Summer 8-1946

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Rose Technic Staff
Rose-Hulman Institute of Technology

ROSE TECHNIC

AUGUST, 1946

MEMBER ENGINEERING COLLEGE MAGAZINES ASSOCIATED

With the Institute filled to capacity, it will be impossible to admit additional Freshman Classes in January or April. The waiting list for admission next July already exceeds the number who can be admitted. If you are interested in attending Rose, you should file your application as soon as possible, in order to get your name on the list for admission at some later date.

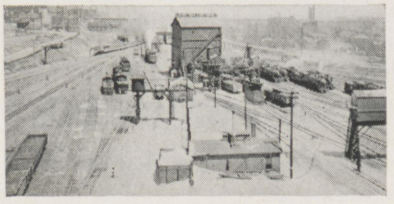
ROSE POLYTECHNIC INSTITUTE
Terre Haute, Indiana

THE ROSE TECHNIC

VOLUME LVII, NO. 1 AUGUST, 1946

IN THIS ISSUE

COVER



The east portion of the Milwaukee Road's engine terminal at Milwaukee. Note the Hiawatha sweeping in at the left.

—Courtesy TRAINS Magazine

FRONTISPIECE

Panorama of the Arc-Welding Industry—Electrical apparatus fabricated by arc welding.

—Courtesy General Electric

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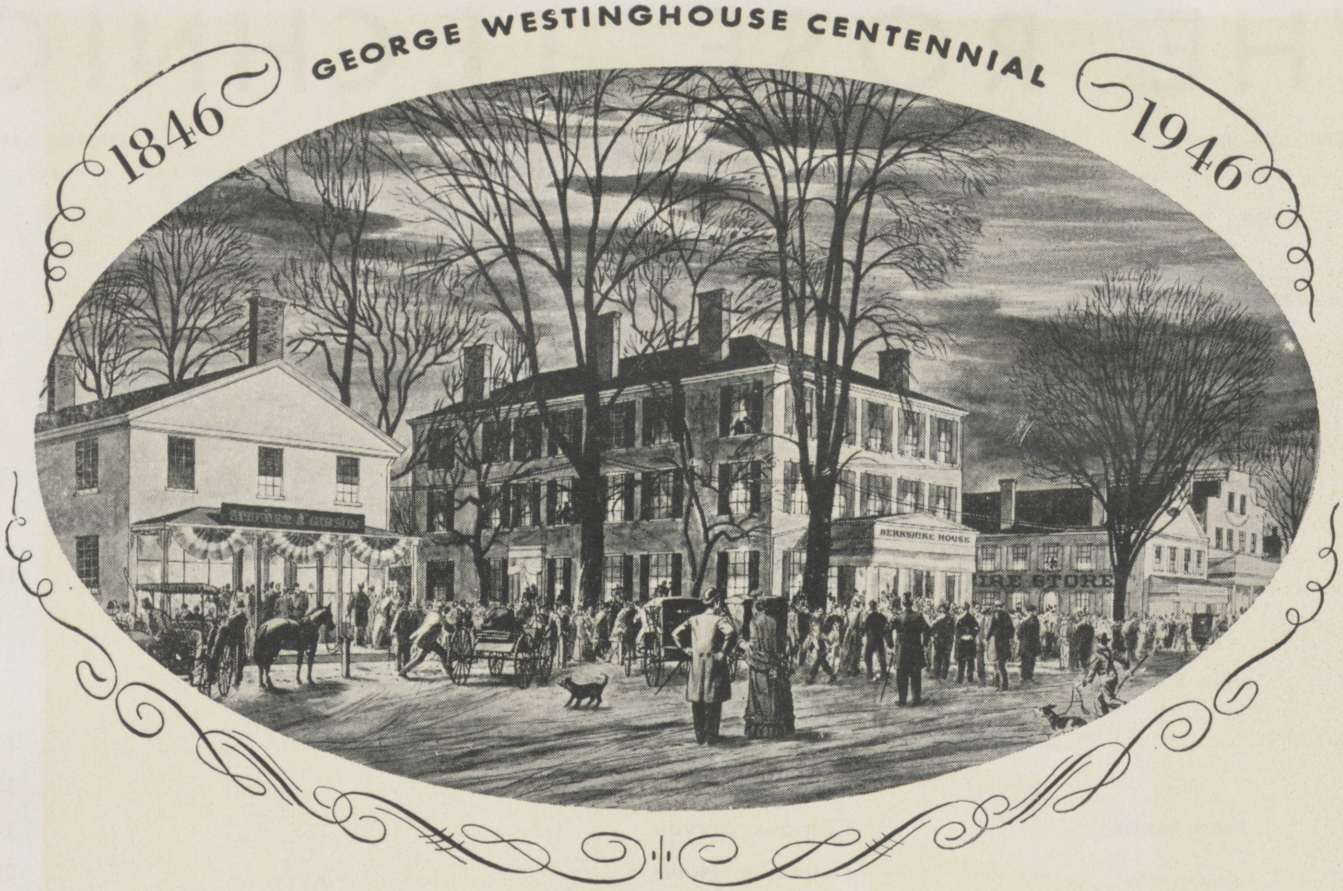


Lighting Main Street

Sixty years ago electric lighting, as we enjoy it today, was unknown. This was because only one kind of electricity was available — *direct current* — which could be transmitted economically for only a short distance.

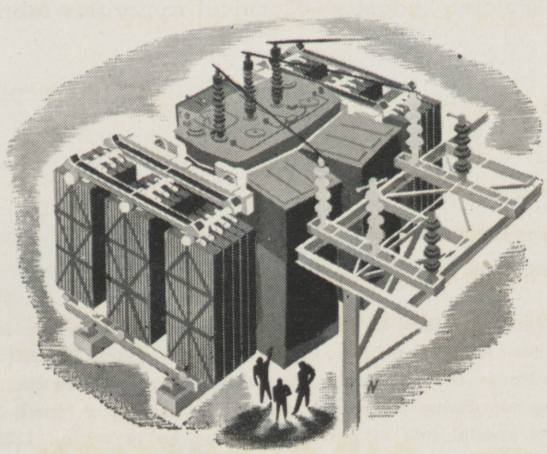
About this time George Westinghouse began experimenting with the "new" alternating current electricity. He soon realized that here was the golden key to a new industrial age — for he found that alternating current could easily be "transformed" to high or low voltage, at will.

Westinghouse reasoned that alternating current could thus be transmitted for many miles at *high voltage,* then reduced to *low voltage* at the point of use.

This great industrial pioneer acted at once. He acquired the rights to manufacture a new invention — the "a-c transformer." He then redesigned it completely and sent his associate, William Stanley, to the outskirts of Great Barrington, Massachusetts . . . to install the first complete a-c transmission system in America.

On the historic night of March 20, 1886, William Stanley closed a master switch and electric lights blazed on Main Street, Great Barrington, nearly a mile away.

George Westinghouse's dream of long-distance transmission of electricity was well on its way to fulfillment.



Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE

TODAY . . . The Westinghouse Electric Corporation manufactures hundreds of different types of transformers—from thimble-size units for radio receivers to giants with ratings as high as 100,000 kva. Two of the latter type . . . each as big as a six-room house . . . were built by Westinghouse for a large eastern utility to transform the output of a huge power plant soon to be put into service.

Tune in: TED MALONE — *Monday, Wednesday, Friday, 11:45 am, EDT, American Network*

THE HUM OF THE ARC *sounds the new note in construction*

The ear-splitting, nerve-shattering staccato sounds that formerly accompanied construction will not be the theme song of post-war building. Instead, the quietly efficient electric arc will weld together the steel skeletons of new structures. And, in so doing, it will save time, space and steel.

As a major manufacturer of welding and cutting equipment, Air Reduction has pioneered many new uses for the electric arc and the oxyacetylene flame. These versatile modern "tools", together with Airco's many other diversified products, serve the needs of the nation in many ways . . . from hardening of metals to high altitude flying . . . from carbonation of beverages to the manufacture of synthetic rubber.

The operating subsidiaries of Air Reduction Company, Inc., are:

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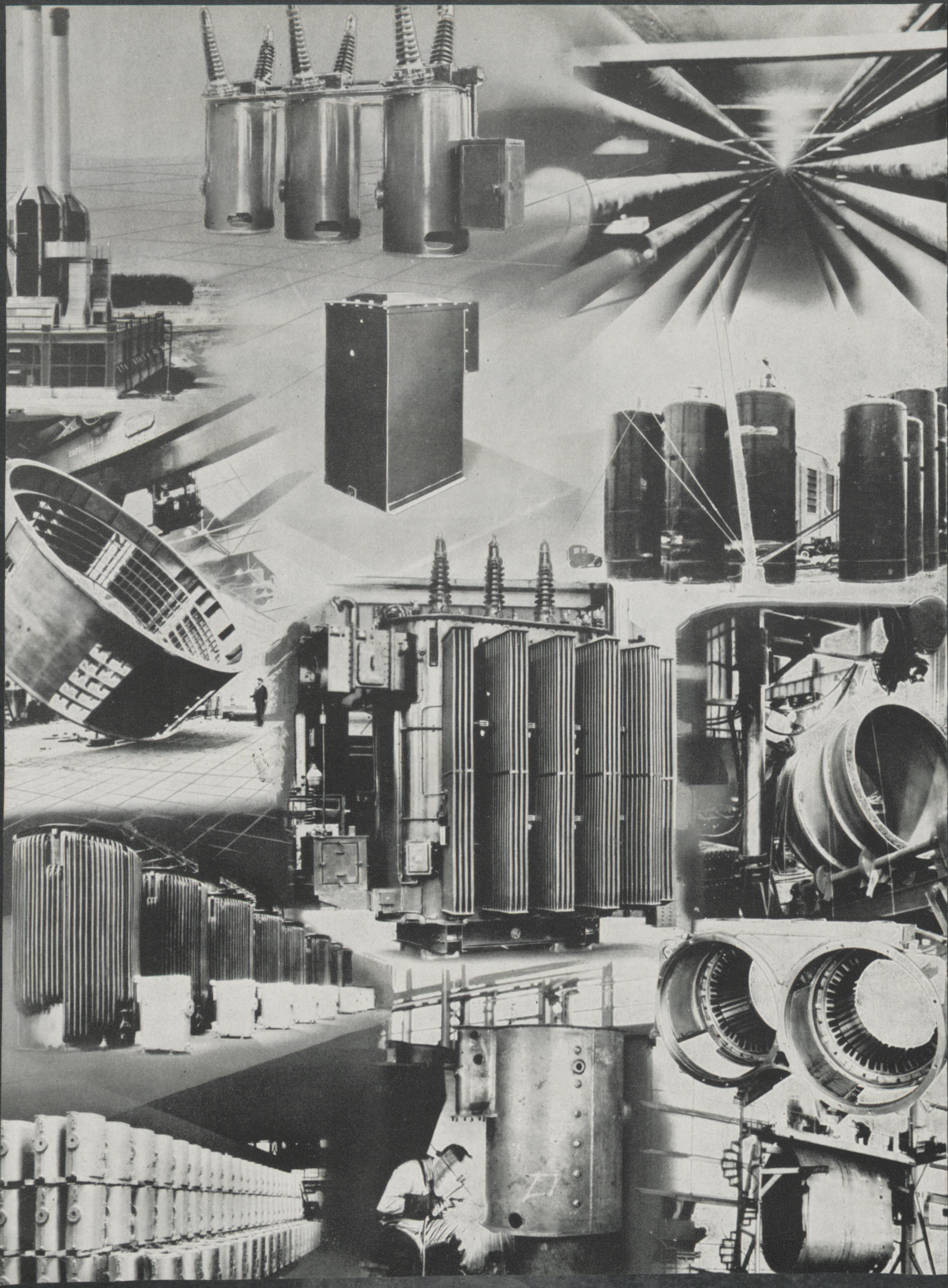


Science and Human Affairs

In recent years it has become almost a truism to speak of our era as an age of science, and yet this is true to an extent which we can hardly realize. Within the space of two hundred years the population of the world has been more than tripled, and the conditions under which the common man lives are in sharp contrast to the struggle for mere existence which characterized earlier ages. The average life-span has been greatly increased through the practical elimination of most contagious diseases and the perfection of other types of medical knowledge. Rapid communication and transportation has been established between all parts of the globe. Knowledge of the universe has been pushed to incredibly distant galaxies and within the incredibly small atom. Perhaps most revolutionary of all, the opportunity for education and entertainment has been made available to everyone.

It is important to realize that the growth of science has not only improved our material welfare but also changed the basic *nature* of our civilization. Previous civilizations were based chiefly upon such forms of culture as art, literature, religion, and philosophy, which tended to grow gradually until a peak of excellence was attained, after which a slow decline set in with the gradual fading-out of civilization. Modern civilization differs fundamentally from this formula in that each new scientific advance makes possible still further advances. Each discovery is a permanent addition to knowledge, and no end to further expansion seems possible, at least within the forseeable future. The implications of the new civilization are tremendous. Many of the traditional institutions and customs which formed the basis of previous cultures will no longer be useful or even rational. Our greatest task will be to effect social changes compatible with the increasing tempo of modern life.

As our civilization grows in complexity, it becomes a vital need that the average citizen understand the nature of the society in which he lives. Two hundred years ago education was useful chiefly as an aid to human happiness; today, when the most distant lands influence our daily lives, an educated population is a necessity. Yet it is one of the paradoxes of our age that, despite widespread access to education, there is little general understanding of the scientific devices and processes upon which modern civilization depends for its existence. While nearly everyone is familiar with the operation of modern conveniences, the basic principles which these devices utilize are unknown and even incomprehensible to the large majority of the population. The great mass of people simply have no familiarity with the great intellectual achievements of science, nor do scientific methods influence their thinking. While our era is truly an age of science, it cannot be thought of as a scientific age.

Even more fundamental than the necessity for understanding scientific achievements is the necessity for realization of the implications of science on human affairs. The growth of technology has raised such pressing questions as the need for international unity, better living standards for the underprivileged, the elimination of unemployment, and the conservation of national resources. Modern civilization surely demands intelligent treatment of these problems; yet such issues are now commonly disposed of by the use of political power, emotional appeals, and clever oratory. While the technique of gaining scientific knowledge has been revolutionized by the concept of rational thinking, the control of human conduct is still vested in prejudice, tradition, and short-sighted self-interest.

