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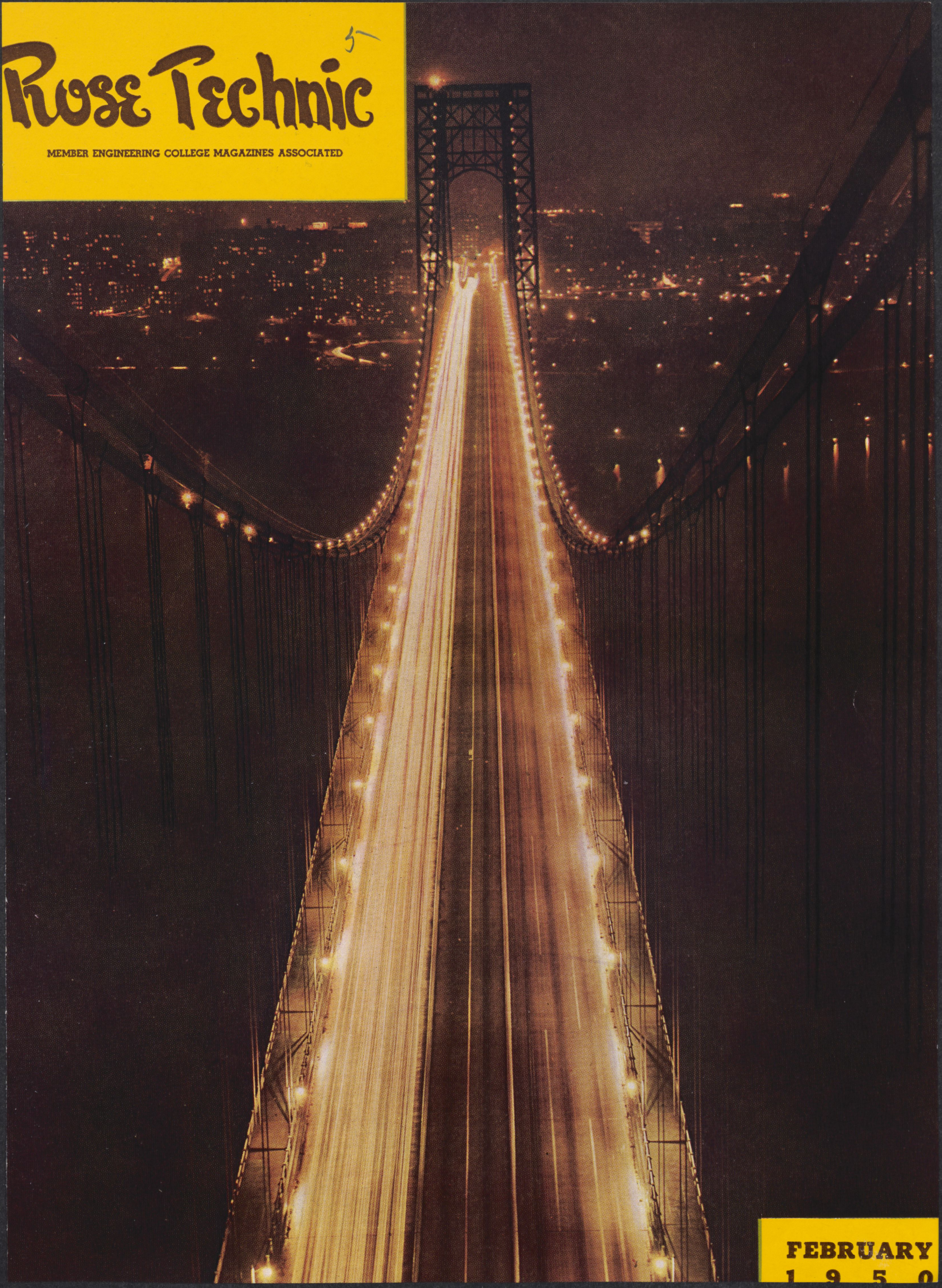
Rose Technic Staff
Rose-Hulman Institute of Technology

Rose Technic

MEMBER ENGINEERING COLLEGE MAGAZINES ASSOCIATED



FEBRUARY
1950

Rose Technic

VOLUME LXI, NO. 5 FEBRUARY, 1950

In This Issue

Cover

Symbol of engineering achievement in transportation, the George Washington Bridge crosses the Hudson River from upper Manhattan to New Jersey, a span of 3,500 feet. At night the bridge is a myriad of moving lights—the headlights and tail-lights of crossing vehicles. Here, in this spectacular time exposure by Ewing Krainin, these lights merge into ribbons of color. Plates by courtesy of Cities Service Corporation.

Frontispiece

The wind tunnel at the University of Maryland is a medium speed subsonic type, with a top wind velocity of 350 miles per hour. The frontispiece shows the propellor—19 feet in diameter, with seven blades.

PHOTO CREDITS: Cover, Cities Service Corporation. Frontispiece, PEGASUS. Page 8, CIVIL ENGINEERING. Pages 10 and 11, WESTINGHOUSE ENGINEER. Page 12, Air Force Photo. Pages 14 and 15, ROSE TECHNIC.

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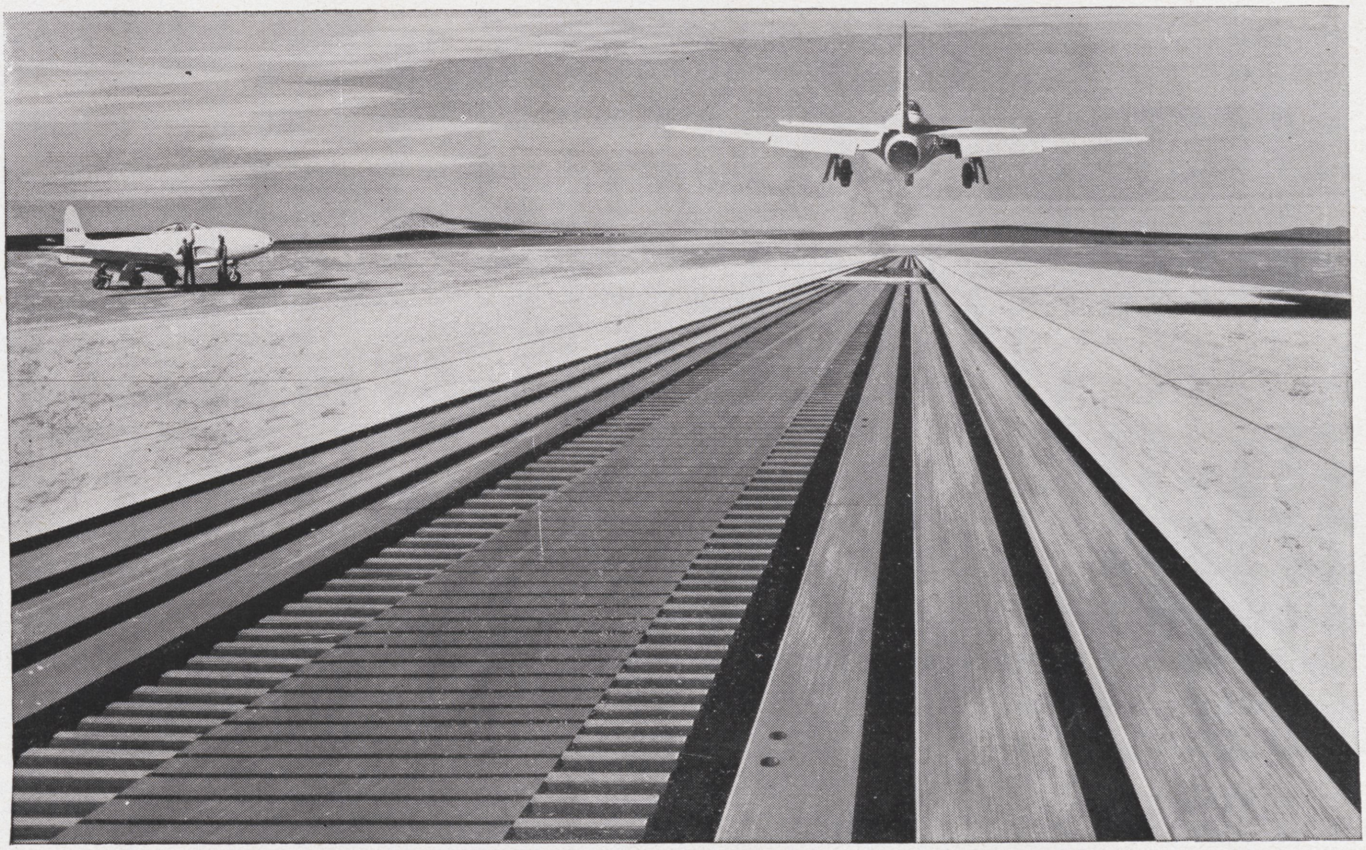

Great Names are built on Solid Foundations

Individual reputations, or futures, like that of a business, are built on solid foundations. So let's examine the basis of a solid foundation.

Suppose you had a problem . . . required some kind of power to help hurl a jet plane into action from a ship. That was a critical problem of the Navy in wartime.

They came to Westinghouse, where they knew they would find a strong foundation in power equipment. And Westinghouse engineers came up with the answer—a motor 1,400 feet long that lies perfectly flat . . . never turns . . . has no shaft . . . that looks like a railroad. And it works . . . sends a plane into the air at 117 miles per hour.

This same daring spirit developed a 65,000-hp motor to pump rivers of water for a vast irrigation project, 20 percent larger than any motor previously built . . . and a motor so small that you can hold it in your hand, and that runs at the almost unbelievable speed of 65,000 rpm to do another highly important task.

This pioneering spirit prevails throughout Westinghouse, whether it's a need for motors, railway locomotives, gas turbines, steam power, elevators, radio, electronic devices, x-ray machines, household appliances, plastics, lamps, lighting, atomic power development, or a need in any of the hundreds of other channels in which Westinghouse carves its name with engineering achievements.

