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Rose Technic Staff

Rose-Hulman Institute of Technology

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Rose

Technic





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HERE you see two pieces of steel. They are the same size, the same shape, the same weight. Although they look exactly alike, one of these steels is far more valuable—in terms of what it can do.

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UNITED STATES STEEL

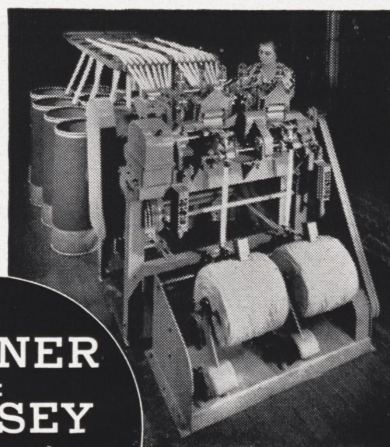
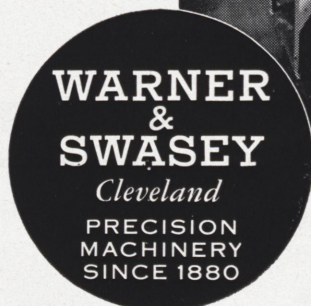
“Friendly” government vs. “selfish” business

THE GOVERNMENT will carry a letter for you from Texas, say, to New York for 3¢. But the government loses money on the trip, and you have to pay taxes to make up the difference.

Business carries a gallon of gasoline the same journey from Texas to New York for 1/5th of 3¢, does it almost as fast. It may not be door-to-door delivery, but it's a lot

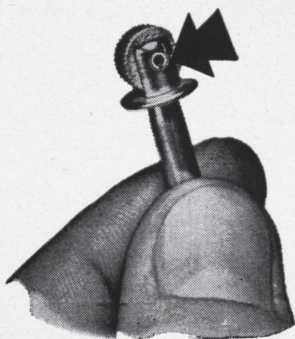
harder to handle, in spite of which business makes a profit—and out of which it pays taxes to support government business ventures such as the post office.

Since time began, the hope of private profit is what has stimulated the drive for efficiency and low costs, out of which everyone benefits. If that is business selfishness, the world needs more of it.

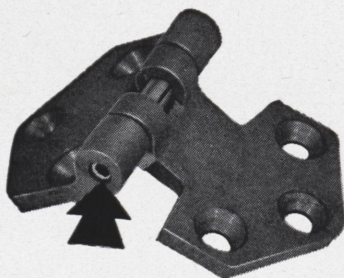


*Pin Drafter processing
wool for yarn*

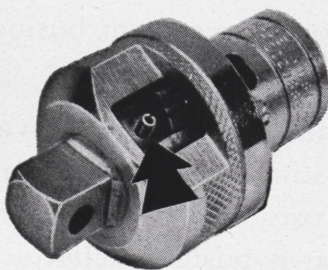
YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY



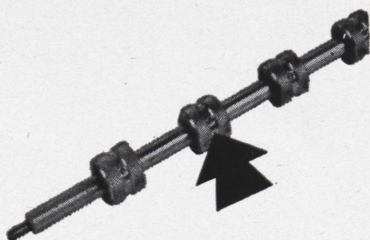
Replacing a rivet



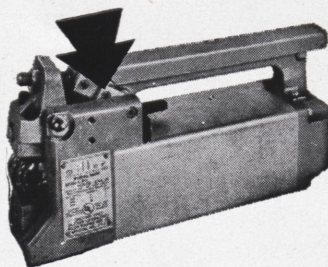
... a hinge pin



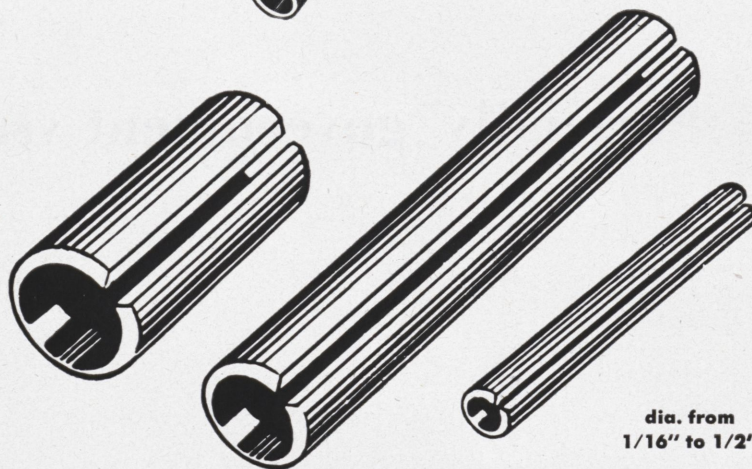
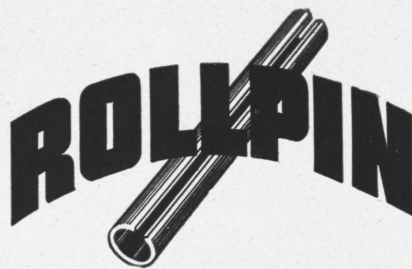
... a stop pin



... a set screw



... a bolt and nut



dia. from
1/16" to 1/2"

... a modern fastener that saves time and money on thousands of applications

Rollpin is a hollow, split, cylindrically formed pin with chamfered ends. It is simply driven into holes drilled to normal production tolerances. Because Rollpin is slightly larger than standard sized holes, it compresses as inserted. It is self-locking—and vibration-proof—because of the constant pressure it exerts against hole walls. Its shear strength exceeds that of a cold rolled pin of the same diameter. Rollpin is readily removed with a drift or pin punch—and can be reused.

Because of its versatility—and the production economies it makes possible—Rollpin is finding wide usage in almost every phase of manufacturing activity. Write for design information on the Rollpin. It will enable you to cut costs for many applications where use of rivets, set screws, dowels, and straight, serrated or cotter type pins create installation or performance problems.

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*Elastic Stop Nuts with the famous red collar
are another ESNA product*



Rose Technic

VOLUME LXV, NO. 3

DECEMBER, 1953

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Courtesy of INTERNATIONAL MINERALS & CHEMICALS CORPORATION.