It is not reasonable, of course, to suggest that social problems can ever be solved by precise quantitative thinking. Human affairs are infinitely too intricate and too little subject to experimental control to be studied in the natural sciences. The great contribution of science to humanity is the concept of the *scientific method*—the development of a clear, open-minded attitude toward a problem, no matter what the consequences. Applied to human affairs, the scientific way of thinking would make possible decisions based upon the consideration of the interests of humanity as a whole instead of the creation of emotional barriers between groups of people by short-sighted policies, as is now often the case. By educating the general public in the methods of clear thinking, some solution may be found to the dilemmas of confusion, suspicion, and insecurity which characterize our age.

—R. G. B.

The Epic of American Railroads

By John R. White, jr., m.e.

THE railroad is to the success of a modern country as a sight is to the effectiveness of a rifle. Without one, the usefulness of the other is limited. America first grasped the importance of this statement in 1826. Although only a young country, her citizens showed mature planning in the construction of a railway to ease the burden of work and improve the methods of transporting people and goods most efficiently. Perhaps these men did not realize the possibilities of this new type of transportation, but nevertheless their inherent desire to make work easier led them to the conclusion that a machine is capable of more work than man. They proved this fact to themselves by building a railroad to carry stone from Quincy, Massachusetts to a dock on the Neponset River for construction of the Bunker Hill Monument. A crude railroad, and costly at $11,250 per mile, it more than repaid its designers by saving 5/6 of the original cost of transporting the stone. The length of the road was approximately three miles, all of which was operated by gravity and the aid of two horses except for an inclined plane of some 300 feet. Over this obstacle, the cars were pulled by a stationary engine to which was attached a chain connecting the cars.

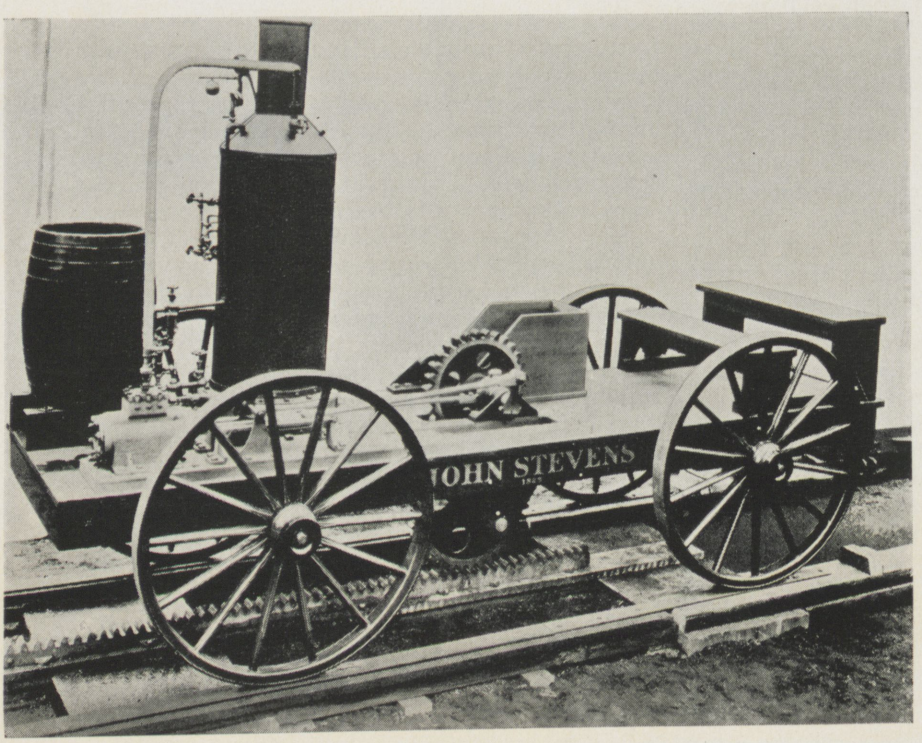
By 1827 America's second railway began operations in the anthracite coal fields of Pennsylvania. Again these cars were operated by gravity. Upon reaching the bottom, the cars were emptied, and two mules carried in the rear car were used to pull the train back up the hill.

Another important step in the development of American railways was the running of an English locomotive, the "Stourbridge Lion", on the Carbondale and Honesdale tracks in 1829. The rails for this experiment were of timber with an iron strap rail fastened to the top surface. A second attempt on the same rails was abandoned because the engineer refused to risk his life on a roadbed structure not heavy enough to bear the seven ton "giant" locomotive.

The first railroad to begin operations as a common carrier was the Baltimore and Ohio, chartered in 1827 by the state of Maryland. By 1829 the first mile of rails was completed, and by 1830 approximately 13 miles had been laid. As a motive power, horses and sails were tried, but from the results of an experiment in 1829 with a locomotive, "The Tom Thumb", the previous methods were abandoned and steam power was taking its first stride in America's railroad boots. Another railroad was in the embryo stage at this time in Charleston, South Carolina. By December, 1830, scheduled passenger service was underway. The life of this road, however, was comparatively short due to a fireman who fastened down the safety valve to stop the hissing sound caused by escaping steam. The boiler exploded, bringing to a sudden halt the career of this railroad.

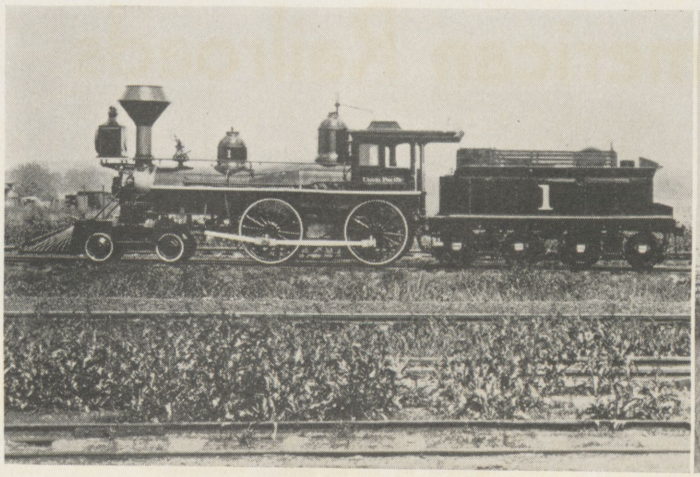
From 1830 to 1835, America's infant railroads made enormous strides in their boots of progress. During this time over a thousand miles of track had been laid and put in operation, and at least 200 charters had been granted individual companies in 11 states. The majority of these roads functioned only for a short time, but the impetus gathered through the experiments carried the idea ahead to broader horizons. 9000 miles of railroad were in operation by 1850. True, the average railway was short, but one could travel farther than any early settler deemed possible. The journey from Waterville, Maine to Buffalo, New York could be made by patronizing 12 different systems. There was only one disadvantage to this trip—4 days was the minimum time, discounting mechanical difficulties, obstacles on the track, and the engineer's temperament.

The progress of America's rail-



Forerunner of the modern locomotive, the "John Stevens" of 1825. This device utilized a center notched wheel for locomotion.

—Pennsylvania R. R.



"The General Sherman," a woodburner of 1865.
—*Union Pacific*

A type familiar to all Americans, built about 1920.

ways received a tremendous boost when Congress passed the land-grant measure designed to aid the railways and stimulate the people's interest in moving west. The land-grant provided for alternate even-numbered sections on either side of a proposed route be offered for sale at $2.50 an acre. Assured now of transportation, people swarmed westward in ever increasing numbers. With this interest in migration, the railway companies began building with feverish haste until the financial panic of 1857 caused a downward trend in both construction and migration. Virtually all construction in the Western states was halted; however, the Chicago, Milwaukee, and St. Paul added 232 miles and the Cincinnati and Muskingum Valley extended its prestige by 132 miles.

In 1860, the total railway mileage was 30,794 as compared with 8,590 miles in 1850. The Civil War interrupted this advancement, but numerous interesting facts may be noted during this period. The Hannibal and St. Joseph Railroad first sorted mail in a specially equipped car on its run from Quincy, Illinois to the Missouri River. This railroad was practically demolished by raiding armies during the Civil War. The land grants offered by the government immediately lost their prospects as a smart investment with the possibility of a group of men raiding and razing an individual's property. With this important source of revenue diminished to a small fraction of its original value, the railroads feared a complete collapse. However, Federal troops constructed a series of blockhouses, protecting operations till the end of the war, and restoring some needed faith in the importance of the railroad.

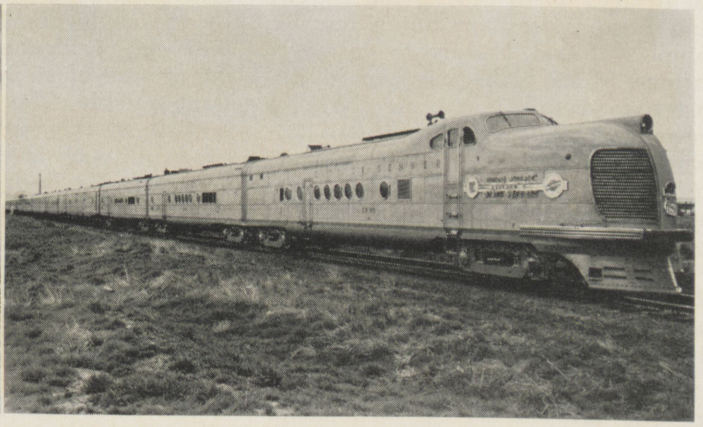
During the year 1866 the Union Pacific opened the throttle on construction plans, completing 361 miles of track. Numerous other companies added track to the extent of 1043 miles. The various companies shifted, constructed, and rebuilt their lines. The latter part of the decade following the Civil War found the railroads lapping the cream of prosperity, which they enjoyed for the next quarter century.

One ambition of all railroad men had not been realized by 1860. There was no connection between the East and the West. In California the Central Pacific was organized to build a railroad east from San Francisco to meet the Union Pacific at Omaha, Nebraska Territory. With construction at full speed, the gap between east and west became shorter and shorter until the momentous day of May 10, 1869, after 6 unprecedented years of hopes and disappointments, the east and west joined each other at Promontory, north of Great Salt Lake in Utah. The two trains making contact at this point were filled with dignitaries of the country. The golden spike was driven, and immediately the entire country heard by telegraph the inspiring message—"The last rail is laid. The last spike driven. The Pacific Railroad is completed." The significance of this feat can be shown by the time, money and inconvenience saved by traveling direct from coast to coast, eliminating long trips by boat or covered wagon.

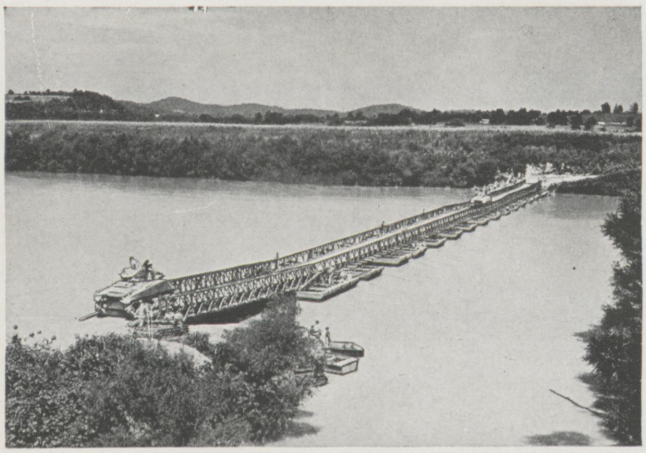
From 1880 to 1890 the most rapid expansion in railroad history took

(*Continued on Page* 18)

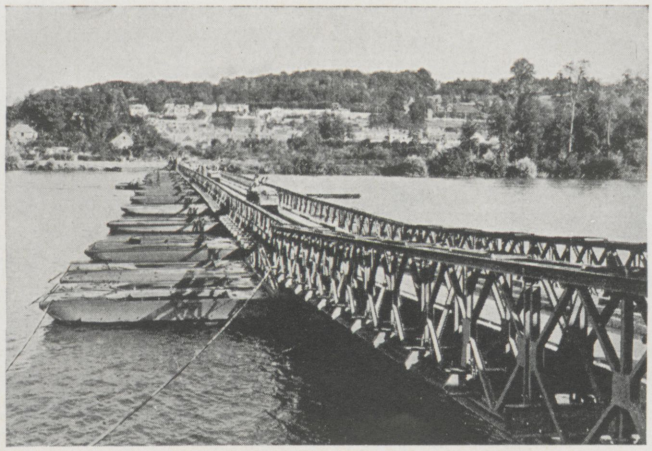
A late model streamlined steam locomotive.
—*Pennsylvania R. R.*



Streamliner "City of Denver"
—*Union Pacific*



Floating Bailey on U. S. 25-ton pontons



Floating Bailey on British pontoons

The Bailey Bridge

By John F. King, jr., c.e.

Cuts Courtesy THE MILITARY ENGINEER

THE ability to move rapidly is one of the most necessary requirements of a modern army. The motor truck and the airplane have satisfied this requirement thoroughly, but they both require certain very necessary ground installations to operate. Airplanes require well-equipped airports; for motor trucks adequate roads and bridges are a necessity. It is with bridges, and specifically the Bailey bridge, that this article will deal.

When an army retreats, one of the most important tasks of its military engineers is the destruction of all bridges in its wake. This has been true from the dawn of history up to the present day. The draw-bridge of the feudal castle and the long list of bridges destroyed by the retreating Axis armies are but a few examples of this. Failure to destroy a bridge in its wake has caused disaster to befall many an army. A recent well-known example of this was the failure of the German army to destroy the Ludendorff bridge across the Rhine River at Remagen, Germany. With the American First Army holding a bridgehead on the east bank of the Rhine, the river became almost useless as a defense line.

