Winter 12-1949

Volume 61 - Issue 3 - December, 1949

Rose Technic Staff
Rose-Hulman Institute of Technology


The Rose Technic
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Greetings
ECEMBER
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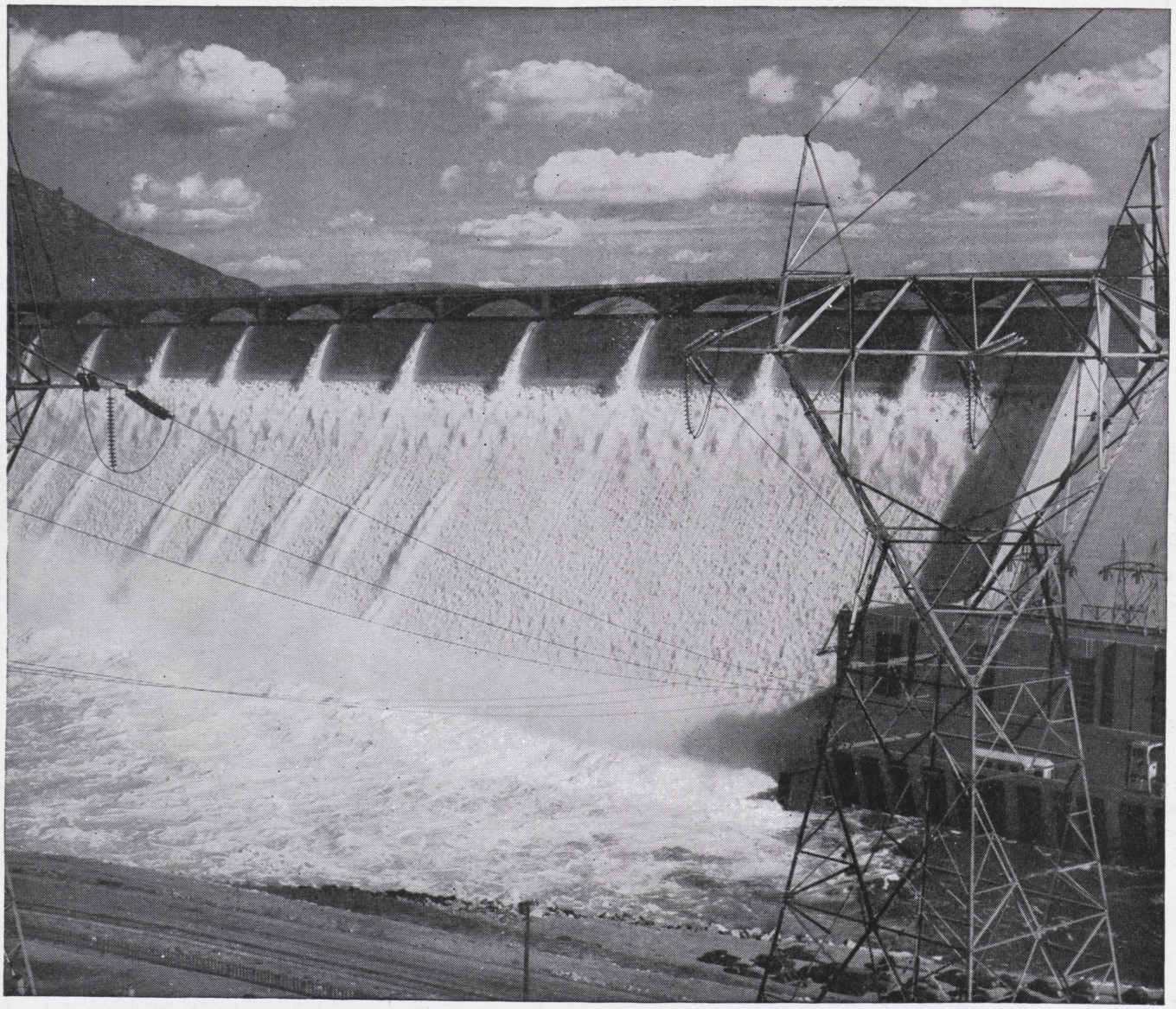
MEMBER ENGINEERING COLLEGE MAGAZINE ASSOCIATED

Making the "juice" that makes life easier!



DIRECTLY and indirectly, the average family in America consumes more electricity yearly than families in any other country in the world. The demand for more "juice" has grown with unbelievable rapidity, and it's *still* growing. By 1955, the electrical generating capacity of our nation is expected to reach 90 million kilowatts!

Steel is a vital material in the production of electricity. Central power stations and great power dams are made of steel and concrete. Special steels are required for turbines and other generating machinery. Steel towers carry steel-reinforced transmission lines across mountain and prairie alike.

Helping to meet America's constantly growing demands for more "juice" is only one of the big jobs ahead for United States Steel. There are many others. And they all call for the services of thousands of carefully-trained, technical specialists. For steelmaking today is a precision operation, as dependent for success on the knowledge of metallurgical, mechanical, chemical, electrical, mining, civil and ceramic engineers, as upon the plant workers themselves.

To assure employees opportunity for maximum personal development and provide a sound foundation for advancement in the organization are fundamental objectives of U. S. Steel. Employees participating in educational activities of U. S. Steel comprise a group exceeded in size only by the student bodies of a few of the nation's largest universities. In these educational programs, particular attention is given to the development of college graduates and other technically trained men.

For men who can qualify, a career with United States Steel offers a promising future.

Rose Technic

VOLUME LXI, NO. 3 DECEMBER, 1949

In This Issue

Cover

GREETINGS, by P. W. Heaton is the Christmas cheer which the ROSE TECHNIC wishes our classmates, instructors, alumni, advertisers and friends.

Frontispiece

Optical Glass in the making. Top, a pot being removed from the furnace. Lower left, these huge crystals were formed in a cooling drum. Lower right, this crude crystal will be cut, then shaped and polished into a lens.

PHOTO CREDITS: Frontispiece & Page 9—Bausch & Lomb. Page 10, left—National Bureau of Standards. Page 10, right & page 11—Air Force. Page 12—R. Johnson, TECHNIC. Page 13—Miller and Vrydagh. Page 14— TERRE HAUTE STAR. Page 28—N. Meyer, TECHNIC.

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Why we know this wax carton will stand up

Cartons and wrapping papers coated with paraffin wax have been used in food packaging for many years. They must be able to withstand rough treatment. Their ability to stand up depends largely on the strength and sealing qualities of the coating agent. Yet until a few months ago, there was no accurate way to measure these qualities in paraffin wax.

Recent experimental work in Standard Oil's laboratories has resulted in a new electrically controlled quantitative test. Expressed as Indiana Coating Index, this test gives, for the first time, an accurate yardstick of wax qualities which may be correlated with performance in service. It makes possible the production of *uniformly* high quality coating agents.

The Indiana Coating Index is only one of many scientific tests developed in Standard Oil laboratories. Standard pioneered in quality-testing, as it did in developing many petroleum products that have contributed to better living. There is no ceiling on what can be accomplished by Standard Oil researchers, present and future.

Standard Oil Company

(INDIANA)

STANDARD

TO THE GRADUATES, STUDENTS

and

PROSPECTIVE STUDENTS

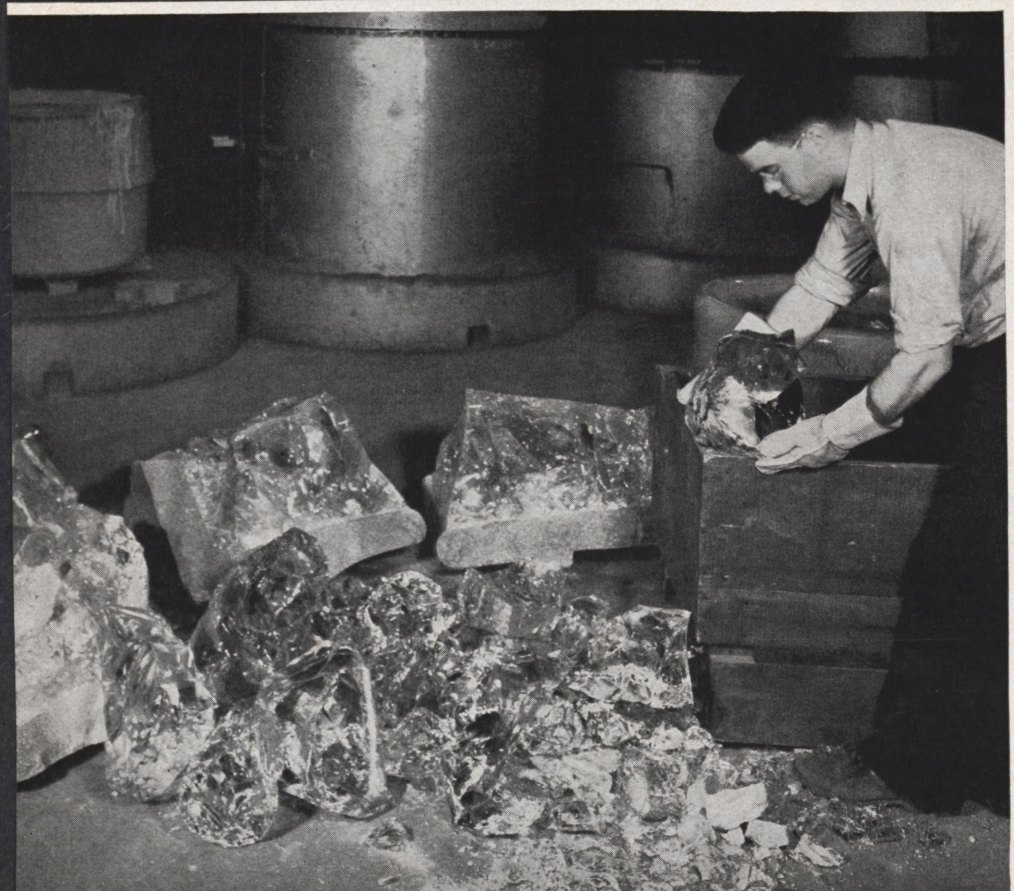
of

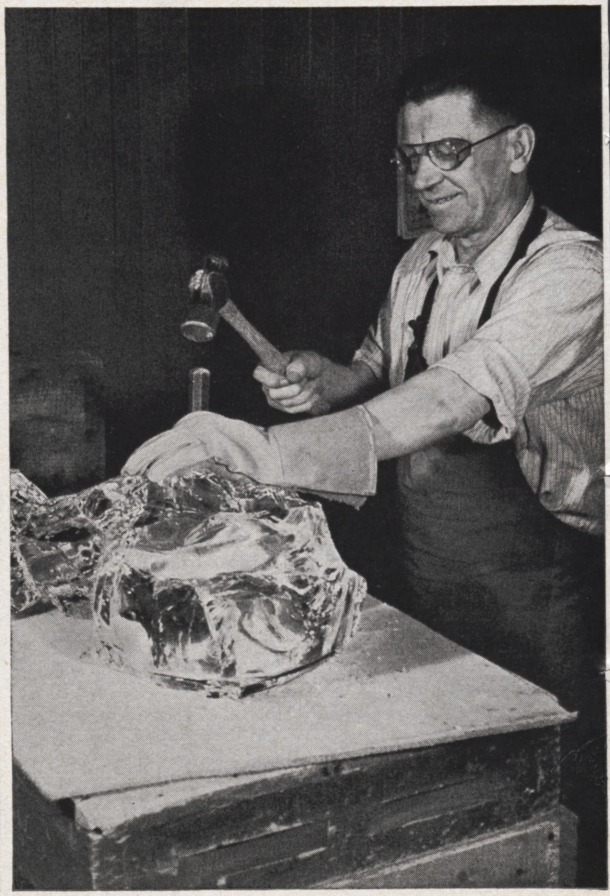
ROSE POLYTECHNIC INSTITUTE

Christmas Greetings

and

Best Wishes for the New Year





DOW

CAUSTIC SODA

All American!

TAKE THIS FOOTBALL PLAYER.
From head to toe Caustic Soda is part of his equipment. The plastic in his helmet, the fabric of his jersey and trousers, the leather in his pads and shoes—in the processing of all these, Caustic Soda plays an important part. Back in the locker room, his soap, towels, the trainer's surgical cotton and dressings, all are made with the help of Caustic Soda.

Caustic Soda is truly an All American—the workhorse of the processing industries. Virtually everything we see or touch in our daily living makes use of this chemical.

The Dow Chemical Company is one of the major producers of high quality Caustic Soda. Large plants in Midland, Michigan; Freeport, Texas and Pittsburgh, California are devoted to producing this important chemical. It is transported to industry everywhere in Dow's fleet of specially designed tank cars. Yet for all its importance, Caustic Soda is only one of over 500 essential chemicals produced by Dow—"Chemicals Indispensable To Industry and Agriculture."

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DOW
CHEMICALS INDISPENSABLE
TO INDUSTRY AND AGRICULTURE

A Merry Christmas

And

A Happy New Year

From The

Technic Staff

No Mystery - The Heat Pump

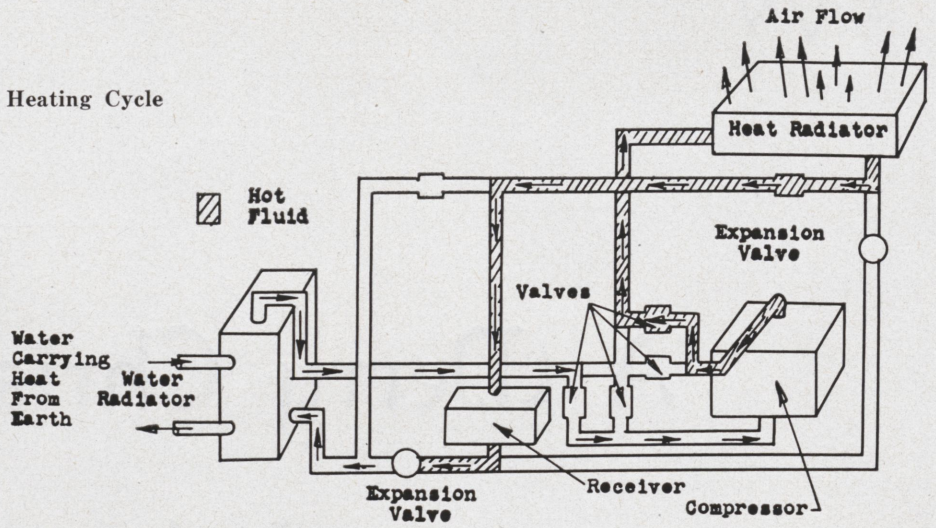
By Fred Reynolds, jr., m.e.