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Men of Rose

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attention to our

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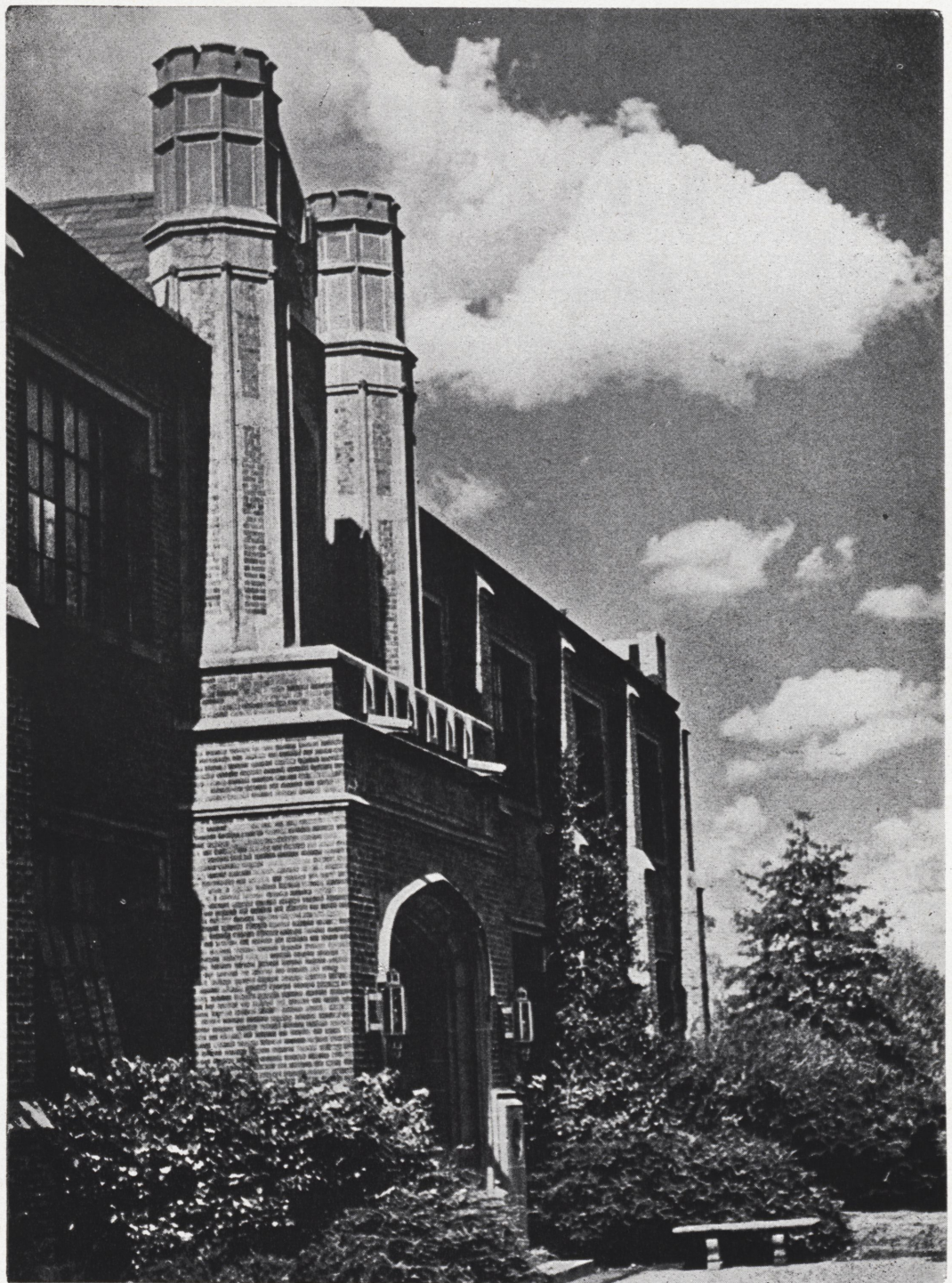
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HIGH SCHOOL GRADUATES OF 1954

You are cordially invited to visit Rose Polytechnic Institute during the present school year to learn more about your college entrance and the highly accredited engineering courses available to you at Rose. The next freshman class will be admitted September 13, 1954.

NOBLE C. BLAIR

Admissions Counselor

ROSE POLYTECHNIC INSTITUTE

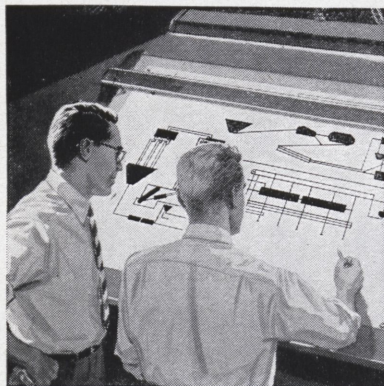
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Another example of opportunities for engineers at LINK-BELT

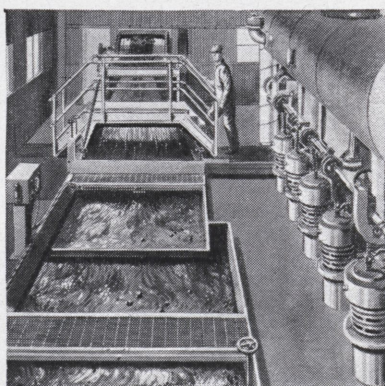
Big assignment--helping produce better coal at lower cost per ton



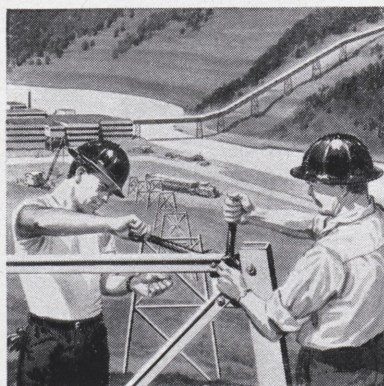
Unified responsibility at work.
Inland Steel's 750 tph coal preparation plant at Price, Ky., was designed, built and totally equipped by Link-Belt.



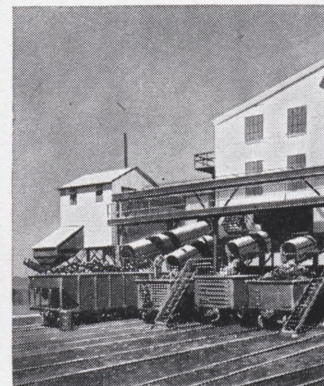
OVERALL ENGINEERING. Vast experience of nation-wide design and field engineering staff integrates all factors, assures expert planning.



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It's a complex process—one that varies from seam to seam . . . from one location to another. And Link-Belt is in a unique position to integrate the job all the way—from preliminary planning to final efficient overall operation.

For Link-Belt's broad line of quality equipment and nation-wide engineering organization offer unequalled facilities to coal producers. In fact, to every

basic industry. Wherever materials are moved or power transmitted, you'll find Link-Belt products at work.

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There's a fully illustrated booklet, "An Introduction to Link-Belt," that tells the entire story. Write for your copy today, or, if you can, visit one of the plants listed below.

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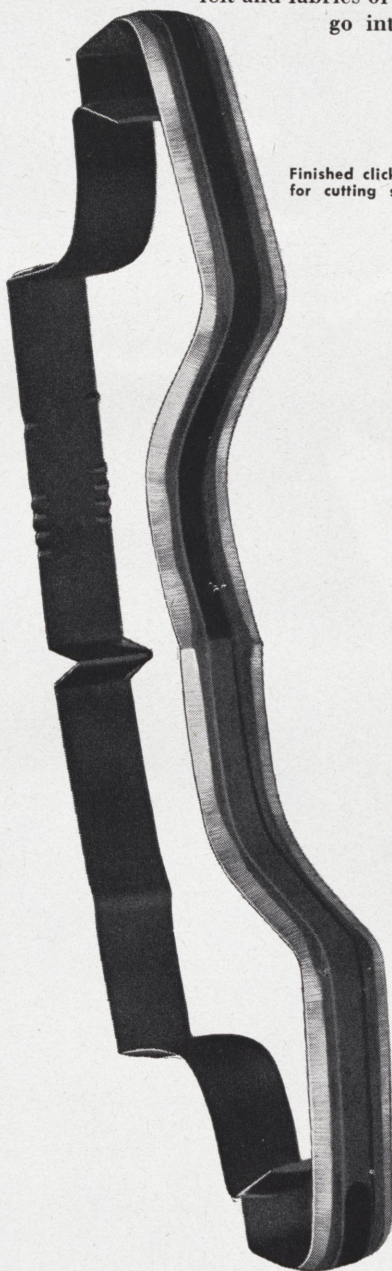
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What's Happening at CRUCIBLE

about clicker die steel

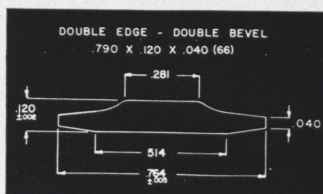
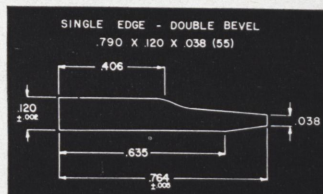
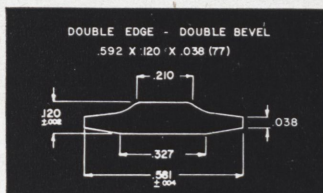
what it is

Clicker die steel is a special cold rolled alloy steel. It is used in making clicker dies for cutting leather, rubber, plastic, felt and fabrics of other compositions that go into the making of shoes and similar products.