Important responsibilities can only be placed on strong foundations. At Westinghouse, programs of training and education strengthen engineering backgrounds so that technical men can assume vital roles in a dynamic organization that stakes its future on the commitment:

YOU CAN BE SURE.. IF IT'S Westinghouse

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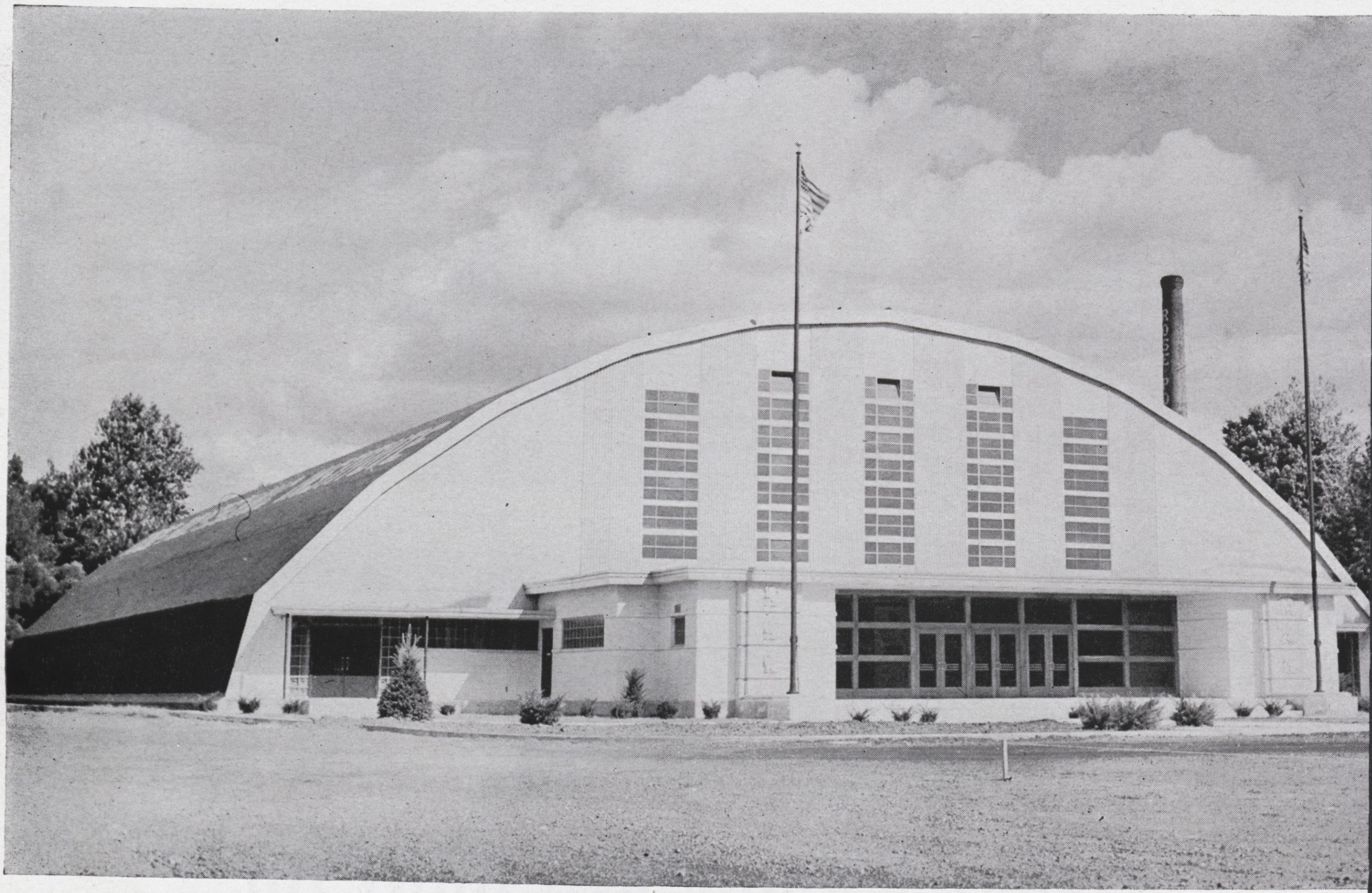
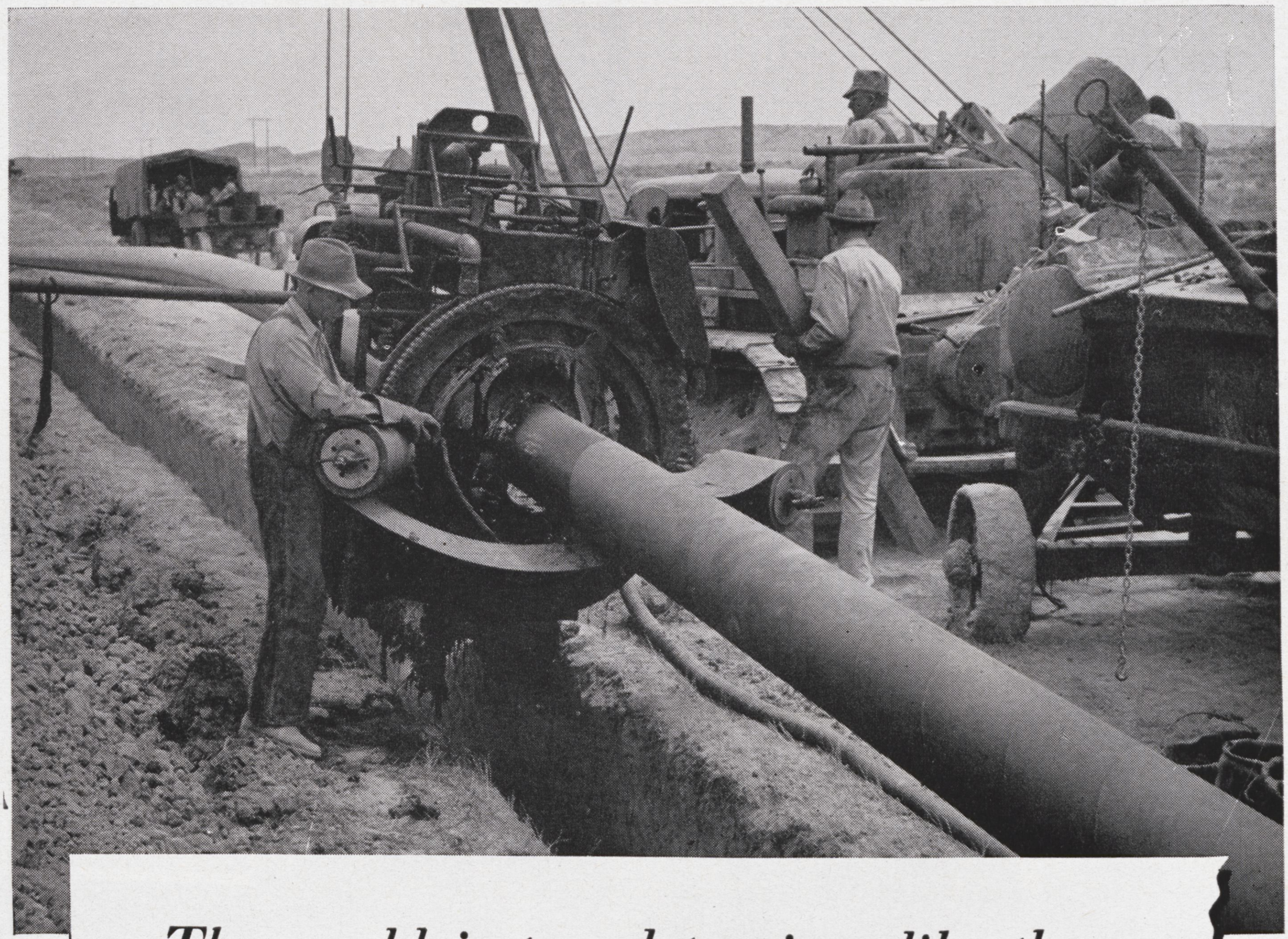


Rose Polytechnic Field House



The world is tuned to pipes like these

Petroleum, as a fuel and as a lubricant, has become the basic material of progress —and petroleum products could not be made available in great quantities at low cost if it were not for pipelines.

Oil transporters pioneered low-cost, long-haul methods of handling liquids in large quantities. Today the users of oil (which includes just about everybody), and of many other products as well, live better because petroleum research men and engineers found ways to get the job done.

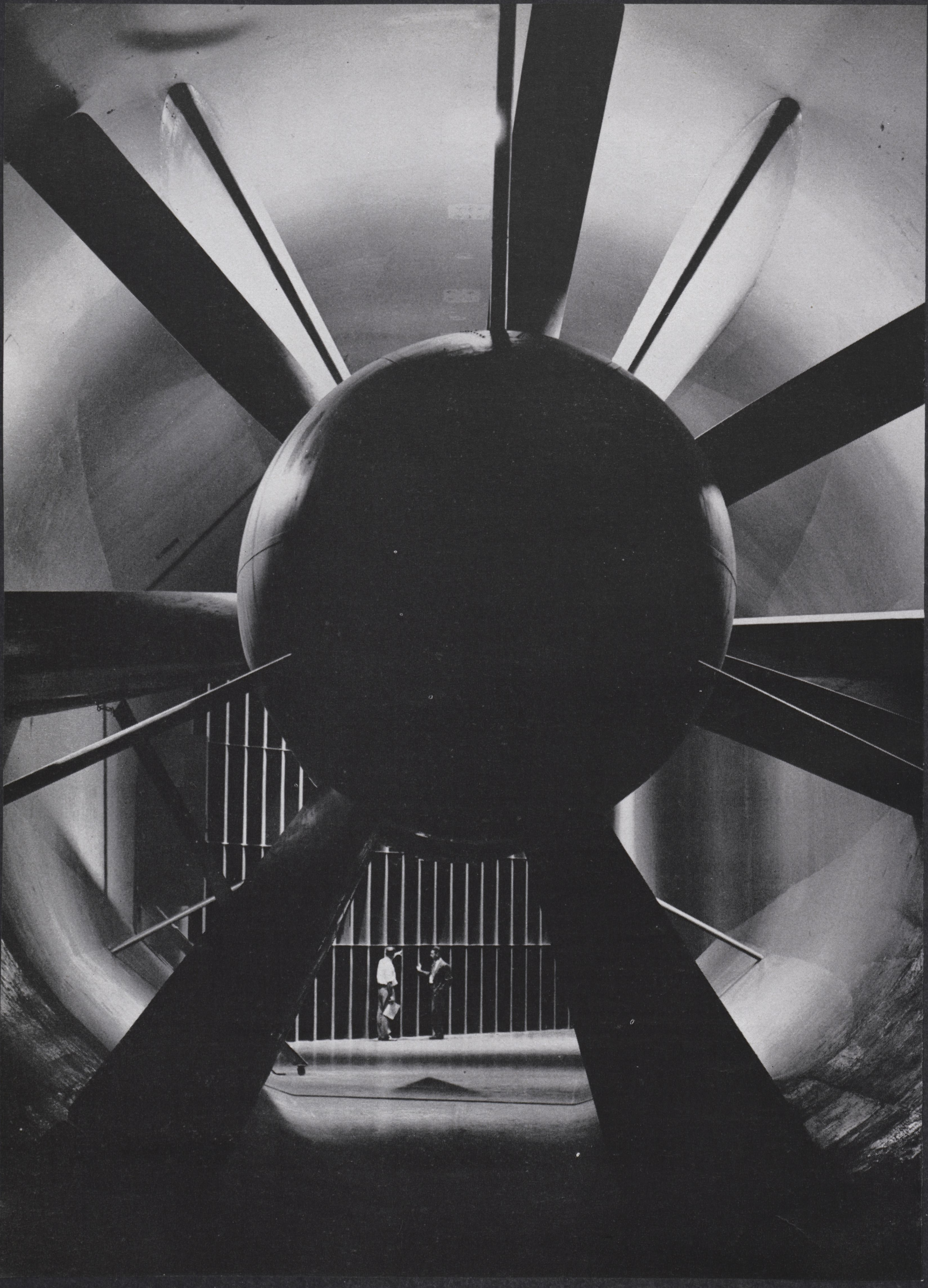
Here at Standard Oil we are developing new methods to increase the efficiency and economy of pipelines. Externally, our lines now have cathodic protection; an electric current is imposed on the line to prevent dissolving the metal of the pipe at points where it is in direct contact with soil. Internally, corrosion is inhibited by the injection of sodium chromate solutions that form a protective film. Both methods minimize costly shutdowns of our pipelines. Even more improved methods are now being sought.

From their work with pipelines, as from their work with all other phases of our business, Standard Oil scientists can feel the satisfaction of accomplishment and the challenge of all that remains to be done.

Standard Oil Company

(INDIANA)

STANDARD



E. C. M. A. Critics

To improve the quality of its member magazines, Engineering College Magazines Associated has required that each month a copy receive constructive criticism by an ECMA critic. This copy is returned then to the individual schools. As a member of the ECMA, the Rose Technic receives well-meant, but sometimes poorly-directed, criticism each month.

