Mees, C.E., '08; president and treasurer, Mees & Mees, Inc., Charlotte, N. C.

**'01** Everett E. King, C.E., '09; M. S. '10; A.B., Indiana University, '10; M.C.E., Cornell, '11; Professor of Railway Civil Engineering, University of Illinois, Urbana, Ill.

Harry A. Schwartz, M. S., '03; M. E., '05; manager of research, National Malleable & Steel Castings Co., Cleveland, Ohio.

**'03** Eugene A. Michel, M. S., '06; proprietor, A. Eugene Michel & Staff, Technical Advertising, New York.

Chester L. Post, M.S., '05; of Condron and Post, Chicago, Ill.

H. Edmund Wiedemann, M. S., '07; Ch. E., '09; consulting chemist and state chemist, St. Louis, Mo.

**'04** Roy W. Hill, LL.B., Northwestern University Law School, '07; of Hill & Hill, patent lawyers and engineers, Chicago.

Robert D. Landrum, M.S., '09; Ch. E., '14; general manager, Ceramic Materials Dept., The Titanium Alloy Mfg. Co., Cleveland, Ohio.

**'05** John S. McBride, Valuation Engineer, C. & E. I. R. R., Chicago.

John C. Sproull, Heminway Medal, M. E., '12; manager, testing dept., tire division, B. F. Goodrich Co., Akron, Ohio.

**'06** Earle S. Butler, assistant to chairman of the board, M.-K.-T. Lines, New York.

Frederick N. Hatck, C. E., '11; engineer, with Southwestern Bell Telephone Co., St. Louis, Mo.

Addison W. Lee, vice-president in charge of operations in the Louisville Gas and Electric Co.

George F. Nicholson, C. E., '21; chief harbor engineer, Los Angeles.

John M. Rotz, of J. M. Rotz Engineering Co., Indianapolis, Ind.

Leon J. Willien, M. S., '08; Ch. E., '10; operating gas engineer, Byllesby E. & M. Corp., Chicago.

Carl Wischmeyer, Heminway Medal, M. S., '10; M. E., '20 Professor Mechanical Engineering, Rose Polytechnic Institute.

**'07** William R. Plew, M. S., '10; A. E., '20; supervising architect and Professor of Architecture, Montana State College, Bozeman, Mont.

**'08** John E. Bernhardt, C. E., '29; bridge engineer, Chicago and Eastern Illinois R. R. Co., Chicago.

Arthur S. Hathaway, Jr., Assistant Professor Civil Engineering, College of Engineering, Northwestern University, Evanston, Ill.

Henry W. Heidenger, M. E., '21; branch manager, Indiana Inspection Bureau, Terre Haute, Ind.

Herbert D. Orth, Associate Professor and head of department of Drawing and Descriptive Geometry, University of Wisconsin, Madison, Wis.

Orion L. Stock, B. S. A. E., '12; M. S., '14; Associate Professor of drawing and architectural engineering, Rose Polytechnic Institute.

**'09** Edward M. Brennan, chief engineer, The Bauer Bros. Co., Springfield, Ohio.

Paul A. Philippi, B. S., Mo. Sch. Mines, '08; M. S., '10; of Wilkins & Philippi, general contractors, St. Louis, Mo.

**'10** Nathan A. Bowers, C. E., '21; Ph.D., Leland Stanford Univ., '26; vice-president, McGraw-Hill Co., of California, San Francisco.

Arthur G. Butler, manager of Pittsburgh branch, Byllesby Engineering & Management Corp., Pittsburgh.

Ben G. Elliott, M. S., '11; M. E., Wis., '13; Professor of Mechanical Engineering, University of Wisconsin, Madison, Wis.

Earl D. Hay, M. S., '15; M. E., '21; head of depts. of mechanical and industrial engineering, Kansas University.

James A. Shepard, Heminway Medal, asst. manager, Roan Antelope Copper Mines Ltd., Luanshya, Northern Rhodesia.

**'11** Edward J. Ducey, M. S., '14; C. E., '22; designing engineer, American Bridge Co., Pittsburgh.

Erich A. Mees, Heminway Medal, vice-president, Mees & Mees, Inc., Charlotte, N. C.

Harold O'Wimsett, locating engineer, State Highway Commission, Indianapolis, Ind.

**'12** Jerry H. Service, M. S., Ohio State, '17; Ph.D., Ohio State, '28; E.E., '28; Professor of physics and chemistry, State Teachers College, Ark.

Harry C. Uhl, assistant district engineer, General Electric Co., Atlanta.

**'14** Kenneth E. Lancet, C. E., '24; member of board of directors, Engineering Metal Products Co., Indianapolis, Ind.

Albert L. Pfau, Jr., Civil Engineer & Architect, St. Petersburg, Fla.

**'15** J. Norvin Compton, M. S., Columbia, '17; Ch. E., '19; Chemical Engineer with Carbide and Carbon Chemical Corp., South Charleston, W. Va.

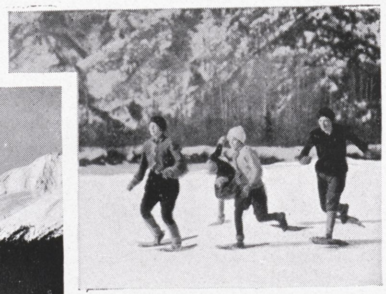
Herman E. Mayrose, Professor of drawing, U. of Detroit.

John M. Sanford, consulting chemist, Terre Haute, Ind.

**'16** Richard D. Leitch, Ch. E., '21; M. S., '22; Associate Chemical Engineer, U. S. Bureau of Mines, Pittsburgh, Pa.

Warren R. Spencer, A. B., Ind. U., '12; C. E., '20; Professor of Civil Engineering, University of Arkansas, Fayetteville, Ark.

# Campus



# Activities

Tom H. Batman, ch., '33

## "It's an Ill Wind......"

ALFRED HASTINGS Wallingford Blickensderfer is a garlic-snapper. "Blick" frankly avows his love for the "Swedish onion," as he playfully calls it. Although it is not in accord with my editorial policy to mention a thing of this sort, I must air the fact. Let me quote Mr. Chinn, of the Rose faculty: "Mr. Blickensderfer, you ought to use Lifebuoy soap!"