Finished clicker die ready for cutting shoe leather.

Some of the clicker die steel standard shapes.



Wider shapes are used when dies are sized by surface grinding after forming and welding. Standard widths are provided when the dies are not to be surface ground.

how it is used

Clicker die steel is furnished to the die maker in either single or double edged form in one of several standard shapes. The die maker first shapes the die by bending the die steel to a pattern that provides the desired configuration, and then welds the two ends at a corner. He finishes the die by grinding a bevel on the outside of the cutting edge and filing the inside edge. Before the finished die is hardened and tempered, the die maker forms identification marks — combinations of circles and squares — in the cutting edge so that the material cut from it may be easily identified as to its size and style.

In the cutting operation, the leather or other material is placed on an oak block in the bed of the clicker machine. Then the die is placed by hand on the material which is cut as the aluminum faced head of the machine presses the die through it. The clicking sound which the head makes as it strikes the die is where the term "clicker machine" derived its name.

what it is composed of

Clicker die steel as produced by the Crucible Steel Company of America is a controlled electric steel in which the combination of carbon and alloy is designed for maximum toughness and proper hardness after heat treatment.

Experience has proved that cold finished clicker die steel is superior to hot rolled material for sizes approximately $\frac{3}{4}$ inch and narrower because of its lower degree of surface decarburization which permits the use of slightly thinner sections. Cold finished material also has a better surface finish with closer width and thickness tolerances and thinner edges that require less grinding and filing to complete the die.

CRUCIBLE'S engineering service

As with clicker die steel, the Crucible Steel Company of America is the leading producer of special purpose steels. If you have a problem in specialty steels, our staff of field metallurgists with over 50 years experience in fine steel making is available to help you solve it. Crucible Steel Company of America, General Sales and Operating Offices, Oliver Building, Pittsburgh, Pa.

CRUCIBLE

first name in special purpose steels

53 years of *Fine* steelmaking

Midland Works, Midland, Pa. • Spaulding Works, Harrison, N. J. • Park Works, Pittsburgh, Pa. • Spring Works, Pittsburgh, Pa.
National Drawn Works, East Liverpool, Ohio • Sanderson-Halcomb Works, Syracuse, N. Y. • Trent Tube Company, East Troy, Wisconsin



A Year of Progress

The year 1953 may well be remembered as one of notable progress at Rose Polytechnic. Apparently the administration at Rose agrees with the one in Washington in one respect at least — "it is time for a change."

The most noteworthy accomplishment of the past year was the construction of a student center on the Rose campus. This newly constructed building is to be part of a proposed dormitory, which is hoped to be built in the foreseeable future. The building was made possible through the donations of friends and alumni of Rose, who have the sincere thanks of the entire student body. The recreation center has filled a great need for additional recreational facilities on campus.

Rose has also made progress in the academic field. Several changes in the curriculum have been made this year, especially in the freshman program. The inauguration of a freshman course in engineering computation should prove of great value in acquainting the freshmen with the fundamentals of engineering. The offering of several new electives in both scientific and humanistic subjects has improved the opportunities for a more varied study at Rose. A faculty committee is now in the process of analyzing the entire curriculum, with the hope of making changes necessary in view of the ever increasing amount of study required in undergraduate engineering.

Recent work on the further modernization of the chemistry department has greatly improved facilities in this field. The library has also increased its availability for student use by staying open during the evening hours.

These improvements have been possible only through the active cooperation of students, faculty, and alumni. With continuing cooperation, Rose may look forward to even greater accomplishments in the coming year.

P. C. E.

The Frontispiece

Not a new invention, but a variation of an old one, this giant lightning arrester is designed to protect 330-kv systems from lightning strokes. The unit consists of seven standard arrester units zig-zagged between supporting insulator columns. Designed for suspension mounting, it is easily erected. Courtesy of WESTINGHOUSE ELECTRIC CORPORATION.

During the past ten years, ion exchange has taken its place among the common chemical unit operations, such as distillation, crystallization, and extraction, that are of value in processes of isolation and purification. Its many uses are reflected in a variety of industrial and research applications ranging from water softening and antibiotic purification to precise analytical methods for the separation of many organic substances. The general applicability and adaptability of ion exchangers have been recognized only in recent years and have been due in large measure to the production of synthetic resinous plastics containing acidic or basic groups.

The phenomenon of ion exchange was first observed over a century ago, in 1850, by J. Thomas Way, consulting chemist to the Royal Agricultural Society of England. Way discovered that the absorption or, more correctly, the exchange of ions by soil provided an explanation for the fact that some fertilizers that were water-soluble remained in the soil and were not leached or washed out by surface water. Although this discovery aroused much interest at that time, it was not until more than fifty years later that ion exchangers achieved industrial importance. The first important use came with the appearance on the market of the 'Zeolite' water softeners. These exchangers were limited in application and utilized natural or synthetic aluminosilicates.

In 1935, a joint discovery of Adams and Holmes marked the beginning of the modern era of ion exchange. These investigators found that the condensation, with formaldehyde, of phenol and certain aromatic amines would give insoluble synthetic resins with acidic and basic properties. The synthetic ma-

terials containing acidic groups were capable of removing or exchanging cations from a surrounding solution, while those containing basic groups were useful for anion exchange. The versatility of these new resins was promptly recognized by industrial and research personnel and led to their immediate application in many processes. The rapid accumulation of knowledge led to the preparation of so-called "tailor-made" resins with specific uses.

Widespread recognition of the immense possibilities of ion exchange was achieved when the excellent work on the separation of the rare earths and radioactive fission isotopes at the Clinton Laboratory for the Manhattan Project became known.

Principles of Ion Exchange

The reactions of ion exchangers may be represented in terms of the anions or cations which are removed from a solution in exchange for ions on the insoluble resins. In general these reactions are reversible. For this reason, regeneration of the ion which had been released during the period of use is possible. This enables the process to be carried out very economically.

Several theories have been advanced to explain the mechanism of ion exchange: (1) the crystal lattice theory of replacement of ions in crystal, (2) the double layer theory, and (3) the Donnan membrane theory.

The crystal lattice theory is based on the concept that the constituents of an ionic solid are present as ions instead of molecules. Some of these ions are integral parts of the lattice structure and are fixed. The charge on these ions is neutralized by surrounding ions of the opposite charge. The forces holding the ions together at some of the lattice points are such

that ion exchange can take place. The exchange capacity thus depends upon the porosity and permeability of the solid. This theory was developed for crystalline ion exchangers, and significant differences have been noted with non-crystalline resinous exchange substances.