The staff pages of the last three issues of the Rose Technic contained the critic's comment, *save space,* and the suggestion that the type be set in agate. This is the smaller type used in previous issues. In governing the policy of the Rose Technic, the editorial staff is of the opinion that the members of the staff receive little enough reward without placing an individual's name off in a corner of a page where it is seldom noticed.

Of course, space saved by crimping on the staff page could be used to an advantage financially by placing advertisements there. However, more recognition pays off in cooperation and added staff members.

For years the Rose Technic has contained the prize-winning essay of the Tau Beta Pi pledge class as an editorial. Why should it be classed *a letter to the edtior* by the critic? An essay done by an undergraduate engineer about engineering would seem to be ideal as an editorial, specially when done by a member of Tau Beta Pi.

As an engineering magazine, the Rose Technic does not intend nor pretend to have universal appeal in reading enjoyment. Nevertheless, nearly all readers of the 1700 monthly copies find something of interest in the magazine. It may be editorials, technical articles, advertisements, alumni news, features, or the joke page.

The readers of the technical articles usually have a sufficient breadth of knowledge to understand the terminology of an undergraduate engineer. Why an article on optical glass must contain an explanation for a term such as "refractive index," which is of high school physics level, will always remain an enigma to the Rose Technic staff.

Most of our readers know that an issue of the Rose Technic does not contain much news of the preceding month. The staff must always plan ahead for make-up, engraving, and printing so that the publishing deadline can be met. While trying to be up-to-date, the Rose Technic, cannot be as current as is desired.

The staff has used the Flesch formula, at least in part, as a guide for a number of years. In the opinion of the editors, the formula in full would tend to sensationalize the copy, imparting more of a *Reader's Digest* style. Would it not be better for the critic to use an engineering-journalist viewpoint rather than a newspaper-journalist viewpoint?

Much of the criticism given this magazine is well-received, and a sincere attempt is made by the staff to improve readability. This editorial is written to clarify the feelings of the responsible members of the Rose Technic staff on the subjects covered.

Would other members of the ECMA care to express their current policies?

Long Span Bridges

By
Thomas E. O'Brien, jr., c.e.

San Francisco—Oakland Bay Bridge During Construction

Bridge designers are unanimous in their agreement that the suspension type bridge permits attainment of longer spans than any other type of bridge structure. The roadway of a modern suspension bridge is supported by suspenders from huge cables which run over two high towers, one on either side of the main span, and are anchored in the ground at each end.

To correct the vertical sag due to loads, a stiffening truss of some type is used. The truss can be either incorporated in the cables or can be a horizontal truss along the roadway. The lateral sway due to the wind is accounted for by cross bracing beneath the roadway or by using the proper distance between the stiffening trusses.

Suspension bridges are not new. They were the earliest type of bridge made entirely of wrought iron. A publication dated 1667 mentioned one of this type in China. At that time, however, it was necessary to construct the suspension cable from iron chain because the early wrought iron was made in small quantities.

Thomas Telford, one of the greatest engineers of history, completed his famous bridge over the Menai Straits in Wales in 1826. The bridge has a span of 580 feet and is carried by 16 main chains arranged in groups of four with each of its two roadways supported by two groups. The towers of the Menai Bridge are made of masonry and they rest on solid rock. The bridge was severely damaged by wind in 1839, but repairs were made and it is still in use.

The earliest notable suspension bridge in America was the Brooklyn Bridge over the East River between New York City and Brooklyn. It was designed by John A. Roebling. Due to his untimely death during the construction, it was completed by his son, Col. Washington Roebling, in 1883. With a main span of 1,595½ feet, it has a single deck 86 feet in width but is divided to provide for two elevated tracks, two trolley tracks, a single lane roadway beside each trolley track, and a central footwalk of 15 feet.

The Brooklyn Bridge marked a great advancement over all other bridges of its type. Its construction introduced the system, now in general use, of "spinning" the giant cables in place. Using a "traveling sheave" which carries a loop of wire from one anchorage to the other, two wires are laid simultaneously.

Also introduced was the use of four cables made of parallel steel wires formed into circular cross-section and covered with steel wire for weather protection. The parallel wire cables are used instead of twisted wire cables because they are stronger and stretch less. Galvanized steel wire was also first used by Roebling on this bridge. The cables were 15-¾ inches in diameter and a total of 14,357 miles of wire was used.

The George Washington Bridge which was completed in 1931, showed the first great improvement over the Brooklyn Bridge. It had a main span of 3500 feet (between towers) and a total span of 4,760 feet (main span plus end spans). It was built over the Hudson River and connected New York City and Fort Lee, New Jersey.

In one step this gigantic structure inaugurated a new order of magnitude in bridge building. The cables of the George Washington Bridge measure 36 inches in diameter and contain 26,474 galvanized steel wires laid parallel to each other. A total of 105,000 miles of wire was used in "spinning" these giant cables.

The towers are made of steel and rise 635 feet above water level. The foundations are as deep as 76 feet below water level in the bedrock. The New Jersey anchorage is drilled deep into the rock of the Palisades and 165,000 cubic yards of concrete form the New York anchorage. The cost of this huge structure was $55,000,000. It is operated as a toll bridge.

Six years after the George Washington Bridge was opened to traffic, the record holding Golden Gate Bridge was completed in San Francisco. It has a main span of 4200 feet which is the longest in the world. The unique feature of the Golden Gate Bridge is that it is the first bridge to have a pier (tower foundation) in the open sea. This had to be done in order to avoid planning a bridge with a span of more than 5300 feet.

As might be surmised, the building of this under-sea pier was the greatest engineering problem encountered in the project. After several disastrous storms and almost two and one half years of toil, the pier was completed and construction of the bridge got underway. The bridge itself showed no great improvement over the George Washinton Bridge except for the added 700 feet of main span.

The normal order of erection of suspension bridges is (1) substructure, (2) tower and anchorage, (3) foot bridges, (4) cables, (5) suspenders, (6) stiffening trusses and floor systems, (7) roadways, and (8) cable wrapping. The cables are the only members requiring specialized knowledge for their erection. The other components are erected by the common field methods of construction.

The substructures are made of concrete or some other form of masonry, and usually rest on the solid bedrock beneath the surface of the water. Large caissons are sunk at the site of the pier so that they are resting on their edges with their bottoms up. The water is forced out by compressed air; then men go down and dig away the dirt until a suitable foundation is reached. A good foundation is probably the most necessary and important part of any big bridge.

The anchorages are either located in natural rock or huge amounts of concrete or masonry. The anchorages must have enough mass to withstand the dead weight of the whole structure plus the live loads the bridge is subjected to. In anchorages of large suspension bridges, there may be required an elaborate grillage of steel beams, buried in the masonry, to which each of the giant cables is connected by large eyebars.

The towers are generally constructed without falsework (scaffolding) from steel structure which is fabricated in the shops and shipped in sections to the pier. The general method of erecting the towers employs a derrick to lift the individual sections into place. The sections are then bolted together until a riveting gang rivets them together permanently. As the tower rises, the derrick is raised with it, using the completed portion for a base. On smaller bridges, the towers may be erected by gin pole or by a stationary derrick alongside.

The footbridges are working platforms which follow the curve of the suspension cable. They are used in the spinning of the cable by the traveling sheave, in wrapping the cable, and in hanging suspenders. They vary in size, but are usually from six to eight feet wide and are equipped with wire rope handrails. They are securely lashed to the completed towers and made as safe as possible.

Before spinning the wires for the cables, a series of special computations have to be made to determine the location of the guide wires, for setting the saddles on top of the towers, and for the length of the strand legs. The length of the cable is then carefully computed applying all the necessary corrections (elastic elongation and temperature difference from mean).

The process of spinning the cables, which Roebling introduced on the Brooklyn Bridge, is usually used.

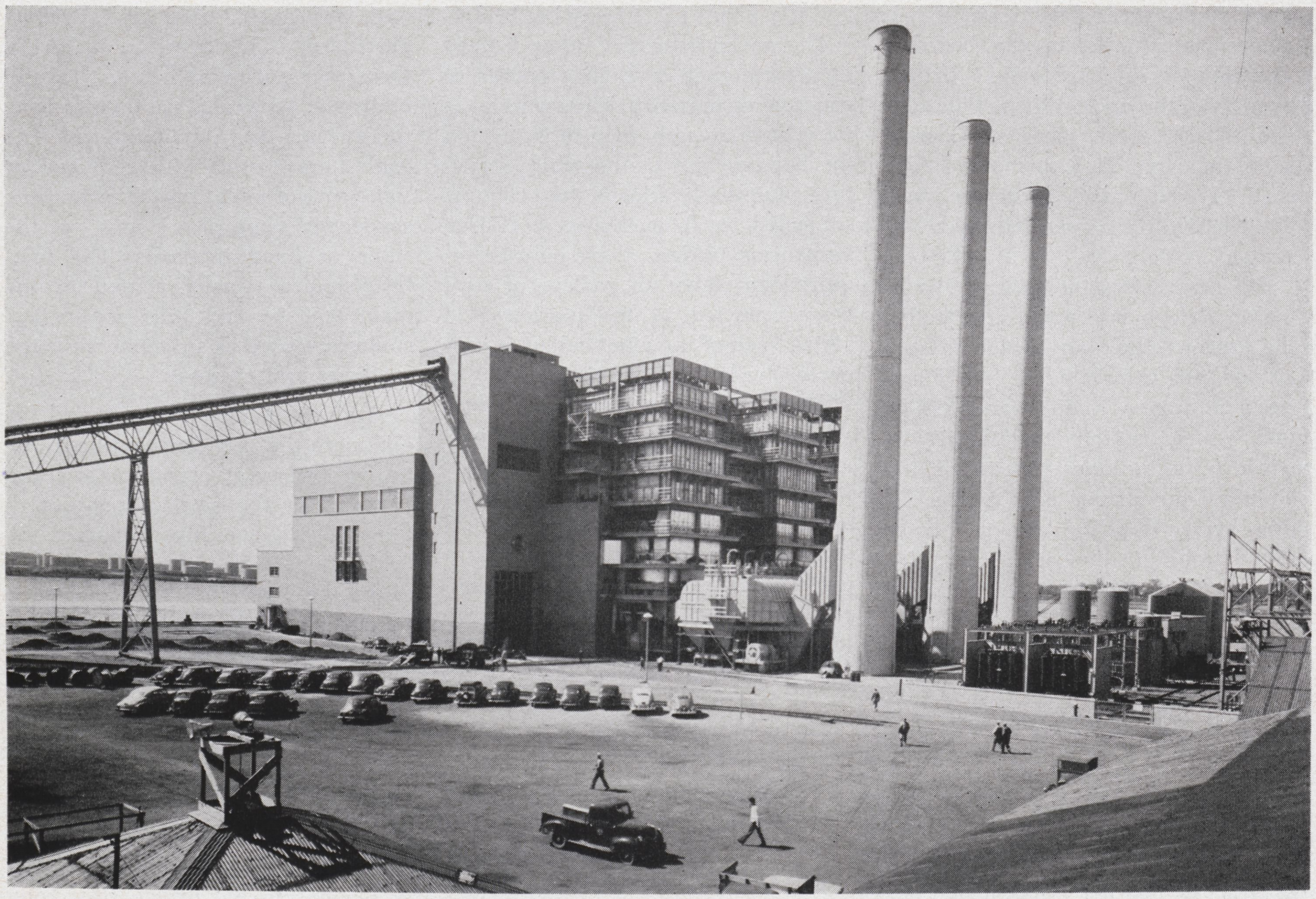
After about 200 of these wires have been thus drawn across the bridge they are banded together to form a cable strand. The cable strands are then connected to the large eyebars protruding from the anchorage. After the strands are completed, powerful hydraulic squeezers are used to form the strands into circular form. The cables are coated with red lead or some sort of metal protector and the suspender clamps are put on the cable at fixed intervals. The foot-bridges are usually affixed to the main cables and the foot-bridge cables are used as suspenders for the roadway and trusses.