On the now historic morning of February 17, Alfred created somewhat of a sensation in the Physics class taught by Doctor Howlett. The night before, he and two of his cronies tickled their palates with a bounteous repast of unadulterated garlic. The three sat in the first row. The rest of the class sat in the sixth, seventh and eighth rows. Doctor Howlett, after calling the roll, surveyed the three beaming faces before him with perplexity. Then he sniffed the atmosphere with a critical nose, saying, "Someone must have left the gas on!" As he checked each of the gas spigots, he remarked, "Don't anyone light a match—you'll blow the place up!"

Later, "Blick" planted himself squarely in front of Doctor Howlett in order to ask him a question concerning the lesson. "Doc" looked up, took a deep breath, and quickly stepped back, as if he had been struck a mortal blow, and leaned heavily against the wall for support. With an averted face he explained Blickensderfer's question.

The next day a new ruling was passed to the effect that the upper tenth of students woud be on their own responsibility in regard to attendance at classes. On a list of favored ones, the name of Blickensderfer stood prominent.

## Assembly

Lieutenant Hill, who was instructor in Military Science and Tactics at Rose several years ago, is now a member of the U. S. Air Corps. He sent two reels of pictures which explained thoroughly the four different types of aircraft in the service and their uses. Air photography is a growing branch of aviation. Its importance in military use was shown in the films.

At a recent assembly four reels of talkies were presented by the Mid-Continent Petroleum Company, after which a demonstration of the standard knock-testing apparatus was given and the usual method of rating motor fuels was explained.

## Valentine Day

All the amateur detectives in the Dorm were called out on the day of February 14. Some anonymous person sent to a large percentage of Dormitory men comic valentines. Some were stupid, some clever, some malicious. The consensus of opinion of the most clever sleuths was finally that anyone who was neglected was beyond the shadow of doubt. Other clues, traced down, led to naught. Who is the man so brilliant as to solve this great mystery Let him step forth. His name will surely go down in history!

## A. S. C. E.

At the recent meeting of the Rose chapter of the American Society of Civil Engineers, Mr. Charles E. Piety, a Terre Haute attorney gave a talk on "Municipal Contracts". Under this title he discussed the functions and powers of the Indiana State Highway organization in the building and maintenance of roads and stressed the importance of following the legal procedure in contracting with a public corporation.

Mr. Piety's talk was received with interest and was greatly appreciated by the members and it is hoped that he will again address them.

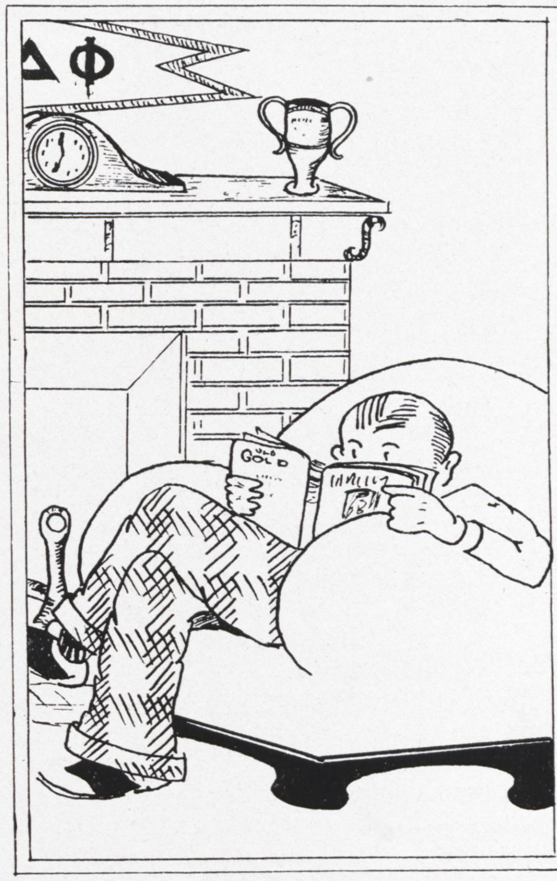
At the next meeting to be held on Wednesday, March 23, there will be given a lantern slide lecture on the Carquinez Strait Bridge with a discussion by Professor McCormick and also a short movie on "America's Great Bridge Test."

## A. I. E. E. Meeting

The Indianapolis chapter of the A. I. E. E. sponsored a most in-

(Continued on Page 30)

# Fraternities




## Tau Nu Tau

Initiation was held at sunrise, February 20, 1932 for eighteen new members including two honorary members of the Corps of Engineers. The men initiated were: Honorary members, Lieut. Gerald J. Sullivan, C. E,, U. S. Army, Lieut. E. E. Barnes, C. E., U. S. Army. Students, N. W. Liston, J. F. Guymon, T. H. Batman, E. A. Schroeder, M. L. Bradfield, G. E. Farrington, J. C. Dalrymple, J. W. Cantwell, N. V. Engman, W. E. Bachelor, E. J. Withers, J. L. Paton, P. J. Carter, E. G. Weinbrecht, J. H. Hughes, and J. C. Skinner.

On the evening of February 26, a very delightful formal dance was given by the fraternity, at the Terre Haute House. The dance was given in honor of the new members.

Major R. G. Guyer, U. S. Army, will be formally initiated into the fraternity when he inspects the R. O. T. C. unit again in May.

## Alpha Tau Omega

Gamma Gamma takes the pleasure of announcing the pledging of the following men: William Eyke, Muskegon, Mich., Frank Mansur, Santa Ana, Calif., Ted Meece, Huntington Beach, Calif., Carrol Merriman, Kokomo, Ind., Jack Runyon, Dayton, Ohio, Virgil Shaw, Coral Gables, Fla., Tom Smith, Detroit, Mich., Earnest Welsh, Louisville, Ky., Fred Wiles, Struthers, Ohio, Burril McIntyre and William Pratt,, Brazil, Ind., Robert Asbury, John Brinkman, Eugene Callahan, William Cliff, Emmet Cody, John Cushman, John Hager, Vern Henderson, Arthur Hess, Albert James, Bert Pearce, and Harold Reintjes of Terre Haute, Ind.