History is full of attempts to produce a commercial, domestic or industrial heating system utilizing the earth's available sources of energy other than coal. It is common knowledge that coal, though by far the most used heating fuel today, leaves much to be desired where cleanliness and efficiency are concerned.

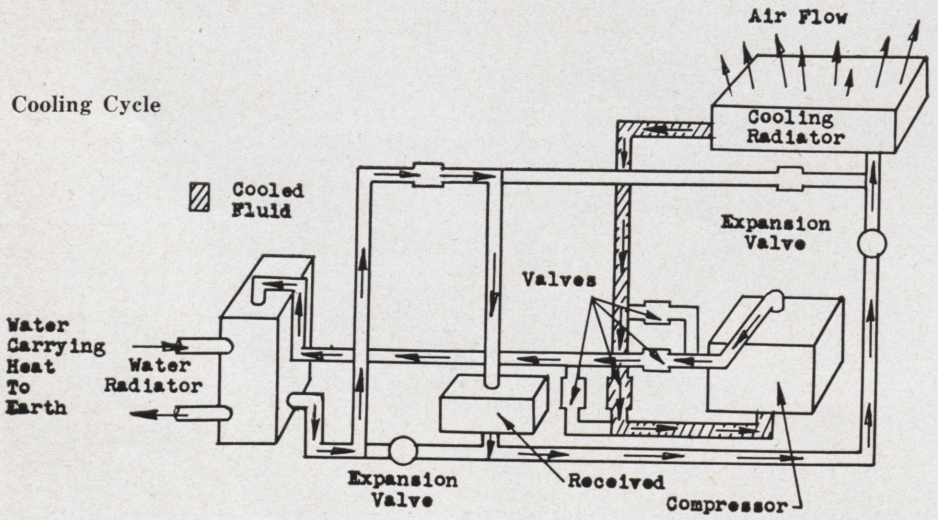
The Muncie Gear Works of Muncie, Indiana, recently introduced a successfully radically different heating system, the Marvair. Commonly known as the heat pump, their unit can be used as a heating plant in the winter and as an air conditioner in the summer. Heretofore the heating and air conditioning units have been separate units, a fact which adds considerably to the overall expense. In the winter the heat pump takes heat from the earth and delivers it to the hot air duct system. The heat from the ground is delivered by means of passing water from a well over a network of tubing containing freon gas which has been supercooled by a sudden expansion greatly reducing the pressure.

The basic circuit of operation on the heating cycle is indicated in the accompanying diagram. In this case the compressor pulls low pressure gas from the water radiator, raises both the pressure and temperature of the gas, and passes it to the radiator. Here the heat is given to the air as it is passed over the radiator. In giving up this heat the refrigerant vapor is condensed to a liquid and passes back to the receiver or storage tank. As heat is required this high pressure liquid is passed through an expansion valve into the water radiator where it is vaporized. In so doing it picks up new heat from the water, the temperature of which is considerably higher than that of supercooled freon gas, and continues its path around the refrigeration circuit. When cooling is required the path of the refrigerant is reversed and the hot refrigerant is passed to the water radiator while the air radiator is used to vaporize the refrigerant gas. The change is accomplished very simply by the automatic operation of four valves which require a minimum of controls. The piping diagram showing the path of the refrigerant for the heating and cooling cycles is shown schematically in detail in the diagram. (Note)

Heating Cycle



Cooling Cycle



A U. S. Geological Survey map will show the ground water temperatures for depths of 30 to 60 feet. For wells of greater depth one degree for every 64 feet should be added. A conventional electric pump is used to bring the water from the ground sources to the unit, but there are two types of power sources for the compressor unit. A gas (not gasoline) operated Willys Jeep engine and a conventional electric motor. The four cylinder engine is an innovation which not only operates cheaper but also gives a higher heating efficiency.

Having a Jeep engine in one's basement may not seem to be desirable; however, the one observed

Continued on Page 18

Glass For Optics

By William J. Kestermeier, soph.

Most of the finer glass used today in scientific instruments is optical glass. Such instruments as microscopes, etc. require high quality lenses which can best be made from optical glass.

Common optical glasses used in these modern instruments include ordinary borosilicate, fluor and barium crowns, crown light dense and barium flints. Each type has special characteristics of value to lens designers. Optical glass must be available in a wide range of refractive indices and with a suitable range of dispersion characteristics.

Quality glass results only from the exercise of great care in each operation required for its manufacture. Glass ingredients are melted in special pots made from components almost as pure as those in the glass itself.

When the pot has dried sufficiently it is removed from the mold in which it was cast. After pre-heating for 72 to 96 hours the pot is placed in a furnace and when heated to the proper temperature is filled with accurately weighed amounts of the specified ingredients. In about eight hours the materials have melted and mechanical stirrings begin; at this time temperatures, which are controlled by use of an optical pyrometer, are up to 2700 degrees.

After 22 hours, in the last seven of which the temperature is decreased, the pot is removed from the furnace and the molasses like mass is allowed to cool slowly in an insulating drum. This slow cooling or annealing allows the glass to break into large chunks so that the drum may be removed and the pot broken away from the glass. After being inspected and broken into various sizes, the pieces are stored until particular types or shapes are needed. They are formed into flats by heating in fire clay trays. The refractive index and dispersion are determined from a sample of each melt.

Before a slab is approved for fabrication, each piece is inspected again for inclusions, bubbles, striae and strain. The slab is polished and examined through opposite ends with a striaescope. With each operation some imperfections may be found and the glass is then discarded. Approved chunks are chipped, heated and shaped by experts until the exact size and shape is formed.

The optical properties result from annealing, optical constants, transparency and color.

All glass slabs are annealed in one of two ways:

Fine annealing . . . so that the birefringence resulting from the permanent strain will not produce a relative retardation or path difference of over 10 millimicrons for one centimeter of transmitted path of sodium light. All pressings are fine annealed. Coarse annealing . . . so that the glass can be cut to size for future pressing without danger of chipping or shattering. This type is provided in instances where the purchaser will shape the piece further.

The optical constants are spectrometer measurements made on fine annealed glass and are listed by wavelengths. Index of refraction attains its highest value only when the glass is fine annealed. If glass is supplied in coarse annealed form or is not adequately annealed after pressing, the actual index of refraction may be slightly lower than

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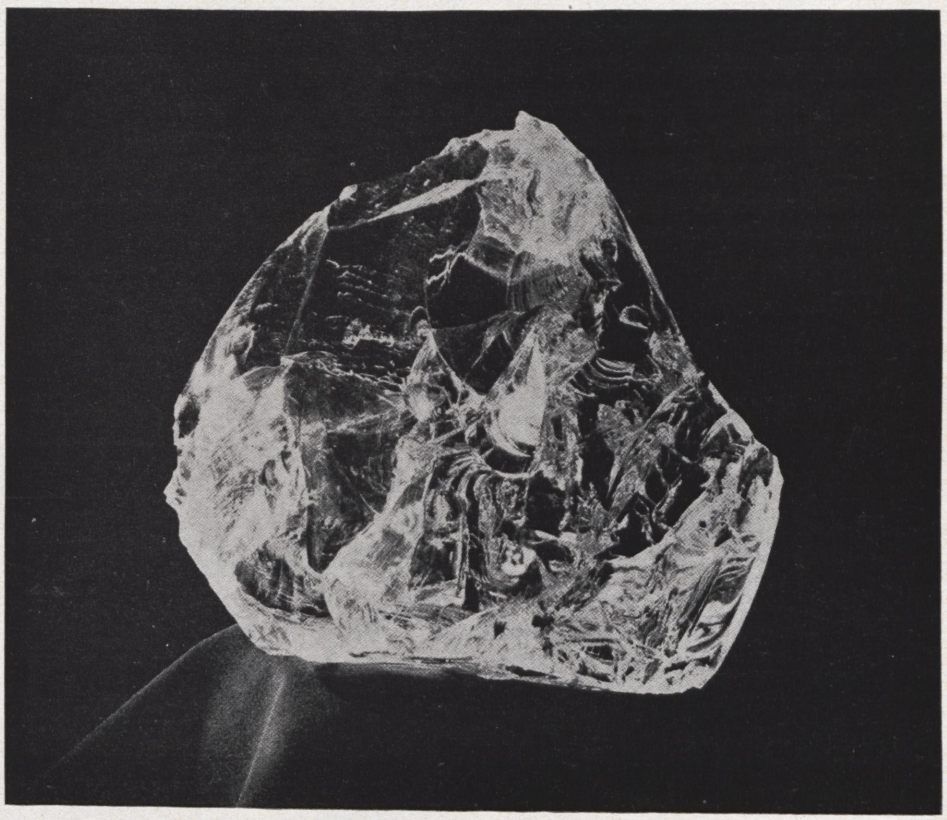
A crude crystal before cutting and polishing



Research and Development

By George W. Eddy, sr., m.e.

Perforated Cover Plates for Steel Columns

A study of the mechanical properties of perforated steel cover plates for bridge columns, utilizing full-scale models, has been completed. The tests consisted of investigations of the cover plates with respect to stress distribution, strength and axial stiffness. The experimental results of these tests proved to be in close agreement with theoretical predictions and provide engineers with a rational approach to the design of bridges using cover-plate columns.

Tests in the elastic range were made on columns with plates having circular, ovaloid, elliptical and square perforations, as well as on columns with solid plates. Maximum compressive-load tests were also made on these columns.

This work indicates that perforated cover plates contribute to the strength, and especially to the stiffness, of columns built up from plates and angles. Formulas have been derived that may be applied whenever data are required concerning displacements in a structure having perforated members, and the validity of these formulas has been confirmed by experiment. At the same time it has been found that the net area of a perforated-plate column may safely be used for design purposes—even for a perforation shape that produces great stress concentration.

Pneumatic Housing Units

A pneumatic quonset hut has recently been developed that is made of cotton fabric and can be blown up with a hand pump.

The structure has no internal braces and can be supported by as little as a pound and a half of air pressure. While it may not be the answer to the housing shortage, this pneumatic hut is expected to be a dream house for stranded airmen in the icy Arctic.

This unit is made of inch-thick, two-layer cotton fabric with 40 to 60 interlocking supporting threads per square inch. It is coated with a low temperature Neoprene compound that will withstand extreme cold. The dead air space between the two layers of cotton provides the best inherent insulation known today. In addition the hut is designed to stand up to 100-mile-an-hour gales.

The quonset hut is draft proof, snow proof, water proof, compact and easy to transport. There is no fear that the pneumatic hut will buckle under the weight of arctic ice and snow. Its rigid air fabric can be fabricated to withstand up to 32 pounds of pressure and, inflated to that extent, could support about 500 pounds of weight.

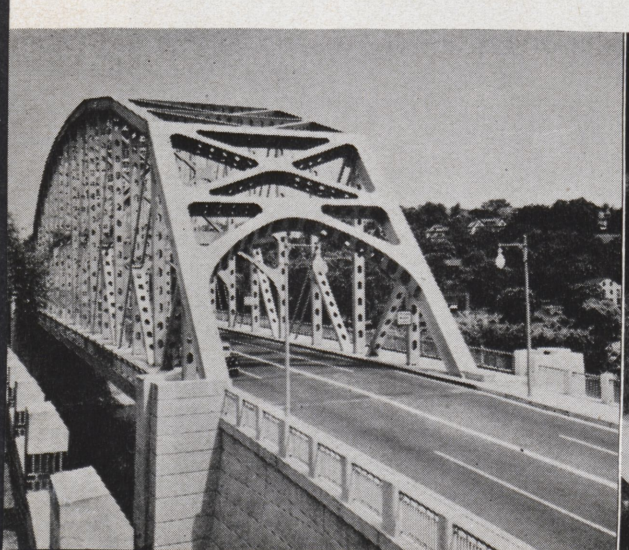
The quonset, which will comfortably house four men, can be erected with high-volume, low-pressure hand pumps in about three minutes. Through a series of interlocking connections the hut and its floor can be inflated simultaneously. However if one section should be ruptured, the others would remain intact.

The structure itself stands four feet high, is seven feet wide and nine feet long. When deflated it can be rolled into a compact bundle readily adaptable to air or ground transport.

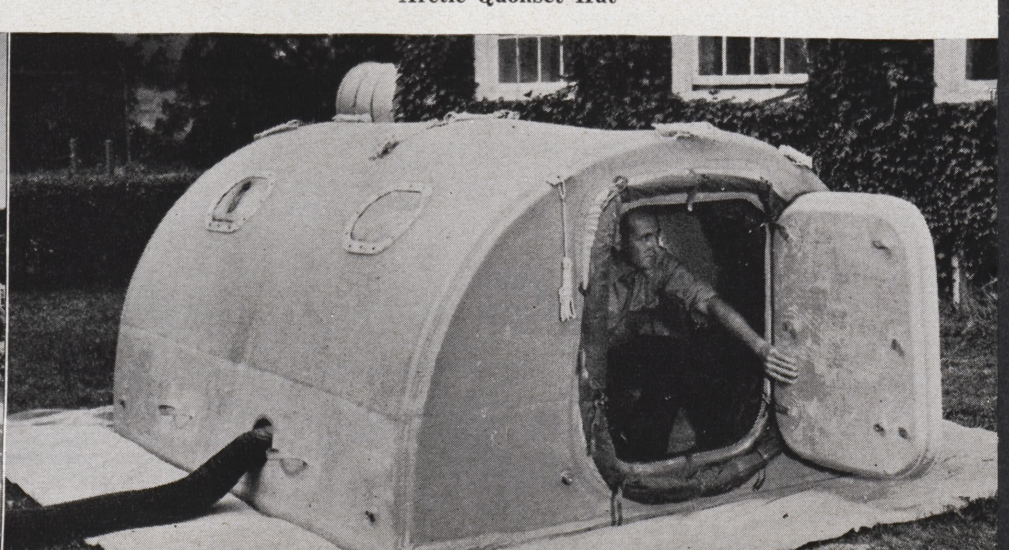
How to provide proper ventilation, yet leave the hut draft proof, was one of the main development problems engineers had to face. Its solution came in the form of a 10-foot-long air duct attached to a sidewall adjacent to the floor of the quonset. Direct drafts can be kept out by snaking the tube along the ground—thus taking the zip out of entering gusts before they reach the interior.