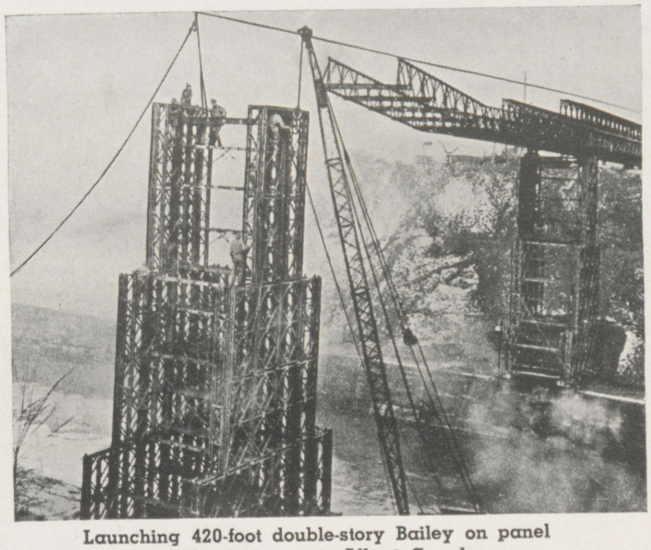
Just as the engineers of the retreating army must be responsible for the destruction of bridges, the engineers of the advancing army must be able to replace destroyed bridges with structures capable of carrying the advancing army and its equipment. This work must be done rapidly and usually under small arms fire and air attack, often with heavy casualties. The military engineer is faced with four major problems in the construction of bridges.

In any river crossing operation, the initial bridgehead is established by troops that cross the river in small boats. In certain large operations, airborne troops may also be dropped in support. Almost immediately after the first wave is established a second wave crosses on light floating foot bridges. At the same time tanks, assault guns, anti-tank weapons, and supplies are floated across the river on rafts constructed by the engineers. In order to maintain the bridgehead and then to break out of it, a bridge must be built quickly. The time factor is essential at this point. Therefore, a good military bridge must be one that can be built in a matter of hours, or even minutes in the case of a small stream.

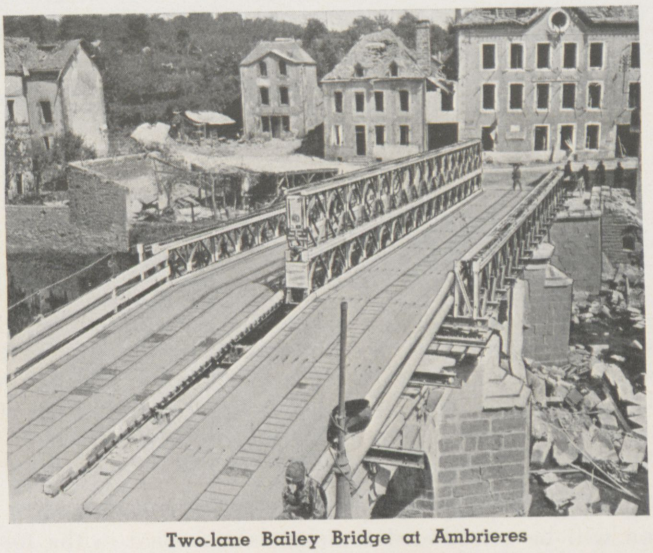
The matter of materials and their transportation is also a great problem in military bridge building. The needs of a modern army are great and the available means of transportation are always limited. As a result, a military bridge must require a minimum of materials and transportation. The design should be flexible enough to permit economical use of the bridge under a wide range of conditions. Power equipment, such as cranes, should not be required for erection because this equipment is not always available, and therefore a bridge requiring its use has serious limitations placed upon it.

In modern warfare a river crossing is a major operation which requires extensive preparations. In order to prevent the enemy from finding out the time and place of the crossing, it is usually necessary to camouflage the preparations. The extent of the camouflage will largely depend upon the quality of the enemy's aerial reconnaissance. Because of this fact, portable bridges that require the use of distinctive equipment such as large pontons or special trucks are at a disadvantage because large equipment is naturally more difficult to camouflage than small. The distinctive outline of the ponton is also very hard to conceal from the aerial camera.

The last requirement of a military bridge is that it must be easy to assemble, even in darkness. Quite often conditions are such that a bridge must be erected under the cover of darkness or a smoke screen. A simple design also eliminates the possibility of failure due to faulty erection.



Launching 420-foot double-story Bailey on panel crib piers across Albert Canal



Two-lane Bailey Bridge at Ambrieres

Development of the Bailey Bridge

It was after a careful study of the problems of military bridge building that Mr. Donald Coleman Bailey of the British Ministry of Supply set to work to design a bridge that would satisfy all of the requirements of a good military bridge. Realizing that the problem of speed of erection was easily solved but that the matter of adaptability and conservation of materials was a much more difficult problem to solve, Mr. Bailey turned his efforts in this direction. After several rather disappointing failures, the first successful Bailey bridge was tested in 1940. Further improvements were made, and during the North African campaign the bridge received its first tests under field conditions. Wherever it was used the Bailey bridge met with immediate approval and was hailed as one of the greatest advances ever made in military bridge building. The bridge was adopted as standard equipment by all forces of the British Empire and more recently by the United States Army.

Military engineers agree that the Bailey bridge is one of the most satisfactory military bridges ever developed. Within its limitations, it satisfies every requirement of a good military bridge. It is easy to erect even by manpower alone. The size of the bridge may be varied to fit the work at hand, thus avoiding waste of material. Special vehicles are not required to transport it, so the problem of transportation is not great. Since the parts are relatively small and distinctive equipment such as pontons are not required, camouflage and dispersion are easily accomplished. Finally, the design is flexible enough to permit the erection of either fixed or floating bridges.

The Bailey bridge has caught the imagination of all who have seen it. It has been described as a giant Erector set or jigsaw puzzle by many. Actually, the bridge is a through truss type made up of several standardized parts. Because of the fact that the principal members of the trusses are steel panels 10 feet long and 5 feet high, the bridge has been officially designated by the United States Army as the Steel Panel Fixed Bridge, Bailey Type, M1.

Component Parts of the Bailey Bridge

There are only ten major parts used in the Bailey bridge. They are:

(1) The *panel,* a truss section 10 feet long and 5 feet 1 inch high. It weighs 600 pounds, and can be carried by six men using three carrying bars. Panels are connected end to end by panel pins to form a truss, and can be bolted one above the

(*Continued on Page* 20)

Two-lane Bailey on barges over Seine River

Bailey over Saar River, built under enemy shell fire.

Post-War R.O.T.C. at Rose

By William K. Sharpe, soph., ch.e.

In line with other post war reconversions, the army has recently distributed a directive outlining several important changes from the existing ROTC regulations. This new program will be instituted with the fall term at Rose. Certain changes which will require Congressional action will be introduced as soon as the appropriate legislation is passed. The new eligibility regulations should be of particular concern to all students at Rose, both veterans and non-veterans. Other new regulations deal with the course of instruction and the proposed remuneration of students participating in the program.

Admission to the Senior ROTC program will be voluntary; however the student must meet certain requirements. He, of course, must be a citizen of the United States and a regular student at Rose. He must be between the age of 14 to 22 inclusive and physically fit. The age limit for veterans entering college prior to January, 1950 is 26. On admission to either the Elementary or Advanced ROTC Course a contract is signed to agree to complete the course unless the student is released by the War Department or drops from school for more than two calendar years. Finally, the student must maintain the general scholastic standing required at Rose.

Students of the Elementary ROTC Course will be paid an established allowance for the entire course of two academic years. This gross sum will be paid in the form of a daily rate. At the present time this rate is 66c per day. Students of the Advanced RO TC will be paid this same daily rate; and in addition, they will be paid an allowance of $1.25 per day in lieu of quarters and uniform. When the advanced student is in summer camp he will be paid the same rate as the 6th grade of the Regular Army. The 66c a day for elementary students and the additional $1.25 for advance students are changes still requiring Congressional action.

The Military Staff at Rose: Col. Otto J. Rhode, Sgt, Roy C. Womak (standing), and Sgt. Louis A. Hargrave

The Elementary or Basic Course is taken during the Freshman and Sophomore years. It will consist of 3 hours instruction per week for 2 academic years of 32 weeks each. The course will deal with the world military situation, military organization, hygiene and first aid, leadership drill and exercise of command, physical development methods, individual weapons and marksmanship, maps and aerial photography, National Defense Act and ROTC, military administration, evolution of warfare, and military law and boards. Any students who have had prior service in the armed forces will be allowed up to two years credit in the Elementary Course. Students were formerly allowed only one

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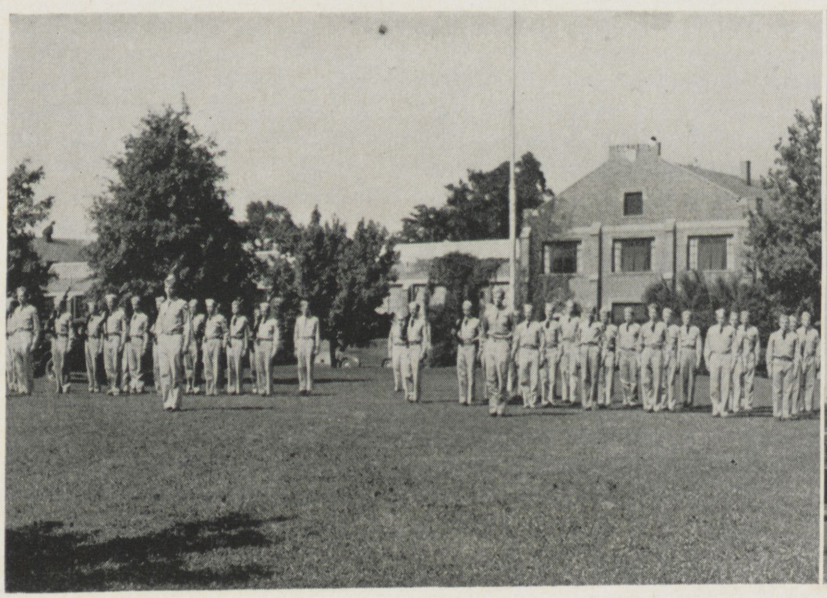


Alumni News

By James A. Milner, jr., m.e.

"In this department of the Rose Technic, effort will be made to chronicle all doings of our Alumni in the business as well as the social world." This statement appeared in the first *Rose Technic* ever published at Rose, in 1891, and with the passing away recently of one of the founders we again pay tribute to the eight men who began this publication and this column.

Today only three of the eight original founders and first editors are living, namely Walter M. Blinks, '94, W. J. Fogarty, '92, and W. Arnold Layman, '92. With the recent passing away of Luther S. Rose, one of these eight, Mr. Layman has written the following short biography of his life. Mr. Layman and his wife, who reside in Evanston, Ill., have just celebrated their Golden Wedding anniversary.

"Another of our distinguished alumni has passed away. Luther S. Rose, of class of 1892, died in Cincinnati May 17 last, at the age of seventy-seven, after a very short illness.

"Perhaps no other Rose alumnus has achieved, as did he, the dual distinction of a fine career in engineering and also a promising career in law after retirement from engineering. For, after closing his career in engineering at the age of seventy, as general manager of the Peoria & Eastern line of the New York Central Railway System, he entered the law department of The University of Cincinnati and graduated in 1942 (the fiftieth anniversary of his graduation from Rose) with the distinction of being 'the oldest person to obtain a law degree from this institution.' His subsequent admission to the Bar of Cincinnati and the State of Ohio launched him upon an active practice of his new profession. At the time of his death he was participating with general counsel of the New York Central System in the defense of very important litigation involving certain corporate procedure of the parent corporation.

"Luther Rose's career in engineering covered an almost romantic progress from menial service upon a railroad to the full executive management of an important line of the great New York Central System. Prior to entering Rose he had novitiated in railroading as crossing watchman, time keeper in locomotive and car shops, receiving freight clerk, and as a minor employee in a variety of other activities of apprenticeship type. All this created an intensified appetite, native with him, for an engineering education, and led to his entrance in Rose. As an undergraduate he participated energetically in various school activities, serving notably as one of the founders and first editors of *The Technic*, and also contributed to the publication of the first Rose Modulus issued by the class of '92 the year of its graduation.

Founders of THE ROSE TECHNIC. Left to right: 1st row—Eugene F. McCabe, T. S. Perkins, W. Arnold Layman, Francis W. Hurlbert. 2nd row—Walter J. Fogarty, William M. Blinks, Luther S. Rose, Arthur M. Hood.

"Upon graduation from Rose, he entered at once the service of the Big Four Railway, this time in the engineering department. He began at the bottom, progressing steadly through the roles of rodman, inspector of wire and masonry erection, chief of track location party, engineer of maintenance of way, signal engineer (in which capacity he supervised the installation of the first automatic signal system on the Big Four) next as valuation engineer, assistant to the Federal manager of the road during the first World War, assistant to the post war manager of the Big Four Ry., and finally as himself manager of the Peoria & Eastern Railway from 1923 until his retirement under the rules of the road at the age of seventy.

"Luther's every step forward was a recognition of competence, initiative, integrity and versatility. In all phases of his professional and private life he personified the fine character and ideals of the engineering profession, and his life reflected favorably to the high standings of Rose Polytechnic in the industrial and engineering world. He was a loyal friend to all Rose men wherever located, and to the advancement of Rose Polytechnic Institute.

"He leaves his widow, Mrs. Nora Rose, to whom he had been married forty-six years, and a daughter Miss Eleanor Rose, living at home. He also leaves two sisters, Miss Grace D. Rose, of La Jolla, California, and Mrs. Jessie Lockard, of Los Angeles, California. Interment was in Spring Grove Cemetery, Cincinnati."

Ball and Chain Club

John Trimble Harris, who was

(*Continued on Page* 28)

Research and Development

By Michael Cvengros, fresh.,
and
Thomas Makosky, fresh.

War On Weeds

If you should see your neighbor spraying his lawn instead of his garden, don't get excited and call for the men with the white coats and the big nets. For he isn't killing bugs, and he isn't using D.D.T.; he is killing weeds and he is using 2,4-D. 2,4-D is chemistry's latest contribution to the homeowner, the farmer, the agronomist, and anyone else who is interested in killing weeds.