On Saturday, February 13, a smoker was held at the house in honor of the new pledges. Professor Wischmeyer, Mort Hayman, and other alumni were the principal speakers. Later in the evening a buffet luncheon was served.

Friday, February 19, the pledges were honored by a dance, given in the main dining room of the Terre Haute House. Professor and Mrs. Wischmeyer, Professor and Mrs. Stock, and Mr. Gantz chaperoned the dance.

## Sigma Nu

After a very successful rush season Beta Upsilon of Sigma Nu is proud to announce the pledging of the following men: Herman B. Taylor, John R. Burget, Byrne Terhorst and Donald E. McCullough, all of Terre Haute; Louis Wm. Heck, of St. Mary-of-the-Woods; Joseph H. DeWitt and Edmundson E. Carrico, of Louisville, Ky.; Harry F. Richardson and Jay F. Hall of Cleveland Heights, Ohio; Earle B. Butler of Bogota, N. J.; and E. P. Ervin, Robert T. Bernd and Edmund C. Horst, all of Indianapolis.

A dance held at the chapter house on Monday night Feb. 1, bid rush week adieu in a gay manner. The chapter is grateful to Mr. Bloxsome and Mr. Hoel who chaperoned the affair. It was a fine dance and was heartily enjoyed by all present. Jack O'Grady's orchestra furnished the music.

On Friday evening, Feb. 5, a pledge banquet was held at the house and the neophytes then became the proud wearers of the serpent. On the following Sunday afternoon formal pledging ceremonies marked the official entrance of the pledges into the life of the fraternity.

From 3:00 to 5:00 o'clock Sunday, Feb. 28, the chapter was host to the parents of all active men and pledges in an open house. Guests of the fraternity were afforded an opportunity to inspect the house and become acquainted with all the men.

Saturday night, February 27,

(Continued on Page 29)

# SPORTS

**P. Arvard Smith, Jr., ch., '32**

## Rose Beaten by Wilmington, Ohio

ROSE failed to survive a last minute attack on the part of their foe and went down to defeat before Wilmington College of Wilmington, Ohio, 25 to 19.

With only a few seconds to go the Rose defense cracked to allow Wilmington to score 6 points, thus putting the game on ice for them. Failure to hit the bucket was the main cause of the defeat. Rose was outscored 10 to 8 from the field and 5 to 3 from the foul line.

Irvin, forward, was the best for the winners with four field goals, good eight points, while Dakin and King, guards, each tallied five points.

Sawyers was the big gun for the Engineers, as he netted three field goals for six points. Griffith and Erwin each tallied four points. Griffith played a very neat defensive game while making these points.

F. Richardson, Engineer forward, held Apking, all-state forward in Ohio college circles, without a point during the entire game.

| Rose Poly., 19— | F.G. | F.T. | P.F. | T.P. |
|---|---|---|---|---|
| Erwin, f. | 1 | 2 | 4 | 4 |
| F. Richardson, f. | 1 | 1 | 0 | 3 |
| Morrison, c. | 1 | 0 | 1 | 2 |
| Sawyers, g. | 3 | 0 | 1 | 6 |
| Griffith, g | 2 | 0 | 2 | 4 |
| Batman, f. | 0 | 0 | 0 | 0 |
| H. Richardson, c. | 0 | 0 | 0 | 0 |
| Price, f. | 0 | 0 | 0 | 0 |
| Totals | 8 | 3 | 9 | 19 |

| Wilmington, 25— | F.G. | F.T. | P.F. | T.P. |
|---|---|---|---|---|
| Irvin, f | 4 | 0 | 2 | 8 |
| Manuel, f. | 1 | 0 | 0 | 2 |
| Apking, f. | 0 | 0 | 1 | 0 |
| Jacoby, c. | 1 | 1 | 2 | 3 |
| King, g. | 2 | 1 | 2 | 5 |
| Dakin, g. | 1 | 3 | 0 | 5 |
| Savage, g. | 1 | 0 | 0 | 2 |
| Totals | 10 | 5 | 7 | 25 |

Referee—Middleworth; umpire, Wheeler.

## Rose 29— Eastern Illinois 33

A great second half rally was not enough to produce a victory, therefore the Fighting Engineers were forced to bow to the prowess of a band of cagers from Eastern Illinois Teachers' College of Charleston a second time. The score was 33 to 29. It was the most interesting contest put on at the Rose Gym this year. The Rose team was unable to hit its stride the first half, when it trailed by a score of 19 to --, but they came out of it the second half to outscore the visitors 18 to 14. Lineup and summary:

| Eastern Illinois, 33— | F.G. | F.T. | P.F. |
|---|---|---|---|
| Ballard, f. | 2 | 0 | 3 |
| Grafton, f. | 1 | 0 | 1 |
| Alexander, f. | 1 | 0 | 1 |
| Walker, c. | 0 | 0 | 2 |
| Von Behren, c | 6 | 2 | 0 |
| Fearn, g. | 3 | 0 | 0 |
| Viseur, g. | 0 | 0 | 1 |
| Simcoh, g. | 2 | 1 | 1 |
| Totals | 15 | 3 | 9 |

| Rose Poly, 29— | F.G. | F.T. | P.F. |
|---|---|---|---|
| Morrison, f. | 0 | 0 | 0 |
| F. Richardson, f | 2 | 0 | 2 |
| Gillette, f. | 0 | 1 | 2 |
| Hess, c. | 3 | 0 | 0 |
| Sawyers, c. | 5 | 1 | 1 |
| Griffith, g. | 1 | 4 | 2 |
| H. Richardson, g. | 0 | 1 | 0 |
| Totals | 11 | 7 | 7 |

Officials—Referee, Dunlap; umpire, Jones.

## Rose 26 — Oakland City 40

The Oaks rallied in the second half to swamp Rose Poly 40 to 26, in a loosely played basketball game at Oakland City.

Holding a four point lead at half time, the Oaks turned on the steam in the second period and led by Edward, a forward, pulled away..