Other precautions were incorporated to make the hut draft free. Its two plexiglass windows are air tight. Jamb-tight doors at either end

Bridge of Perforated Cover Plates



Arctic Quonset Hut



are protected by four-foot igloo-entrance type tunnels which can be sacked up for added protection against arctic winds. In addition, a non-inflatable 18 inch nylon apron circles the exterior of the hut on which snow or ice blocks, timber and rocks can be piled for added anchorage in high winds. The hut itself is anchored by sturdy guy lines.

The quonset's exterior is bright orange in color and easy to spot by air search and rescue parties. Inside it is flaked with aluminum, both to reflect heat and reduce heat loss due to radiation.

All Weather Jet Developed

This country's first "all weather" jet engine for military aircraft has been developed recently.

New engineering features which have been added to the J-47 turbojet have made the engine an "all weather" powerplant capable of operating successfully under icing conditions. Furthermore, design refinements are improving the performance of the standard J-47. This is the most powerful turbojet in production in this country, with a rating of more than 5,000 pounds thrust or driving force.

The "all weather"engine is protected from icing conditions by heated parts at the nose. With the application of heat adequate anti-icing protection can be provided. This is accomplished through the effective use of internally-heated hollow parts. These parts include inlet guide vanes, fairings and forward frame struts.

The hot air supplied to these parts from the engine's compressor prevents large accumulations of ice at the inlet. These shut off air flow and might even break off and enter the engine to cause severe damage.

Anti-icing tests leading to the new developments were conducted on an engine installed atop Mt. Washington during the winter. The new devices then were given flight tests on a J-47 engine slung from the fuselage of a B-29 "Flying Laboratory."

Design improvements in compressor and turbine have accounted for the engine's greater power which has been achieved without any increase in fuel consumption or size of engine.

In addition, reductions in the use of scarce alloys, like tungsten and cobalt, have greatly improved the productibility of jet engines, without sacrificing efficiency or life of parts. This practice will lessen the danger of production curtailment in the event of shortages of the elements.

Fireproof Rescue Apparel

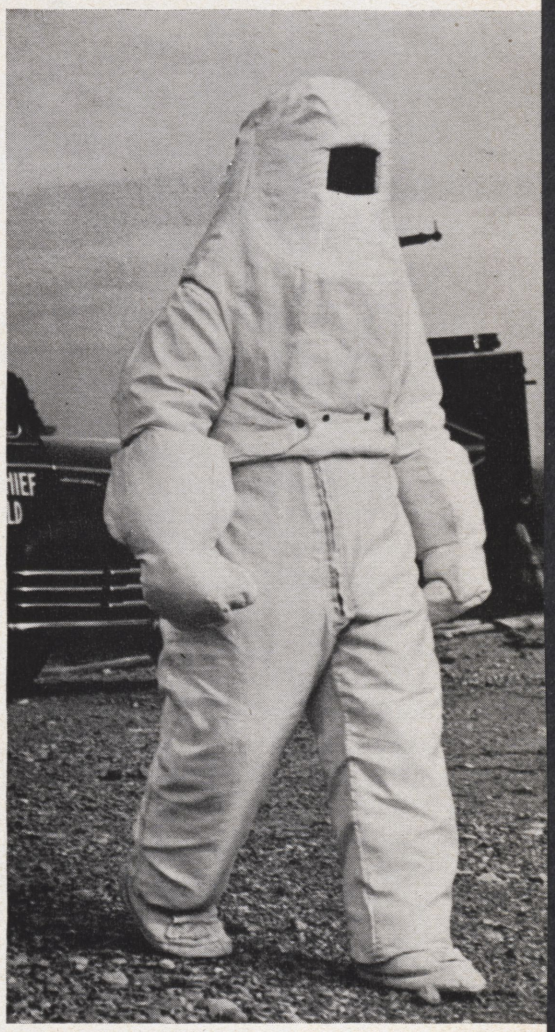
A suit designed to keep aircraft crash firemen at a cool 130 degrees of body temperature while working in a flaming inferno of gasoline and oil that registers a sizzling 2000 degrees has just been put through a series of successful tests.

The suit, only one of its kind so far developed, is made up of 18 layers of glass fiber, glass fiber batt, glass fiber net, neoprene coated glass fiber, honeycombed cotton cloth, silver foil, aluminum foil and nylon arranged so as to provide the best possible protection yet devised against both the conductive and radiative type of heat experienced in aircraft crash fires.

The suit is only about one-half inch thick, and gives the lowest possible bulk and weight consistent with its insulating function. The material is able to withstand abrupt and extensive changes in temperature without loss of physical properties, and contains nothing which would be deteriorated by water, oil, common solvents, fuels, lubricants, or fire-fighting agents.

During recent tests volunteer firemen, wearing the protective covering, remained in a wall of flame at 2400 degrees for one minute and 32 seconds without experiencing any bodily discomforts whatever. Studies have indicated that in actual use the wearer could remain completely surrounded by 2000 degrees of heat for as long as ten minutes. After that length of time it would be necessary to withdraw from the flames to cool the suit even though the body temperature might still be comfortable.

Tests in rescuing entrapped personnel indicate that firemen will be required to remain in the flaming area for only three minutes at any one time. A blanket, made of the same material as the suit, is provided for wrapping around the person brought from the flames.



Not a "Klu-Kluxer" but an Air Force Fireman

The new apparel consists of a one-piece coverall, a hood, mitten-type gauntlets, and asbestos soled boots of the 18-layer material which has a total weight of approximately 29 pounds. The mittens are of slightly lighter weight material than the rest of the suit, both because of the greater heat tolerance of hands and because of the need for hand dexterity. The head and body are completely enclosed to protect the respiratory system against external heat, flame, and hot, harmful gases. Because this limits the amount of breathable air inside the suit, the fireman wears a bottle of compressed air strapped to

Concluded on Page 26

Campus Survey

By Leonard Pyle, soph., John Kelly, soph., and James Myers, soph.

Parking Lots Completed

The parking lot east of the building and the one at the field house have now been completed. These parking lots have a history. The ground for the lots was graded during the spring term, and the cinders were spread preceding and during the summer term. The job was finally completed in the two weeks before the present term. Approximately sixty posts, costing one dollar and ten cents apiece, were set in each lot. The purlins (metal portions of the racks) came from the old airplane hangars from which the fieldhouse was made. Four parking racks were built in each lot, each lot holding from ninety to one hundred cars. With these cars removed from the campus lawn, perhaps the grass will have a chance to grow.

Renovated Machine Shop

The machine shop in the basement has taken on the new look. Several new pieces of equipment have been added. Five new Logan ten inch metal-working lathes, valued at seven hundred dollars apiece, have been added. One new vertical Bridgeport mill, valued at twelve hundred and fifty dollars, and three new Delta drillpresses, valued at one hundred and ten dollars apiece, have also been added. All the old equipment has been cleaned and repainted. A face-lifting job is being done on the shop itself, as the walls are in the process of being cleaned and painted. For safety and convenience, all the old countershafting is being removed and replaced by individual drives on each machine. In the near future the job as a whole will be completed by the repairing and repainting of the heat treating equipment.

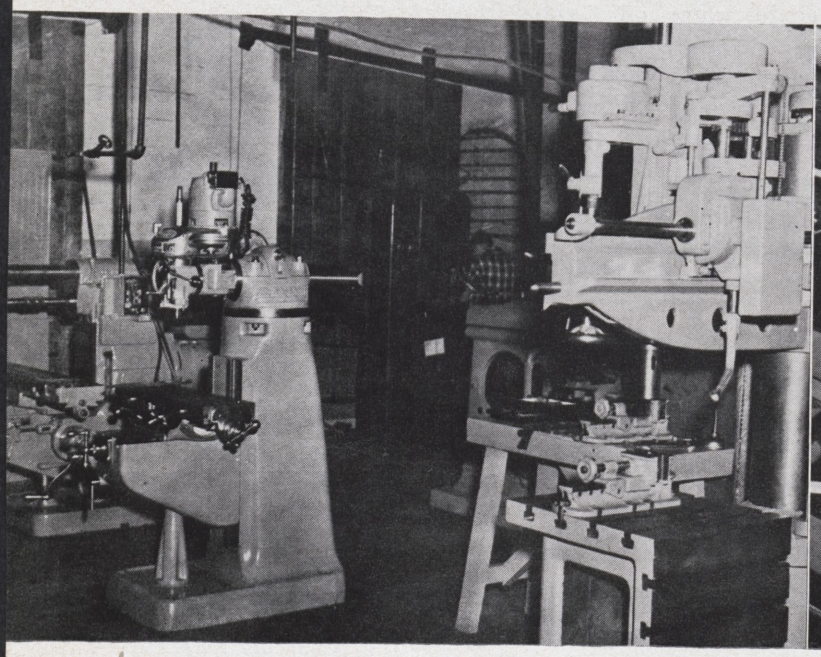
Additional Courses Offered

With the beginning of a new term and a Freshman class some new courses have been added to the Rose curriculum. Elements of Engineering has been added to the Freshman curriculum and the Sophomores have been given the opportunity of taking Advanced Public Speaking.

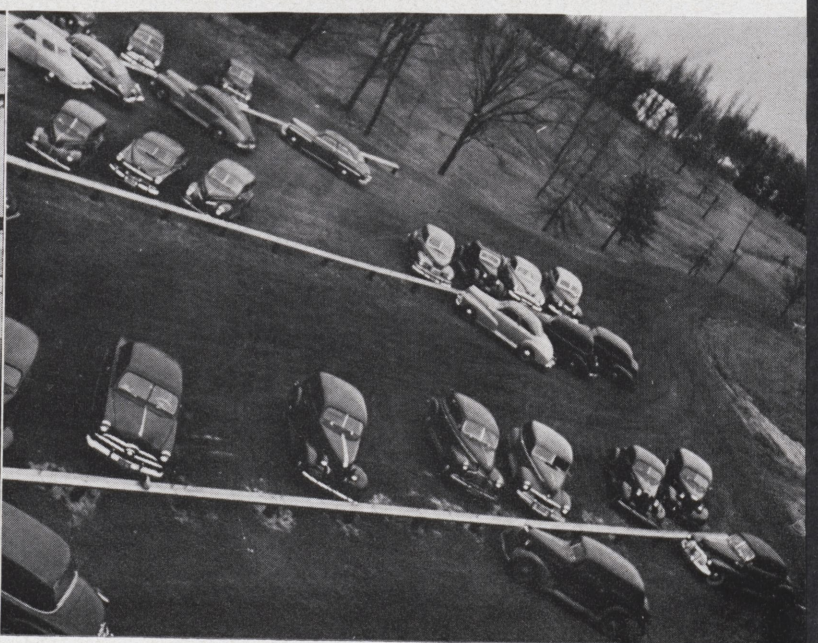
Elements of Engineering is a course designed to give the incoming Freshmen a chance to become acquainted with the engineering profession as a whole and with some of the duties and responsibilities of the engineer. The course is being taught by President Wilkinson and provides an opportunity for the President to become acquainted with the new students and for the new students to become acquainted with the history and traditions of Rose. It also informs the Freshmen of the system of grading used by the school. The course should prove helpful in giving new students a better understanding of Rose.

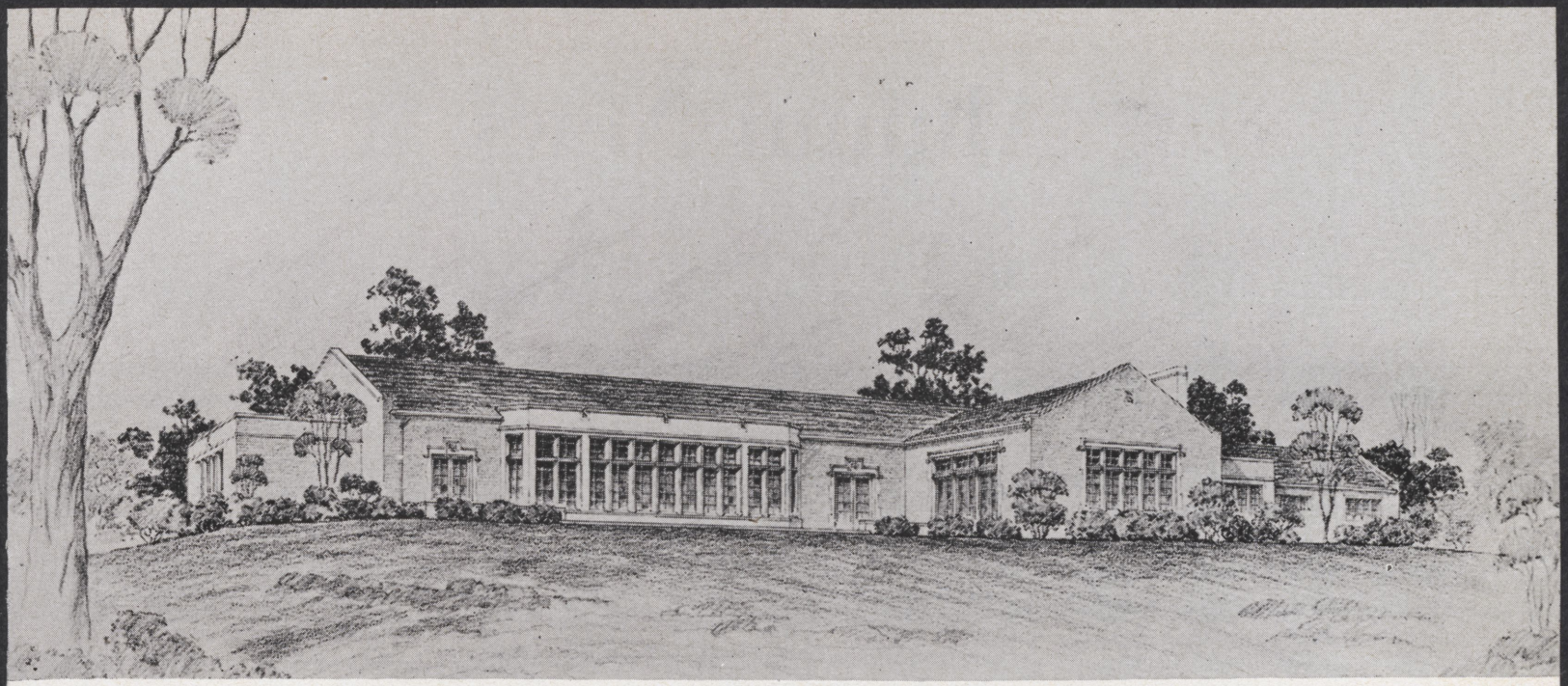
The Advanced Speaking course, which is being taught by Professor Bloxsome, is a continuation of the required speech course. What the class lacks in numbers it makes up in the enthusiasm of its members.