The stiffening trusses used to eliminate the vertical movement due to live loads vary greatly in size, depending on the size and nature of the bridge. Generally the larger the bridge the less need for stiffening because the live load-dead load ratio becomes very small. It also depends upon the concentration of the loads; therefore railroad bridges need more stiffening than do other types.

The erection of the trusses proceeds without the use of falsework and is usually started at both towers at the same time. The trusses are prefabricated in the shop and shipped in sections to the bridge site. They are usually erected by large traveler derricks provided with bull-wheels, and stationary derricks are used at the towers. The steel supports for the floor are usually in the form of steel panels. Erection of them is at the same time the trusses are being put in place. Common field methods are used in the assembly, and surfacing is completed in the ordinary manner.

The use of soft galvanized steel wire for cable wrapping originated on the Brooklyn Bridge and is still employed on the large bridges. The wrapping can be done with an ingenious machine developed by H. D. Robinson. The machine is operated by an electric motor and it wraps the wire under constant tension. After the cable wrapping is completed the suspension bridge is ready to be opened to traffic.

The designers and builders of bridges have made astounding progress in the last century. To the needs for bigger and better bridges in the future they will respond with even greater engineering feats.



Power Plants Go Outdoors

By William G. Rinker, jr., e.e.

The engineers of Public Service Electric and Gas Company (of New Jersey) built into Sewaren Generating Station their most forward thinking. Sewaren, with its many new features, shows that the power industry, despite the immutability of generating principles, is ever dynamic and changing.

Public Service has long distinguished itself in promoting bigger and better 3600 rpm turbine generators. The utility culminated its efforts when it placed in service the first two turbine generators to operate at 1050 degrees F. The turbines, which have a nominal rating of about 100,000 Kw, are among the largest capacity, high-speed units in operation. They are to be followed by two more, one of which will be rated 125,000 Kw.

The complete four-unit station will cost approximately 132 dollars per Kw and will operate with a plant heat rate of approximately 10,000 Btu per Kw-hr.

Sewaren exemplifies modern station design in that three semi-outdoor type boilers are first to catch the eye upon approaching the building. To the utility engineer these boilers are extraordinary because they are the largest and among the first semi-outdoor boilers located so far north. The building encloses only the front and part of one side of each boiler, reducing building dimensions and saving construction cost; furthermore the ventilation problem and facilities for good house-keeping are reduced because the heat and dirt cannot enter from the boiler-room directly into the turbine.

Sewaren is laid out on the inexpensive unit system. With this scheme each generating "unit" is complete in itself and practically independent of others.

Each of the four boilers was constructed by Combustion Engineering-Superheater Inc. Each boiler is of the three-drum, radiant type, rated 1500 psig at 1050 degrees F., with a continuous capacity of 850,000 lbs. of steam per hr. and a four hour maximum capacity of 950,000 lbs. The fourth boiler is arranged for reheating, therefore delivering a greater output with the steam flow the same.

The furnace is of the wet-bottom type; the molten ash flows into water-filled tank which disposes the ash by hydraulic pumping. The furnace is fired from the four corners using coal, gas, or oil as fuel. Steam temperature is controlled by a damper. Each boiler has a combination mechanical-electro static flue-dust collector that removes 95 per cent of the total weight of fly-ash.

The Sewaren turbines, particularly interesting to utility engineers because of their high temperature, high pressure, and high capacity at high speed, posed particularly difficult problems to their designers for precisely these same features. One of the most difficult of these problems resulted from the 1050-degree steam conditions, which required the use of steels new to turbines. For example, in the Westinghouse turbine the steam chests and nozzles are of 18-8 chrome-nickel stainless steel.

Similar problems occurred on the turbines themselves, whose various sections are constituted of different alloys, determined by the temperature of each. The difficulties were surmounted by welding, at the points of lowest stress, relatively thin, flexible members which permit expansion and contraction with temperature changes.

Another difficulty was the development of a suitable 23-inch-long turbine blade for the last low-pressure stage on the rotor.

Another innovation at Sewaren is the exclusive use of motor-driven auxiliaries instead of steam-driven. At Sewaren, steam from the boilers is used only to run the main turbines; the steam is then condensed and returned as water to the boilers. Most of the functions normally assigned to auxiliary steam are accomplished by other means. One problem in eliminating the use of auxiliary steam was in the substitution of motor-driven vacuum pumps for steam-jet ejectors.

Soot blowing, which normally requires a large volume of steam, is done by compressed air.

Also discarded at Sewaren is the steam-driven auxiliary oil pump. The system used is comprised of a full-capacity a-c motor-driven pump, backed up by a smaller a-c motor-driven auxiliary pump (normally used for lubrication when the turning gear is operating), and further backed up by a still smaller d-c motor-driven pump supplied with current by the station battery. The latter pump has enough capacity to provide lubrication for bringing the turbine generator to a stop should both a-c motor-driven pumps become inoperative.

The advantages of all-electric auxiliary drive are: (1) reduction in the quantity of make-up water to less than one-half per cent, (2) elimination of the auxiliary steam heater at the boiler, the pressure-reducing valve, and much steam piping, and (3) facilitation of central control of the station, another Sewaren feature.

Three distribution voltages are available for auxiliary power: 2400, 440, and 220 volts. Power is distributed through drawout-type high- and low-voltage switchgear.

Induction motors are used for all auxiliary drives. Such motors are simple in construction and afford the utmost in reliability—essential features where emergency steam units are not provided. Totally enclosed motors are used extensively.

The Main Electrical Equipment

Each of the main generators 1, 2, and 3 is rated 111,765 kva, 95000 kw, at 15 pounds hydrogen pressure.

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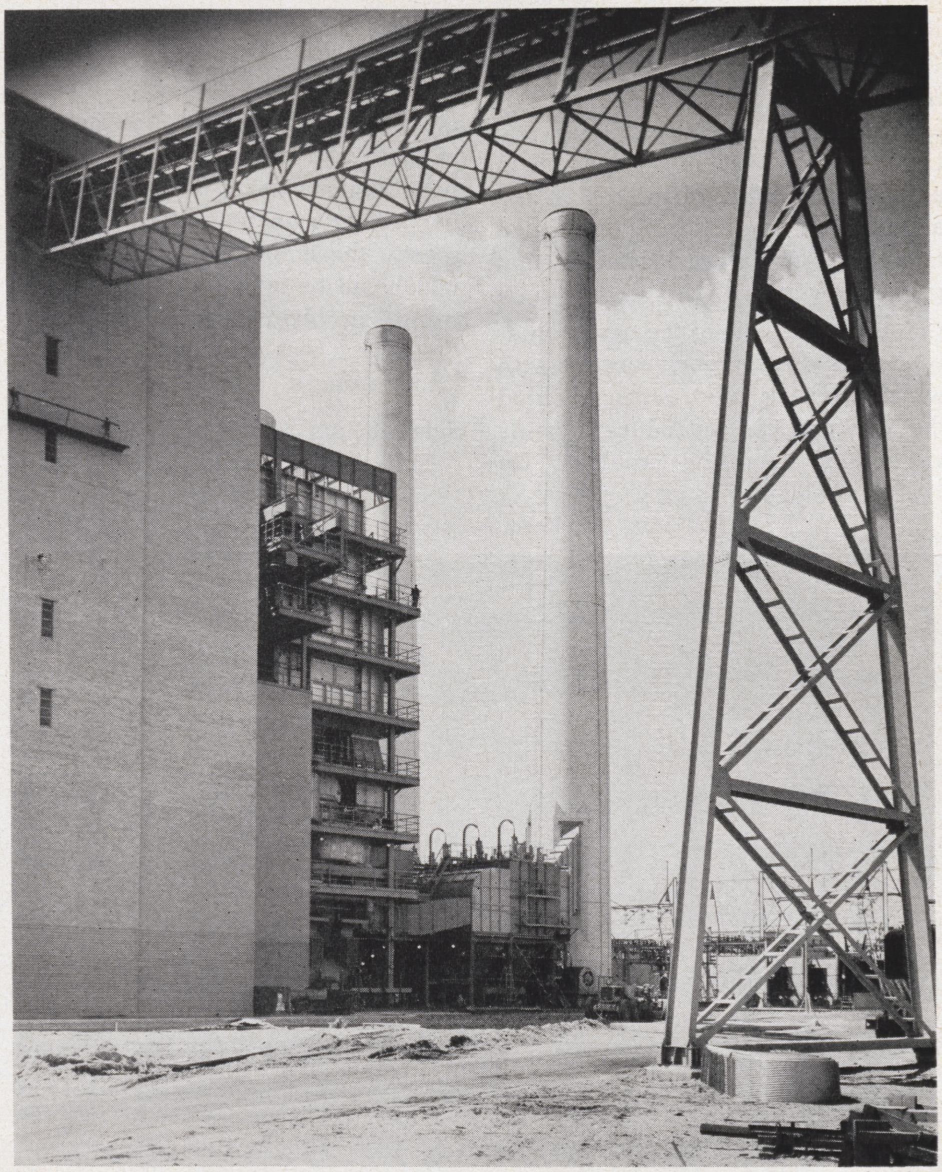
In the Foreground — The Coal Conveyor



Research and Development

By George W. Eddy, sr., m.e. and Fritz Wheeler, fresh.

Linktronic Training

Jet pilots will do their first flying of high-speed aircraft on the ground in the future. The new training is made possible by a Link Trainer especially designed to simulate jet aircraft flight, and combines training in flight, engine and radio navigation in one package.

The device is popularly dubbed the "Linktronic." Squat and stubby, it much more nearly resembles a Deisel locomotive than the sleek airborne craft it simulates, and provides space for both trainee and instructor in one integral unit.

All of the controls, instruments and indications of a high speed aircraft are included in the new trainer, and they function just as they would in actual flight. Rates of roll, climb and acceleration are faithfully duplicated and the controls are loaded so that pressures vary with airspeed.

An integral part of the new trainer is a series of emergency controls with which a check pilot, sitting behind the cockpit, can introduce a wide variety of operating troubles. By pushing a button the instructor can make the fuel pump or hydraulic system fail, can stir up a thunderstorm, can have the fuel tank punctured by a burst of flak, or can create any other flying hazard.

Flight conditions in the trainer may be varied from a thin overcast to night instrument conditions through the use of light intensity controls. Wing and pilot icing are also simulated, and they affect both flight performances and instrument indications. The new trainer also permits the introduction of rough air, and permits its intensity to be governed by the check pilot.

Because of the extensive amount of air work at high altitudes required in jets, and their frequent use in polar regions, wind effects become a major factor in navigation. For this reason the amount of wind velocity which can be introduced into "Linktronic" problems is more than twice that which was provided in previous Link Trainers.

Scintillation Counter

Split-second flashes of light, produced when radioactive particles strike a suitably prepared surface may now be measured with great accuracy by an electronic counting system embodying recent developments in phototubes. Because of its greater sensitivity and flexibility, the instrument, called a scintillation counter, is fast replacing the Geiger counter in many applications involving atomic and nuclear radiation.