Richardson, forward, topped Rose's scoring and tied with Daubenspeck, Oaks center, for game honors, with eleven points. Summary:

| Rose Poly, 26— | F.G. | F.T. | P.F. |
|---|---|---|---|
| Richardson, f. | 5 | 1 | 2 |
| Sawyers, f. | 3 | 2 | 3 |
| Batman, f. | 1 | 0 | 0 |
| Hess, c. | 1 | 0 | 1 |
| Morrison, g. | 0 | 0 | 0 |
| Griffith, g. | 0 | 3 | 0 |
| Gillett, g. | 0 | 0 | 1 |
| Totals | 10 | 6 | 7 |

| Oakland City, 40— | F.G. | F.T. | P.F. |
|---|---|---|---|
| Chappell, f. | 3 | 0 | 1 |
| Kell, f. | 0 | 0 | 1 |
| English, f. | 4 | 1 | 1 |
| Hutcheson, f. | 0 | 1 | 1 |
| Daubenspeck, c. | 5 | 1 | 2 |
| Loge, g. | 3 | 0 | 2 |
| Hollen, g. | 2 | 2 | 0 |
| Conner, g. | 0 | 1 | 3 |
| Totals | 17 | 6 | 11 |

Referee—Manhart; umpire, Petersburg.

## Rose 14—Hanover 31

The Rose Engineers dropped a 31 to 14 decision to the Hanover College Hilltoppers at the Rose gym.

Two of Rose's ten players trailed to the bench due to four personal fouls, sixteen being called on the Engineers in all, while twelve were called on the visitors. Lineup and summary:

| Rose Poly, 14— | F.G. | F.T. | P.F. | T.P. |
|---|---|---|---|---|
| Price, f. | 0 | 1 | 1 | 1 |
| F. Richardson, f. | 1 | 1 | 1 | 3 |
| Batman, f. | 0 | 1 | 0 | 1 |
| Sawyers, f. | 0 | 0 | 2 | 0 |
| H. Richardson, c. | 0 | 1 | 3 | 1 |
| Hess, c. | 3 | 1 | 0 | 7 |
| Pratt, g. | 0 | 0 | 1 | 0 |
| Morrison, g. | 0 | 0 | 0 | 0 |
| Griffith, g. | 0 | 1 | 4 | 1 |
| Gillette, g. | 0 | 0 | 4 | 0 |
| McAninch, g. | 0 | 0 | 1 | 0 |
| Totals | 4 | 6 | 17 | 14 |

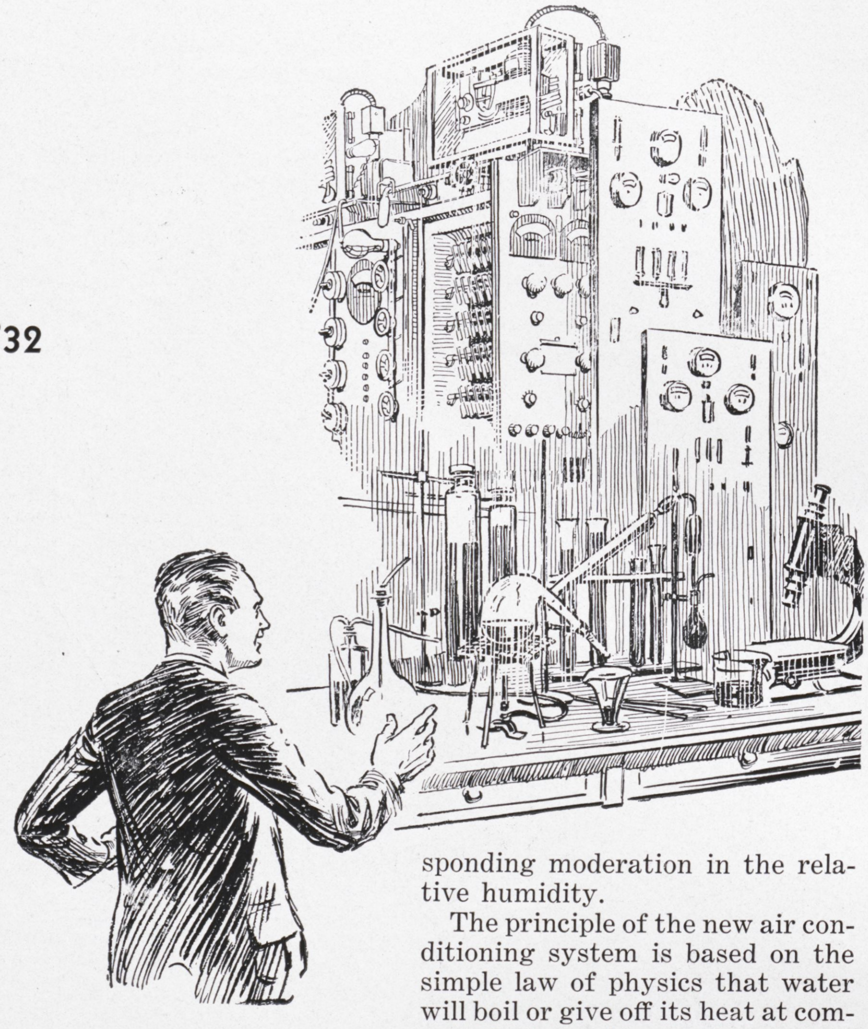
| Hanover—31 | F.G. | F.T. | P.F. | T.P. |
|---|---|---|---|---|
| McNaulty, f. | 1 | 1 | 1 | 3 |
| Heizen, f. | 0 | 0 | 1 | 0 |
| Raney, f. | 1 | 9 | 1 | 11 |
| Shuler, f. | 1 | 0 | 0 | 2 |
| Spann, c. | 4 | 0 | 3 | 8 |
| Razovich, g. | 2 | 0 | 3 | 4 |
| Lemon, g. 0 | 0 | 0 | 0 | 0 |
| Gwin, g. | 0 | 2 | 2 | 2 |
| Taggart, g. | 0 | 1 | 0 | 1 |
| Menzoi, g. | 0 | 1 | 0 | 1 |
| Totals | 9 | 13 | 12 | 31 |

Referec—H. Conover; umpire, Briggs.


norman kenyon

# Research and Progress

Lee C. Kelsey, Jr. m. '32



## The Rockefeller Center

THE installation of 76 automatic elevators, in the 68 story office building, the largest of the group of structures in the Metropolitan Square development in New York City, will represent the largest group of elevators in any single building.