Face Lifting



"Downstairs





Proposed Student Center

New Plans for Rose

At its October meeting the Board of Managers instituted plans that, when completed, will make Rose a truly resident college. These plans include resident and recreational facilities for approximately 300 students on the campus distributed as follows:

Fraternity Houses	100
Deming Hall	100
Remodeled Temporary Barracks	100

The program includes the construction of a handsome student center situated at the southeast end of the twin lakes. The building is designed to house eight bowling alleys, a combined dining room and cafeteria, book store, snack bar and soda fountain, billiard room, large student lounge, phonograph and radio room, reading room, and other spaces for student recreational activities.

The main dining room is so arranged that it will provide on the campus a ball room superior in size and facilities to any available in the city of Terre Haute. The architects, McGuire and Shook, Indianapolis, and Miller and Vrydagh, Terre Haute, have presented drawings of a building that fits splendidly into the campus landscape.

As previously reported the four fraternities will be offered low interest loans for the purpose of financing construction of chapter houses on the east portion of the 123 acre campus. Rooms for 30 additional freshmen will be provided in Deming Hall together with a much-needed small infirmary and first aid room. Until such time as a new dormitory can be constructed, the temporary war surplus buildings will be remodeled to house approximately 100 additional upper classmen.

Through the generous efforts of Chesleigh Gray, '13, and Wilbur Shook, '11, new hard surfaced driveways through the campus and an ornamental entrance from the National Road are assured at practically no cost to the Institute.

New money in the amount of $450,000 will be required to implement these plans and to construct a new heating plant to supplant the present obsolete and inadequate one. The Board of Managers has appointed a committee of Board members, consisting of Messrs. Paul N. Bogart, Oscar Baur, Crawford F. Failey, Walton L. Woody and Ford L. Wilkinson to devise ways and means of bringing these plans to completion at the earliest possible moment.

With the completion of the reconstruction and conversion of space in the Main Building, now underway, the added athletic and recreational facilities in the Field House, and the construction proposed, Rose Polytechnic Institute will realize a dream of twenty-five years and be able to present to its students an on-campus environment not generally found in small colleges. No one can better appreciate the benefits to be derived from these changes than can Rose alumni.

144 Freshmen Enter Rose

On Monday, November 28, 1949, the institute acquired its scheduled class of Freshman students. One hundred and two students registered for classes for the first time. After registering at eight o'clock, the new students proceeded to the Drawing Room, where they received their schedules and were assigned to their sections.

There were six sections with sponsors as follows: Section A—Mr. G. K. Haist, Section B — Rev. F. L. Brown, Section C—Mr. P. B. Headdy, Section D— Mr. R. M. Ross, Section E—Mr. T. P. Palmer, and Section F—Dr. C. P. Sousley. Following this were the general meeting at eleven-thirty A.M. in the auditorium, the aptitude test at one-fifteen P.M. in the Drawing Room, and the physical examination at two-thirty P.M. in the Machine Design Room.

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Alumni News

By Allen Junkers, jr., mech.

Rose Alumni Hold Chief Offices in Iron and Steel Associations

The Eastern States Blast Furnace & Coke Oven Association, the Blast Furnace & Coke Association of the Chicago District, and the American Foundrymen's Association have chosen Rose men as their Presidents.

The Eastern States Association is headed by Dewitt P. Cromwell, Class of 1919, Superintendent of Blast Furnaces, Youngstown Sheet & Tube Company, Youngstown, Ohio.

The Chicago District Association has elected as its leader Clarence L. Corban, Class of 1926, Superintendent of Coke Plants, Inland Steel Co., East Chicago, Indiana.

These two associations count in their membership the major blast furnaces in the United States.

The vast American Foundrymen's Association has chosen for its President in 1950, Walton L. Woody, Rose 1914, Vice President, National Malleable and Steel Castings Company, of Cleveland, Ohio, and a member of the Board of Managers of Rose.

Rose men continue to exercise leadership in industry and the practice of engineering.

'03 Word has been received that James S. Brosius, of Miami, Florida, died in October, 1949. He was formerly secretary of the Crawley-McCracken Hotel Company & associated companies.

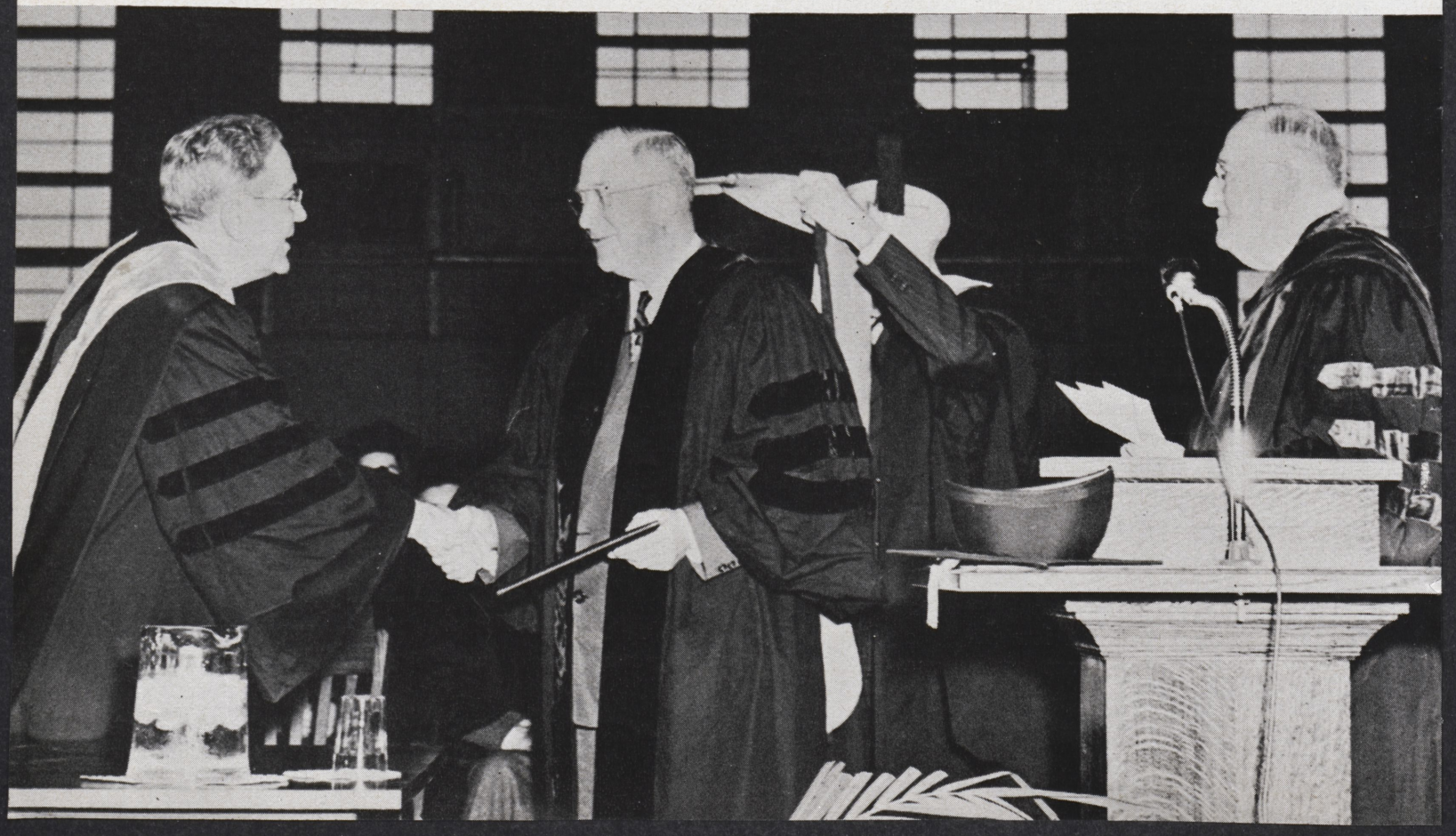
Brent C. Jacob of Bay City, Michigan died October 3, 1949. He was an engineer with the Industrial Brownhoist Company from 1934 until his retirement in 1946. Mr. Jacob won the Hemingway Medal award in his class and was always keenly interested in scientific subjects.. His survivors include his wife, one son, Brent C. Jacob Jr., Rose '34, a daughter, and a sister.

'11 George T. Christopher, president and general manager of the Packard Motor Car Company was awarded an honorary degree of Doctor of Engineering by Rose Polytechnic Institute at the recent commencement exercises. Mr. Christopher received the award from Dr. Wilkinson in recognition of his "outstanding leadership in engineering, industry, and public service, before an audience of over 700 people.

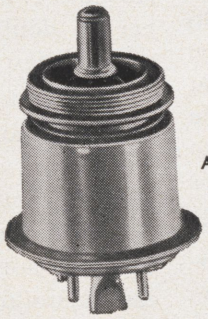
'13 Kenneth V. Wood, 5416 Broad Avenue, Altoona, Pennsylvania, died June

Continued on Page 30

George Christopher, '11, Receives Doctor of Engineering



Newsworthy Notes for Engineers



ACTUAL SIZE

Mighty Midget of Microwaves

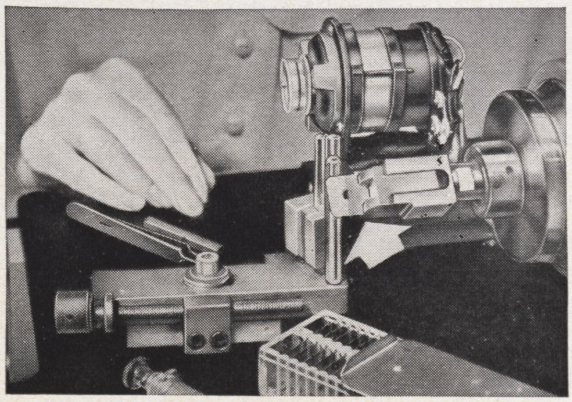
This little electron tube is called the 416A. It's the very heart of the latest radio relay repeater equipment for telephone and television transmission over long distances. Bell Telephone Laboratories scientists designed it—with elements spaced five times closer than in any previous microwave tube—and made the first samples under laboratory conditions.

Could such a tube ever be factory-produced in quantity? It seemed almost impossible—but Western Electric engineers tackled the ticklish problem. Here's the sort of thing they had to deal with.

Between the grid, which controls the flow of power in the tube, and the cathode, which produces the electrons, must be a space 6/10 thousandths of an inch. The oxide coating on the cathode must be 5/10 thousandths of an inch—no more, no less. The grid wires—3/10 thousandths of an inch in diameter—must be wound around the grid frame one thousand times to an inch!

The tiny parts would have to be made with laboratory precision. Much of the work would have to be done under microscopes. All parts would have to be kept surgically clean—for a speck of lint or a trace of perspiration could mar the efficiency of such sensitive tubes. New machines would have to be designed—new techniques developed—people trained to assemble the minute parts with utmost accuracy.

Could it be done? Well, Western Electric is making 416A tubes in quantity today—and with an amazingly low percentage of rejects.



This machine winds wire 1/8 the thickness of a human hair around the grid (arrow)—1000 turns per inch—maintains tension of 60% of wire's breaking strength.

Western Electric

A UNIT OF THE BELL SYSTEM SINCE 1882

Engineering problems *are many and varied at Western Electric, where manufacturing telephone equipment for the Bell System is the primary job. Engineers of many kinds—electrical, mechanical, industrial, chemical, metallurgical—are constantly working to devise and improve machines and processes for production of highest quality communications equipment.*

Fraternity Notes

Lambda Chi Alpha

"Hell Week" activities for the second group of pledges culminated in a road hike on the night of December 3. Although the participants in this little march seemed happy to be home late that evening, from one standpoint or another all were agreed that the trip was a success. The large number of men in this class has made both the initiation and training of the group somewhat unwieldy. Careful planning by Bill Gordon, Ritualist, and Al Schmidt (Mr. Al Schmidt that is) who have been in charge of the study program have made the task less difficult than it might otherwise have been.

Formal initiation ceremonies were conducted on the evening of December 9. Scheduling this event in what amounted to shifts permitted the initiators to take an occasional break as they worked on into the night. Sometime early in the morning the last of the pledges was welcomed into the brotherhood.

The annual Christmas Dance was held at the Deming Hotel on December 16. Dancing from nine until midnight to the rhythms of Leo Baxter's orchestra was enjoyed by the large group attending. Arrangements for the dance were made by Richard Kuehl, social chairman, assisted by Don Inman and Dick Spiroff.

Alpha Tau Omega

The Gamma Gamma chapter of Alpha Tau Omega noticed a change of occupants of the fraternity house. Several brothers graduated and brothers Al Scott, Clyde Willian, Joe Perona, Jim Myers, Dick Englum, Bob Johnson, Bob Waid, Dick Pierce and Stan Updike are now residing at 63 Gilbert.

Aram Karamian is the only student at Rose that has a home address in a foreign land. Brother Karamian's home is in Persia. He became an active member in the fraternity at Worcester Polytechnic Institute. He has transferred his membership to the Gamma Gamma chapter and is staying at the fraternity house.

The mother's club presented another leather lounge chair to the fraternity. This chair matches the one received last summer.

Pledging ceremonies have -wel comed Ray Baker, Don Duck, Ronnie Brunner and Guy Smith into the fraternity.

The Christmas dance has been set for Friday, Dec. 16, by the social chairman, brother Riley McKeen. A committee was selected to aid brother McKeen with the programs, favors, tree and house party following the dance. The dance will be held in the Mayflower Room of the Terre Haute House.

Theta Xi

Theta Xi's main social event for last term was a gay party after the Junior Prom.