Like D.D.T., 2,4-D is a synthetic organic chemical. Its full name is 2,4-dichloro-pheno-oxyacetic acid. In its pure form, 2,4-D is a white powder and is practically insoluble in water. To make a water spray it is necessary to dissolve it in another chemical and then add the water. When this solution is mixed with water it still does not disolve, but forms a milky emulsion which is very good for maximum distribution with a sprayer.

The great virtue of 2,4-D is its selective action. It will kill almost any plant, except members of the grass family and their near relatives, such as sedge and rushes. This selective action is not absolutely perfect, as a few weeds resist it, and a few desirable grasses are harmed by it. However, most lawns are made of bluegrass, which can stand repeated applications without harm.

For mass killing of rank weed growth like poison ivy, Japanese honeysuckle, and bindweed, 2,4-D looks like a first class weapon. Preliminary experiments last year proved very promising and more extensive tests will be made this year by federal and state agronomists.

For mass killing, where everything in sight is to be killed, 2,4-D will have competition from another weed-killer, ammonium sulfate. This compound made its appearance about four years ago, but since it is also a good flameproofing material the whole available supply was needed for war purposes. However, it received a good enough tryout last year to prove its effectiveness.

Tests have shown that 2,4-D stirred into the upper layer of the soil will clean out all seeds, including grass seeds. This makes possible its use in killing weed seeds in fallow fields, before the soil is made ready for a new planting. Soil thus treated, as well as the soil under grass that has been sprayed, does not hold its 2,4-D content for very long. After a few months it disappears, making it safe to plant any kind of seed, even the highly sensitive flowers and vegetables.

It should be remembered that 2,4-D is unlike any other plant poison in its action. In small doses it causes more rapid growth but otherwise leaves the plants unharmed. In heavier concentrations it promotes a wild and unhealthy overgrowth of the tissues, causing the leaves to twist and pucker, and breaking down all internal communications. The plant then dies of sheer inability to make its parts function properly.

Another thing to remember is the fact that 2,4-D kills practically everything except grass, so that it should never be used in vegetable or flower gardens. If the same sprayer is to used to kill weeds in the lawn and bugs in the garden, it should be thoroughly cleaned before putting in the insecticide.

Human beings and animals experience no ill results from 2,4-D. It was tried out on cows and ewes, and had no detectable effect on them. Samples of blood drawn from their veins showed its presence, but it did not get into their milk. A few hardy scientists swallowed samples of it, and although it is not recommended for eating purposes, these men came through with no apparent ill effects.

Spraying should be done only on warm days (about 80 or 85 degrees Fahrenheit are best), because 2,4-D is more effective when the weed's sap is moving most actively. The

"Before-and-after" pictures showing the effect of weed-killing spray (ammonium sulfamate in this case) upon poison ivy.
—Science Service

Steps in preparing duplicate plastic plates: (1) Releasing the plastic matrix, or reverse plate, from the original metal pattern; (2) spreading granules of plastic on the matrix; (3) taking a proof of the final plate. *—Science Service*

poison is then carried to the inner tissues and down to the roots, getting in its deadly work all over.

Plastic Printing Plates

One of the less spectacular developments to come out of the war was the plastic printing plate. Our overseas propaganda warfare developed featherweight halftone plastic plates so that fast air delivery of propaganda pictures to out-of-the-way places such as Arabia and China could be made. These plates were also used by the Government Printing Office to speed delivery of stories and pictures to South America for use in local newspapers there. At present these plates are being used by the Government Printing Office to print notices about housing for veterans, blanks for change of address, life insurance applications, and other forms and notices. Plastic plates are also used to rush duplicate advertisements to home-town newspapers. These plates can be incorporated directly into the type forms from which the mats and eventually the regular metal printing plates are made.

There were two reasons for the development of the plastic printing plate during the war, one being the shortage of metal and the other the need for a strong, lightweight, duplicate printing plate. The present plate weighs only one eighth as much as similar metal plates, and the plastic surface is so durable that there is little chance of their being damaged in shipment or in storage.

Duplicate plastic printing plates are made from the halftone or line-cut metal originals or from original metal type forms or electrotype patterns. Two steps are needed to complete a plastic plate from the metal original. First a matrix or reverse plate is made from the original type form, photo engraving, or zinc etching. Then a printing plate is molded in plastic using this matrix as the mold.

Two types of plastic are used in accomplishing the two steps, a thermosetting material in forming the matrix and a thermoplastic material in molding the plate. Thermosetting differs from thermopastic material in that it does not lose its shape when reheated.

In the first step a sheet of Bakelite, a thermosetting plastic, is placed over the original type form and both are inserted into a molding press. The press lightly squeezes the type form and Bakelite together and after a few seconds the Bakelite softens enough for a pattern to be presed into it. The final molding pressue is maintained for about ten minutes to allow the Bakelite to polymerize or "set". The matrix is then permanently hard and is ready to be used in the second step.

A granlar powder form of the thermoplastic Vinylite is usually used to form the plastic printing plate. After coating the matrix face with a special lubricant the powder is spread on it and both are placed in the forming press. The press is held at 1200 lbs. per sq. in. for about three minutes while being heated to 260° Fahrenheit. This combination of heat and pressure melts and shapes the Vinylite powder to the form of the original pattern. The whole assmbly is then cooled in water where the plate hardens.

After having been striped from the matrix the printing plate is trimmed and smoothed and a proof is pulled to see if it is ready for use.

Many plates can be made from one master matrix, and even after 250,000 sheets have been printed from any one plate the letters do not show signs of fuzziness or imperfections. The new method is faster as well as cheaper than the old methods, the whole operation from original pattern to the plastic printing plate taking only forty-five minutes.

At present experiments are being conducted to perfect a plastic type that can compete with the standard metal type in wearing and sharp outline producing qualities. This last-mentioned advance of plastics into a realm where metal has long been king is still in the experimental stage, however.

New-Type Atom Smasher: The Synchrotron

A 300 million electron volt synchrotron, a powerful new-type atom-smashing machine which may eventually enable scientists to fire atomic bullets of one billion electron volts, is now under construction at the University of California. Combining features of the cyclotron and the betatron with modifications, the new device will utilize electrons as projectiles. Since the projectiles will be in the energy range of cosmic rays, it is hoped that it will be possible to smash not only the nucleus but also the basic particles—protons and neutrons—of which the nucleus is composed.

Devised independently by Prof. Edwin H. McMillan, co-discoverer

(*Continued on Page* 27)

Campus Survey

By Orville L. Stone, soph., e.e

New Members of the Faculty

Due to the greatly increased enrollment at Rose, numerous additions to the faculty have been necessitated. The following appointments have recently been made:

Mr. Ralph M. Ross is a new member of the mathematics department. Mr. Ross was recently released from the armed forces after four years of service. A graduate of DePauw University, he completed work for his master's degree at Indiana University.

Mr. C. L. Mason, who was a member of the faculty during the period of the army training program, has returned to Rose and is presently instructing in the physics department. Mr. Mason is a graduate of the University of Wisconsin, where he also received his master's degree. His family will move to Terre Haute when housing conditions permit.

Mr. Gordon Keith Haist has recently been appointed as an instructor in English. A graduate of North Central College, Napierville, Illinois, Mr. Haist holds a master's degree in English from Northwestern. He has done editorial work on a newspaper, had some experienct in adult education, and recently was assistant personnel director at the Lindbergh Manufacturing Company in Chicago.

John Newlin and James Mason, both graduates from Rose, have been appointed instructors. Mr. Newlin is an instructor in the department of civil engineering, while Mr. Mason teaches engineering drawing. Both hold reserve commissions with the Corps of Engineers, having recently returned from extensive overseas service.

Colonel O. J. Rohde, commanding officer of the ROTC at Rose, has announced the appointment of two additional staff members in the department of military science and tactics. They are M/Sgt. Roy C. Womak and T/4 Anthony G. Lombardi. Master Sergeant Womak recently re-enlisted in the service after serving with the Engineer Corps overseas during the war. Technician Lombardi, an automotive mechanic in civilian life, served in the Maritime Service during the war, entering the army in May, 1945.

1946 Track Team

Staff members returning to the college in the Spring from leaves of absence for military service or war work include Professors E. A. MacLean, Herman Moench, Theodore Palmer, and Irwin Hooper.

Dr. George Hansche has resigned from the department of physics to return to Albuquerque, New Mexico, to resume research on a project for the United States Navy with which he was connected during the war.

Freshmen

Although predominately veteran, the new freshman class contains more green-hat freshmen than did any of the past several classes. At a meeting on Friday, July 12, fifteen of the "green-hats" showed up and were organized in traditional style by the upper classmen, who "laid down the law." The meeting was climaxed by a laking party where, to give evidence of their good will, the upper classmen treated several freshmen to a swim in the lake.

Radio Club

The Radio Club, which almost folded during the lean war years, is now very much alive under the wing of Professor Moench, the faculty advisor for the club. The club now sports a brand-new transmitter and plans to begin amateur broadcasting soon. Several members possess amateur licenses and others are working on Morse code and other qualifications toward getting their "ham" licenses. Other activities of the club include recording and work with radio equipment from the grounded P-47.

Officers for this term are: President, Jack Doerffler; Vice-President, Marshall Roesch; Secretary-Treasurer, George Kyle.

Football

Football may seem a long way off during these hot August days, but already a group of aspiring gridders is working out under the direction

Upperclassmen informally welcome a freshman to Rose.

of Coach Phil Brown. The boys are wearing shorts and T-shirts until the weather cools enough for wearing regular gear. Although Coach Brown declined to comment upon the football outlook, the return of several letter men and reserves of the '42 team plus a large enrollment seem to warrant a little bit of optimism. The nine-game schedule, which includes such old rivals as Manchester and Earlham, is printed below.

Coach Brown intends to tie in the twice-weekly football sessions with intra-mural softball, and when your reporter contacted the Coach he was hard at work shaping up the new baseball diamond west of the football field. The diamond was moved from the old position last year, and recent improvements such as cutting new base lines and building up the pitcher's mound have developed the field into a very satisfactory diamond.

The football schedule:

Sept. 28 At Manchester
Oct. 5 At Rio Grande (Ohio)
Oct. 12 At Hanover
Oct. 19 At Wabash
Oct. 26 Indiana Central (Homecoming)
Nov. 2 At Principia (Elsah, Ill.)
Nov. 9 Cedarville College (Ohio)
Nov. 16 Franklin
Nov. 23 Earlham

Camera Club

The Camera Club is holding a contest among its members with "water scene" as a very promising topic. This is one of a series of contests which began several months ago, and so far has produced some excellent photography. The prints submitted in the contest are usually posted on the Camera Club bulletin board.

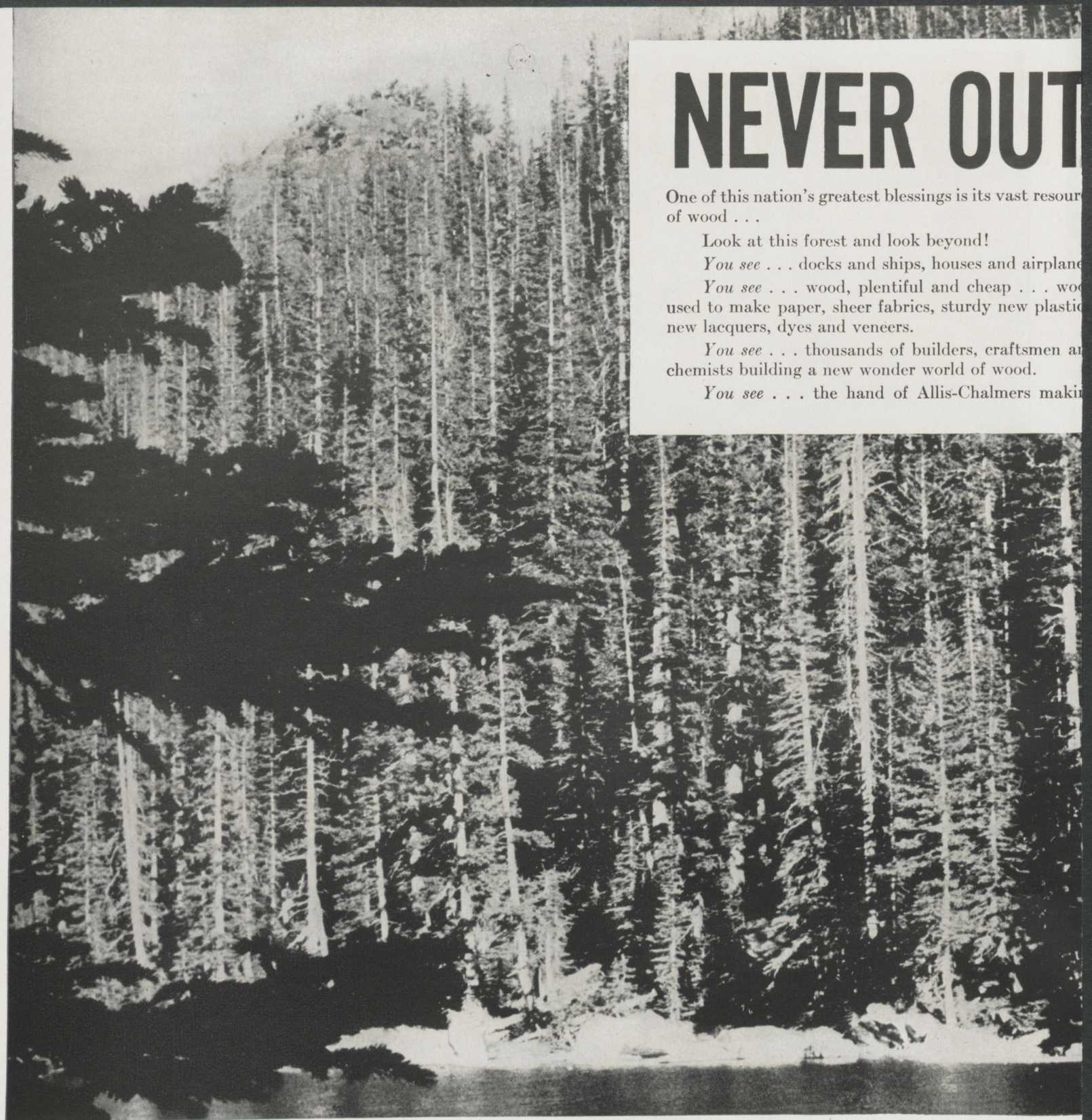
The Modulus

Plans have now been completed for the publication of the 1946 *Modulus,* the school yearbook which has appeared more or less continuously since 1892. The work of securing photographs, writing copy, and soliciting advertisements is now well under way, and present plans call for actual distribution of the book early in December. The editor this year is Charles G. Weibel, with Richard G. Olson as Business Manager and Professor H. V. Fairbanks as Faculty Adviser.