These elevators are planned to handle the 13,000 regular tenants and in addition a transient population of about 30,000 persons daily. Twenty-four of the elevators will operate at a speed of 1,200 feet per minute, permitting an elevator running express to the 65th floor to cover the whole distance of 805 feet in about 50 seconds, as against 1 minute and 20 seconds under the speed of 700 ft. per minute allowed by the old building code.

Operating on a full schedule from 8 in the morning until 6:30 in the evening, the 76 elevators in this building will travel over 21,000 miles a day!

—*Eng. News Record.*

## New Type of Railway Air-Conditioning

Ten diners equipped with the latest type railway air conditioning and cooling systems will be placed in operation in the near future by the Atchison, Topeka and Santa Fe Railroad on their trans-continental trains running through the West and Southwest.

The Santa Fe will be the first railroad to use a new air conditioning system, which employs steam from the engine as the refrigerating energy and water as the sole refrigerating medium, thereby eliminating gaseous refrigerants. Railroad executives and engineers, representing the major roads of the country, who witnessed the initial demonstration of the system, voiced the belief that it foreshadowed general application of air conditioning on American railroads.

More than a year ago the Santa Fe inaugurated the first transcontinental air conditioned diner on their crack train, "The Chief". It was the success of this air conditioning system in maintaining uniformly comfortable conditions during the heat waves of the past two summers, even across the burning Mojave Desert, which company officials say decided them to air condition the ten additional diners.

The new cooling system will maintain a temperature not to exceed 80 degrees with a relative humidity of 50 per cent, when the outside temperature is 100 degrees. The temperature inside the car will thus be lowered at least twenty degrees under extreme conditions, with corresponding moderation in the relative humidity.

The principle of the new air conditioning system is based on the simple law of physics that water will boil or give off its heat at comparatively low temperatures when the atmospheric pressure is reduced. Steam from the engine is forced under pressure past an opening in the upper part of a tank partly filled with water. A vacuum is thus created within the tank, causing the water in the lower part to boil at about 50 degrees Fahrenheit. The water as it boils gives off heat in the form of vapor, which is drawn out of the tank by the steam suction, thus lowering the temperature of the remaining water still further.

This cold water from the steam refrigerator is circulated through cooling coils. The air passes over these coils where it is cooled and dehumidified. Concealed ducts permit the conditioned air to be distributed uniformly through the car. All the air conditioning equipment, with the exception of the water storage tanks, will be placed in the roof of the car, so that no usuable space will be sacrificed. Absolute cleanliness of the air is assured by filtering all dust and dirt particles before it is taken

into the car. Open windows for ventilation will be unnecessary.

In cold weather, the air conditioning system supplements the usual steam heating, and provides for circulation of the air which had not previously been practical.

The trend toward air conditioning on railways is seen as a move by the railroads to improve their competitive position with respect to bus and private car travel. They anticipate that the comfort of cooled cars in summer will attract customers to railways just as the air conditioning of theatres enables them to overcome the usual summer box office slump.

## Hoover Dam

Contractors at Black Canyon, according to reports of R. F. Walter, chief engineer of the Reclamation Service to Secretary Wilbur, have "holed through" on the pioneer bore of the first of the great tunnels which are to carry the flow of the Colorado River while Hoover Dam is being built.

In a single day recently, he reports further, the crew, working at eleven different heads, drilled and excavated a total of 163 linear feet of tunnel.

As a matter of fact, the task of driving four tunnels, each 50 ft. across and practically a mile long, one of the major undertakings of the whole enterprise, is in this way shown to be well under way and progressing rapidly. With but a year of work, most of it preliminary, Mr. Walter says the contractors are today six months ahead of their schedule.

In constructing each of these 50 ft. tunnels the first task is to run a 12 ft. tunnel all the way through on what is to be the floor of the main tunnel. This makes it possible then to bring down the 38 ft. of rock that must be removed in creating the 50 ft. tunnel and to load it into cars for removal with the expenditure of a minimum of energy.

## Unique Water Tower

There has been constructed recently on the West Coast a unique monumental water tower, designed against earthquakes. The tower consists of a 1,250,000 gal. flat bottom steel tank, 35 ft. high and 78 ft. in diameter. This tank is encased in an outer shell of concrete rising approximately 123 ft. above the ground surface. The supporting structure for the tank consists of a series of rectangular cells 12 ft. square, on top of which is a 16 in. reinforced concrete slab that acts as a foundation for the steel tank. At the intersection of the walls forming the rectangular cells the forms were so arranged as to make a column 23 inches in diameter. The walls of the cells are solid from the ground level to the under side of the top slab, except for intercommunicating openings just below the top. This cellular construction is very rigid, insuring the safety of the structure against seismic disturbances.

The vertical lines are emphasized on the exterior of the tank to accentuate the appearance of height. The outside walls, as well as the columns and curtain walls, were constructed with slip form that contributed greatly to the rapid completion of the work and to the economy of the job.

After the steel tank was erected it was treated on the interior with a hot coat of enamel, and graphite paint was applied to the exterior. The outside of the bottom was given a heavy coat of plastic material before it was lowered upon a bed of coal tar and sand on the supporting concrete floor.

## One Way Glass

The latest ingenuity evolved by the ever progressive motor industry is a "one-way" make of glass through which it is possible to see without being seen. Those who look outward through it observe a world somewhat saddened in its colour scheme, but visible. Those who attempt to look inward are baffled by a surface that acts as a mirror and stops their vista as short as would a sheet of tin.

The invention has possibilities. To live in a glass house of this composition would entail no fear of being overlooked. We should one and all enjoy the satisfaction, found now only in fairy tales of being invisible while still being able to observe what is going on. However, so far as the motor industry is concerned, the possession of a car is not usually attended with an anxiety to conceal the fact. The proud owner delights to be recognized, and would not thank you for presenting him with a perfect means of traveling incognito. Nor could he be allowed, for safety's sake, to present to oncoming vehicles a reflective wind screen, which, though it dimmed their headlights, would throw the glitter back with probably disastrous results.