Last month an election of officers was held in Kappa chapter. The officers serving for the next six months are: Lamar Michaels, president; Cliff Hennig, vice president; Jack Oberle, treasurer; Ray Haller, House manager; and Robert Stater, corresponding secretary. The chapter wishes to congratulate the officers of the last two terms on their splendid job.

Kappa chapter regrets the loss of three brothers at the end of last term—Willard Ham, Fred Campbell, and Jim Berling—but wishes them good luck in their future. We are happy to have Bob Sewell, Nick Michaels, and Bob McMasters returning to school and also fraternity activities. The present pledge class, although small because of recent initiation exercises, includes Dan Swartz, Bob McMasters, and Chris Scharpenberg.

Brother and Mrs. Myron Hawk are the proud parents of a eight pound eight ounce baby boy, born November 30. A prospective member no doubt. The chapter extends its heartiest congratulations.

Congratulations are also in order for Jim Moulten. Jim won the scholarship key awarded at the end of pledge training. The award is presented to the pledge with the highest scholastic and pledge test grades, each counting half.

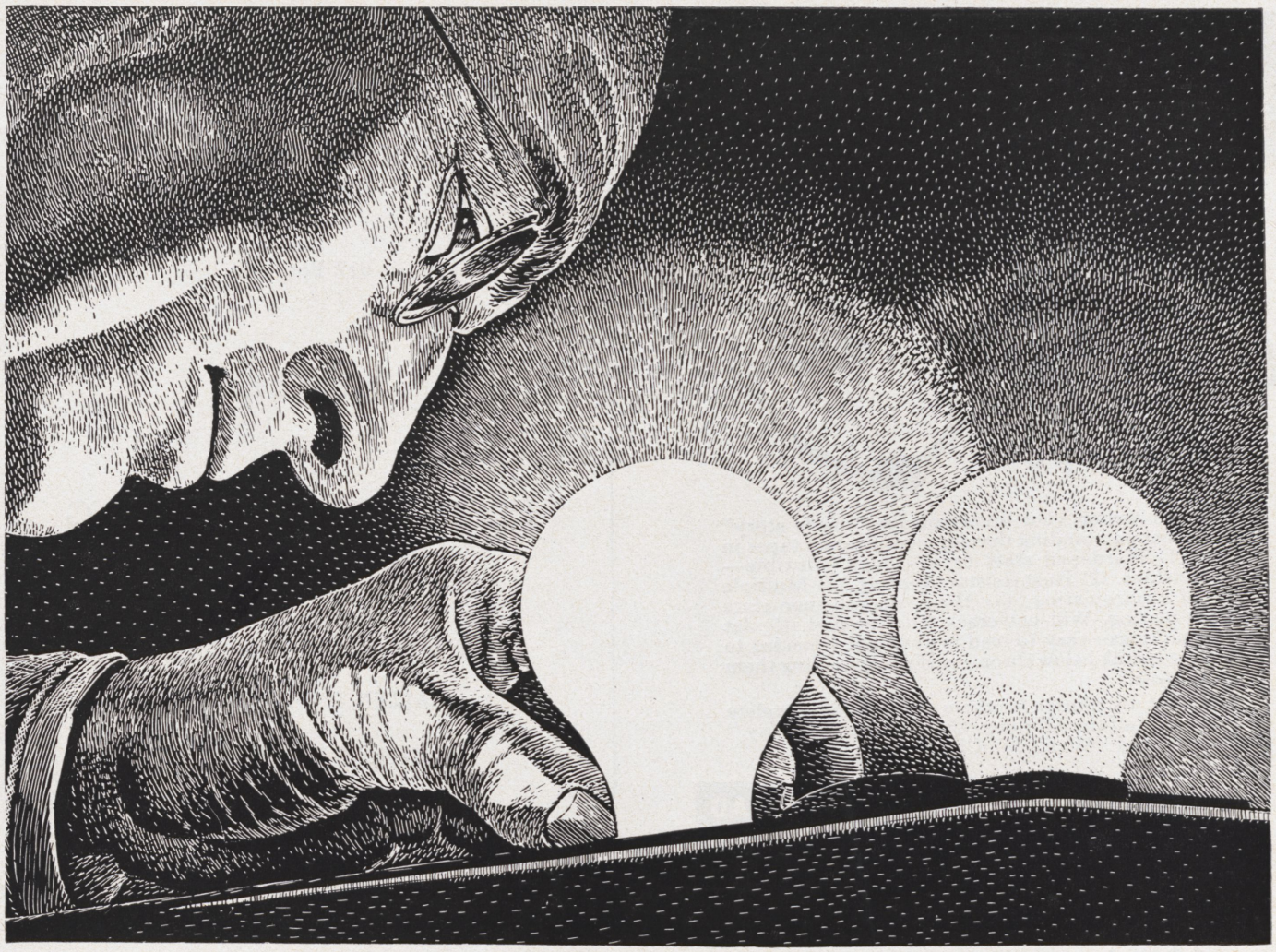
Sigma Nu

At the close of last semester, Beta Upsilon held its election of officers. Brother Al Seiler was chosen to replace Tom Leathers as Commander. Other officers include: William Campbell, Lt. Commander; Harry Harrison, Recorder; Ed Herbst, Chaplin; Bob Atherton, Reporter; Bones Bohrman, Marshall; Vern Meulenbelt, Sentinel and Denny Hammond, Alumni Contact Officer. We are confident that Al will perform his duties in the same competent manner as Tom has done during the past two semesters.

Beta Upsilon wishes to congratulate those who graduated last semester. Those transferred to the alumni list include: Fred Burdett, Waldo George, Gilbert Hilt, Bob Hutchinson, Swede Johnson, Charles McMorris, Don Moore, Jim Schwier and Wayne Walter.

Beta Upsilon staged a hayride on October 29, near North Terre Haute. The hayride, attended by more than twenty-five couples, was followed by a weiner roast.

Each year the chapter attends church as a group on Memorial Sunday. This year Sigma Nu attended the First Baptist Church on Memorial Sunday, November 6. Preceding the church service, formal initiation was held at the house for two new members. The new initiates were Phil Gilmour, Linton, and Bill Gray, Farmersburg.



The lamp that's bright all over—*an inside story . . .*

You could look directly through the clear glass of Edison's first lamp and see the hot filament. While this may have been interesting, the glare made it unpleasant. Many attempts were made to diffuse the light and cut the glare by coating or frosting the bulb, without loss of too much light.

But during years of work on many varied lighting projects, Pipkin kept up the search for a still better coating. He has found it—a new silica finish that diffuses the light almost perfectly and gives softer, more beautiful illumination. It is used in the G-E Deluxe-White Lamp now on the market —the lamp that's bright all over.

A General Electric lamp researcher named Marvin Pipkin was the first to offer a practical inside frosting for lamps, with little light loss. His method, perfected in 1925, was a milestone in lamp research. The G-E inside frosted incandescent lamp is still today the one most commonly used.

This new success of Marvin Pipkin, called the most outstanding improvement in filament lamps since his earlier discovery, has come only after thousands of experiments and years of investigation. It illustrates again how General Electric emphasizes research and creative thinking, encourages fertile minds to follow their own imaginative bent, and so stays in the forefront of scientific and engineering development.

You can put your confidence in—

GENERAL ELECTRIC

No Mystery . . . .

Continued From Page 8

in actual domestic operation was quiet and self-operating. The engine is mounted on airplane type shock absorbers and has an insulated hood which reduces noise to a murmur. To allow for the variation in gas pressure due to a possible over consumption on the line, a self adjusting carburetor was installed. When the pressure decreases, an intake valve automatically opens so as to maintain a constant gas input.

The engine is run normally using only approximately one-third of the available horsepower, thus giving longer wear and durability. The heat recovered from the water jacket and exhaust is added to that of the regular heating system to greatly increase the available heat output. The engineer's choice of power units to be installed would depend upon the economic advantages offered by that particular locale. In both the electric- and gas-driven heat pumps the operation is entirely controlled by a thermostat. The drives, pumps and belt-driven fan all go into operation at the same time under thermostatic controls.

Since a B.T.U. of gas in much of the U.S. costs only about one-eighth as much as a B. T. U. of electricity (at two cents a kwh), the gas driven system is, in general, considerably cheaper. However some of the saving is lost in the summer because the electric drive is more efficient on the cooling system.

In comparative tests run for cost estimates of the various types of fuels, including both systems of the heat pump, the following results were obtained. (delivered cost per therm or 100,000 BTU)

Coal

12,000 BTU/Lb. at $15 per ton, 50% furnace efficiency

Net fuel cost $0.125 per therm

Oil

150,000 BTU/Gallon at $0.15 per gallon, 70% furnace efficiency

Net fuel cost $0.143 per therm

Gas

1,000 BTU/Ft^3, 70% furnace efficiency

Net fuel cost $0.143 per therm

Gas Heat pump

1,000 BTU/Ft^3 at $1 per 1,000 $Ft.^3$

Net fuel cost $0.06 per therm

Electric Heat Pump

@ $0.015 per kwh.

Net fuel costs $0.13 per therm

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THE DU PONT DIGEST

FOR STUDENTS OF SCIENCE AND ENGINEERING

CARBON MONOXIDE... FRIEND OF MAN

Thanks to high-pressure synthesis, it now leads a useful life

To the man on the street, carbon monoxide is just a poisonous gas that sometimes causes tragic deaths when it escapes from the exhaust of an automobile or from a poorly tended furnace.

Outside of the chemical field, few people are aware that, properly used, it is a very real friend of man. In the last 25 years, during which catalytic and high-pressure chemical techniques have been highly developed, carbon monoxide has become a keystone of industrial synthesis.

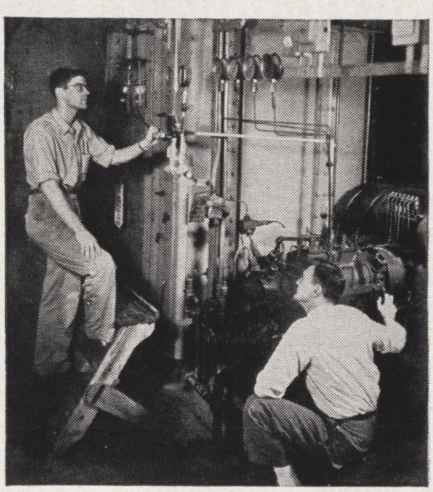
A. H. Emery, Jr., *M.S. Ch.E., M.I.T. '49 and M. J. Roedel, Ph.D. Org., Michigan '40 inspecting a high-pressure batch reactor taken from the shaker tube assembly after a run to make 3,5,5-trimethylhexanol.*

Scientists have found that under the proper conditions of high pressure and temperature, carbon monoxide, in combination with other substances, can be converted to a variety of useful products. These or their derivatives range from an acid used in tanning hides to the sparkling plastics in milady's boudoir.

You'd hardly associate carbon monoxide with anti-freeze. But at temperatures from 300 to 450°C. and under pressures of 1500 to 15,000 pounds per square inch, carbon monoxide and hydrogen unite to form methanol—a colorless liquid from which is made "Zerone" anti-rust anti-freeze for automobiles. From methanol and carbon monoxide as raw materials, ethylene glycol for "Zerex" anti-freeze is produced.

Plastics *and* Anti-Freeze

Methanol is used also to make a large number of compounds such as formaldehyde and methyl methacrylate. The former goes into urea- and phenol-formaldehyde plastics for light fixtures, radio cabinets, hardware, utensils, and electrical equipment. The latter is the basic material for "Lucite" acrylic resin with its many uses.

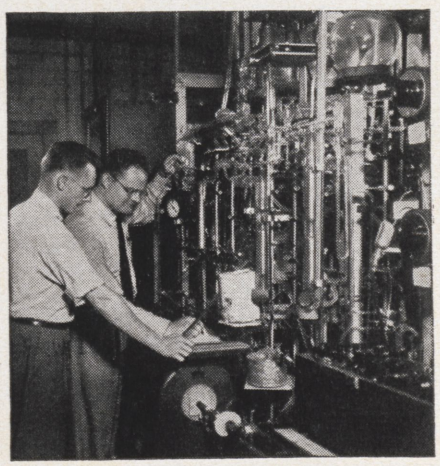


R. L. Stearns, *B.S. Ch.E., Yale '49 and H. Peterson, B.S. Ch.E., Northeastern Univ. '42 checking a multi-stage carbon monoxide compressor used in semi-works operations.*

The reaction of methanol with carbon monoxide leads to acetic acid, which is a well-known industrial chemical. By the same synthesis but substituting ethanol for methanol, propionic acid is obtained. From it come the "Mycoban" sodium and calcium propionates that retard mold and rope in bakery products.

Synthesis in the Future

Today Du Pont manufactures some 120 different items that are partly or wholly dependent upon elevated pressures. However, the possibilities have by no means been exhausted. Just recently, for example, chemists have been learning how to use carbon monoxide in "up-grading" certain petroleum hydrocarbons to give interesting alcohols. One of these, 3,5,5-trimethylhexanol, is prepared from diisobutylene by reaction with carbon monoxide and hydrogen.



A. J. Hill, Jr., *Ph.D. Org., Yale '44 and F. F. Holub, Ph.D. Org., Duke '49 carrying out an experiment on a new method for purifying carbon monoxide. The large furnace in this apparatus operates at 1200°C.*

College-trained men and women interested in working in this field at Du Pont may share in discoveries as outstanding as any yet achieved.

Because of the wide scope of Du Pont's activities, young graduates in many different fields have opportunities to select the careers that prove to suit them best as their abilities and interests develop.

No Mystery . . .

Concluded From Page 18

To convey the hot air to the various parts of the structure a standard belt-driven fan and duct system is employed. A set of filters placed on the intake side of the blower cleans the air before its entry into the rooms. This along with the thermostatic controls serves to give an automatic heating that is quiet, safe and dependable. It eliminates hazards of heat generation through flame combustion such as explosion and fire.

The heat pump is ideal in compactness, cleanliness and quick response to changes in temperature requirements. In the future the construction industry should see considerably more of the heat pump since the very apparent trend is to get away from the dirt, soot, smoke and odors of the coal-utilizing heat plants.

Scientists at RCA Laboratories solve exacting problems within the "nothingness" of vacuum tubes.

Inside story of Better Television

Now television is flashing *visual* entertainment, news, and educational material to millions of people daily. The "inside story" of its rapid growth is the history of some remarkable tubes. Inside these tubes, electrons are put to work—to perform, for your benefit, the miracle of long-distance vision.