To a casual reader of the *Modulus* the amount of work necessary for final publication is not at once apparent. A good deal of time is spent on such items as planning, proof reading, etc., so that in years to come the student can dust off the cover once in a while and remind himself of his school days. Wholehearted cooperation is necessary not only from staff members but from the student body as well. Suggestions or comments, which can be made to any staff members, are welcome.

With a student body now larger than ever before, this year's book promises to be one of the best. A trend to more laking parties and social activities seems to be instilling a little more of the spirit of former students. Who can tell if that won't be you in one of the campus snapshots?

Informal shot of Modulus Staff



NEVER OUT

One of this nation's greatest blessings is its vast resour of wood . . .

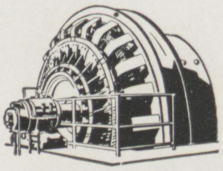
Look at this forest and look beyond!

You see . . . docks and ships, houses and airplan

You see . . . wood, plentiful and cheap . . . wo used to make paper, sheer fabrics, sturdy new plasti new lacquers, dyes and veneers.

You see . . . thousands of builders, craftsmen a chemists building a new wonder world of wood.

You see . . . the hand of Allis-Chalmers maki



Whether your electric power requirements run to hydraulic or steam turbines . . . whether your needs are for generators, transformers, motors, control devices, or switchgear—expect from every Allis-Chalmers product advanced electrical engineering and design, thoroughly modern efficiencies. Specify Allis-Chalmers.

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ALLIS -

One of the Big 3 in Electric

Biggest of All in

OF THE WOODS—AND GLAD OF IT!

chines and equipment that help to expand the hty wood industry—that enrich your life by bring- the new world of wood closer to you!

* * *

w big is Allis-Chalmers in this picture? Not only erica's No. 1 builder of sawmill machinery—but portant source of barkers, chip screens, kilns and ed equipment for pulp and paper mills—one of the ion's leading producers of processing machinery for chemical industries!

What reason for this bigness? A unique reputation for product engineering and integrity—vast industrial experience—craftsmanship of the highest order—*a reputation known and respected in every industrial field!*

Today, Allis-Chalmers supplies major products for virtually every basic industry . . . has a hand in making almost every machine-made commodity you can name.

Allis-Chalmers is a good name to know!

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TUNE IN THE BOSTON SYMPHONY over the American Broadcasting Company, Saturdays, 9:30 P. M. EST

CHALMERS

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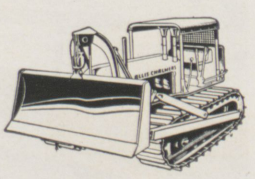
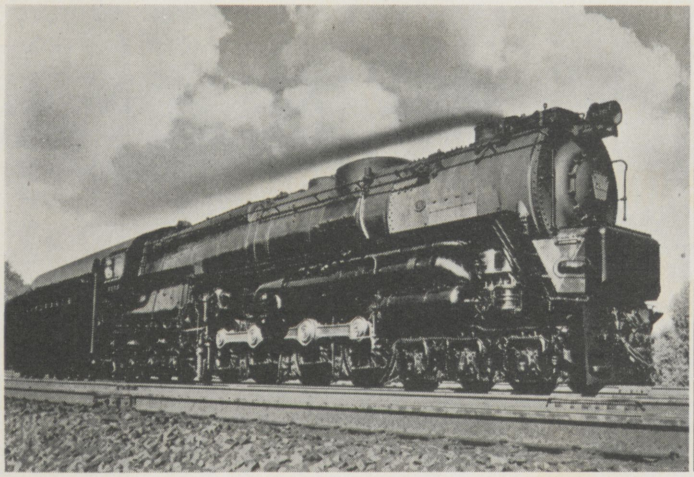
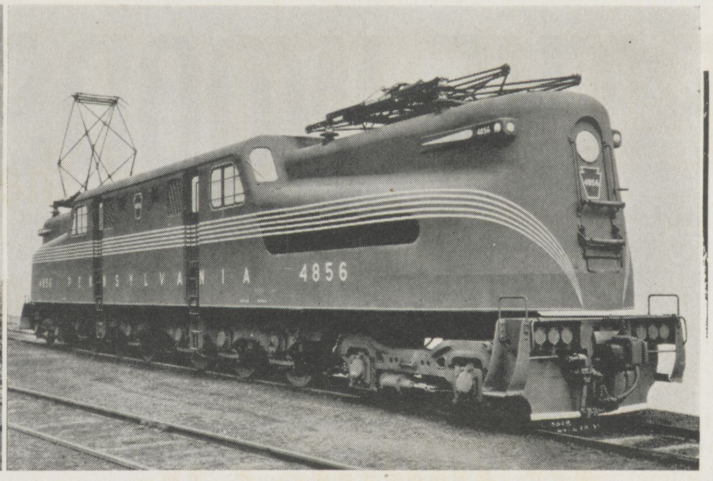


Allis-Chalmers builds tractors like this for the logging industry—mills for making flour—machines for mining and processing ores—pumps for moving almost any fluid—compressors and blowers—welders—speed changers—literally 1600 important industrial products. Call the Allis-Chalmers office in your city.



First direct steam turbine locomotive in U. S.
—*Pennsylvania R. R.*



Electric passenger locomotive.
—*Pennsylvania R. R.*

THE EPIC OF AMERICAN RAILROADS

(*Continued from Page 7*)

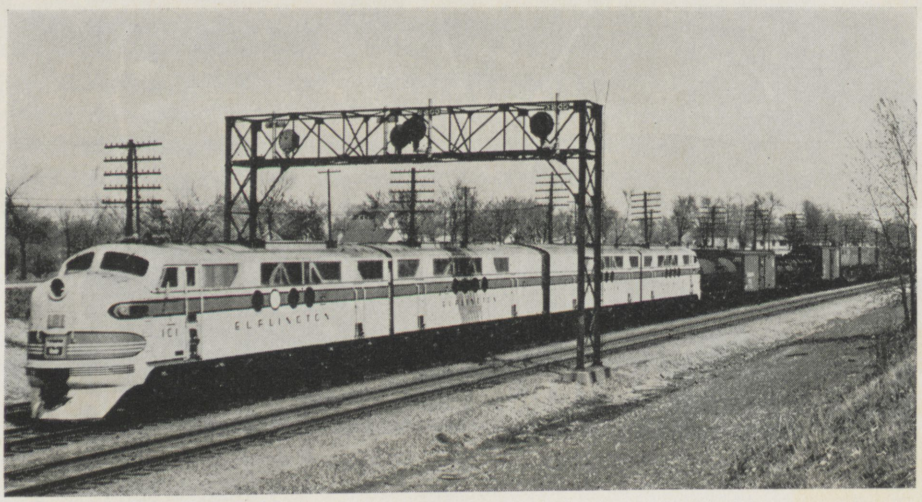
place. America's railroads were now recognized as supreme among transportation systems. In this ten-year period 74,000 miles of track were added, and by 1916, when the advancement was dwindling, nearly all towns of any importance were connected by the spider web of railroad service.

By 1930, the aggregate length of U. S. railways was 251,865 miles, approximately 2/5 of the entire world's total. Texas has the greatest railway mileage in America with 16,940 miles, followed by Illinois and then Pennsylvania. Since World War I, more than $11,000,000,000 has been spent, or in clearer terms over $1,000,000 per day has been appropriated for improvement of railroad properties. Consolidations have reduced the number of independent roads from 1312 in 1911 to 732 in 1944. During this time Railroad Associations have come to be of great importance. Their purpose is to coordinate certain activities, principles and policies. Among certain of the Association's standardization of operations is the adoption of standard time, gauge of tracks, and equipment. Also, a Standard Code of Operating Rules has been the result of joint action and research, giving the railroads uniform operation codes for block signals and interlocking devices.

The last great step in railroad progress was the introduction of streamlined trains. Now a passenger could travel in comfort as well as speedily and efficiently. Diesel powered trains have made the trip from New York to San Francisco in 55¾ hours and have run from New York to Jacksonville, Florida in 18 hours. The interiors of these trains remind the passenger of a most luxurious home complete with every living facility.

Freight service has been greatly improved since World War I. In that war, the government operated the roads at a loss of $2,000,000 a day. In World War II, private companies operated the roads and contributed over $3,000,000 a day in taxes. It is interesting to note that with 25,000 fewer locomotives, 600,000 fewer freight cars, and 500,000 fewer employees in World War II than in World War I, more than double the passenger service and nearly double the freight traffic was handled than in the first war with less delay and congestion, all of which can be traced to coordination between shipper and railroad.

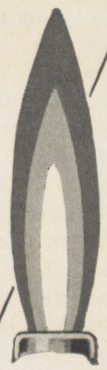
Progress of freight equipment has made long advances from the early box car to various types of cars suitable for all freight hauling. Stock, refrigerated, tank, automobile, grain, and coal cars have all been developed to give greater efficiency and usefulness to their specific jobs. Car capacity has steadily increased and individual car construction has improved to the point where steel has virtually replaced wood as building material. Locomotive efficiency has increased with further study in this streamlined age. The New York Central line boasts of a new Niagra Class locomotive for combined passenger and freight service capable of delivering over 6000 cylinder horsepiwer at higher speeds. All of these improvements in construction and design have been for one purpose: American railways wish to give the best services possible to the traveling public. However, the railroads are enjoying considerable competition from the bus-lines, air travel and even private auto travel. Such competition may not look too profitable from the railroad viewpoint, but the individual traveler is profiting, for competition brings out some of the better designs and safety features which otherwise would be overlooked or neglected.



Streamliner used in freight service.
—*Burlington*

Some of the many advantages of Gas and Modern Gas Equipment

- **Dependability**
- **Versatility**
- **Simplicity**
- **Minimum Capital Investment**



When the operator turns on the Gas control, he knows that this modern fuel will go to work at once, evidence of its dependability.

No matter what special conditions obtain in your plant, Gas will be found the most versatile fuel. It is adaptable to any problem in heat treating—there is Gas equipment to meet any situation in the application of heat industrially.

Gas equipment is the easiest to introduce to any production system. Gas works with or without a furnace; there is no other source of heat for plant operation that can surpass this modern fuel in simplicity of equipment, yet do such a successful job.

Gas, dependable fuel for industrial processing, requires a minimum capital investment for equipment. Gas is simple to utilize, has unlimited application possibilities. Research Engineers of American Gas Association have cooperated with manufacturers to develop economical, modern Gas-fired equipment for every industrial heating requirement.

THE TREND IS TO GAS

FOR ALL INDUSTRIAL HEATING

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE, NEW YORK 17, N.Y.

THE BAILEY BRIDGE

(*Continued from Page 9*)

other to form a double-story bridge.

(2) The *transom,* which is the principal transverse member of the bridge. It is clamped in position across the bottom panel chords and supports the stringers and flooring. It consists of a 450-pound 10-inch I-beam 18 feet long. Transoms are spaced at 5-foot intervals (two per panel section) for loads under 40 tons; for heavier loads they are doubled up (four per panel section).

(3) *Stringers,* which consist of three 4-inch steel I-beams 10 feet long, separated by stiffeners and weighing 265 pounds. There are two types of stringers, plain and button. Each bay of the bridge contains three plain stringers and two button stringers. Button stringers are placed on the outside of the bay to hold the flooring in place.

(4) *Chess,* the flooring planks They are held down by the curbs.

(5) *Ribands* (curbs), trapezoidal timbers that serve as side rails. They are bolted to the button stringers.

(6) *End posts,* steel columns which are attached to the end of each truss to take the vertical shear at the end of the bridge. They consist of plates welded together, and are secured to the end panel by panel pins. A bearing block at the bottom of the post fits over the bearing, which supports the bridge.

(7) The *bearing,* a steel assembly upon which the bearing block of the end post rests. One bearing, usually supported on timber cribbing, is used to hold up the end of each truss, except in triple-truss bridges, where ends of the second and third trusses rest on the same bearing.

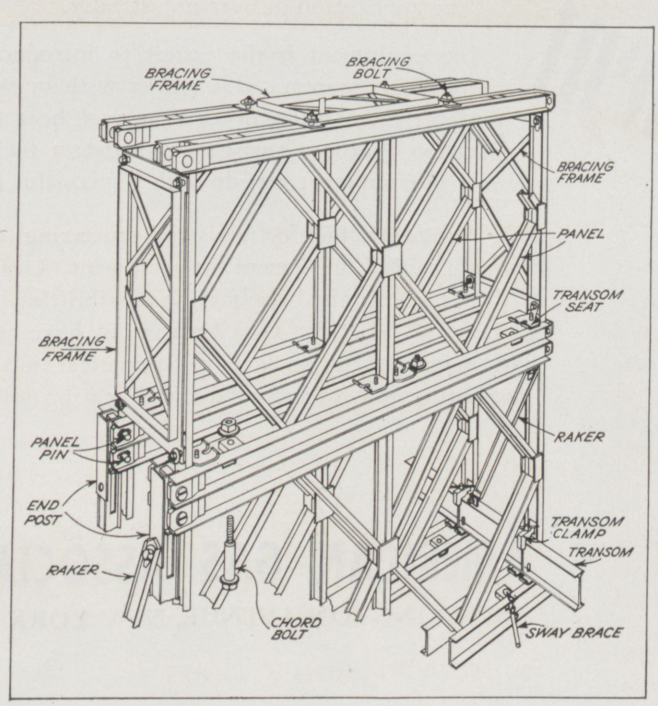
(8) *Ramps* similar to stringers are supplied for use at the ends of the bridge. Like stringers, they are of two types, plain and button. If two bays of ramps are employed in the approach, their junction is supported by a transom carried on four pedestals.