The scintillation counter consists essentially of an extraordinary phototube "eye" and a fluorescent screen or phosphor crystal. When the instrument is exposed to radiation, radioactive particles strike the fluorescent screen and produce flashes of light. The light from each flash is picked up by the phototube and converted into a tremendously amplified electrical signal. The signals are then further amplified and registered on a meter or other device to indicate the presence and strength of radioactivity in the immediate area.

The heart of the scintillation counter is a remarkable electron tube called the multiplier phototube. This photo-electric eye picks up the feeblest phosphorescent flash and converts it into an electrical current which is amplified as much as a million times before it is released to the other circuits of the instrument.

This tube is capable of discriminating or "counting" radioactive particles arriving less than one 100-millionth of a second apart.

Packaged Power

Tomorrow's engine is the gas turbine — and tomorrow is not so far away. In the two and a half years since its experimental existence was disclosed, the Boeing Model "502" turbine has made extraordinary progress. Today it is the most advanced small gas turbine for general application in the United States.

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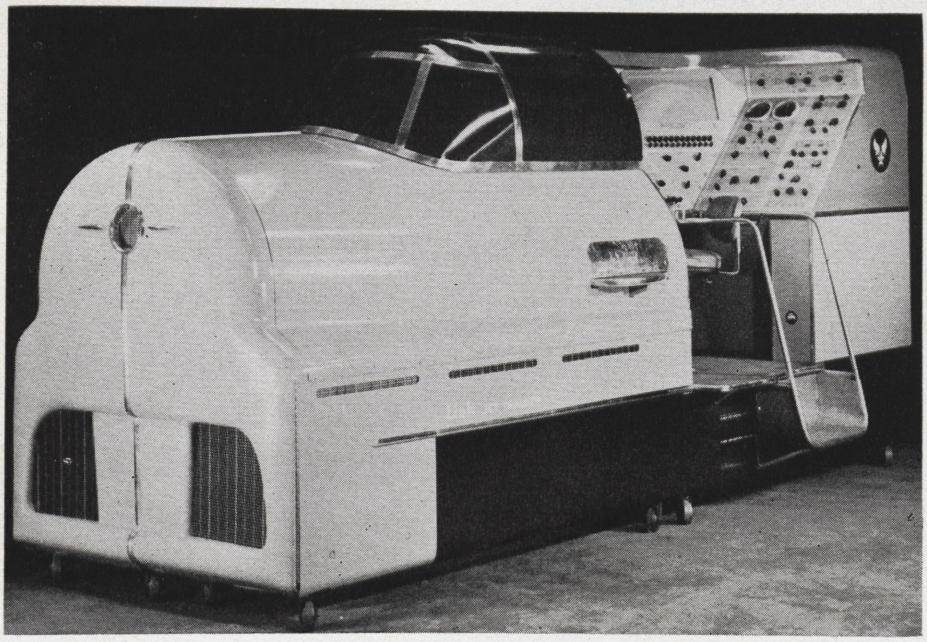
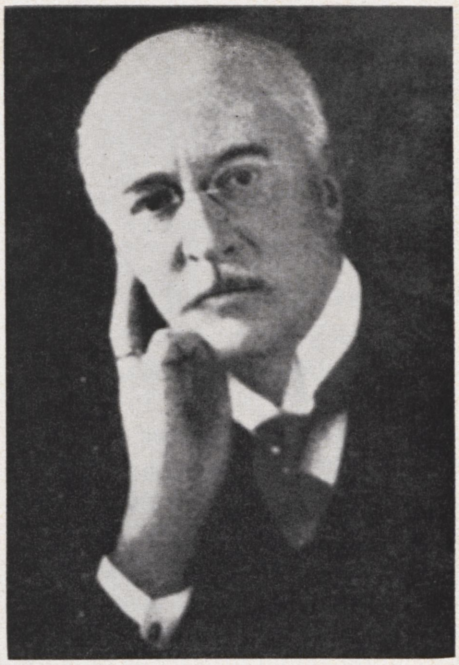
Army Air Force Linktronic Trainer.



GREAT MEN OF SCIENCE

Dr. Rudolph G. Diesel

By Stanley Updike, soph.



Dr. Rudolph G. Diesel

It was on the dark, misty night of September 29, 1913, that Dr. Rudolph G. Diesel, while crossing the English Channel aboard the steamer Dresden, said goodnight to his two friends Messrs Carels and Luckman, and walked into the night, never to be seen again.

Was it murder or suicide? This is a question to which the world has never known the answer for his body was never found. There were ample reasons for believing either. Dr. Diesel had access to many of Germany's technical secrets and it is thought that he may have been erradicated to prevent his divulging these to the British.

Diesel was born in 1853 at No. 38 rue Notre Dame de Nazareth, Paris, France. He lived in an age of development of such scientific wonders as the electric light and gas engine and this would naturally stimulate a young boy's imagination much as do the jets and rocket planes of today.

Young Rudolph's education began in a protestant school in Paris which he and his two sisters attended. At this time his family was forced to move out of the country and they settled in Augsburd, Germany, where he attended the Augsburd Trade Schools and graduated with honors. He received a two year scholarship to Munich Technical Institute, and after two years received a renewal for two more years. At the age of 20 he graduated breaking every academic record.

It was at a lecture by D. Carl Linde, a pioneer in artificial refrigeration, that Diesel first concieved the idea for his internal combustion engine. While discussing the steam engine Dr. Linde pointed out that 90 per cent of the energy in coal was wasted in the best engine available at that time. This set the gears of Diesel's technical mind to whirring. "Since mechanical theory teaches us that only a part of the heat in the fuel can be utilized, why not put the heat to work directly?", he thought. Diesel began to work nights on his plans for his dream engine immediately. This meant long tiresome hours of work for him since he was also working for Dr. Linde in Paris.

The theory of his engine was built around the principle that the more you compress air the hotter it becomes; therefore, he would build an engine in which the piston pulls in pure air and then drives back compressing it and thereby heating it to a calculated figure of 1000° F. A material such as coal dust or oil would then be injected and the combustion would create enough power to drive the piston down.

Much figuring was done and finally every detail was down on paper—work was ready to begin. All that was needed was a financier. At this time Diesel was transferred to Dr. Linde's office in Berlin where he took out patents and then had his manuscript printed. In January 1893 it appeared in a pamphlet entitled "Theory and Construction of a Rational Heat Motor."

Many laughed at the idea but in August 1893 Krupp financed Diesel's invention and the first engine was constructed. It was a tall queer looking contrivance with a large flywheel which revolved slowly.

Then came the crucial day when the first actual test was to be run. You can imagine the suspense which was experienced by Dr. Diesel as the large wheel turned slowly taking in and compressing air, forming intense heat deep within the soul of the machine. Were the careful calculations and principles applied correct—or were the long hours of labor wasted? Now was the time when these questions would be answered.

Slowly the piston drew in the pure air and then as it was compressed into a minute fraction of its original volume Dr. Diesel pulled the switch which injected a fine spray of oil into the cylinder head. There was a sudden explosion and for a moment the air was filled with pieces of flying debris. At first it might be thought that the dream engine had turned into a nightmare, but Dr. Diesel was overjoyed at the results. Here was proof, tangible evidence, that his injection method would create tremendous power! All the engine needed now was development, a stronger construction which would withstand the power which was created by the combustion.

Work was started at once on improvement of the engine and many experiments were carried on to determine what was needed to make the engine a success. After four years of such experimentation the final model was produced. It was a 20 horsepower "Dieselmotor" of amazingly high efficiency.

Today the mighty diesel locomotive, as it streaks through the night sounding its mournful horn, and the gigantic ocean liner, making another trip to a far distant land, are propelled by an engine far beyond the wildest dreams of Dr. Rudolph G. Diesel.

Campus Survey

By James R. Myers, soph.,
Duane Pyle, soph.

Intramural Basketball

The following announcement was placed on the bulletin board during the latter part of December: "Prior to the war all our intramural athletics were played on an inter-departmental basis. We hope to conduct these sports on the same basis in the present and in the future. Only one-third (approximately) of the upper classmen are members of fraternities. If intramural activity is carried on with the fraternity teams as the basis, two thirds of the upper classmen, as well as all of the freshmen, are denied the privilege of playing on teams which have a reason for formation.

"We have found that a definite rivalry can be developed among teams from the various departments and in freshman teams made up from sections or in combinations thereof. In case the fraternities wish to form a league and have their own games, this action will be encouraged as an additional activity, but it will not be sponsored by the athletic department. P.C.B. will be glad to help officiate such games and help in any way possible.".

The preceding announcement received a hearty response from the student body and nine teams were formed from the ninety-odd applicants. Games, which started the week after the Christmas holidays, are played under the following rules:

Each team is required to have a manager who will be responsible for his team's appearance and for adherence to playing regulations. Each team must try to provide a scorer.

Games are played under high school time—four eight-minute quarters with eight minutes between second and third quarters. Each team or squad member who reports for any game must be allowed to play at least one quarter in that game. Failure to adhere to this rule results in forfeiture of that game.

Players provide their own shoes and other clothing. The Atheltic Department provides game jerseys.

Failure of any team to appear for a scheduled game, or failure to have at least five members of that team on hand for any scheduled game results in a forfeit to the scheduled opponent. Two forfeits are considered ample reason for dropping a team from the league.

Evening games start at 7:15 P.M.; afternoon games start at 4:30 P.M.; and Saturday games start at 2:00 P.M., and 3:30 P.M. Before the season's regular play commenced, Coach Phil Brown, Director of Athletics, posted the following information with regard to officiating: "Officiating will be of the highest type—impartial, improved, impoverished, impure and inefficient. All insults to officials are to be left in a bottle of Air Wick until purified."

Medals will be awarded to the members of the winning squad. Silver medals will be awarded to individuals of an "all star" group selected from other teams. At the end of the season's play, the winner will be challenged by the "all star" team. The results of the champion vs. "all star" game will not effect the season standings in any way.

League games are still in progress and it is hoped that the medals arrive by the time that each team has played all eight others.

As of February 1, the Mechanical B team is at the top of the team standings with four wins and no defeats.

. . . . and the rains came

A. S. M. E.

On January 20, 1950, the Rose chapter was host to the Central Indiana section of A.S.M.E. Registration, a social hour and dinner were held in Deming Hall. The coffee speaker was Dr. Wilkinson who spoke on "The Support of Technical Education by Industry." The main speaker of the evening was Mr. McGrain, a geologist, who spoke in the new auditorium on the topic, "Flood Control in Indiana." Approximately 75 industrial representatives attended the meeting.

The student chapter is planning a dinner meeting to be held early in April.

Officers for the year 1949-1950 are: Wayne Loving, Student Chairman; Allan Junker, vice-chairman; Morton Hief, Secretary; William Slagley, Treasurer; Al Johnson, Program Chairman. These officers were elected in October, 1949 and will serve until August, 1950.

This article is dedicated to the many students who have cast inquisitive glances through the dirty glass window at the entrance of the new library; also, it answers the typical question, "Daa, what's going on here?" All the noise that has been heard in the once quiet library is due to the remodeling plan at Rose. The new auditorium and machine design room were the first part, and there is more to come.

In what is now the library will be built some badly needed faculty offices. There will be rest rooms for the staff and interview rooms for employers seeking "expert" engineers. President Wilkinson's and Mr. Blair's offices will be located there also.

In the front part where the registrar's and bursar's offices are now, some much needed changes will be made. The telephone switchboard will be moved there from its present location in the library. Along the hall leading to the present library will be individual mail boxes for those students who live on the campus. On the other side of the front offices will be located the faculty lounge. This room will provide a place for the instructors to relax between tests. The three rickety stairways will be replaced by one stout one.