The use of the new device seems likely to be exceptional. It is a case where the ingenuity of invention has outrun human need.

## Free Wheel Propeller

Considerable saving may be effected in airplane operation by the use of a free wheel propeller, recent tests revealed. According to aeronautical experts of the Society of Automotive Engineers, this new type of propeller is free from vibration and may be available for all forms of propellers, wood, steel and aluminum. It makes no change in the operation of the airplane except to give it a greater feeling of accelerative freedom, familiar to those who have driven free-wheeling motor cars.—*Machine Design.*

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## A Lecture Room Problem

(Continued from Page 13)

lems for this lecture room were solved.

The lighting of the lecture room provided a very pleasant line of thought. Illumination today should be more than mere lighting. It should be good not only for the eyes, but for the body also. To have health insuring qualities of sunshine available indoors is not just a fine dream—it can be made a reality. A hot body gives off radiations of a multitude of wave lengths, the shorter ones being measured in angstroms. An angstrom is one ten-millionth part of a millimeter or about four billionths of an inch. As indicated in the figure, light waves have lengths between 4000 and 7600 angstroms. Longer waves are merely to be classed as heat waves,

while shorter waves in the ultraviolet have many striking properties. Of special interest to us are those of 2900 to 3000 angstrom lengths because they are the vitalizing and health-maintaining constituents of sunshine. They produce the tanning of the skin, they enable the body to assimilate vitamin D, clear up some skin troubles, and increase body resistance to disease. Because of their importance in health matters a new unit has been devised for measuring their effect. This unit is the MPE or "minimum perceptible erythema". One MPE dose is the amount of ultraviolet which will produce barely the minimum perceptible amount of reddening on untanned skin.

The task of producing a lamp which would give out a proper amount and length of light rays for illumination of the right quality, and at the same time give a proper proportionate amount of ultraviolet of the safe tanning range with little or none in the still shorter wave lengths which might prove harmful to the eyes, has been well accomplished in what is known as the Type S-1 lamp. This lamp contains a filament of tungsten, a few drops of mercury, and a pair of electrodes. The filament not only produces ordinary light waves, but also supplies heat to vaporize the mercury. The mercury vapor passing between the electrodes allows an electric arc to form. It is this arc which radiates the great proportion of ultraviolet rays. To screen back the harmful, very short ultraviolet a special glass has been developed for the bulb. Ordinary glass would screen back nearly all ultraviolet rays. For this reason the beneficial ultraviolet of sunshine is lost when sunshine must pass through window glass. Much of it is also lost by absorption in the air when the sun is low as in early morning and late afternoon in summer and even at noon time in winter. The sunshine of mountain regions is much richer in the ultraviolet for the sun rays there pass through less atmosphere.

As clearly shown in the accompanying spectra of natural sun light and of the Type S-1 lamp, the sun lamp has a much greater proportion of health rays to light rays than has the sun. In other words, this lamp supplies more of health rays than the summer sun with less brilliant illumination—a very desirable characteristic.

One industrial type sunlamp with wide angle reflector and glare reducing baffles was installed for every twelve chairs. This gives sufficient intensity to supply to each student about one-half of an MPE dose during a one hour period. It has been noted that when a student remains in the room continuously for three hours there is a slight reddening of the skin, particularly on the ears.

## Conclusions

With the installation of an electric hoist in the laboratory directly over the lecture room table our lecture room will be complete. It is supplied with two and three wire direct current, two and three wire single phase alternating current, three phase alternating current, storage battery supply and four auxiliary lines to furnish any other connections which might be desired. The room is pleasingly decorated, there is no chance for disturbance from outside, the acoustics are excellent, the air is tempered and is changed every eight minutes, lighting of the usual type is provided to supplement or substitute for the sunlamps when desired, and the sunlamps give a restful, even flood of light carrying upbuilding ultraviolet rays to every student. A nearer approach to ideal lecture room conditions could hardly be conceived.

## St. Pat Visits Rose

(Continued from Page 8)

chaff to each of them. Doc White, being the first to be met was uncermoniously asked, "Well, and do ye start all of yer classes with 'H-r-r-r-mp. Please answer to yer names'?" Boys, the way Pat got off that well-known line would have made half the fellows in school settle down in their seats for a good nap.

Right behind Doc, as usual, came Alf, and Pat stopped him to ask about progress on the In-

dustrial Lab. "Some of the byes was afther tellin' me, Alf," said Pat, "that the new oil furnace ye'-'ve got out there scares ye half to death. They tell me that ye're afther jumpin' about half a mile every time she pops at ye. Keep at her, though, me lad. Ye'll learn to light her yet if ye work at it long enough."

Just after Doc left us, Mac came loitering along the runway. "Ah, Bird!" he said, as he spied Pat. "How's the old boy this year Haven't seen you in a coon's age!" and he entered into a long discussion of the relative merits of, "When I was a student here—" he began, and rambled on at great length. At about quarter after, he looked at his watch and said, "Well, I had a class this hour, but I don't believe the boys were anxious to listen to me. They've probably gone by now, anyway," and he went cheerfully on with the discussion which lasted until the end of the hour. The reporter picked up some very valuable pointers.

## To---The Upper Classmen

Knippy and Moench were the next two to show up, but by now the Saint was about talked out. Knippy started off on one of his harangues relative to the relation between student and Professor, and the poor Saint wasn't able to head him off. He had to let him go clear through the well-known lecture (to the upper classmen). The reporter withdrew, since he knew it all by heart. No sooner was Knippy through—winded—than Moench started in on the subject of Electronics, and the reporter dashed out of the building, fearing a repetition of his unfortunate experience with Doc and Alf.

St. Pat was greatly pleased with the appearance of the buildings since his last visit, but he appeared restless and uneasy after he had seen and talked to all the Profs. Before long he indicated a desire to get back to town. "It's not long until tymorrie, me lad," he said, "and I'd hate to be out of shape then. Guess I'll go back in. See ye tymorrie." And with that he dashed down to grab a car.