(9) *Footwalks* are wooden assemblies used to furnish a walkway on each side of the bridge. They are supported on footwalk bearers, which fit on the transoms. Footwalk posts are employed to support hand ropes.

(10) *Rakers, sway bracing, bracing frames,* and *tie plates* are used to brace the panel trusses.

All parts of the Bailey bridge are assembled in the shops of the manufacturer. Great care is exercised to insure that each piece will be interchangeable with similar pieces manufactured in other shops both in United States and Great Britain. The use of special jigs and guages has greatly simplified this work. After assembly each steel part is carefully cleaned and painted to prevent corrosion.

All wooden parts of the Bailey bridge are made from select structural-grade Douglas fir. The wood is dressed on all four sides and is treated with a wood preservative. Each piece is given two coats of paint.



Bailey panels in end bays of double-double bridge.

For purposes of supply and for tactical considerations, a basic Bailey bridge has been established. This consists of 120 panels and enough of all other parts to build a double truss, double story span 150 feet long with a twenty foot approach ramp at each end and a footwalk on each side for pedestrians. In addition, a certain number of spare parts and tools are supplied with each basic bridge. Some of these spare parts are shipped with the bridge while the remainder are held in supply depots for replacement of operational losses. Twenty-one 2½-ton trucks with trailers are required to carry a basic bridge.

The carrying capacity of the bridge can be increased by using one, two or three trusses in a single tier or by using two or three trusses in two or three tiers on each side of the roadway. Each tier of trusses is connected by special bolts to make them act as a unit. The trusses are braced to each other by special bracing frames. Depending on the number of trusses used, the different types are known as a single-single, single-double, single-triple, double-double, triple-double, or triple-triple.

Single spans of 180 feet have been used in practice, and spans of 240 feet may be realized. Much wider crossings are possible when intermediate supports such as pontons, piers, or bents are used. One of the most notable Bailey bridges ever constructed was built December 24, 1945 by the 3053rd Engineer Combat Battalion of the United States Ninth Army across the Albert Canal in Belgium. The bridge was supported by two piers made from Bailey bridge panels. The three spans were 151, 152 and 121 feet in length. Each pier was 52 feet high. The operation required a total of 16,970 man-hours of daytime work and 6,120 man-hours of night work.

Erection of the Bailey Bridge

Erection of the Bailey bridge is a rather simple operation. The bridge is assembled complete with flooring on rollers on one bank with a skeleton length of bridge on the forward end to act as a launching nose. The launching nose is usually built at an angle of about 20° above the horizontal to overcome natural sag or to reach a high far bank. If the bridge is to span a stream, the launching nose may be floated on pontons or pneumatic floats as it is launched across the gap.

Quite often a bulldozer is used

(*Continued on Page 22*)

Off to a good start

Joe always had definite ideas about marriage. At the garage where he worked before doing his hitch with Uncle Sam, he used to tell the boys: "I got it figured out. Wives are like piston rings. Get yourself the right one to start with, and you got nothing to worry about!"

So now Joe is off to a good start.

And any engine . . . whether in a bus, truck, locomotive, ship, airplane or passenger car . . . is off to a good start for smooth, economical performance if it's equipped with Koppers American Hammered Piston Rings.

These rings incorporate today many improvements and refinements developed by Koppers during the war. They have proved themselves able to withstand successfully the terrific heats, the tremendous explosive forces, the constant wear and tear and grueling punishment that piston rings must take in an engine. And their use assures many thousands of additional miles of service between engine overhauls.

To the manufacture of piston rings, Koppers brings the same engineering background, the same accumulated skills and knowledge as it does to the design and building of coke ovens; to the pressure-treatment of millions of feet of lumber every week; to the making of couplings, propellers, road surfacing and roofing materials.

It is this engineering and chemical skill, applied to almost every major field of endeavor, which has made Koppers "the industry that serves all industry." Koppers Company, Inc., Pittsburgh 19, Pa.

The industry that serves all industry

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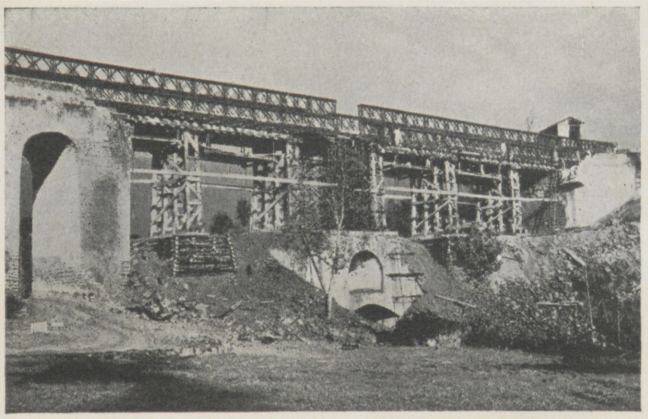
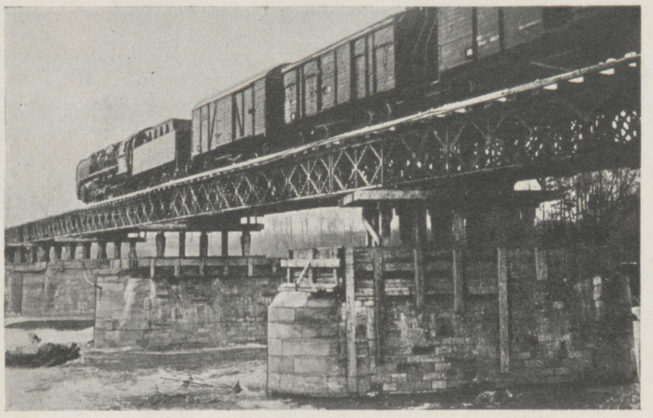


Replacing Bailey with semi-permanent trestle bridge.



Deck-type Bailey railway bridge over Moselle River.

THE BAILEY BRIDGE

(*Continued from Page 22*)

to push the bridge across the gap. A heavy truck can also be used. Smaller Bailey bridges may be launched by manpower but this is an inefficient method if power equipment is available. After the span has been put in place, jacks are used to lift the bridge off the rollers and place it on the bearings. As soon as the approach ramps are in place, the bridge is ready for use.

Depending on the size of the bridge to be constructed, from one to four engineer platoons, each consisting of 39 men, are required to erect it. With trained personnel under favorable conditions, an 80 foot double-truss, single story bridge can be constructed in about two hours, and a 140 foot, double-truss double story bridge in about 10 hours.

One of the most remarkable characteristics of the Bailey bridge is its adaptability. In addition to the usual one-lane span, the special design of Bailey bridge parts makes possible the erection of bridges of two or more lanes, with a common center girder of heavier construction than the outside members. Bailey bridge sections were also used in the construction of suspension bridges for use in mountainous terrain where ordinary bridges would be impracticable. Floating Bailey bridges using pontoons were devised to span wide rivers. Special bridges for railway use, retractable and life bridges to permit passage of boats, and many other types of special bridges were developed using the basic Bailey parts.

Future Prospects of the Bailey Bridge

Recently there has been much discussion as to the possibility of converting the Bailey bridge to peacetime use. Authorities differ widely, and as yet no definite statement can be made on the subject.

Certain facts do stand out, however. The Bailey bridge purchased new would cost more than a conventional bridge. It has but a single lane only 10 feet 9 inches wide, which is much narrower than the average single lane highway bridge. Another disadvantage of the Bailey bridge is that from a civilian standpoint it is not pleasing to the eye. The speed with which it can be erected, however, would make it a very valuable emergency bridge with which to replace a damaged structure. The State Highway Commission of Indiana has built a Bailey bridge across the Patoka River at Jasper, Indiana to replace a structure which was destroyed when a truck hit it.

Whatever its peacetime developments, nothing can detract from the wartime record of the Bailey bridge. Unequalled for simplicity, speed of construction, adaptability, and economy, it became the first all-purpose military bridge. It will undoubtedly go down in history as one of the most important developments in engineering progress to come out of World War II.

110-foot triple truss single-story fixed Bailey over the Roer River at Heimbach, Germany.

110-foot triple-truss double-story fixed Bailey over Vire River near Vire, France.

Kodak

Because photography is expressive . . .

THIS baby can't talk. But, as you see, her picture *can* . . . thanks to the expressiveness of photography.

Offhand, you may not realize how important photography's expressiveness is to business and industry. Yet it is this unique characteristic that makes photography their most persuasive "spokesman."

Because of it, you can say things pictorially about your product . . . in magazine and newspaper advertisements . . . in direct mail and point-of-sale displays . . . that just can't be said any other way.

Because of it, you can get closer attention, quicker action from the buying public with sales promotional films than with almost any other medium.

This gives you only an inkling of what photography's expressiveness can do for business and industry. For a treatment of the subject that will give you a broader understanding of this and photography's other unusual abilities . . . and of what they can mean commercially . . . write for our new booklet, "Functional Photography." It is free.

Eastman Kodak Company, Rochester 4, N. Y.

Advancing business and industrial technics . . .

Functional Photography

Scene from pre-war R.O.T.C. field exercises at Rose

POST-WAR R.O.T.C. AT ROSE

(*Continued from Page* 10)

year credit.

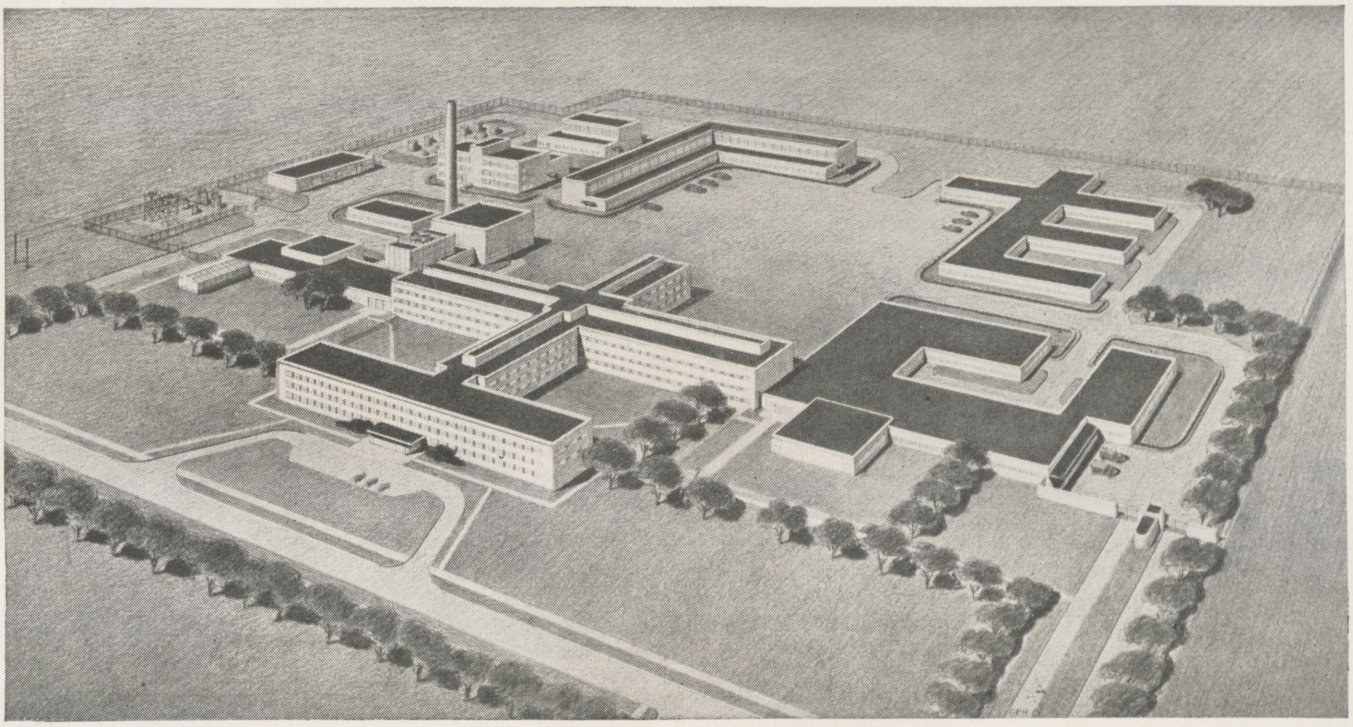
The Advanced Course ROTC requires 5 hours instruction per week for 2 academic years and an 8 week summer camp. The instruction is of a specialized nature in order to qualify Rose graduates for reserve commissions in the Engineer Corps. The subjects covered include leadership drill and command, military teaching methods, geographical formations of national power, tactics and technique of the Engineer Corps, combined and joint operations, occupied territories, military leadership, psychology and personnel management, military problems of the United States, military law and boards, psychological warfare, military mobilization and demobilization, and command and staff.

The War Department issues uniforms to students in the Elementary Course. It is provided, however, that the school can draw an allowance instead of the uniform in order to issue on its own a distinctive or individually tailored uniform. The students of the Advanced Course must provide their own uniforms.

Upon graduation from Rose and upon completion of the Advance Course ROTC, a student may be granted a commission as a 2nd Lieutenant. The candidate, however, must be 21 years of age.

At present, the unit at Rose is quite small. This fact may be accounted for by an apparent lack of interest on the part of veterans and a lack of available non-veterans in school. ROTC, to the veteran, offers an excellent opportunity to win a reserve commission in the Engineer Corps. Non-veterans can hardly overlook the fact that students of the Advance Course are deferred from the draft. Furthermore, Rose gives 3 credit hours per term towards graduation for the Elementary Course, and 2 hours per term for the Advanced Course.

R.O.T.C. Engineers build footbridge at summer camp in 1940. Post-war summer camps are scheduled to begin next year.