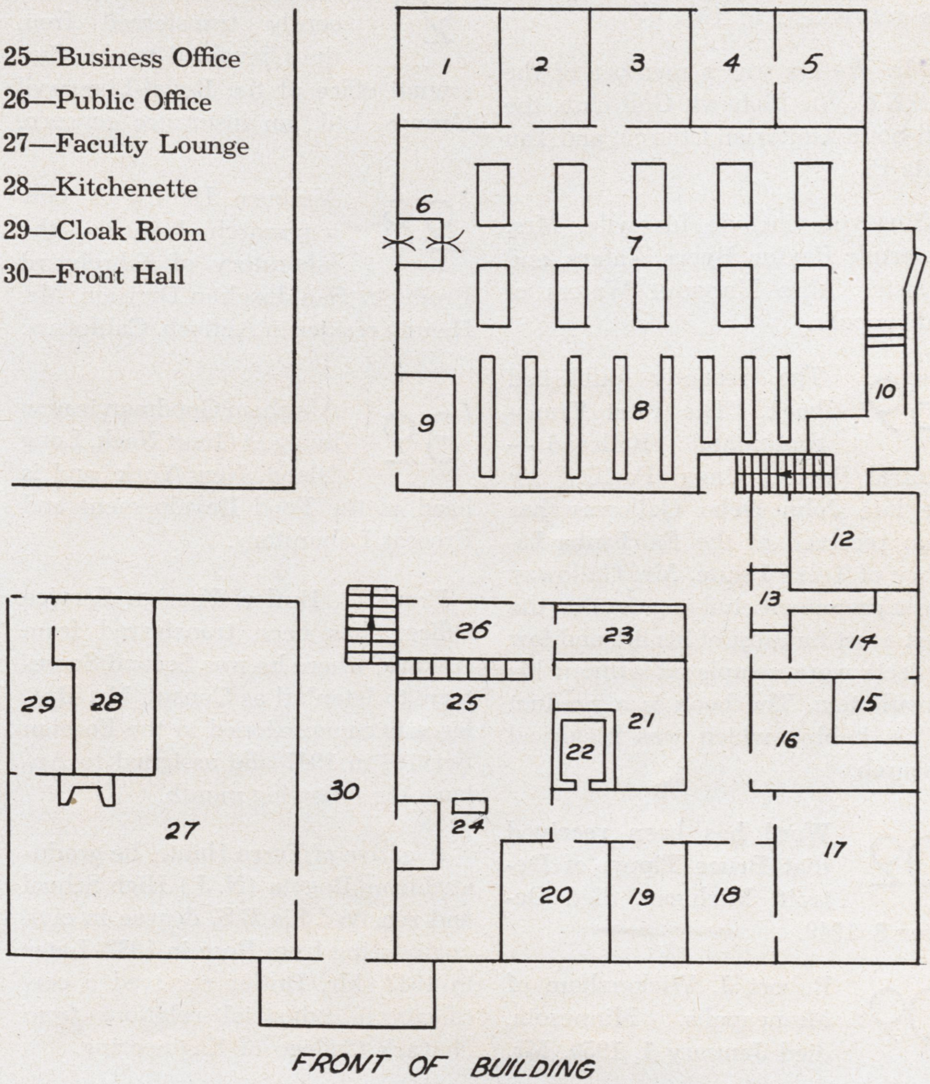
The new library will be in the old machine design room. It will follow the same pattern of construction as the auditorium. Along the north end of the library there will be special reading rooms, the librarian's office and the offices of the Military Department. The main part of the library will be a reading and study room. The book shelves will remain where they are.

This by no means explains all that is going on. For the rest the reader will have to wait until sometime in September when the remodeling is supposed to be finished.

Concluded On Page 26

Improvements in the Making

1.—Dark Room
2—Librarian's Office
3—Special Reading Room
4 and 5—Military Offices
6—Entrance to Library
7—Main Reading Room
8—Stacks
9—Janitor's Closet
10—Outside Entrance
11—Hall
12—Men's Rest Room
13—Janitor's Closet
14 and 15—Women's Rest Room
16—Admissions Office
18—President's Secretary's Office
19—Interview Office and Alumni Records
20—Bursar's Office
21—Storage and Supply Room
22—Padded Cell
23—Mail Room
24—Switchboard and Receptionist's Desk
25—Business Office
26—Public Office
27—Faculty Lounge
28—Kitchenette
29—Cloak Room
30—Front Hall



Alumni News

By Allen Junkers, jr., mech.

'88 Edward Guy Waters, retired official of the General Electric Company, died recently after an illness of several weeks. He was born in Peru, Indiana, in 1866 and won the Heminway medal in his class. After graduation from Rose, he studied graduate work for a year, then joined the Thomson-Huston Company at Lynn, Mass. From 1896 to 1903, Mr. Waters held the position of assistant to the first vice president of the G. E. Co. He then joined the Thomson-Huston Co. again as manager of the commercial department. In 1906 he was recalled to Schenectady and remained with G.E. until the time of his retirement in 1931.

Mr. Waters was a member of the A.S.E.E., the Mohawk Golf club, the All-Souls Unitarian Church, and Tau Beta Pi.

Survivors include his wife, Mrs. Gertrude Paxton Byers Waters, and a sister, Miss Margaret Waters of Indianapolis.

'89 The recently published book, "The First Transcontinental Railroad — Central Pacific, Union Pacific," by the late John Debo Galloway has been received at the Fairbanks Library of Terre Haute. Mr. Galloway was a prominent civil engineer on the west coast for most of his life and few projects were completed without his consultation. The book is a product of his hobby, which was historical research.

'02 Word has been received that Bruce Tippy, of Detroit, Michigan, died October 8, 1949.

'09 Robert J. Wickersham of Minneapolis, Minnesota, died January 1, 1950. Mr. Wickersham was formerly Vice President of Marsh and McLennan.

'11 Edward J. Ducey is now living in Columbus, Ohio. Mr. Ducey has retired from active service with the Corps of Engineers and is engaged in consulting work.

'19 George M. Owens, assistant manager of the Solvay Process Division of the Allied Chemical and Dye Corporation, died in August, 1949.

'21 Robert E. Sewell was recently transferred from the Cleveland to the Cincinnati office of the Royal-Liverpool Groups, Ltd., an insurance concern.

'28 Melburn Hennig is now a research chemist in the laboratory of Fibreboard Products, San Joachim Division. Mr. Hennig resides in Antioch, California.

'32 Abraham Goodman is now living at Great Neck, Long Island, New York, and is head of the Food Development and Process Laboratory.

Frank P. Butler, Foreign Service Officer, has been transferred from Ankara, where he was Second Secretary, to Istanbul as Consul. Mr. Butler was commissioned in the Foreign Service in 1947 and assigned to Ankara the following month.

A native of Terre Haute, he graduated from Bogota (N. J.) High School and received his B.S. degree in civil engineering from Rose in 1932. Later in 1942, Mr. Butler received a certificate in ndustrial relations from Newark College of Engineering.

Mr. Butler was a junior engineer for a railroad company from 1932 to 1933, then served with the U.S. Army in 1933-36 and later during World War II. He reached the rank of Lieutenant Colonel during the last war and received the Bronze Star Medal and the Croix de Guerre.

'42 Donald D. Logsdon, employed by the Standard Oil Company of Indiana, has been transferred from East Orange to the Whiting refinery.

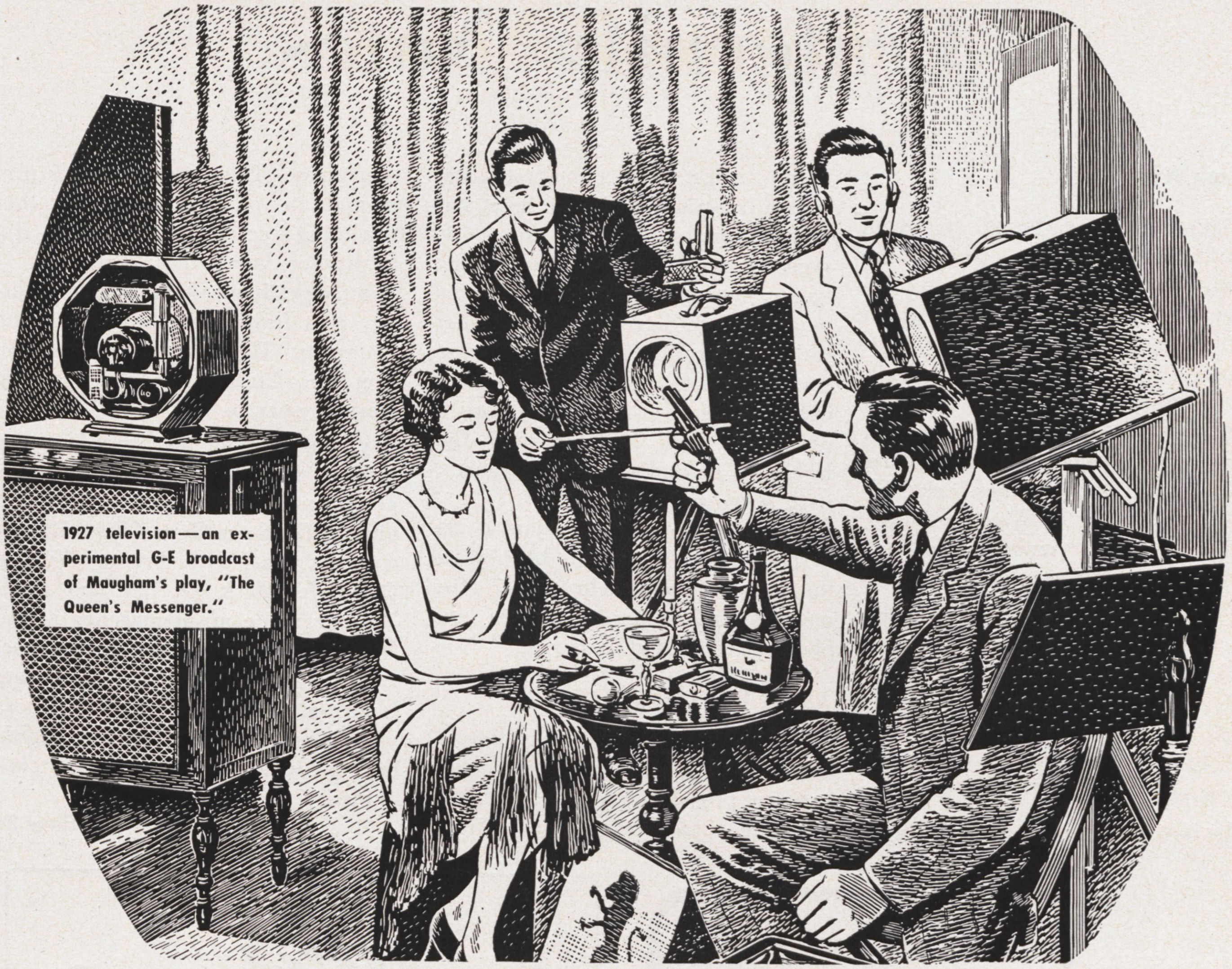
Benjamin K. Sollars was recently promoted to Plant Layout Engineer at the Diamond Chain Company, Indianapolis. After graduating from Rose, Ben served with the Army in the Engineer Corps and was discharged with the rank of captain.

Mr. Sollars began with Diamond as a junior engineer in 1946 and later rose to the position of Assistant Staff Engineer. His present promotion came as a result of his excellent work in layout of a new building and rearrangement of departments in the old building.