Gouy and Stern have proposed a theory of ion exchange based upon a modification of the Helmholtz double-layer theory. They look upon the exchange material as a colloid consisting of an inner, fixed, charged ionic layer surrounded by a diffuse, mobile layer of compensating charged ions. The system is at equilibrium. When a new ion is introduced the equilibrium is upset and an exchange of ions occurs until a new equilibrium is established. Concentration will thus govern the capacity for exchange to a marked degree.

The Donnan membrane theory regards the exchange process as an equilibrium of ions between two separated phases. In place of an ion restrained by an impermeable membrane, the resin or other exchange substance is considered to be a non-diffusible ion, and the interface between solid and liquid phases is taken to be the membrane. The replacement of the exchangeable ion depends upon the strength of the forces between the ions of opposite charge and varies according to the electrolytic strength of the solution.

All of these ion exchange theories are similar in many aspects. For instance, they all postulate that the exchange must satisfy the law of electroneutrality and the place of the exchange must be at a point where there is an ionic grouping capable of forming an electrostatic bond with an ion of opposite charge.

The actual mechanism of the exchange may be divided into five stages: (1) diffusion of the ex-

EXCHANGE

By Donald C. Wood, jr., ch.e.

changing ion through the solution to the particular ionic group, (2) diffusion of the exchanging ion to the exchange site, (3) interchange of ions, (4) diffusion of the exchanged ion to the interface, and (5) diffusion of the exchanged ion away from the exchanger interface into the solution. From the emphasis on diffusion it can be seen that the exchange is limited by the diffusibility of the ions and this factor is of great importance in determining the rates of reaction and even the extent to which the exchange proceeds.

Much work remains to be done before the true mechanism of ion exchange is fully understood. However, sufficient progress has been made so that the principles can be applied to many industrial uses.

Application of Ion Exchange

Ion exchange may be used in either of two ways: by batch or by column technique. In the batch process, the exchanger is agitated with the solution to be treated until the desired amount of electrolyte has been removed from the solution. The phases are then separated and the exchanger is regenerated before the next batch is treated.

The column process is preferable, because it is a continuous operation which is much more economical. In this technique a vertical column is packed with exchanger and the fluid is passed through the column. The only stoppage in this process occurs when the exchanger must be regenerated. A prolonged delay in plant operation has been eliminated in many plants by using a double bank of columns, one of which is in use while the other is shutdown for regeneration.

The fields of usefulness of exchangers may conveniently be divided into five principal categories: (1) exchange of ionic constituents,

(2) removal of ionic constituents, (3) fractionation of mixtures, (4) concentration of ionic substances, and (5) miscellaneous applications. These categories tend to overlap in many cases.

The largest single use of the ion exchanger, the softening of water, is an example of the exchange of ionic constituents. For this purpose any one of a number of mineral cation exchangers is used in the form of the sodium salt. Calcium, magnesium, and iron, which are the usual causes of hardness, exchange easier than sodium and are thus held by the exchanger.

Ionic substances may be removed from solution by use of cation exchangers in the hydrogen form and anion exchangers in the hydroxyl form. When both cations and anions are to be removed, the two types of exchangers are used together, either alternately in series or in a mixed bed operation. One of the most striking examples of the mixed bed process is the preparation of deionized water. Water treated in this manner is chemically equivalent to that obtained by triple distillation.

Fractionation of ionic materials in aqueous solution has become a major research use of exchangers. Such separations may be accomplished if the ionic materials vary in any of a number of properties such as; ionic radius, valence, and acidic or basic strength. Two general methods are used. They involve either adsorption of a single component from a mixture or adsorption of all components followed by selective desorption of one component at a time. The separation of numerous organic compounds, such as members of the amino acid group, may be carried out by use of either of the two methods.

The fourth application of ion exchangers, the concentration of ionic constituents, is based on similar con-

siderations. Under favorable conditions, small amounts of ionic substances may be collected from dilute solutions and recovered in concentrated form. Among the materials concentrated in this manner are many of the vitamin constituents, thiamin, riboflavin, folic acid, ascorbic acid, and various amino acids.

Finally, a few of the applications of ion exchangers differ in nature from those involving ionic exchange. For example, resins are used as catalysts, and the hydrogen and hydroxyl forms of exchangers are used for the adsorption of acidic and basic gases such as SO_2 and NH_3 . Possibly future research may prove that even these applications are true ion exchange reactions.

The Future of Ion Exchange

Ion exchange has already made a place for itself in the processing of numerous products in which the various applications discussed above are of value. Continued expansion in this field may reasonably be expected.

Several different physical forms of exchange resins have been developed. These include liquid exchangers, ion exchange membranes or sheets, and ion exchange fabrics. Special applications of exchange reactions may be realized by use of these different forms.

Another development which should prove of interest in the future involves polymeric substances which exchange electrons instead of ions. The reaction has been shown to be reversible, so that either oxidation or reduction may be carried out without the introduction of an oxidizing or reducing agent.

In a field that is advancing as rapidly as that of ion exchange, quite unforeseen developments may be expected. Thus a continuation of the growing interest in ion exchange may be anticipated. Ω

The MARCH

INTRODUCTION

The purpose of this study was to determine the ideal feminine companion of Rose men. It is to determine the qualifications a hypothetical girl should meet and also to learn certain dating characteristics of Rose men.

The investigation was carried on between October 19, 1953, and November 16, 1953. It included the circulation of questionnaires, recording, and evaluating the results of same.

GENERAL SOCIAL CHARACTERISTICS OF ROSE MEN

Girls

The only question that everyone interviewed agreed on was the first one. There was 100% agreement that the fellows liked girls. This question was a leading one, since if anyone had answered "no", the chances were that the remainder of the questionnaire would not be worth tabulating.

Dating

Some rather interesting results were obtained on the second question, "Do you like to date?" The senior and sophomore classes had a 100% record on this question. The junior and freshman classes had 97.2% and 94.7%, respectively, on the question. Overall for the student body 97.7% answered "yes" to the question. The local students interviewed were 100% "yes", while the out of town students registered 97.4%.

Blind Dating

Blind dating is an entirely different matter. The seniors answered this question 40% for the affirmative, the junior class 29.8%, sophomore class 57.1%, and the freshmen 22.2%. Terre Haute students were in favor of blind dating by only 15.4%. Out of town students had an average of 39.7%, and the overall was 36.1%.

Double Dating

The question on double dating showed that Terre Haute students were 100% in favor. Out of town students were 89.5% in favor, while overall was 91%. Class percentages were fairly consistent, ranging from 89.3% in the junior class to 95% for the freshmen.

Dating Period

The length of dating period of the Rose man varies somewhat according to class. The big break is between the junior and sophomore classes. The average dating period of the senior class is 6.9 years, while the junior class is 6.8 years. The sophomore and freshman classes are 4.2 years and 4.1 years, respectively. The overall average for men interviewed was 6.4 years.

Married

Of the 90 questionnaires tabulated, only 7.8% of the men were married. Each class being represented by at least one married man.