The screen of your direct-view television receiver is actually the face of a tube—the kinescope developed by Dr. V. K. Zworykin and his colleagues of RCA Laboratories—on which electrons in motion "paint" pictures. A tube, too, is the "eye" of RCA's Image Orthicon television camera, which can "see" clearly by the light of a match.

And since you asked for big-picture television, they developed projection receivers—also a way to "weld" glass and metal, thus speeding the production of 16-inch direct-viewing tubes . . . at lower cost.

To these basic "firsts," RCA scientists have added advance after advance, which are daily bringing television into the lives of more and more people.

How you profit

Advanced research in television tubes is just one way in which RCA Laboratories work in your interest. Their leadership in science and engineering adds *value beyond price* to any product or service of RCA and RCA Victor.

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

Continue your education with pay—at RCA

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

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

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

Also many opportunities for Mechanical and Chemical Engineers and Physicists.

RADIO CORPORATION of AMERICA

World Leader in Radio—First in Television

Continued From Page 9

when fine annealed. To assure uniformity and yet permit economical manufacture ,a very small tolerance on optical constants is allowed.

All glasses, except dense flints, extra dense flints, and dense barium crowns, are so colorless that a white target when viewed through a plate of glass—two centimeters thick—appears white. The dense flint glass will cause the target to show slightly yellow and the dense barium crown shows green; otherwise, the light absorption will not exceed 1% per centimeter of light path measured in white light. For the dense flints and barium crown glasses a maximum of 2% absorption per centimeter of light path is allowed.

Transmission characteristics include total white light transmissions, spectrophotometric transmissions in infra red, visible, ultra violet, and complete spectrophotometric transmissions.

The physical properties consist of bubbles, striae, hardness and expansion.

Optical glass normally contains bubbles, the bubble size and quantity varying with the type of glass. A bubble is a gaseous inclusion no smaller than 0.02 mm in average diameter. Smaller inclusions are not considered visible. The most frequent size bubble in all types is about .2 mm or less and the less frequent larger bubbles may be .5 mm in diameter. The number of bubbles in 20cc ranges from one to forty and is specified for certain types.

Optical glass is not entirely homogeneous. Slight differences in index of refraction give rise to striae, which are visible to the naked eye under dark field illumination. These striae can usually be seen only with a striaescope. The effect of striae on optical performance is proportional to their density, quantity and the location of the optical part. The prominence of striae tolerated varies inversley as their frequency. Since glass does vary considerably in its striae content, three grades are offered depending on the application:

Grade A shows clear or no striae when viewed through opposite ends of a striaescope.

Grade B contains striae which are light and scattered when viewed through opposite ends of a striaescope.

Grade C. contains striae which are light when viewed through opposite ends in daylight with the naked eye.

All glasses are hard in the ordinary sense of the word. If hardness is expressed as a rate of grinding or width of scratch produced, the glass of lowest refractive index will be approximately twice as hard as the glass of highest refractive index. If measured according to Moh's scale, the glasses of lowest refractive index would be slightly softer than quartz and the highest refractive index would be somewhat harder than apatite.

Chemical stability is an important factor since, no matter how useful the optical properties of a glass may be, it would not be used in an optical system if its polished surface corroded in the environment. On the other hand all types of glass contain components which are soluble in water. They will give up a small portion of their more soluble components when exposed to water.

Glasses containing large amounts of lead or barium are likely to develop surface interference colors. The presence of an acid, such as dissolved carbon dioxide or perspiration, accelerates this formation. Ordinarily no damage of the polished surface occurs on this glass, since only the lead or barium dissolves and the hard silica structure is not affected. The light transmittance of a stained surface is equal to or greater than that of an unstained lens. Films of controlled thicknesses are purposely used in many systems to decrease the amount of light lost by reflection at the surface. The glasses are classified by the amount of time required to form a low reflection film when immersed in nitric acid at 25°C. The lower classes are not

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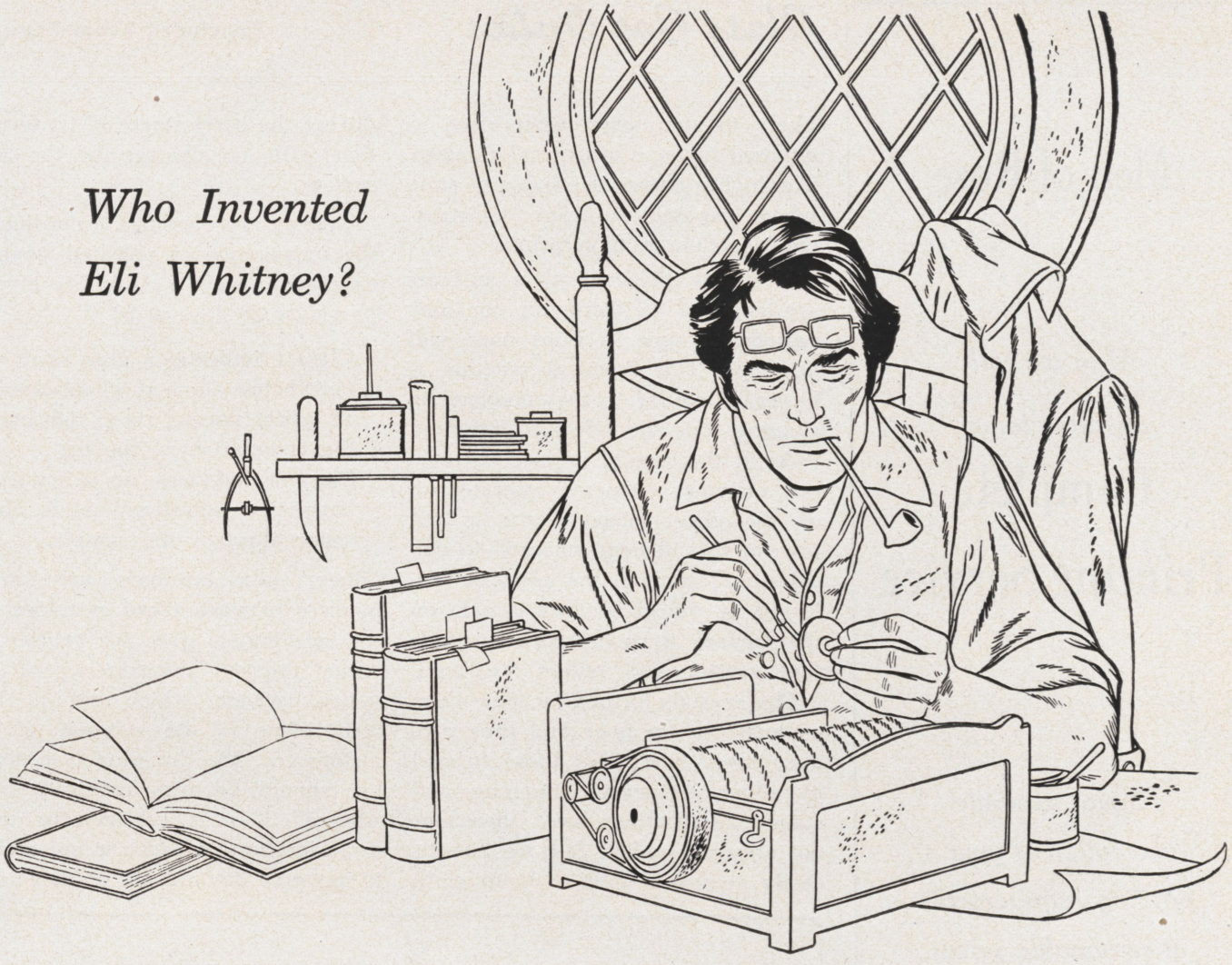
Who Invented Eli Whitney?



In 1793 Eli Whitney helped a growing nation take another step in the direction of greatness. Inventions like his made and keep America great. But what does the greatness of American inventors and technology prove?

It proves that Americans are better trained than other people in the scientific and technical fundamentals so necessary for the continuing progress that has kept America the world's greatest nation. In America, the finest textbooks are available to all. This is the background for the technological advances that raise one country above all others.

Many of the books from which you learn your fundamentals bear the McGraw-Hill imprint. McGraw-Hill is the world's largest publisher of books for technical reference and instruction as well as for advanced research and study.

The discoveries of today are the fundamentals of tomorrow. When you finish school, you'll find it necessary to keep up with the advances in your specialty. The McGraw-Hill magazine serving your field will report all that is new, necessary and important.

It is not enough to know that a new process exists, or that a new invention has been developed. You must know also how it can be made available to you. You will find the best source for this information in the advertising sections of your McGraw-Hill magazines.

Today in school and tomorrow in business, you will find that your progress depends on your up-to-the-minute knowledge of your field. And, McGraw-Hill will continue to serve with books and magazines designed to provide all that is important and current.

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Glass For Optics

Concluded From Page 22

likely to stain even when used as exposed surfaces in tropical climates. The higher classes are liable to stain when exposed to rain, moisture, condensation or fingerprints.

If highly polished glass surfaces are exposed to damp air for long periods of time, a faint haze will develope. The chemical reaction is basically similar to that involved in staining, but the effect is different.

As in the case of surface staining, one or more elements migrate out of the glass. Since water is not present in sufficient amounts to dissolve and remove the elements released by the glass, they remain on the surface as microscopic crystals that scatter and reflect the light.

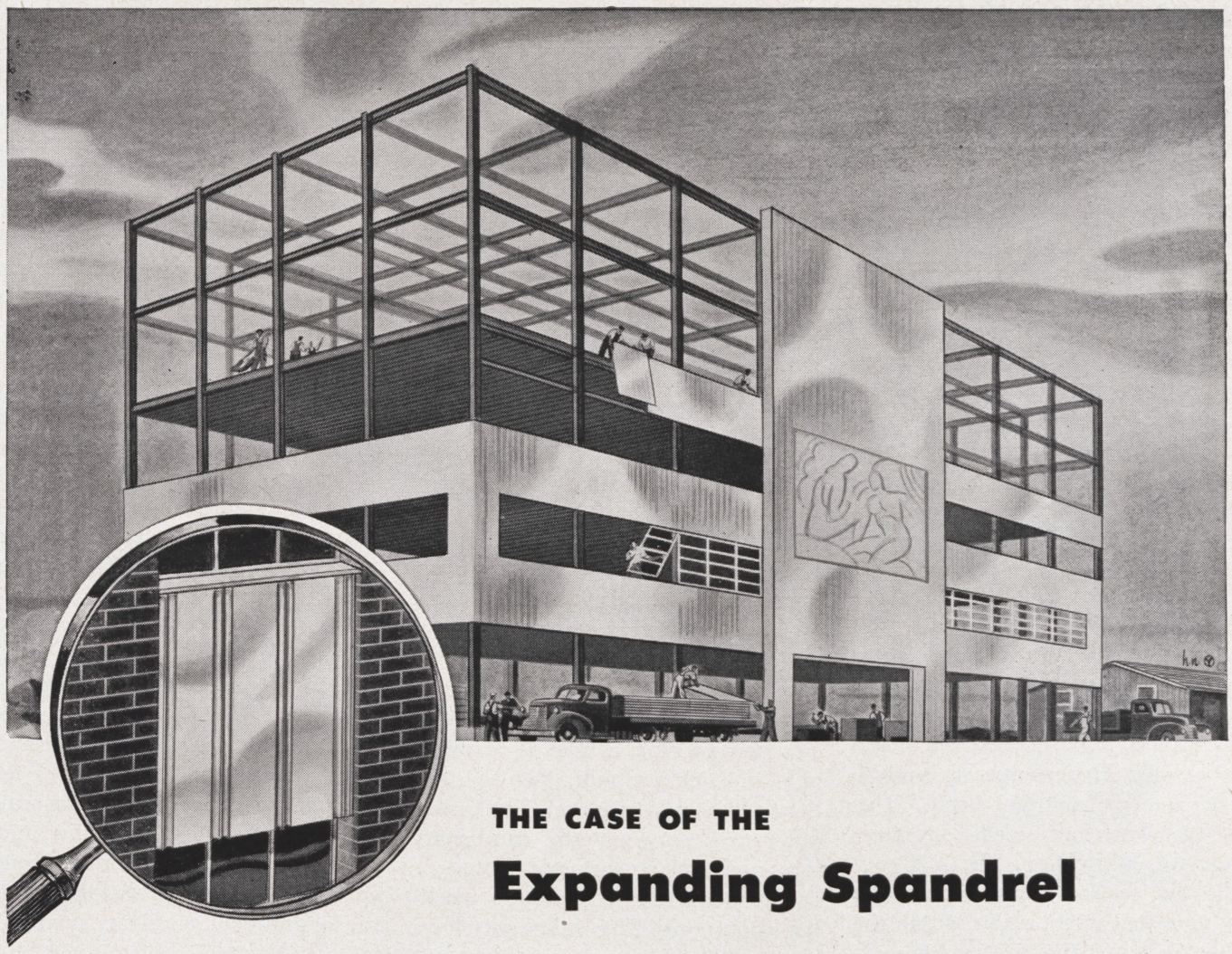
The crystals formed by some glass components are finer and thus produce more haze than those formed by other elements. Dimming and stain classifications are, therefore, not always parallel. Surface haze is easily removed with a damp cloth during the early stages of its formation with no damage to the lens surface.

Glasses are classified according to the appearance of polished samples exposed to a 100% humidity atmosphere for 28 days at 50°C.

Class 1 indicates a glass that was not visibly dimmed when examined under normal room lighting at the completion of the test.

Class 5 indicates an amount of haze that interfered with clear vision through the sample.

Other class numbers are intermediate between these extremes. In the selection of glass for reticles or other internal components of an optical system which are in the focal plane of the eyepiece of an instrument, the dimming test number should be very carefully considered. This is particularly true in an instrument which is not sealed to prevent the ingress of moisture.



THE CASE OF THE

Expanding Spandrel

Night and day, winter and summer, year after year, for more than twenty-six years aluminum spandrels (the vertical area between windows in skyscrapers) were exposed to the weather . . . and nothing happened.

That was proof enough for the architects.

Proof that Alcoa Aluminum castings used for spandrels stood up in all kinds of weather, resisted corrosion, kept up their good appearance, never needed maintenance.