# Humor

## By Richard K. Toner, '34

EDITOR'S NOTE: Ye nimble witted sons of Rose, see what you can do with this. Hand your *complete* solutions, showing method, to this editor *personally* before March 31. The first correct solution gets its owner something he doesn't expect. Professors,—no fair helping! Members of the Technic staff are not eligible. The solution is too long to print here, but it will be posted on the bulletin board April 4. Here 'tis:

A piece of rope weighs four ounces per foot. It is passed over a pulley and on one end is suspended a weight and on the other end a monkey. The whole system is in equilibrium.

The weight of the monkey in pounds is equal to his mother's age in years. The age of the monkey's mother added to the age of the monkey is four years. The monkey's mother is twice as old as the monkey was when the monkey's mother was half as old as the monkey will be when the monkey is three times as old as the monkey's mother was when the monkey's mother was three times as old as the monkey.

The weight of the rope or the weight at the end is half as much again as the difference between the weight and the weight plus the weight of the monkey. How long is the rope

Hint: The problem can be solved by simple arithmetic. If St. Patrick was able to drive the snakes out of Ireland, you embryo engineers ought to be able to handle this.

1st ROTC (preparing essay): "What do they call those tablets the Gauls use to write on?"

Roommate: "Gaul Stones."

—*A. & N. Journal.*

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"Gwendolyn: "Sailor boy, you are the breath of my life."

Marine (approaching unnoticed): "Here's where I take your breath away." The marine landed and had the situation well in hand.

—*Texas Runner.*

---

She: "We've been waiting here a long time for that mother of mine."

He: "Hours, I should say."

She: "Oh, George, this is so sudden."

---

Then there is the tale of the absent-minded Prof who turned on his wife and kissed the ignition.

---

He (on telephone): "Hello darling, would you like to have dinner with me tonight?"

She: "I'd love to, dear."

He: "Well, tell your mother I'll be over at seven o'clock."

---

Big He-man: "I developed these muscles by working in a boiler factory."

Innocent Young Thing: "Oh, you great big wonderful man. And what do you boil?"

---

A doctor told a Scot that his wife needed salt air. The good woman awoke the next morning to find her husband fanning her with a herring.—*Worthington News.*

"I saw a man swallow a sword."

"That's nothing. I saw a man inhale a camel."

---

Sap: "Do you care for dancing,"

Coed: "No."

Sap: "Why not?"

Coed: "It's merely hugging set to music."

Sap: "Well, what is there about that you don't like?"

Coed: "The music."

—*Auburn Engineer*

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The fortunate youth gazed delightfully at his stunning date as she gracefully descended the stairway. His heart beat violently as he realized that all this beauty was his. Charmingly she stood before him and whispered, "How do I look?"

"Sweetheart," he murmered, as he took her in his arms, "you look mighty good to me."

"Don't let your impressions mislead you," she breathed, snuggling closer. —*Princeton Tiger*

---

It seems that the dean of a certain college was called to investigate a charge made by some of the girls. They reported that the men who lived in the fraternity house next door invariably forgot to lower their shades at night. The dean looked through all the sorority windows and then said, "Why, I can't see into any of the windows of the fraternity house." A meek voice from one of the girls said, "Oh, yes you can, only you have to stand on that chair."

—*Auburn Engineer*

## Fraternities

(Continued from Page 21)

the active chapter entertained at the house the pledges at a dance in their honor. Arrangements for the affair were in the hands of the social committee, which Frank Butler is the capable chairman.

## Theta Kappa Nu

On Sunday evening, February 28 the house of Indiana Gamma was all aglow with excitement. Pledge services were over, and the banquet for the pledges was in sight by 6:00 p. m.

Outside of this one event things have been rather slow for our men, except those interested in students outside of Rose. But just wait, big plans are in the making for a real pledge dance to be given in the near future—it's going to be something to write home about. Then in addition we have plans for several "Open Houses". So it seems that the men of Theta Nu have planned a rather full calendar.

As a supplement to the social calendar, a little study has been added. It is a great task, to return to studies after such a midyear vacation. But don't worry it's all fixed up to graduate the whole chapter with honors next spring.

## Theta Xi

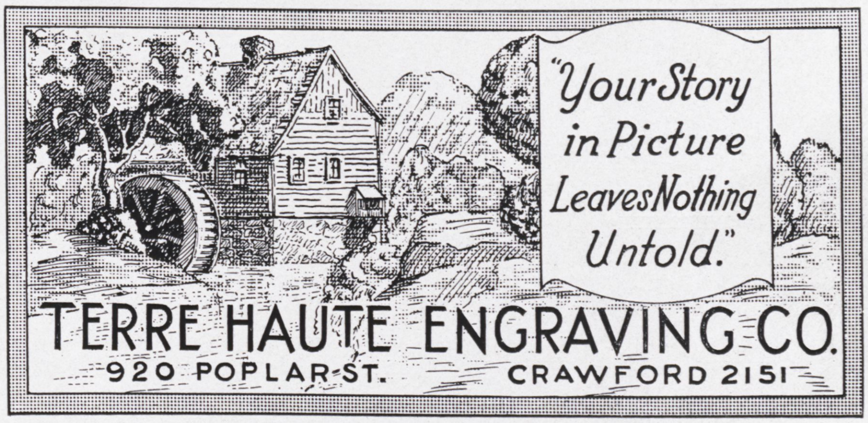
After a very successful rushing season, Kappa of Theta Xi announces the formal pledging of Richard Stamm, Wauwatosa, Wis., Donald Troll, Kansas, Ill., Harry McCord, Newcastle, H. L. Lofton, Shelburn, J. L. Finch, Carlisle, and Thomas Day, Vincennes, Ind.; John W. Brennen, Richard Lloyd, and James R. Marks, Brazil, Ind.; George Cavanaugh, Norman H. Cromwell, John E. Hartmann, Milton Kroesch, John F. Mayrose, Eugene Mueller, Emerald F. Newman, Carl Price, Ray Rennels, Raymond Scherich, Norman Tucker, and Robert J. Utz, Terre Haute, Ind.