PREFERRED PHYSICAL CHARACTERISTICS

Height

The average height desired for this hypothetical girl turned out to be 5 feet, 5.2 inches. Terre Haute students preferred a girl with an average height of 5 feet, 4.6 inches, and out of town students desired a height of 5 feet, 5.3 inches. Of all the men interviewed 67.7% considered the average as a medium height, and 20.4% as tall.

Stature

Stature requirements were quite definite. 92.1% of the men preferred a medium stature and 7.9% a small stature. The most decisive figures were those of the juniors. All of the 37 juniors interviewed were in favor of a medium stature for this ideal girl.

Face

Percentage wise, these results were quite similar to the stature results.

A pretty face was preferred by 86.3% of the men, beautiful face by 12.6% and a plain face by only 1.1%. Class averages were quite similar. Of the Terre Haute students 92.2% favored a pretty face and 85% of the out of town students also did.

Figure

The figure dimensions were significantly similar throughout the classes. The average dimensions of the ideal female were found to be: bust, 35.3 inches, waist, 24.4 inches, and hips, 34.4 inches. These dimensions correspond exactly with the out of town students dimensions. The local students preferences were: bust, 34.2 inches, waist, 25 inches, and hips, 33.4 inches.

Complexion

Complexion figures were again very similar. A medium complexion was preferred by 69% of the student body, with light 16.1%, and dark 14.9%. Except for the sophomore class, other classes had almost the same percentage figures. The sophomore class averages were: medium 52.4%, dark 28.6%, and light 19%.

Hair

One half of the persons answering this question preferred long hair and the other half short hair. While 86.3% of them preferred curly hair to straight hair. Again the class percentages were consistent with the overall averages. The big difference was that the town students preferred short hair by 61.6% over long hair.

Makeup

Light makeup was preferred in all cases. There was not a single person who answered the question with heavy makeup. Overall, light makeup lead with 60.9% and medium next with 39.1%.

Color Hair

The results for this question were quite decisive. Overall, brown hair was preferred by 54.5%, black hair by 22.0%, blond hair by 20.8%, and

REPORT

By Owen B. March, jr., c.e.

red hair 2.7%. Red hair had a percentage of 5.7 in the junior class, otherwise there was no mention of red hair. Blond and brown hair were tied in the senior class at 37.5% apiece. Other figures were quite the same as the overall averages.

Color of Eyes

In most instances these figures were very close. For an overall average, blue eyes were preferred 54.6% to 40% for brown eyes and 5.4% for green eyes. Blue eyes were very popular with the senior class, attaining 77.8%. The junior class preferred brown eyes by 50% to 46.9% for blue eyes. Local students indicated a 9.1% preference for green eyes and distant students only 4.8%.

PERSONAL CHARACTERISTICS

Conversation

Results show that the ideal girl should be a conversationalist. Overall, 75.8% indicated this as a requirement. Out of town students voted this at 81% and local students 46.1%. The classes had results of 90.8%, 80.5%, 70.0%, 65.0%, respectively.

Observations

It is also shown that this girl should have a moderate amount of observation. Moderate observation was preferred by 71.9%, critical observation 13.5%, and liberal observation 14.6%.

Important Qualities

For the overall, most important qualities were friendly 44.6% and witty 20.6%. Figures for Terre Haute students varied. They preferred friendly by 52.9% and socially-active replaced witty with a reading of 18.5%, witty was third with 14.8%.

DATING CHARACTERISTICS

Punctuality

Punctuality was preferred by 71% of the men polled, while 27.7% indicated that this characteristic was ac-

ceptable. This nearly corresponds with class figures.

Gambling

This characteristic was prohibitive in most instances. The junior class thought gambling was acceptable by 56.8% and prohibitive by 43.2%. Overall figures were 60% prohibitive and 38.9% acceptable and 1.1% preferred.

Drinking

Averages on this question followed pretty consistent lines. For the overall, drinking was acceptable by 55.5%, prohibitive for 34.5% and preferred for 10%.

Smoking

In all instances smoking was found to be acceptable, prohibitive and preferred, in that order. Overall, smoking was acceptable by 69%, prohibitive 27.7% and preferred 3.3%.

Singing

The percentages varied considerably for this question, but in all cases the resulting order was acceptable, preferred, prohibitive. Overall average was 71% acceptable, 27.8% preferred, and 1.2% prohibitive.

Dancing

Aside from the local students, figures were very consistent. The town students indicated a 50-50 choice between preferred and acceptable. Otherwise the overall average was 71% preferred, 29.8% acceptable and 1.1% prohibitive. These overall results were indicative of class averages.

Sports

In all instances the students thought it acceptable if this hypothetical girl was an athlete. The overall average was 65.7% acceptable, 23.2% preferred and 11.1% prohibitive. As for the girl being a sport spectator, there were a considerable deviation of values. The overall consensus was 66.1% preferred, 32.4%

acceptable and 1.5 prohibitive. These values were almost identical to those of the out of town students, while the Terre Haute students had 57.2% acceptable and 42.8% preferred. The sophomore class was split 50-50 between preferred and acceptable.

Necking

Necking was another big issue. Overall figures were that 66.7% preferred necking, 30% thought it acceptable and only 3.3% prohibitive. The sophomore class had the closest issue with 54.5% preferring necking, 41% acceptable and 4.5% prohibitive.

Petting

The question of petting was not settled too well through the results obtained. Overall, 46.6% thought petting acceptable, 45.5% preferred and 7.9% prohibitive. The out of town students had nearly the same results, and local students had 50% preferred, 42.9% acceptable and 7.1% prohibitive. Outstanding was the senior class with values of 72.6% acceptable and 27.4% preferred. In every case petting being prohibitive took last place.

Family Background

A number of fellows indicated that family background was important. Overall, 50.5% agreed that family background matters. Local students were only 35.7% in agreement with this, and out of town students 53.5%. Results of senior through freshmen classes were 50%, 56.8%, 42.9%, and 47.4%, respectively.

Religion

Religion seems to make quite a difference. Overall, 69.3% said that religion made a difference. The only great deviation on this question was from the local men who answered 50% in the affirmative.

(Concluded on Page 30)

Ferromagnetism

By Herb Smith, jr., e.e.

What is there about iron and other ferromagnetic metals that enables them to be made into magnets? This perplexing question has been the subject of much research by physicists and engineers, particularly in the last half century or so. Some of the theories that have been advanced and the modifications of these theories that have led to the present concept of ferromagnetism are discussed in this article.

It is a commonly known fact that an electric current is always accompanied by a magnetic field. This current is always thought of as being a flow of electrons along a wire path. It would be equally correct to consider an electron circulating in an atomic orbit as a current, and this current would have an accompanying magnetic field.

The theory was put forth by Ewing, about fifty years ago; that every atom acted as an independent magnet because of their circulating electrons, and that an externally applied magnetic field would bring the atomic magnets in a ferromagnetic substance into alignment, at first slowly since they must be dislodged from their initial position, then rapidly, and then slowly again when most of the atomic magnets were aligned. This theory explained the shape of the magnetization curve of iron quite well. Ewing set up a model of the crystalline structure of iron containing many small unaligned magnets and found that, even on this large scale, the magnets lined up

with an external field much as his theory predicted. On the basis of these experiments he derived expressions for magnetic behavior which were dependent upon the size of the magnets and the spacing between them. When the size of iron atoms and the spacing between them was discovered, the theory was found not to apply to magnets of atomic size, and Ewing himself admitted its inadequacy.