Great new research laboratories being built by Standard Oil (INDIANA)

will provide every modern facility for about 1200 research workers

War activities revealed hitherto undreamed-of possibilities that lie in petroleum . . . found many new products that can be made from it . . . widened the entire horizon of organic chemistry.

So, the Standard Oil Company (Indiana) started building these new research laboratories at Hammond, Indiana, near the famous Whiting refinery. Here the Company's able scientists will work their magic . . . taking hydrocarbons apart and putting them together . . . turning aliphatics into aromatics . . . developing amazing new methods for carrying out chemical reactions.

From these laboratories will come fuels for new cars and new diesels, for gas turbines, for jet-propelled planes. There will appear new lubricants, insecticides, cutting oils—and an increasing number of new chemicals and plastics.

Some of the scientists will work with flasks and beakers, some will operate pilot plants. Others will carry out complicated chemical analyses electronically by the flick of a switch. Still others will design huge new refinery units, or help run these towering steel giants. Chemical engineers with a flair for economics will watch crude supplies, costs, markets. They will decide when, if ever, the Company ought to start making gasoline from natural gas or from coal.

All this and more will go on in these new research laboratories.

STANDARD OIL COMPANY (INDIANA)

Fraternity Notes

Sigma Nu Fraternity News

Beta Upsilon chapter of Sigma Nu launches its program of summer activities under the leadership of new officers. The officers were elected before the end of last term and are as follows: Commander, George Staub; Lt. Commander, Fred Mueller; Chaplain, Elmer Cooke; Recorder, Bill Monzel; Reporter, Carl Johnson; Sentinel, Ignac Matus; Marshal, Bob Leathers; and Treasurer, Perry Ray.

The chapter extends its heartiest welcome to the following veterans who have returned to school: Brothers C. V. Hinton, Ben Richardson, Paul Benning, and Bill White.

The chapter is happy to announce the initiation of five pledges. Those initiated were George Cooper, Tarentum, Pa., James Thompson, Terre Haute, Hollis Mellon, Sellersburg, Ind., Ignac Matus, New York City, and Carl Johnson, Chicago. At the meeting held July 8, James Wade, Indianapolis, was initiated. Brother Wade has just returned from service in the navy. Following the initiation a banquet was given in honor of the initiates at the Terre Haute House. Guests present were Mr. R. F. Burns, alumni advisor for the chapter, and Professor MacLean, faculty advisor for the chapter.

A rush party was held Saturday, July 13, at the home of Mr. and Mrs. Clay Phillips. The food for the occasion was prepared by the Sigma Nu Mothers' Club. Three men were pledged as a result of the party. They were Carl Monzel, Indianapolis, George Boaz, Chicago, and Bob Kapps, Terre Haute.

At the meeting held July 8, Brothers Bill Monzel and Perry Ray gave an account of the District meeting held at the Edgewater Beach Hotel. Plans were made at this meeting for a picnic at Shakamak State Park July 20. Congratulations go to Brother Tucciarone who passed out his pin to Carol Hargis.

Alpha Tau Omega

From July 2 to July 7 the chapter held "hell-week" for the pledges who did a fine job of repainting the house as well as fulfilling the requirements of the week. Sunday morning of July 7 the chapter attended services at Westminister Presbyterian Church and at 1:30 held formal initiation ceremonies for twelve men of the current pledge class. The men who became actives of the chapter are: David Diehl, Terre Haute; Earl Howlett, Terre Haute; William Maddock, Terre Haute; Thomas Duwelius, Elkhart, Ind.; Francis Heinz, Newcastle, Ind.; Robert Mikels, Clinton, Ind.; John DeReamer, Griffith, Ind.; Harold Lucas, Sullivan, Ind.; Albert Schairbaum, Cinn., Ohio; John Weibel Sellersburg, Ind.

Sunday, July 14, the chapter and guests enjoyed a rush party at the house with games, and refreshments as the principal activities of the afternoon. Brother John White was chairman of the rush committees and Brother Allen Smith headed the entertainment committee.

On July 21 the chapter and their guests spent the afternoon at Shakamak State Park and enjoyed an excellent evening meal prepared by the A.T.O. Mother's Club. The chapter wishes to extend their thanks and appreciation to the Mother's Club for their assistance.

The past few weeks have found most of the men of the chapter spending the remaining daylight hours after meetings at the Rose lake for a short swim in an attempt to combat the summer heat.

The chapter is happy to welcome John Bartholome and Gordon Hayes back from active service. These men will continue their studies in October.

Theta Xi News

The Kappa Chapter Theta Xi at the start of the summer term found back at the house seven old T.X. men who attended school prior to the war or for a short time at the beginning of the fray. Eighty-eight keys Backes, Bill by first name, is back both at the piano and at his studies, while Bob Weinhardt represents his side of the family while Bill is working and getting married. Robert Lee Brandenburg traded his blues and swabbing bucket for a slide rule to start this term along with some of his former classmates Ed Mabley, George Staples, Max Lindley and Charles Eshelman. Chuck is still looking for an apartment without a built-in furnace.

During this past spring term various alumni of the chapter have dropped around to the house to pay their respects. It sure was good to see Paul Kaplan, Dean Albon, Jim Mitton, Russell Northam, and Jim Torr. Dean Albon is now the chief engineer for the Air Mite Corporation.

Saturday evening, July 13, the chapter held formal initiation for Sherrill Arvin, Otto Andres, William Berling, John Cavanaugh, Floyd Christy, Frank Dorfmeyer, George McNeil, John Titsworth, Harry Todd, and Edward Valenzano. It is with great pleasure that these fellows were accepted as Theta Xi men at Rose.

For amusement these hot summer days the chapter is planning house parties, picnics, stag parties, picnics, dances, picnics, etc. With Bud Eberly still as chief pilot and Bob Somers as co-pilot the chapter is enjoying a very excellent school term, both socially and academically.

Lambda Chi Apha

Brothers who have returned to school this term are Willis Rose, Ralph Mitchell, Harmon Shaw, Robert Greger, John Mitchell, Robert Kylander, and Charles Bresett. Charles Bresett had already graduated before he left for the navy. He is now taking a one term refresher course before he goes to Purdue to teach.

The chapter was visited last term by brothers Burton Butts, Don Alexander, and Charles Baker. Brothers Butts and Baker will return to school next term. In addition, brother Charles Bashe is also expected back at that time.

Recently initiated are Harold V. Fairbanks, Marvin V. Hansel, and Dr. Oran M. Knudsen, John Leins, Kenneth Schneider, and Robert Bannister. The formal initiation ceremonies were held Saturday, July 20.

The chapter's summer term rush party was held Saturday afternoon, July 13. Those pledged are Robert Bitting, John Lichtenwalter and Wayne McCoy. The party was held at the Woman's Department Club. Chuck Daugherty, traveling secretary from the national office, was present at this party.

Sunday the 21st the chapter went on a picnic to a farm near Bowling Green, Ind. There were present 25 members with dates. A very good time was had by all.

Tau Beta Pi

After remaining on a semi-active basis throughout the war, Indiana Beta of Tau Beta Pi is now making plans for full reactivation. The chapter welcomes back the following ex-servicemen: Willis E. Rose, William E. Barrick, and Marshall Roesch.

On July 11 an initiation was held for Charles G. Weibel, sr. c.e., of Sellereburg, Indiana, and Herman W. Prust, jr. m.e., of Terre Haute. Due to the large influx of ex-servicemen into the upper classes, it is believed that several more men have already become eligible, and an additional initiation will probably be held later in the summer.

The following officers have been elected for the remainder of 1946: Robert G. Bannister, President; Theodore W. Blickwedel, Vice President; Marshall Roesch, Secretary-Treasurer; Willis E. Rose, Corresponding Secretary; Professor R. E. Hutchins, Faculty Adviser.

Herbert Bailey is now pursuing graduate work in electrical engineering at the University of Illinois.

RESEARCH & DEVELOPMENT

(*Continued from Page* 13)

of neptunium, and the Russian scientist, V. Veksler, the synchrotron employs a new principle which corrects a basic defect inherent in the cyclotron and the betatron. As accelerating particles in the cyclotron and betatron reach progressively higher speeds, they begin to fall out of step with the regularly-spaced high-frequency electrical pushes applied to speed them up, and hence gain no further speed. This phenomenon is due to the law of relativity, whereby high-energy particles do not accelerate as much as low-energy particles due to increased mass at high velocities. The synchrotron compensates for this factor by progressively increasing the magnitude of the magnetic field as the particles reach higher energies, thus jerking the lagging particles up to the acceleration point exactly in time to receive a new push.

A principle similar to that utilized by the synchrotron will also be applied to a huge new cyclotron designed to achieve high energies with heavy particles—protons, deuterons, and alpha particles. Instead of altering the magnetic field to keep the particles in step, however, the new machine will progressively decrease the frequency of the accelerating impulses. By lengthening the intervals between the accelerating impulses, the lagging projectiles will be kept exactly in step. By utilizing this type of modulation, it is expected that deuterons of 200 million electron volts will be produced.

ALUMNI NEWS

(*Continued from Page* 11)

voted the man most likely to succeed against the feminine world, graduated from Annapolis this past spring and then married Miss Dorothy Cooper, daughter of Rear Admiral and Mrs. Oswald Symister Couldough at the Emmanuel Episcopal Church in Alexandria, Virginia. John attended Rose in '41 and '42 and left in the fall of the latter year for his appointment to Annapolis.

William Herman Plenge, Jr., undoubtedly a future student at this school, is now the proud, nine pound son of Lt. and Mrs. Plenge who are residing in the town made famous by S.A.A.C. (San Antonio to illiterates of army lingo). Lt. Plenge started at Rose in the class of '45 but due to conditions unforseen at the time of his matriculation he was unable to continue in the curriculum of an engineer. Uncle Sam got him.

Soon to become a member of this distinguished club is Mr. Benjamin F. Cook, class of '41, who is engaged to Miss Mildred C. Butler of Crestwood, Ky. Mr. Cook has recently left the services of the Army Air Corps.

Discharge Emblems Issued

'25 Jay F. Hall exchanged his silver leaf for a good set of civilian clothes and has returned to his old job, where he was transferred to Youngstown, Ohio. Jay is selling Clark Controllers, Papp Insulators and Papp Transformers.

'30 J. Harold Dicks, who has stayed in the army, has been promoted to major and is Engineer Disbursing Officer for the sixth Corps Area with headquarters in Chicago. Who would want to get out of the army with a soft touch like that?

'43 Joe Valentine has proved to the medical profession that his cerebellum is under extreme pressure by returning to Germany as Purchasing and Contracting Officer at Heidelberg. The guy's nuts, and he seemed so sane at times when he was here at Rose.

'43 From sir to Mr. in five days is the motto of Dean Albon, who graduated from Rose in October of '43 and then went into the engineer corps of the army to serve with the thirty-first engineers in the E.T.O. Dean now is working for the Airmite Corporation in the capacity of Chief Engineer.

The Grads Advance

'92 George R. Wood has retired from business December thirty-first last, giving up his extended professional association with the West Virginia

'14 Mr. George M. Derr, has finished his war service in Washington and is now District Manager for the Truscon Steel Company at Chattanooga, Tennessee.

'21 William H. Junker, widely known Cincinnati mechanical and electrical engineer, has become affiliated with William W. Carlton and Associates as consulting engineer. Junker went to Cincinnati from Louisville in 1925 to become associated as mechanical and electrical engineer with Harry Hake, architect. In 1933 he joined the Thomas Emery & Sons Company as chief engineer, and successively became Director of Engineering and Works Manager for the organization. He will continue with the Emery concern in a consulting capacity. He is a past president of both the Louisville and Cincinnati T.X. clubs and was also a vice president of the Rose Polytechnic Alumni Association.

'25 Everett C. Gosnell, formerly of Lukens Steel Co., has joined the Colonial Iron Works Co., Cleveland, Ohio, as manager of the chemical and process equipment division.

'29 Robert H. Dowen has returned to his work with the Detroit Edison Co. Public Service Commission.

'31 Anthony G. Blake has been transferred by the du Pont Company to Newark, N. J.

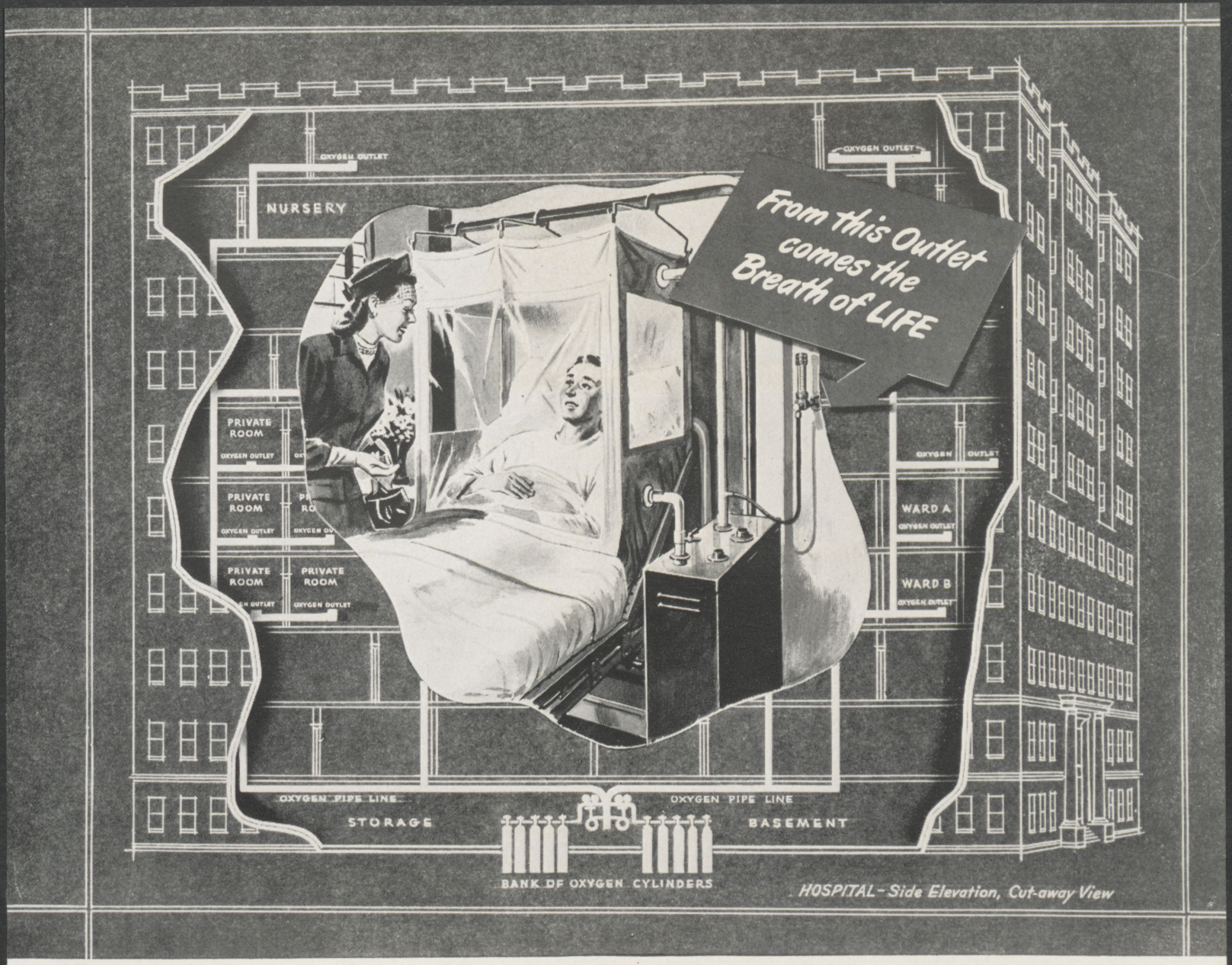
'33 Edward H. Hilgeman is now a partner with the firm of Lingmaster and Breger, Chemical and Metallurgical Engineers, New York.