"Aluminum works so well for spandrels," reasoned the architects, "why not expand its use . . . make entire walls of it?" They came to Alcoa with their ideas. Alcoa engineers had kept pace. Designs and methods for making complete walls were ready. New ways had been found to make aluminum cheaper and more useful.

Today you will see aluminum-clad buildings going up in every part of the country. These buildings are quick and inexpensive to build. Their aluminum walls never will need expensive painting or repairs.

This case is typical of the history of Alcoa and of the men and women who work for it. While aluminum was proving itself in small applications, Alcoa engineers were perfecting the methods for large scale production and fabrication Within the lifetime of men now living, this company has grown to be one of America's great industries. New developments now underway in Alcoa's laboratories are pointing the way to even more widespread uses for aluminum in the years ahead. ALUMINUM COMPANY OF AMERICA, Gulf Bldg., Pittsburgh 19, Pennsylvania.

ALCOA FIRST IN **ALUMINUM**

Concluded From Page 11

the shoulder blades or to the chest.

The outer layer of the suit is a white layer of glass fiber-cloth which is highly resistant to abrasion but which breaks down at approximately 1400 degrees. Directly underneath is a second layer of glass cloth which, though structurally weak, is resistant to temperatures over 2000 degrees. Because of this arrangement in construction no protection is lost when the top layer is sacrificed by exposure to high temperatures. Another protective feature is a layer of material near the surface, and another near the skin, which cannot be permeated by gas or liquid.

Automatic Lubrication

An automatic lubricant which is both compressible and expansible has been compounded for pressurized plug valves. This energizable lubricant, called Hypermatic, is said to store energy within itself. This energy, when released, produces automatic lubrication. The lubricant seals the seating surfaces and fills any void that might occur within the valve. It stores the energy for multiple valve turnings and when exhausted can be re-energized by adding more lubricant to the reservoir.

To date, tests have been confined to valves, but later tests may reveal other uses. Field tests on valves indicate that the energizable lubricant functions under most conditions in a temperature range to 250 F.

Compared to a standard lubricant, which is incompressible and maintains pressure within the valve only for a short time, Hypermatic continues to exert pressure to fill lubrication voids until the confined pressure drops to a minimum of 50 pounds. The time during which the valve maintains 100 per cent automatic lubrication without repressurization depends upon the number of valve closures and the amount of lubricant stored within the valve. Full automatic lubrication may be restored simply by adding more Hypermatic either by insertion of the material in stick form or by a high-pressure grease gun.

The self-acting lubricant is held in its energized condition between the valve sealing surfaces and the ball check valve in the stem of the valve. Should the valve be neglected over a long period of use and the energy of the lubricant become dissipated, this material simply reverts to the status of a nonautomatic lubricant.

Three advantages for the users of automatic lubrication are claimed: (1) decreases the frequency of valve lubrication, (2) keeps the valves in a state of 100 per cent lubrication, and (3) maintains the valves in operable condition without first stopping to relubricate the valve.

Basically the new lubricant is similar to standard noncompressible materials in its lubricating properties and wetting action. It is available in stick or bulk, just as standard valve lubricants. The main difference between this automatic lubricant and nonautomatic types is its intrapowered action under working conditions. The lubricant flows into voids and maintains an unbroken film surface. When it comes to rest, as when the valve turning is complete or any void is filled, it again assumes its plastic form with all lubricated surfaces.

Automatic Paint Spraying For Automotive Parts

New electronic devices that paint cars automatically—and even make the paint go around corners to coat the back side of part—are being adopted in a growing number of automotive plants.

Automatic paint spraying equipment now is used in a number of plants for car roofs, hoods and other parts.

The paint spray-gun moves up and down, and sideways, under control of a battery of electric eyes. Depth of the paint is regulated by electronic devices.

To make paint travel around corners and reach hidden surfaces, an "electrostatic" painting process is used. The car parts which are to be painted are passed through an electric grid, which is given a high-voltage negative charge.

Paint sprayed into the space between the car parts and the grid also is given a negative charge, which makes the grid repel the paint and causes the car part to attract the paint.

Another electrostatic process removes the last drops of excess paint which drain and collect at the bottom of the sprayed item.

About 30 automotive and supplier firms now use the electrostatic process, on body parts, headlamps, horns.

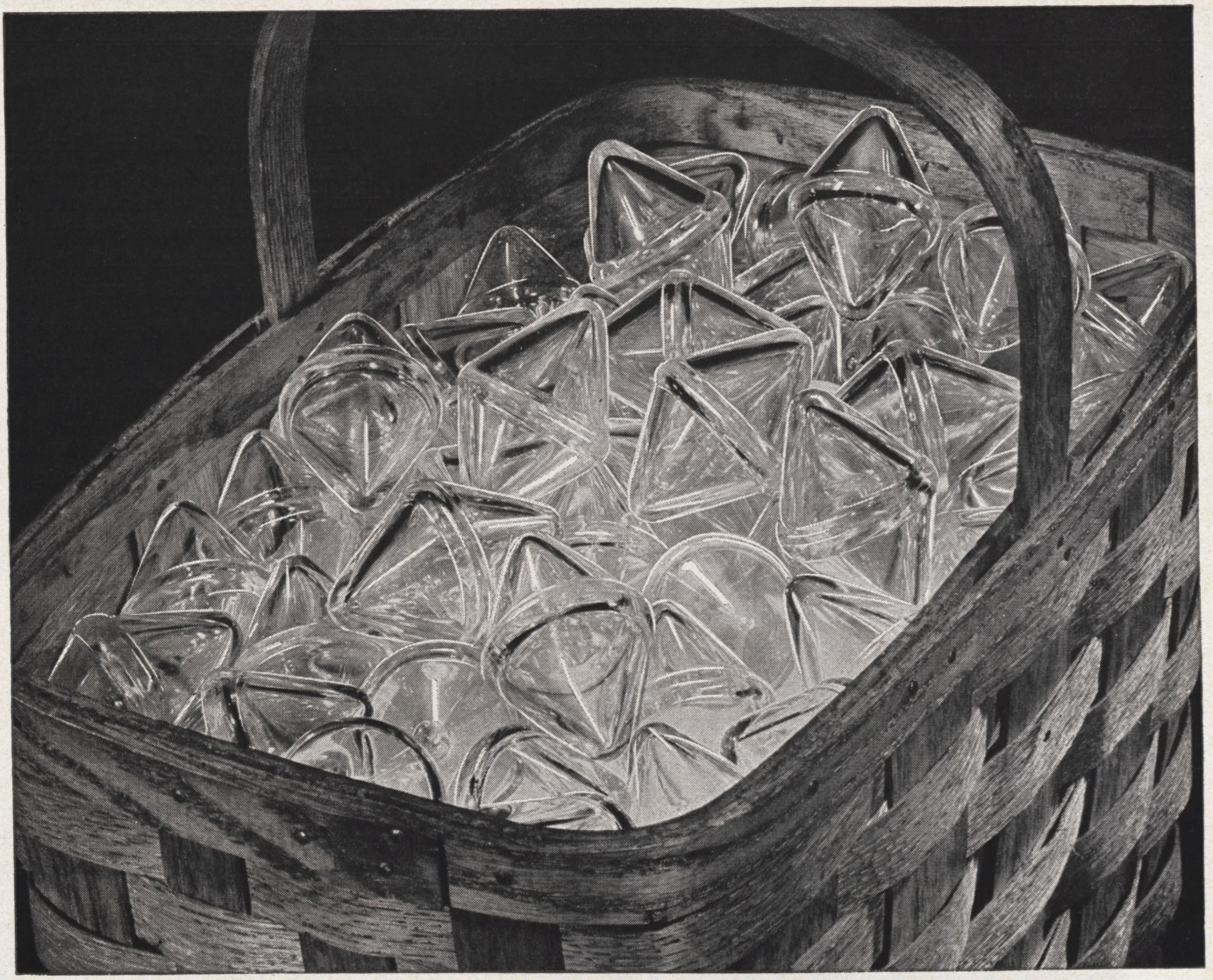
Baseboard Heating System Studied

A recent investigation of a typical baseboard heating system has been conducted to study the heat transfer phenomena in small houses. The tests covered the temperature distribution in a four-room test bungalow under various outside temperature conditions, in addition to the installation and operational problems involved.

Two types of room temperature controls were used for the tests: (1) a conventional wall-type electric thermostat and (2) a modulating control employing an outside thermostat and a threeway valve that mixed the boiler supply and return water to vary the temperature of the water entering the system.

The test results showed that comparatively small temperature differences existed between rooms and between different levels in the same room with this type heating system for the range of outside temperature from 50° F. to 0° F. However, the temperature differences increased in magnitude both horizontally and vertically as the outside temperature decreased.

The investigation also showed that the specimen baseboard convector system produced lower vertical temperature gradients in the test bungalow than any other system or device that had been tested heretofore.



These glass eggs make TNT behave

The traditional way of shooting an oil well is to lower cans of nitroglycerin into the hole and explode them at the depth where traces of oil have been found.

Now, petroleum engineers, using double-ended glass cones made by Corning, can shape and direct these explosions to penetrate oil-bearing rock with a rifle-like charge.

These pointed glass eggs, with shells no thicker than a pop bottle, are set in the ends of cylinders of TNT and the charges are arranged in a case for lowering into the well.

Miraculous as it may seem, the glass egg—as it is liquefied by the explosion—acts as a gun barrel to aim the tremendous blast and concentrate it in a thin stream. The TNT charge—shooting directly outward—rips a hole in the rock to let the oil flow.

And this hole penetrates some sixteen times farther than one made by an unshaped charge.

Because they are sometimes used in wells two miles or more deep, these Corning glass charge-directors are built to withstand heavy subterranean pressures.

And although the eggs are hollow, they'll stand up under a pressure of 20,000 pounds per square inch.

But if that seems strong to you, we'd like to point out that a one-inch cube of this same glass has a compressive strength of 250,000 pounds.

Throughout industry, *Corning means research in glass* because a multitude of Corning developments—such as finding ways to increase its strength—have helped make glass one of today's most versatile engineering materials.

You'll find—when you're out of school and concerned with planning new products and processes, or changes in old ones—that it's a good thing to keep *glass* in mind.

Then, we hope you'll call in Corning before your planning reaches the blueprint stage—to learn how this material, which has so many varied uses, can best serve you. *Corning Glass Works, Corning, New York.*

CORNING
means research in glass

Concluded From Page 13

In the evening, the Blue Key sponsored a Freshman smoker in the dining room of Deming Hall. Jo-Dean Morrow was toastmaster and a welcoming address was given by President Wilkinson. Approximately fifty new students were present along with fifteen faculty members.

The class has seventy-seven civilian students and twenty-five veteran students. There are twenty-five students from Terre Haute, and fourteen from Indianapolis; while the rest are collected from Illinois, California, New Jersey, New York, and Kentucky.

The Monday registration showed the total number of students to be four hundred and six, with one hundred and eleven Sophomores, ninety six Juniors, and eighty five Seniors in addition to the Freshmen.

"Once a Year"

Freshman Initiation

At the first Freshman Assembly the new greencaps were welcomed with due respect for school tradition. The sophomores made clear by their actions that they intended to make the freshmen feel at home at Rose.

Complete cooperation by all the freshmen in initiation is sometimes difficult to obtain. In order to "weed out" troublesome characters, a group of effective restrictions are imposed. These restrictions are embodied in the "Freshman Commandments" and any freshman who breaks a commandment is subject to punishment for his misdeed.

For their first assembly the freshmen were herded together in one corner of the field house. They had been instructed previously to have their green caps, the Freshman Handbook, matches and garters, as prescribed in the "Freshman Commandments." Those who were absent-minded and did not possess all the required articles were taken to task by a select group of sophomores wielding a grease bucket.

The most artistic job of the day was turned in by Tom Reifenberg. He evidently was seeking revenge for his past treatment, having been one of the first freshmen greased last year. The freshman who received this grease job had been judged guilty of illegally assaulting a sophomore.

At least six other forgetful freshmen were treated in like manner; however, they were not covered from neck to ankles as was the freshie decorated by Reifenberg.

Before the assembly was dismissed, the sophomores demonstrated cheering and the school song, "Dear Old Rose," so that the freshmen might be prepared to cheer at the first home basketball game. It is quite obvious that the sophomores expect very little trouble from the frosh.

Concluded From Page 14

24, 1949. He held a position in the test department of the Pennsylvania Railroad before his death and is survived by his wife and eight children.

Chesleigh "Dolly" Gray died unexpectedly November 7, 1949, at his home in Indianapolis. Mr. Gray was loved by all those who knew him and was always enthusiastic about the activities of the Institute. He had been serving on the board of managers of Rose since 1935.

He was a native of Shelburn, Indiana and received his professional degree as Civil Engineer in 1923. Among his outstanding positions, he was chief engineer of the Indiana State Highway Commission, and at the time of his death, president of the Ready-Mixed Concrete Corporation of Indianapolis. Mr. Gray held membership in the Rotary Club, Janto Club, Columbia Club, Indianapolis Athletic Club, Highland Country Club, Indianapolis Chamber of Commerce, American Legion, Rose Alumni Association, and the national Ready-Mixed Concrete Association.

Surviving his death are his wife, Mrs. Edna Douglas Gray, two daughters, Mrs. Margaret Gray Peterson of Seacliff, Long Island, and Mrs. Mary Jo Gray Wilderman of Indianapolis, a brother, William Gray of Shelburn, and two grandchildren.

'25 Gustav H. Pfeiffer died at his home recently after an extended illness. In 1926 he received his M.S. degree from Carnegie Tech, and during the same year he joined the Hercules Powder Company as a research chemist. At the time of his death he was business manager of the experiment station for Hercules.

Mr. Pfeiffer had been a member of the Wilmington Symphony Orchestra, as a violinist, since 1933. He was a member of the Chamber of Commerce, the American Chemical Society, and wrote several articles on cellulose chemistry.

He is survived by his wife, his mother, Mrs. Anton Pfeiffer, and two sisters, Mrs. Charles M. Smith, Gary, Indiana, and Mrs. Richard Brollier, Jasper, Indiana.

'48 Daniel Francis Rice, of Sullivan, Indiana was fatally injured recently in an automobile crash about four miles south of Terre Haute.

Mr. Rice was graduated from Linton High School in 1941 and served as a navigator in the Air Force before coming to Rose. He was a member of the Linton Assembly of God Church, the United Mine Workers of America, the American Institute of Electrical Engineers, and an officer in the Air Force Reserve Corps.