Later work by Weiss predicted the existence of a molecular magnetic field. The strength of this field was a function of temperature, being a maximum at absolute zero and zero at or above a certain critical temperature. It is known that above a certain temperature the crystalline structure of iron changes and it loses its ferromagnetic properties. The curve of magnetic saturation as a function temperature was derived in the form of a hyperbolic tangent. This would predict that at room temperature any piece of iron would possess a high degree of magnetization, which experience indicated was not the actual state of affairs.

Further investigation indicated that iron could be considered to be composed of small elementary magnetic units, called domains, which followed the relation predicted by Weiss. In a piece of unmagnetized iron these domains are arranged in no particular fashion, and, hence, their magnetic fields tend to cancel each other. As an external field is applied, these domains behave like

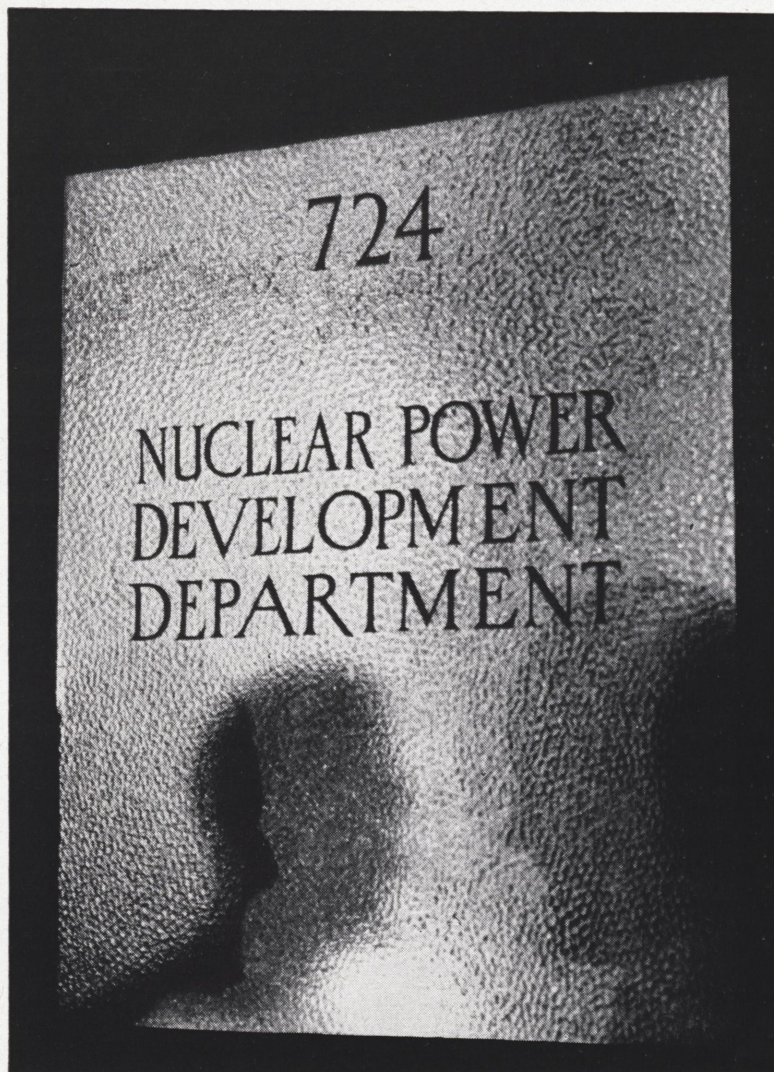
the atomic magnets proposed by Ewing, bringing themselves into alignment. The magnetic effect of domain appears to be due to the fact that the outer orbits of electrons in the atoms making up the domain are "locked" in a position which forces them to rotate in the same direction, thus behaving like a current-carrying coil of wire.

The explanation for the shape of the magnetization curve when using the domain theory is much the same as case when the individual atoms were considered as independent magnets. When the magnitude of the external field is low some of the domains that are not oriented with the field "crumble" and the fragments add to and aid the initially oriented domains. As the excitation increases, whole domains or groups of domains are jerked into orientation, giving a rapid increase in magnetization inside the iron. At higher values of excitation most of the domains will be aligned with the exciting field and an increase in excitation will cause any remaining unoriented domains to rotate slowly into position, with a slow increase in magnetization. The magnetization curve would not actually be a smooth curve, but would go in steps as domains are pulled into position slowly.

Each crystal of iron contains approximately 10^5 domains. A cubic centimeter of iron contains about 10^9 domains, which means that if a domain were cubic in shape it would be about 0.001 cm on a side. Ω

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they can and will be improved by young engineers like you. There are ever new problems in our complicated distribution system needing to be solved. You will have our new a.c. network analyzer and the most up-to-date equipment available, to aid you in this work.

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HAZING

As surveyed by Richard Allinder, jr., e.e.

The student body is in favor of the present hazing activities with a few modifications. While the more boisterous forms of hazing are less desirable than wearing green caps, one-half of the freshmen interviewed were in favor of brawling. The upperclassmen were also in favor of occasional brawls by a two-thirds majority. Laking was accepted as fair sport by at least 60% of the students questioned. An almost unanimous desire to wear greencaps was expressed by the freshmen and the opinion of the upperclassmen was similarly directed by the same margin.

Only about one-fifteenth of the student body has not participated in hazing activities. The remainder have participated in varying degrees and have suggested that the character building qualities of the hazing routine greatly overshadow any bad aspects of hazing. Although fifty-nine percent of those questioned have stated that accidents or injuries incurred in hazing activities would reflect unfavorably on the school, it has been suggested that, with the aid of referees or supervisors at the brawls and laking parties, injuries could be eliminated almost entirely.

If hazing were to be outlawed at Rose, the most popular suggested substitute was increased emphasis on intra-mural sports such as basketball, football, pushball, etc. More appropriate, however, was the suggestion by several students that a definite period be set aside for hazing. The proposed time interval was from matriculation to homecoming, after which the freshmen could remove their greencaps.

Forced freshman attendance at school functions was backed by seventy percent of the students, but the point was brought up several times

that the upperclassmen should set a good example by attending themselves, thus eliminating the need for forced attendance. School spirit is emphasized by almost all those in favor of hazing, but unfortunately the upperclassmen haven't lived up to that spirit standard.

In regard to the faculty, 63.5% of the students interviewed believed that a reserved attitude was in evidence. About 9.0% didn't know the faculty's attitude. It is accepted, however, that for the record, the faculty must adopt such a stand, regardless of their personal views.

Perhaps, in the future, the Student Council and the faculty can come to a suitable agreement whereby hazing can be regulated and still not be snuffed out.

INTRODUCTION

In the past few weeks, much has been said, pro and con, about the hazing question. In an effort to clarify the views of the student body regarding this important question, a survey by the questionnaire method was instituted. By stating the opinions of the students, and by accepting their suggestions for consideration, a positive stand on the question of hazing can be made. This stand can be the basis for a workable agreement to the mutual satisfaction and welfare of all those concerned. It is with this idea in mind, that the following report is made.

DISCUSSION

Question: "Do you participate, or have you participated in any form of hazing?"

Response:	No		
	Yes	No	Comment
Freshmen	87.0%	13.0%	—
Sophomores	92.3%	5.1%	2.6%
Juniors	97.2%	2.8%	—
Seniors	100.0%	—	—
Student Body	92.6%	6.8%	0.6%

Question: "Are your parents acquainted with hazing activities at Rose?"