'34 Brent C. Jacob has taken a position with The Chrysler Corporation at Detroit, Mich., as Project Engineer.

'36 Francis M. Blair is an engineer in the Propeller Lab. at Wright Field, Dayton, Ohio.

'40 Willis R. Lucas is engineer for Factory Mutual Insurance Companies, Inspection Department, Boston, Mass.

'43 William Weinhardt has taken a position with Penn. Bell Telephone Company at Philadelphia.



HOSPITAL—Side Elevation, Cut-away View

OXYGEN TO BREATHE is the most important thing in the world to one who is ill and unable to get enough for life from the air alone.

The use of oxygen in medical practice has grown rapidly in recent years. Physicians have found it effective in the treatment of certain types of heart disease, shock due to wounds or injuries, following major operations, and for numerous other illnesses.

The need for extra oxygen is so frequent in hospitals that many of them, instead of depending on cylinders of oxygen brought to the bedside, now have convenient oxygen outlets in many rooms and wards. Oxygen is brought directly to the bedside through an unseen "pipeline" from a centrally located "bank" of oxygen cylinders.

Oxygen is a principal product of Units of UNION CARBIDE. It is supplied to hospitals—and in much greater amounts to industry for numerous mass-production operations—largely through The Linde Air Products Company.

Linde Oxygen is now so readily available that no one need ever be without oxygen for any purpose. Oxygen is but one of the many basic and essential products from UCC—materials which, all together, require continuing research and engineering work with over a third of the earth's known elements.

FREE: *Physicians, nurses, teachers, and others who would like more information on the availability of oxygen, and on the various types of oxygen therapy equipment, are invited to write for a copy of the* "OXYGEN THERAPY HANDBOOK." *Ask for Booklet P-8.*

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SLY DROOLINGS

Patient's wife: "Is there any hope, doctor?"

Doctor: "Depends on what you're hoping for."

* * * *

Visitor: "How do you tell the ganders from the geese?"

Farmer: "Oh, we don't have to worry about that . . we just turn them out together and they figure it out for themselves!"

* * * *

She was only the miner's daughter, but oh! what natural resources!

* * * *

The top sergeant sang out just before the company was dismissed: "All those fond of music step two paces forward."

With visions of a soft job in the regimental band half a dozen men stepped out.

The sergeant growled: "Now then, you mugs get busy and carry that piano up to the top floor of the officer's quarters."

* * * *

Freshman Definitions

Chlorine—a dancer in a night club.

Carbon—A storage place for street cars.

Barium—What you do to dead people.

Boron—A person of low mentality.

Mole—A subterranean fur-bearing animal.

Catalyst—A western ranch owner.

Centimeter — A hundred-legged worm-like animal.

Flask—A measuring vessel carried on the hip graduated in fingers.

Electrolyte—A thing which when it is dark you turn on and it gets light.

Nitrate—special price on telephone calls and telegrams after dark.

* * * *

"Are you the little boy who took my order?" asked the impatient gentleman in the restaurant.

"Yes, sir," replied the waiter politely.

"Well I'll be ——," he remarked. "You don't look a day older."

Some husbands are wonderful. My uncle has been married twenty-seven years and he has never stopped being romantic. Of course if his wife ever finds out, she'll break his head.

* * * *

Simon: "Gee, I'm only a little pebble in your life."

Simon's Susie: "Then why don't you become a little boulder?"

* * * *

A pair of newlyweds had tipped the porter generously on boarding the train to keep the fact a secret. The next morning, noticing the many knowing looks cast in their direction, the angry groom called the porter to account for his treachery.

"Lawdy, boss," he replied, "I didn't tell 'em; they asked me if you was jus' married and I sez 'no, they is jus' very good friends' ".

* * * *

Recently a would be chicken fancier had some difficulty with her flock and wrote the following letter to the Department of Agriculture:

"Something is wrong with my chickens. Every morning when I come out I find two or three lying on the ground cold and stiff with their feet in the air. Can you tell me what is the matter?"

After a little while she received the following letter from the Department:

"Dear Madam:—Your chickens are dead."

* * * *

One of the questions asked in an examination on stock-raising was, "Name four different kinds of sheep."

An inspired student answered: "Black sheep, white sheep, Mary's little lamb, and the hydraulic ram."

* * * *

The most potent water power in the world is found in a woman's tears.

* * * *

How about the lady who was so dumb that she thought a goblet was a sailor's child?

Brain Twisters

1. There are three men, John, Jack, and Joe, each of whom is engaged in two different occupations. Their occupations classify each of them as two of the following: chauffeur, bootlegger, musician, painter, gardener, and barber. From the following facts, classify each man according to the two occupations in which he is engaged:

(a) The chauffeur was amused by the musician's long hair.

(b) Both the musician and the gardener were good friends of John.

(c) The painter bought a quart of whiskey from the bootlegger.

(d) The chauffeur courted the painter's sister.

(e) Jack owed the gardener five dollars.

(f) Joe beat both Jack and the painter at billiards.

2. Two circular disks which measure two inches and four inches in diameter, respectively, are cut from a larger circular disk six inches in diameter. What is the diameter of the largest circular disk which can be cut from the scraps remaining from the first two cutting operations.

3. Readers who have had trouble with Triple E are advised not to try this one: Find the total resistance of an electrical circuit whose branches form the edges of a cube. The two leads come out of diagonally opposite corners of the cube. Each edge of the cube has a resistance of one ohm.

4. A man is going on a trip of 27,000 miles. His tires are guaranteed for 12,000 miles each. What is the least number of tires that he should take with him (not including the four new tires on the car) to carry him through the journey?

5. Two bicyclists approach each other on a straight road, pedaling at 15 miles an hour. When they are thirty miles apart a horsefly alights on one bicycle, then dashes off to the other. It shuttles back and forth between the two riders at 20 miles an hour until they meet. How far has it traveled?

6. A teacher read a number to his class as follows:

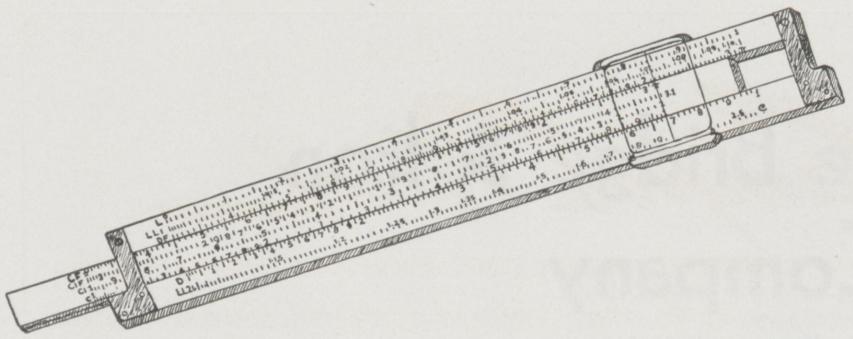
123454638459854321

and then asked the students to divide by nine. After giving them time to finish he called for the answer. After receiving various replies, he asserted that no one had the correct answer, since there was no fraction in the answer. In reading the problem again it was found that a figure was omitted. Find the missing figure.

7. A man gives you a dollar and asks for fifty coins. What change would you give him?

ANSWERS

1. John—painter, barber.
   Joe—gardener, chauffeur.
   Jack—musician, bootlegger.
2. The disk is 1 5/7 inches in diameter.
3. The resistance is 5/6 ohm.
4. 5 extra tires.
5. 20 miles.
6. The digit 4, which may be placed anywhere in the original number.
7. 40 pennies, two dimes, eight nickels.



Sly Droolings

By Robert W. Wolf, jr., e.e.

He who laughs last has found a double meaning that the censors missed.

* * * *

Prof.: "When the room settles down I will begin the lecture."
Student: "Why don't you go home and sleep it off?"

* * * *

Guest (to host in new house): "Hello, old pal, how do you find it here?"
Host: "Walk right upstairs, and then two doors to the left."

* * * *

Her eyes gazed into mine—
palpitation.
Soft hands closed in mine—
vexation.
Fair hair brushing mine—
expectation.
Red lips close to mine—
temptation.
Footsteps—
damnation.

* * * *

Shoulder strap: The difference between an attraction and a sensation.

* * * *

Cutie (in department store): "Do you have notions on this floor?"
Floorwalker (appraisingly): "Frequently, but we can't give way to them."

* * * *

Law Prof. (at registration): "So you are a pre-legal, eh?"
Student: "Like hell. I'm the youngest in our famiy."

* * * *

In a newspaper from a nearby city, we ran across this little article:

"To speak with a pleasant voice, you must give full and correct value to the vowels. A theatrical producer recently stated that of three hundred girls interviewed, he found only two that could say 'no' properly."

Not a very high percentage, properly speaking.

"HUBBA, HUBBA!!"

* * * *

We have a deep respect for age, if over 8 years and bottled.

* * * *

Perpetual motion—A cow drinking a pail of milk.

* * * *

There is an engineer who calls his girl "discontinuous integral" because she has no limit.

* * * *

Definition

Wisdom—Knowing what to do next.
Skill—Knowing how to do it.
Virtue—Not doing it.

The gas company in a small college town inserted the following advertisement in the local newspaper:
Wanted: Hard boiled, beauty-proof man to read meters in sorority houses. We haven't made a dollar in two years.

* * * *

There is nothing strange about the saying, a modern girl is a live wire. She carries practically no insulation.

* * * *

This column doesn't cost so much to produce because raw material is so cheap.

* * * *

Witness: "I think—"
Belligerent lawyer: "We don't care what you think. What we want to know is what you know."
Witness: "If you don't want to know what I think, I may as well leave the stand. I can't talk without thinking. I'm not a lawyer."

* * * *

"Kiss me once more like that and I'm yours for life."
"Thanks for the warning."

* * * *

You can lead an engineer to water but why disappoint him?

* * * *

Exercise kills germs, but we haven't found out how to get the darn things to exercise.

* * * *

Professor's Wife: "Junior tells me that he caddied for you all afternoon."
Absent-minded Prof: "Now that you mention it, I did think I had seen that boy somewhere before."

* * * *

Mother: "You acted wrongly in disobeying me. I am punishing you to impress it on your mind."
Sonny: "Aren't you proceeding under a slight misapprehension as to the location of the mind?"

Campus News

RESEARCH AND ENGINEERING KEEP GENERAL ELECTRIC YEARS AHEAD

HOW G.E. TRAINS DESIGN ENGINEERS

MOST college engineering graduates hired by G.E. are assigned to the Testing Department for 12 to 15 months. At the same time they may enroll in sections of the General Course or be selected to follow one of the specialized training courses of the Design Engineering Program.

ADVANCED ENGINEERING

Besides meeting in class one morning each week, students spend 15 to 20 hours of outside time in solving assigned problems. The programs include a study of the fundamentals of electric machinery, electronics, and fluid mechanics. Student engineers can continue this course for as long as three years.

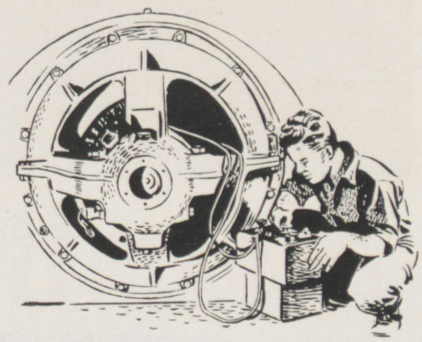
CREATIVE ENGINEERING

The intent of the Creative Engineering Program is to give the student with creative ability the tools that will be helpful in future work. Emphasis is placed on rotating assignment, as it has been found more effective, in developing creative ability, to place young men in contact with several engineers of proven ability. This program—lasting for about a year—also includes some time spent in class.

GENERAL COURSES

The highly specialized sections of the Design Engineering Program are open to selected men—the four engineering sections of the General Course are open to everyone. The sections include the Electrical Section, a course in application engineering; the Mechanical Section, covering the materials and processes used in the electrical industry; the Electronics Section; and the Engineering Fundamentals Section.

The Engineering Fundamentals Section includes a study of thermodynamics, fluid mechanics, chemistry, and metallurgy as they relate to Company products. The section serves as a refresher course for men who are several years out of school and emphasizes to recent graduates the importance of fundamental principles. Experienced engineers recommend that it be taken before any of the other technical sections. *General Electric Co., Schenectady, New York.*



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