'43 Vinton B. Haas, Jr., is now Assistant Professor of Electrical Engineering at North Dakota Agricultural College, Fargo, N. D.

x'43 Lt. and Mrs. John Lee are the proud parents of a baby girl, Kathy, who was born November 26, 1949.

'49 Just arrived to the proud parents, Jean and Marie Lape, a bouncing baby girl, Christine Ann, four pounds, nine ounces. The Lapes reside in Portage Path, Akron, Ohio.



1927 television—an experimental G-E broadcast of Maugham's play, "The Queen's Messenger."

'Go ahead with television,' he was told . . . in 1927

Looking back over an engineering career that has brought him 313 patents in 46 years—or roughly one every seven weeks, Dr. E. F. W. Alexanderson tried to sum up recently what had been the requisites for this kind of inventive fertility. What, in other words, makes up a climate conducive to creative thinking?

One thing essential to the scientist and inventor, he felt sure, is the steady backing and encouragement of his employer—particularly when his projects are long-range, offering no prospect of immediate returns.

It had taken foresight on the part of his employer, Dr. Alexanderson thought, to endorse his experiments in radio as far back as 1906 and later to underwrite his attempts to develop transoceanic telephone equipment. It had taken still greater foresight to encourage his research into television—at a time when America had scarcely gotten used to radio.

But on each occasion his employer, General Electric, had said "Go ahead." "Encouragement and financial backing were extended to me," he recalls, "through long years of experimentation." With this kind of support, he thought, "there is assurance that creative thinking will flourish."

* * *

Dr. Alexanderson's views illustrate again how General Electric emphasizes research and creative thinking, encourages fertile minds to follow their imaginative bent, and so stays in the forefront of scientific and engineering development.

You can put your confidence in—

GENERAL ELECTRIC

Fraternity Notes

Sigma Nu

Beta Upsilon continued its social activities this semester under the planning of our new chairman, Bill Gray. An informal dinner was given at the chapter house Saturday night, January 21. The more than twenty attending couples enjoyed a real feast prepared by Mrs. Cora DeGraff, our house mother. The following Saturday a "hard times" skating party was held at the Wigwam Roller Rink. Wives, girl friends, actives and pledges enjoyed a wonderful evening with the exception of a few bumps and bruises.

We recently acquired seven new pledges. The new men are: Hank Bosch, Phil Bracht, Gene Hicklin, Bill Luce, Lloyd McGrew, Walt Meyer and Dick Williams.

The bowling team is still struggling along trying to regain first place. Sigma Nu has been battlin hard, narrowing the lead to two games. We recently set a record of high team game, now giving first and second team game to Sigma Nu. Our basketball team is rolling right along, having won its first two games. We recently defeated Lambda Chi by a score of 28 to 15. Jack Marshall and Bob Bohrman shared top scoring honors with seven points apiece.

Our traditional stag party at the first of every term will be held at the house Monday, February 27, after meeting. All alumni, actives and pledges are invited to attend.

Alpha Tau Omega

The Gamma Gamma chapter of Alpha Tau Omega was given the honor of presenting to J. J. Maehling, Province Chief, the Silver Circle Certificate. This certificate was presented in recognition of Brother Maehling's active service in the fraternity for twenty-five years.

Sunday, January 22, William Harvey was formally initiated into the fraternity. The chapter attended St. Stephens Church for the morning worship service.

Visual proof of the unity between alumni and active members was given on a Saturday evening when alumni Brothers Gene Glass, Robert Cassidy, Carl Hildebrand, William Orbaugh, Mark Orelup and John Winters made an appearance at the fraternity house. Alumni and actives joined together in many song favorites. Respect for the neighbors was in evidence by the respectable hour at which the singing was concluded.

Concluded On Page 24

THE DU PONT DIGEST

FOR STUDENTS OF SCIENCE AND ENGINEERING

BAD MEDICINE *for flies*

Research that produced an insecticide safe to spray on cows may save millions for American agriculture

Armed with only a fly-swatter, the farmer would get nowhere in ridding his dairy barn of disease-carrying insect pests. But he has to be careful in using insecticides around cows. A toxic spray may be absorbed through the animal's skin and show up in meat, milk and butter.

Next fly-season farmers and ranchers will be able to buy a fly-killer that is both powerful and safe. In Du Pont Marlate* 50% technical methoxychlor insecticide they will get this combination of properties that no single insecticide has ever offered before.

Methoxychlor is a recent Du Pont development. Du Pont scientists worked for eight years in the laboratory and in the field to develop its applications in agriculture.

A safer insecticide

"Marlate" 50 is a residual insecticide and remains an effective killer of flies, mosquitoes, fleas and lice for several weeks after application. When used as directed, this insecticide is exceptionally safe to human beings, livestock, pets and crops. This has led federal experts to recommend it not only for spraying in barns, milk houses and milk plants, but also on the animals themselves.

Besides its use on livestock, methoxychlor kills many insects that attack vegetables, fruits and forage crops. It is offered to flower growers as an ingredient in Du Pont Floral Dust. It is used in moth-proofing compounds so that dry cleaners can easily moth-proof woolens while cleaning them. Many stores carry aerosol bombs containing methoxychlor for household use. It can be used with safety in flour mills, freezing and canning plants, grain storage elevators, cereal manufacturing plants—wherever food is processed. This development of research can bring immediate cash savings of millions of dollars to American agriculture, industry and homes.

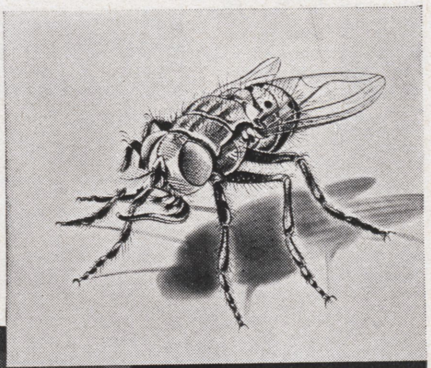
The long fight

Exciting as the future of "Marlate" 50 appears, this does not mean that the use of other insecticides will not continue. Each has its special characteristics, and each has special uses for which it is outstanding. There are at least 10,000 kinds of insect pests, of more or less importance, in North America, and there can be no let-up in the scientific fight being waged against them.

Du Pont alone now makes over fifty different insecticides. The knowledge gained in making each one speeds the development of the next. By backing ideas with funds and facilities, Du Pont helps the farmer put more and better food on the American table. At the same time, in many other fields, Du Pont is helping to raise the American standard of living with continuous research aimed at developing new products and improving present ones.

*REG. U. S. PAT. OFF.

"MARLATE" *50 kills flies and many other insects attacking livestock, vegetables, fruits and forage crops.*



THE BITES *of flies, lice, and ticks can cut down milk production as much as 20 per cent. One spraying of "Marlate" 50 will control these pests for several weeks.*

SEND FOR "Chemistry and the Farmer," an interesting, informative booklet on the development of pest control, etc. 34 pages. For your free copy, write to the Du Pont Company, 2503 Nemours Building, Wilmington, Del.

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING

. . . THROUGH CHEMISTRY

Great Dramatic Entertainment—Tune in "Cavalcade of America" Tuesday Nights, NBC Coast to Coast

Power Plants . . .

Concluded From Page 11

No. 4 generator will be rated 140,000 kw, 119,000 kw at 30 pounds. All rating are at 85-per cent power factor.

Each generator is grounded by an air-cooled transformer loaded by a resistor. With this scheme, the current resulting from a phase-to-ground fault in the machine is limited to about ten amperes.

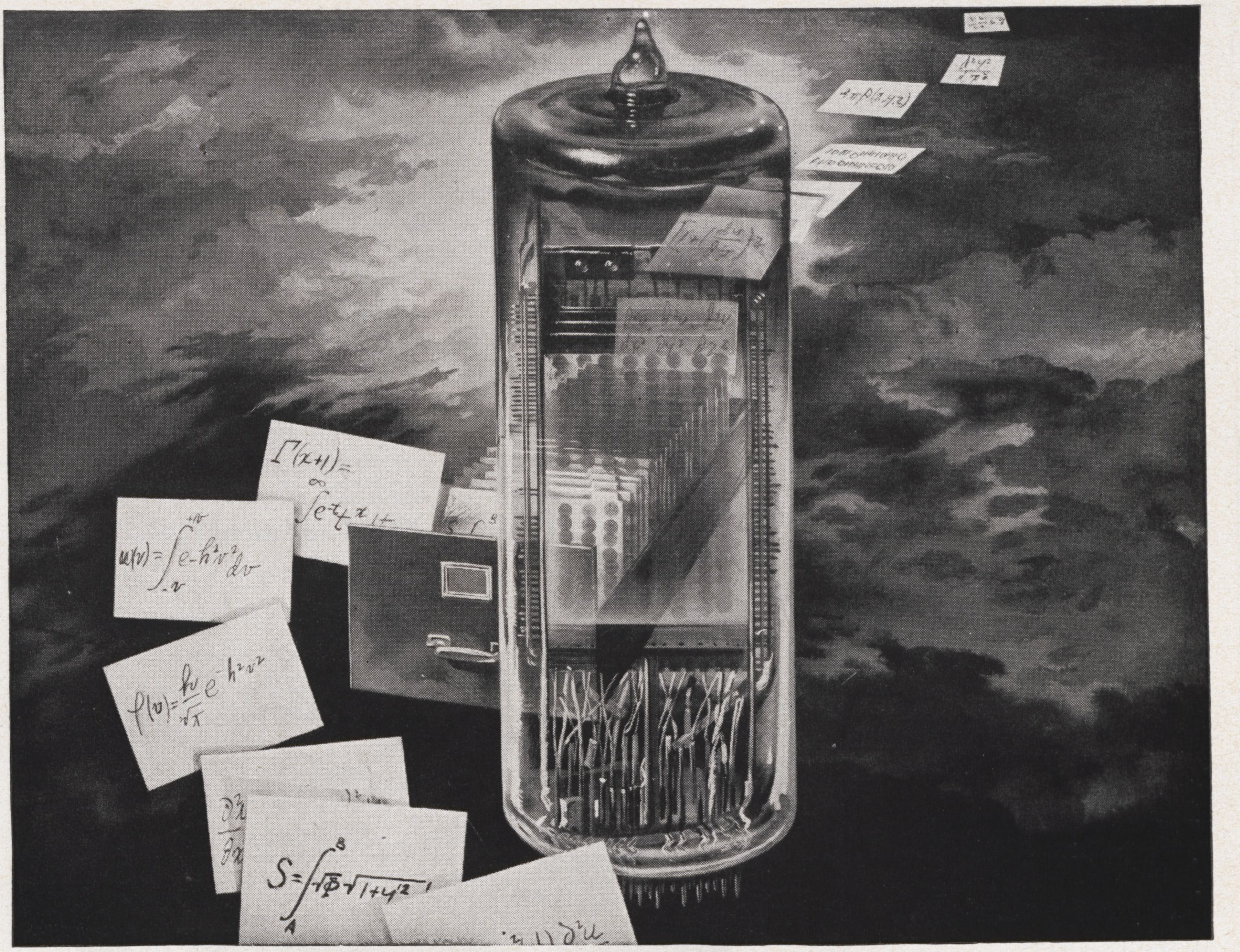
Centralized Control

Whereas many older power stations have separate boiler-turbine and electrical control rooms, Sewaren combines the two. A greater degree of supervision is afforded from the control room. Because the auxiliaries and turbine controls are motor driven and are easily adaptable to remote operation.