He is survived by the widow, Francis, three daughters, Danetta Kay, Leah Diann, and Cynthia Joy, and the parents, Mr. and Mrs. Daniel Rice of Linton.

EXPLORE
New Frontiers of Industry!

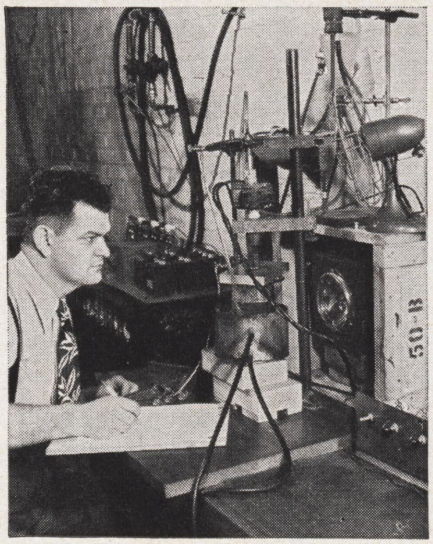
By EDWIN H. BROWN, *Vice President, Engineering Development Division*
Allis-Chalmers Manufacturing Company (Graduate Training Course 1908)

WILL IT WORK? Is it practical? Is there a *better* way to do it? If you feel the challenge in questions like these and get a thrill out of finding the answers — perhaps you're cut out for research.

EDWIN H. BROWN

There are a lot of us like that here at Allis-Chalmers. Pioneering beyond the immediate frontiers of industry has been one of the major factors in the growth of this company for over 100 years. Yet today we're finding more exciting frontiers to explore than ever before.

My part in this work started back in 1906 when I joined the Allis-Chalmers Graduate Training Course, from the University of Nebraska. During my two years in the course, I spent a good deal of time on the test floor. That's the spot where original thinking, new designs, and new methods pay off in results. It's a great vantage-point from which to watch industrial development at work.



Measuring cavitation resistance of various materials for pumps and hydraulic turbines. Material under test is electronically vibrated at a high rate while submerged in water.

After completing my GTC, I worked as a test engineer . . . as development and sales engineer on steam turbines . . . as a chief engineer and department manager . . . and into my present work in research and development.

Unusual Range of Activities

Research here at A-C covers a tremendous range of industrial fields. I might point out that product development is considered a responsibility of each product department, while the central research and development organization works with the many departments in a staff capacity. Since Allis-Chalmers produces important machinery for every basic industry, you can see that our development work is extremely varied.

It includes such things as methods of burning coal deposits underground, to produce power without the intermediate steps of mining, processing and transporting the fuel to power plants. We're developing equipment for the application of atomic power in naval vessels. Working closely with engineers of the Turbopower Development Department, we're developing gas turbines for ship propulsion and high-temperature gas turbines for locomotive service, burning powdered coal.

Other engineers and scientists are engaged in pure physical research into factors that influence power transmission over long lines. There's constant departmental research and product development going on in the fields of flour milling, ore processing, water conditioning, hydraulic turbine design, electronics, new manufacturing methods and techniques, industrial design.

Pick Your Spot

Graduate engineers selected for the Allis-Chalmers Graduate Training Course have a unique opportunity to explore many engineering and industrial fields, and find the work that suits them best. Here, you help set your own course—may change it as you go along and special interests develop. You can gain first-hand experience with almost any major industry you can name—electric power, mining, wood products, hydraulics, public works. You can work in machine design, research, manufacturing, sales engineering. You can earn advanced degrees in engineering at the same time. When you finish the course, you know where you're headed— and you're on your way!

Write for details of the Allis-Chalmers Graduate Training Course—requirements, salary, advantages. Representatives may visit your school. Watch for date.

Allis-Chalmers Manufacturing Company, Milwaukee 1, Wisconsin

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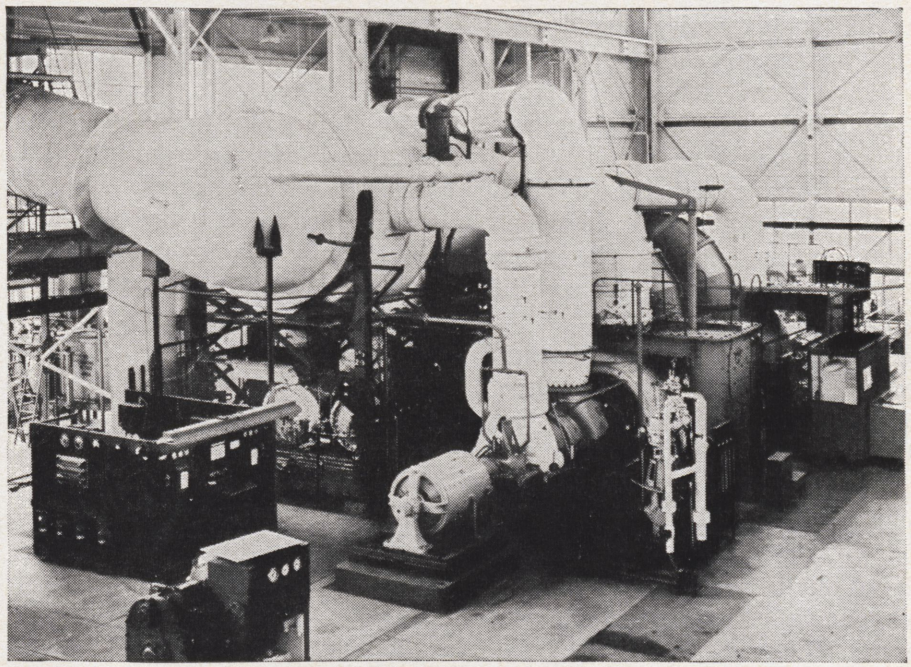
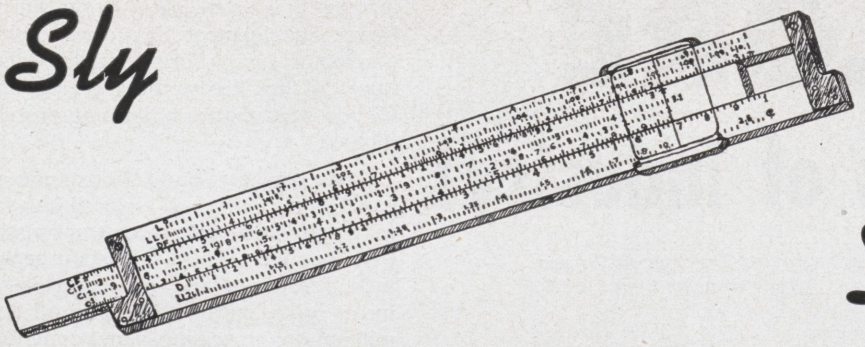


U. S. NAVY PHOTO

Experimental Gas Turbine at Annapolis is shown in new building to which it was recently moved. After extensive testing at progressively higher temperatures, the U. S. Navy unit has now been operated in several tests at its design temperature of 1500°F.

Sly Droolings



by Denzil Hammond, sr., m.e.

"Oh, dear!" she exclaimed. "I've missed you so much!" Then she raised the revolver and fired again.

* * * *

A couple of young farm boys brought a load of watermelons to town to peddle from door to door. At the first door a good looking girl answered the door. She asked the price of the melons and was told seventy-five cents apiece.

"You wouldn't charge little old me 75 cents would you honey?" asked the girl with liquid eyes and turning on all her womanly charm.

"Listen lady," said the boy pleadinly, "yesterday we gave away a whole load of peaches and we just gotta sell the melons."

* * * * *

Little Willie was late for school and the teacher inquired as to the cause of his tardiness. "Mamma was ill, Daddy called the doctor, and I had to get my own breakfast," explained Willie.

"Well, you go right home and find out what was wrong with your mother," said the teacher, "it might be contagious, in which case your presence in the room might expose me and the rest of the children."

So little Willie went home and came back in a short while. "Teacher," he said, "Mamma had a baby. And she said to tell you that if you were a good girl you wouldn't get it!"

* * * *

Kind Lady (about to give a backdoor caller a coin): "Are you married?"

Tramp: "Pardon me madam, d'ye think I'd be relyin' on total strangers for support if I had a wife?"

I've read enough fiction to understand most plots,
I know that the butler did it though no one heard the shots,
I know the poor but honest guy will wed the boss' daughter
And the rangers will arrive in time to stop the Indian's slaughter.
I know the gypsy maiden who is both so sweet and wild,
Is really princess Alice who was kidnapped as a child.
But authors I implore you and wait with baited breath,
To learn just what the heck can be a "fate that's worse than death."

* * * * *

I never kiss I never neck,
I never say hell I never say heck;
I'm always good I'm always nice,
I play no poker I roll no dice.
I never drink I never flirt,
I never gossip or spread the dirt;
I have no line or funny tricks,
But what the hell, I'm only six!"

* * * *

The following brief story on Benjamin Franklin was handed in by a little girl in school: "He was born in Boston, traveled to Philadelphia, met a lady on the street, she laughed at him, he married her and discovered electricity."

* * * *

She this
is like
the at
kind look
of you
girl

* * * *

Teacher: "What does it mean when I say, 'I love you, you love me, he loves me'?"

Willie: "It usually means someone gets shot."

The clergyman anxious to introduce some new hymn-books to his congregation directed the clerk to so notify the group present at the end of the sermon. The clerk had a notice of his own to give with regard to the baptism of infants. Accordingly, at the end of the sermon, he announced, "All those who have children to be baptised please send in their names immediately."

The clergyman who was hard of hearing and supposing that the clerk had given out the hymn book notice, promptly arose and said, "And I want to say for the benefit of those who do not have any, that they may be obtained from me any day between the hours of three and four. The ordinary little ones at fifteen cents—and the special ones with the red backs at only twenty five cents."

* * * *

Mirandy, surrounded by her brood of pickaninnies, was talking to the spinster settlement worker, "Yas'm birth control am all right for you all but me, Ah's married an doan need it."

* * * *

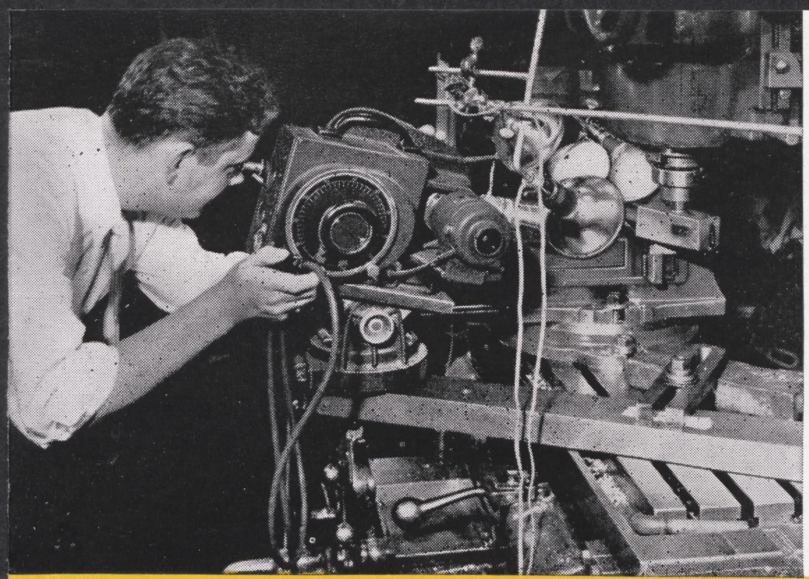
As the couple on their honeymoon stood on a cliff overlooking the ocean, she grew very romantic.

"Darling," she murmured, "when did you first know that you loved me?"

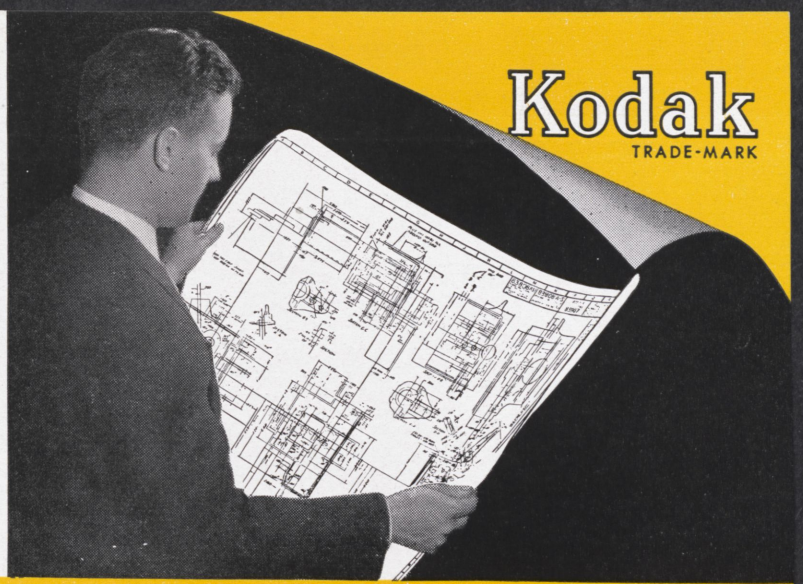
"Well," replied the groom tenderly, "when I first began to get mad when people said you were brainless and unattractive."

* * * *

Many a go-getter is afterwards sorry that he gotter.



IT HELPS IMPROVE PRODUCTS—High speed movies provide a record of motion far too fast to see. With the Kodak High Speed Camera, a second becomes three minutes, so you can see and analyze rapid movement—spot faulty action and points of excessive wear—see ways to make a better product.



IT COPIES DATA IN SECONDS—Engineering drawings, shop orders, specifications, records, and letters of all kinds can be copied fast, and with utmost accuracy. Photocopying with Kodagraph Papers, Cloths, and Film saves time, protects originals from wear and tear—even permits producing clean, legible copies from faded or worn material.

How photography's *Lightning Speed* works for business

HERE YOU SEE a few examples of how the speed of photography serves industry. In addition, its accuracy is used in copying drawings, documents, and data of all kinds. Its ability to reduce can put records on microfilm and save 98% of filing space.

These and the other unique qualities of photography are helping cut costs, improve products, speed production, and stimulate sales. If you would like to know more about how it could serve you, write for literature or for specific information which may be helpful to you. Eastman Kodak Company, Rochester 4, N. Y.

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