Response:	No		
	Yes	No	Comment
Freshmen	75.9%	24.1%	—
Sophomores	87.2%	10.3%	2.5%
Juniors	91.7%	8.3%	—
Seniors	94.7%	5.3%	—
Student Body	85.1%	7.0%	7.9%

Question: "Do you think hazing activities tend to lower your grades in any way?"

Response:	No		
	Yes	No	Comment
Freshmen	24.1%	66.6%	9.3%
Sophomores	2.6%	92.3%	5.1%
Juniors	8.3%	91.7%	—
Seniors	5.3%	94.7%	—
Student Body	12.2%	83.2%	4.6%

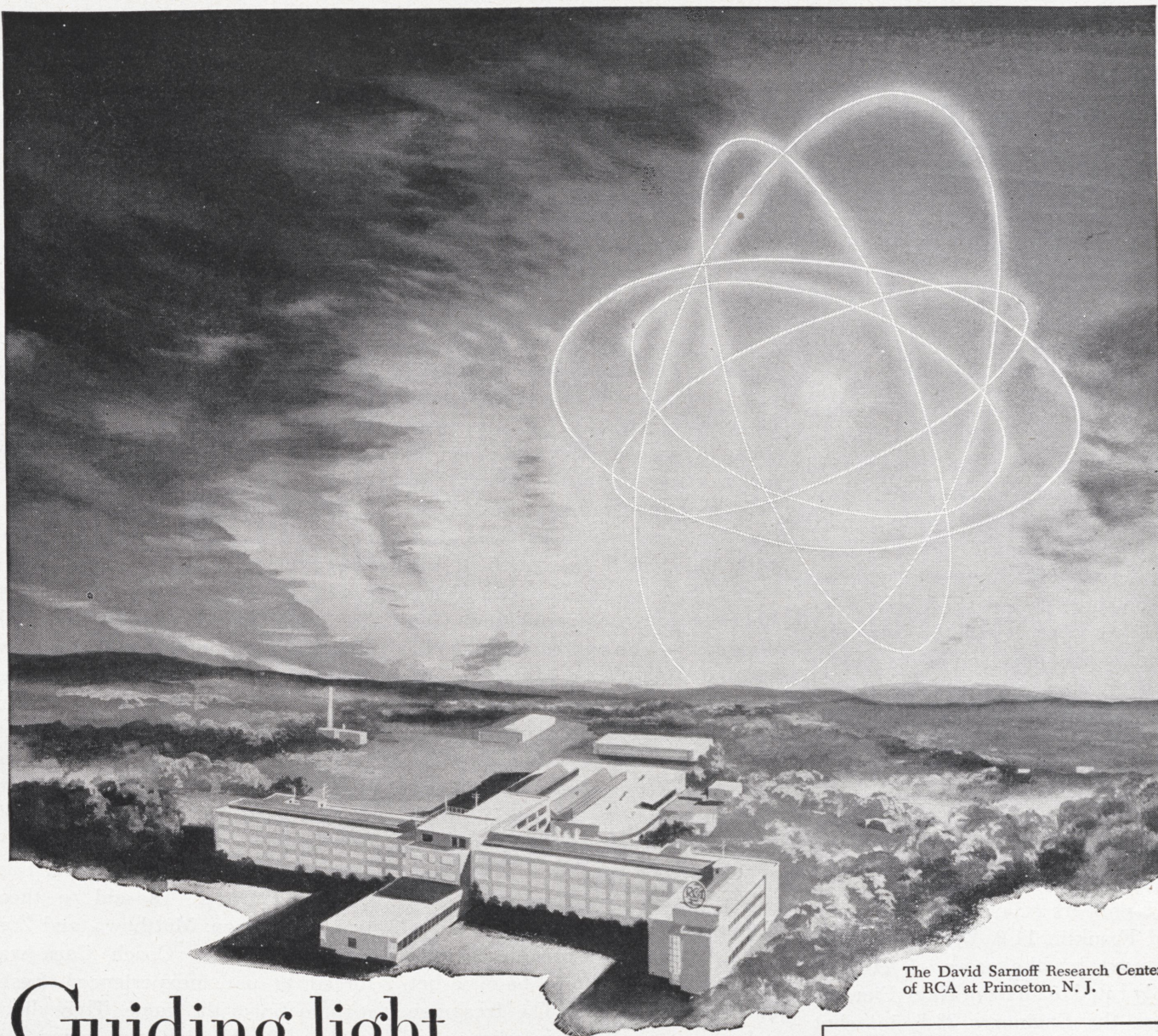
By far the most prevalent comment on this question was that hazing activities do not take place during study hours. For the most part, the time used for hazing would be wasted for lack of something to do. Objectionable features as far as grades are concerned, were road hikes at night when most studying is done, and noon-hour hazing that results in students being late for their first afternoon class.

Question: "Do you think hazing activities tend to build school spirit and/or interest in the school?"

Response:	No		
	Yes	No	Comment
Freshmen	72.2%	24.1%	3.7%
Sophomores	97.4%	2.6%	—
Juniors	97.4%	2.8%	—
Seniors	94.7%	5.3%	—
Student Body	87.9%	10.8%	1.3%

Question: "Should Freshmen be required to attend athletic contests and convocations in force?"

(Concluded on Page 38)



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Campus Survey

By Jack Farell, sr., ch.e.; Jack Freely, sr., c.e.; and Herbert Smith, jr., e.e.

1953 FOOTBALL SEASON

A winning season—the best since the days of famous Eddie McGovern—was the claim of the 1953 football squad and their coach, Phil Brown.

The season started with a hard fought game against Earlham College, only to have the Engineers wind up on the short end of a 7-6 score. The following week found the Engineers invading the homeland of the Taylor Trojans. They returned home from that encounter still thirsting for the taste of victory. Victory, however, was not far away, as Polymen, in the first conference game, defeated Shurtluff 13-6.

The Homecoming game was played before a full house of spectators, and the Engineers rolled over traditional rival Franklin 14-0. Eureka fell victim next by the score of 21-6. A highly rated team from Navy Pier fell before the Engineers 28-7, in what was the last home game of the season.

In order to win the Prairie Conference crown for the first year, the Engineers had to defeat the ominous Principia team. The triumph of this final action is well summed up in the score, 26-13, the Polymen definitely not on the short end this time.

The season was successful beyond a doubt. Rose scored a total of 108 points as compared to 71 for its opponents. The team ended the season with a record of 5 wins and 2 losses. The first year of the newly formed Prairie Conference saw the Engineers walk off with the crown.

The most noticable point with regards to next season is the fact that only four men will graduate from this year's team. Joe Verdeyen, offensive and defensive tackle, who was voted this year's most valuable player; co-

captains Bob Rader and Irv Ulbrich, and point after touchdown specialist, Gene Sovereign will all be sorely missed next year. However, men like fullback and line backer Harry Samuels, and quarterbacks Bob Young and Jim Calabro will be back. Along with them, will be backfield men Harry Stutts, Al Merrell, Terrell Vanover, Jay Stevens, and Gene Stoker. The line will be held together with men like Owen March and Bill Scharpenberg at center, and Bob Mogle and Jim Tatoes and the ends, Ray Fischer, Harve Green, Don Calvert, Bill Payne, and Doyne Grandlund will again be the middle posts.