These men were formally pledged February 5, at a banquet held in their honor at the chapter house. After the pledging ceremonies short talks were given by Professor Peddle, Clyde Weber, Edward Weinbrecht, and Hubert Merrill. John Wells was the toastmaster.

On Friday, February 19, the Fraternity entertained with an Open House. Fred Reed was in charge of the affair, and arranged a treasure hunt and light luncheon. Guests for the evening were Miss Effie Reis, Professor Bloxsome, Professor Peddle, and Mr. Kearns.

Theta Xi was well represented when the Military appointments were announced this semester. Robert D. Moench is captain of Company B, with Laatz and Wells as platoon leaders. P. J. Schaack is a platoon leader in company C. George Hauer and P. J. Ogden are attached officers. Among the juniors, Weinbrecht is Sergeant Major.





## Campus Activities

(Continued from Page 20)

teresting lecture by Dr. Phillips Thomas, research engineer of the Westinghouse Company. He demonstrated the stroboglow, an apparatus by which it is possible to examine any kind of rotating or vibrating machinery as though it were stationary; the fire scarner, a device for automatically extinguishing any fires within a given area; the cathode ray oscilloscope, an instrument which projects sound waves on a screen by means of the light produced by a stream of electrons as it is deflected from the horizontal by the sounds; the Spencer disc theormostat, the latest development of its kind; the photomatic telephone, which makes use of the phototube and the grid glow tube in the remote control of electrical circuits by a light beam; and two recently developed alloys which are now being used, one in transformers used in radio amplification, the other in place of platinum as the metal used in coated filaments for vacuum tubes.

Dr. Thomas relieved the tedium of technicalities by the introduction of spectacular exhibits, such as blowing out the lights of the lecture hall and then lighting them with a match. He also performed in his version of a modern William Tell. He placed an apple on the head of a bust, and with his little bow and arrow—the arrow being a beam of light which flashes from a flashlight tied on the bow—he aimed, snapped the bowstring, and—Bang! The apple was blown to bits. The flash of light fell upon a phototube, and caused an associated grid glow tube to pass a momentary current. This current energized a relay which caused a larger current to flow through a second circuit, blow a fuse and ignite a small charge of powder inside the apple.

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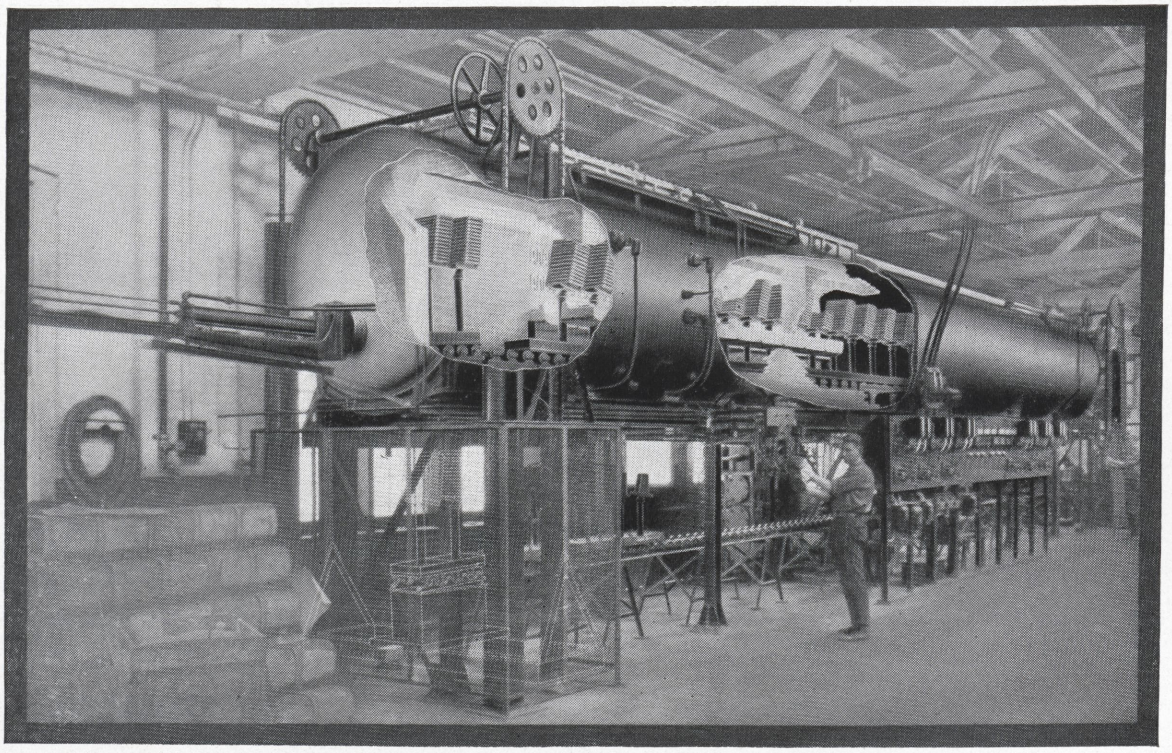
Ruth rode in my new cycle car
In the seat back of me;
I took a bump at fifty-five,
And rode on ruthlessly.
—*Worthington News.*



# SEALING STEEL

## WITH FLUID COPPER

WITH copper melted to the consistency of kerosene in an electric furnace, steel can be sealed so as to be gas-tight. Like bones, the grains of steel tend to grow together slowly, but electric heat speeds up the process so that steel joints require but a few minutes to knit. And steel joints knit in a copper-brazing furnace are exceptionally neat, strong, and tight.

As a controlled atmosphere at very high temperature must be used, the electric furnace is important to the process. At brazing temperature, the molten copper wets the clean steel and flows into the finest crevices, forming a copper-steel alloy which seals the joint. The greater the pressure at the joint, the readier the flow of copper.

Such furnaces are used in the manufacture of G-E refrigerators, where hundreds of evaporators are hermetically sealed daily.

These developments in industrial heating are largely the achievements of college-trained General Electric engineers. Newly graduated young men obtain in the Testing Department practical experience which fits them for future positions of responsibility.

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