The control rooms are air conditioned and soundproofed. The lighting is of the indirect fluorescent type with a partly louvered, parabolic ceiling. This design is advantageous in that it diffuses the light and avoids glare on the vertical panels and irritating contrast between dark and light areas.

Another feature of Sewaren conducive to effective control with a minimum of personnel is its layout for two-level operation. This plan requires personnel on only two floor levels—the turbine and condenser floors. This is possible because the plant is dispersed horizontally, rather than built up vertically, with the auxiliary equipment as near ground level as possible. Thus, every advantage is taken of the fact that Sewaren is a new station from the ground up.

The performance of this station, which features the hottest of steam temperatures, large 3600-rpm turbine generators, semi-outdoor-type boilers, centrolized control, and an all-electric auxiliary drive, will be watched with interest by utility engineers.



New RCA electron tube gives today's amazing computing machines an indispensable memory.

Tube with a memory keeps answers on file

So complex are present scientific studies—such as in atomic research—that working out the "arithmetic" could take all of our scientists' time.

Short cut through this drudgery is found in huge electronic computers, able to add or multiply numbers as large as a thousand billion in *millionths of a second.* But such speed is valueless unless—with comparable speed—the results of countless computations can be kept "on file" and taken out again.

Such a "file" now exists in a "memory" tube, developed at RCA Laboratories. It retains figures fed into calculating machines, stores them, memorizes new ones—speeds solutions through mazes of mathematics.

Uses of RCA's "memory" tube are many. It will help atomic scientists acquire new knowledge . . . provide new information on supersonic flight . . . even help make rapid weather predictions! It is an invaluable instrument in the scientist's campaign to penetrate the unknown.

For your benefit: Development of the "memory" tube is another basic advance pioneered at RCA Laboratories. Continued leadership in science and engineering adds *value beyond price* to any product or service of RCA and RCA Victor.

Examples of the newest advances in radio, television, and electronics—in action—may be seen at RCA Exhibition Hall, 36 West 49th St., N. Y. Admission is free. Radio Corporation of America, Radio City, N. Y. 20.

Continue your education with pay—at RCA

Graduate Electrical Engineers: RCA Victor—one of the world's foremost manufacturers of radio and electronic products—offers you opportunity to gain valuable, well-rounded training and experience at a good salary with opportunities for advancement. Here are only five of the many projects which offer unusual promise:

- Development and design of radio receivers (including broadcast, short wave and FM circuits, television, and phonograph combinations).
- Advanced development and design of AM and FM broadcast transmitters, R-F induction heating, mobile communications equipment, relay systems.
- Design of component parts such as coils, loudspeakers, capacitors.
- Development and design of new recording and producing methods.
- Design of receiving, power, cathode ray, gas and photo tubes.

Write today to National Recruiting Division, RCA Victor, Camden, New Jersey.

Also many opportunities for Mechanical and Chemical Engineers and Physicists.

RCA

RADIO CORPORATION of AMERICA

World Leader in Radio—First in Television

 Concluded From Page 12

In general, the "502" is far superior to the conventional reciprocating engine in these respects: (1) Simplicity of design, (2) Light weight, (3) Small volume, and (4) Torque characteristics.

For example, the field of industrial standby equipment is a "natural" for the gas turbine. The "502" has the necessary horsepower, wrapped up in a small package that can be conveniently tucked away in a corner for operation of standby pumps, generators and compressors.

Because of its portability, the Boeing turbine can fill a need of long standing in such fields as mining, logging, and exploration; it can also be used in portable fire-fighting equipment, where inaccessibility often makes it difficult to employ unwieldly piston-type power sources.

 Concluded From Page 18

Lambda Chi Alpha

Since the great movement of brothers into the fraternity house the eating facilities were proven inadequate. Therefore two new dining room tables were purchased. The final finish was applied to the tables and accompanying benches by Tom Reifenberg, Tom Norman, Carl Wokasien, Bill Chambers and our new pledge, Al Stiles.

Theta Kappa has just completed the pleasant task of being judges in a beauty contest. The contest was to choose the Yearbook Queen of Fayette High School in New Goshen. It was felt that a better judgment could have been rendered if the girls had been present instead of being merely represented by their photographs.

Bill Gordon, slave driver senior IV, has been putting AX's basketball team through its paces. Even though a victory isn't a reality as yet, one is assured before the season ends—even if the regulars have to play the scrubs.

Theta Xi Notes

Theta Xi's annual "Winter Formal" was held at the Hotel Deming this year and was enjoyed by members and their guests. Music for the dance program was provided by Jimmy Holler's orchestra. The dates were given small compacts with the fraternity's emblem engraved on them.

Among the guests were Dr. and Mrs. O. S. Knight, Kappa Chapter adviser. Faculty members attending the dance as chaperons were Mr. and Mrs. T. A. Duwelius, Mr. and Mrs. W. H. Berntsen, and Mr. and Mrs. William Hollis. Preparations and decorations for the dance were well handled by the social committee consisting of Allan Aiken, Donald Somes, Myron Hawk, and Al Long, chairman.

CAMPUS SURVEY

Concluded From Page 15

Blue Key

The recently-tapped Blue Key pledges were initiated at a banquet February 1. The ten new members are George Eddy, Jim Gaston, Bob Haswell, Cliff Hennig, Bill Kestermeier, Lamar Michaels, Chuck Olmsted, Bob Rinker, Bill Rinker, and Dave Smith.

The banquet time was also used for the election of officers for the next six months. Jim Gaston is the Blue Key's new leader; Jody Morrow is vice-president. Lamar Michaels will handle the fraternity's mail while Bill Rinker is recording secretary and treasurer. Chuck Olmsted will revamp the alumni register as part of his work as alumni secretary.

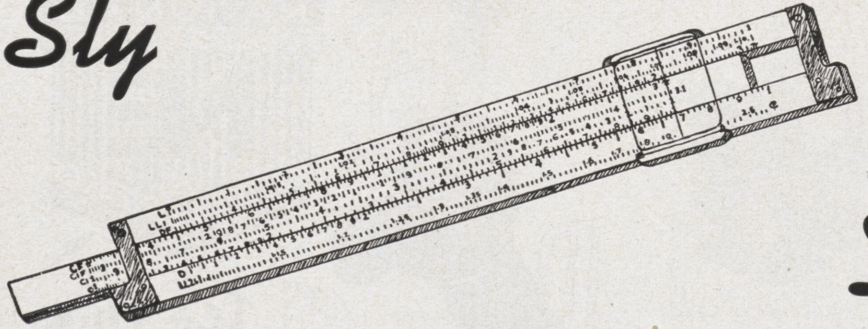
The meeting then gave way to an old-fashioned "gripe session." Dr. Wilkinson and the fellows discussed present school problems and the student attitude on the administration and its policies. The only conclusion reached was that the faculty and the student body should be better informed and better acquainted.

Tau Beta Pi Initiation

On January 29, the men who were tapped at the honor assembly held December 22 were formally initiated. After the initiation the old actives along with their new brothers partook of a juicy steak dinner at the Don-Al Club. Later in the evening the new initiates were presented with their keys. Fred Gary then read the report of their class project. This project consisted of tracing the course of a given amount of water in Lost Creek from Rose Poly to the Gulf of Mexico. A full account of this project will be published in the next issue of the Rose Technic.

The newly initiated brothers are Bill Rinker, Bob Rinker, Fred Gary, Bill Gray, Bob Ragsdale and Harold Osterhaudt.

Sly Droolings



By Denzil Hammond, sr., m.e.

Frosh: Would you please repeat the question?

Soph: Beg pardon?

Jr: Huh?

Sr: Z-Z-Z-Z

* * * *

Reformer: You don't expect a glass of that vile stuff to quench your thirst do you young man?

Young man: No, sir, that's why I'm going to drink the whole bottle of it.

* * * *

"Pop, what makes the world go 'round?"

"You little devil, stay out of the cellar."

* * * *

Note to girls: Better your lips calloused than your feet.

* * * *

I hear your girl works in a bottle factory.

Yep, she's a corker.

* * * *

There once was a lady named Banker
Who slept while the ship was at anchor.
She awoke with dismay
When she heard the mate say
"Now hoist the topsheet and spanker.

* * * *

"Have you ever studied a blotter?"

"No, why?"

"It's very absorbing."

* * * *

She: I'm a good girl.

He: Who asked you?

She: No one.

He. Then no wonder you's a good girl.

As they say in Applied: Every couple has its moment.

* * * *

Little Audrey, mad as hell
Pushed her sister in the well,
Said her mother drawing water,
"Gee, it's hard to raise a daughter."

* * * *

"Honey ah sho loves yo bathin' suit."

"Sho nuff?"

"Man, it sho do!"

* * * *

He: "Why do the most important men on the campus go with the prettiest girls?"

She: "Oh you conceited thing."

* * * *

Officer: "What's the idea of driving that truck so fast? Do you think the highway is a racetrack? Haven't you a governor on this thing?"

Driver: "Nawsuh, boss, the governor's in Indianapolis; that fertilizer yo smells!"

* * * *

Drunk (to splendidly uniformed bystander): "Say call me a cab will yuh?"

Splendidly uniformed bystander: "My good man, I'm not a doorman; I'm a naval officer."

Drunk: "All right, then call me a boat, I gotta get home."

* * * *

Blonde: "Would you call it mental telepathy if we were both thinking of the same thing?"

Engr.: "No, just plain good luck."

An old man and his wife were sitting in a restaurant; the old man was consuming a hearty dinner, while the old lady sat drumming on the table cloth and looking out the window. Curiosity got the best of the waitress and she inquired of the woman, "Aren't you hungry?"

"You bet I am," said the wife, "but I gotta wait till Pa's finished with the teeth."

* * * *

"I was shot in the leg in Africa," said the vet.

"Have a scar?"

"No, thanks, I don't smoke."

* * * *

ME: I know a place where women hardly wear anything but a string of beads once in a while."

CE: "My gosh, where?"

ME: "Around their necks."

* * * *

Passionate lover: "I'm going to kiss you till the cows come home."

She: "You'd better not. My two brothers are policemen, and they'll be home any minute."

P. L.: "All right then, I'll kiss you till the bulls come home."

* * * *

"I'm losing my punch," she said as she left the party in a hurry.

* * * *

You know what EE means? Everything Eliminated, just like our joke page.

* * * *

"What foah is da doctah comin' out youah house?"

"Ah dunno, but ah thinks ah got a little inkling."

Photography can make this page

this  small

IT'S DONE WITH MICROFILM MAGIC

TINY AS IT IS, the little rectangle above is this page in black and white—as it appears on microfilm. Everything there, condensed to a mere spot, but ready to be brought back full size with all its features intact. For photography can reduce tremendously without losing a detail.

As a business or professional man, you can utilize photography's reducing ability in any of many important ways.

You can utilize it to save space . . . to speed reference. With Recordak microfilming, you can "debulk" files 99% . . . keep the records at hand for quick viewing, full size, in a Recordak Reader.

You can utilize photography to make sales presentations more complete, more resultful. With motion pictures, you can "pack" a plow, a plant, a whole process into a small can of film . . . travel it where you will, show it off "large as life" and much more dramatically.

Only a suggestion . . . this . . . of what photography can do because it is able to condense. And because it has many other unique characteristics as well, photography is becoming an increasingly important tool all through science, business, and manufacturing.

Whenever you want to improve methods of recording, measuring, testing, teaching, or countless other functions, be sure to consider the unusual abilities and advantages of photography.

Eastman Kodak Co., Rochester 4, N. Y.

Functional Photography

—is advancing business and industrial technics.

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"JOLSON SINGS AGAIN"
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