This year's team was a young one, comparatively speaking. They were put into shape by a great coach, Phil Brown.

A look into the future reveals that next year's team should be even better than this year's. The freshmen, sophomores, and juniors who played this year have had an opportunity to put a year's experience under their belts and will be accustomed to their co-players of the coming football season.

Hats off to Phil Brown and his fine squad! Everyone connected with Rose is looking forward to seeing you have another great season next year.

BASKETBALL

At the end of last years basketball season the list of returning lettermen was long, and it seemed as though Rose would have another fine season this year. When basketball season rolled around this year, the list of lettermen returning was a good bit smaller.

Returning are the following starters from last year: Dick Green, Don Snape, Joe Buscher, Jim Matthews,

and Harry Zorman. Other lettermen back are Dick Gordon, Hugh Davis, Don Fyfe. Also returning is Walt Johanningsmeir, a member of last year's squad.

These men give Rose a fine starting five and some reserve strength, but the necessary depth is not there. Thus, Coach Carr had to look to freshmen for this added strength. The frosh include: Bob Wertz, John Bloxsome, Jim Blair, John Bizal, Harold Brown, Bob Bright, John Frenz, and Dick Fisher.

The team started the season on the wrong foot Sat., Dec. 5, by losing to Concordia of Fort Wayne, 68 to 60. In this game Rose was without the services of both their big men, Buscher and Davis. To add to these troubles, Green, Matthews, and Zorman fouled out. Coach Carr was forced to use inexperienced freshmen to finish the game. They did a very creditable job, but came out short.

When the team returns to full strength, they should be able to look forward to a very good season. Good support by the students would certainly help a lot.

AN ODE TO ALL ROSE MEN

Breathes there a man, around this school—

Sufficiently restrained, and cool—

Enough to limit his demands, and say goodnight just holding hands.

Who has the decency to wait,

Until at least a second date,

Before expecting osculation, at least an hour in duration.

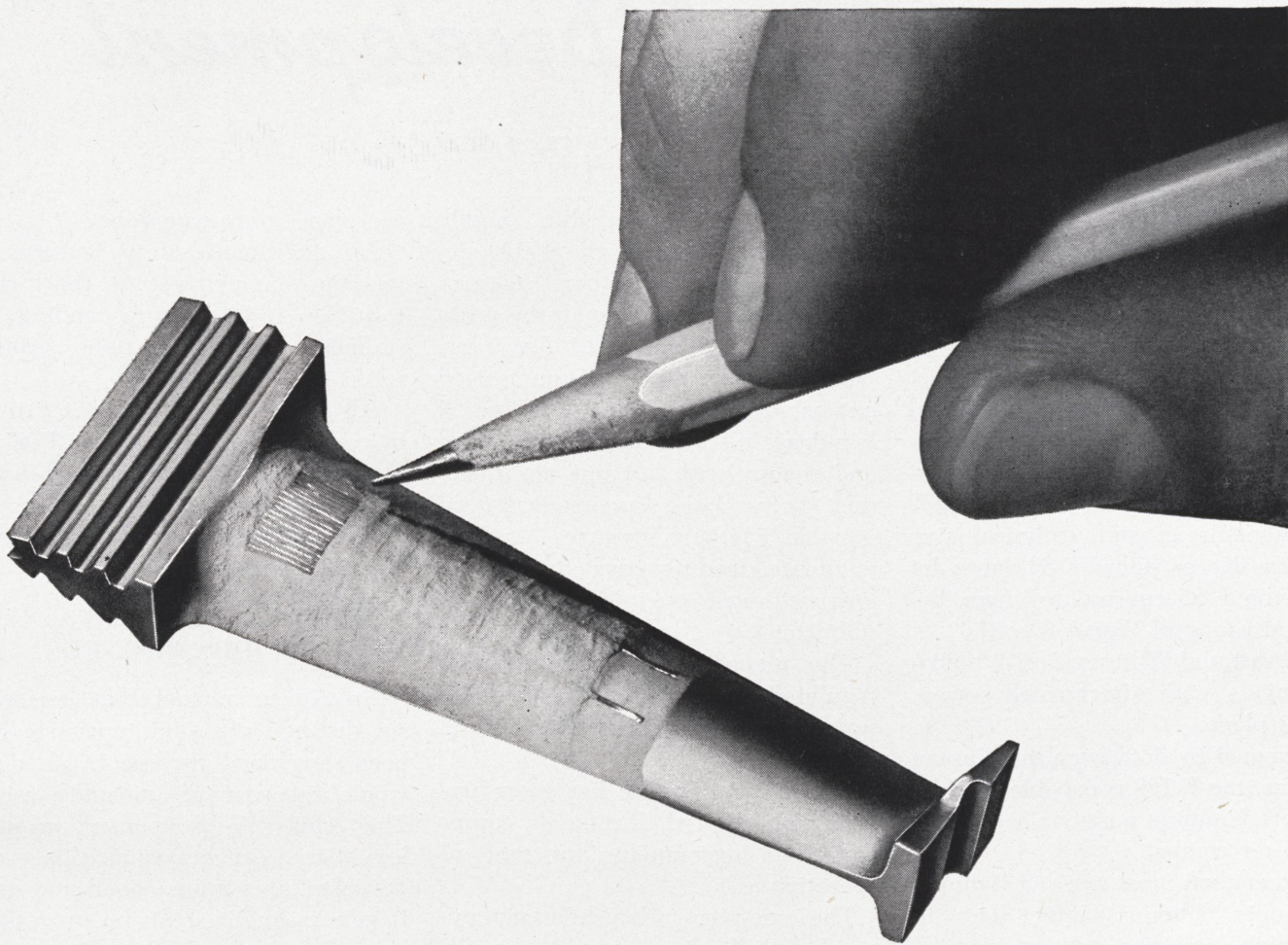
If such there be,

Go mark him well,

I'll date the guy, and make him tell

Me what the hell he had for supper,

That makes him so damn sick!!!



important wire on a hot subject . . .

Even at temperatures of 1500° — speeds of 12,000 rpm — this tiny wire grid reports to our engineers on the strains in jet turbine blades. It gives them accurate measurements for calculating stresses caused by resonance and flutter.

This basic information, in turn, permits the design of blades that combine the optimum aerodynamic characteristics with structural integrity.

Strain gages are not new. But our engineers had to advance the art considerably to get readings

at these high speeds and temperatures. It required the development of improved cements, instrumentation, slip rings . . . new application techniques and calibration curves.

Nothing can be left to chance in the design of aircraft engines for supersonic flight. Thus we use — and frequently improve on — every advanced technique and engineering tool. This straight-forward approach to engineering problems is one of the reasons many outstanding engineering graduates decide on a career at Pratt & Whitney Aircraft.

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Research and Development

Edited by John Sawyers, sr., m.e.

SUPER SABRE

The number one production model of the F-100 Super Sabre, the USAF's first operational jet fighter to exceed the speed of sound in level flight, came off the assembly line at North American Aviation's Los Angeles plant Oct. 20th.

Incorporating a razor thin, 45 degree swept wing and tail the F-100 represents a greater technical step over the Korea-famed F-86 Sabre Jet than the F-86 represented over the F-51 Mustang of World War II.

A Pratt and Whitney J-57-7 turbo-jet engine with afterburner powers the airplane.

Designed by data from the Korean air war, the F-100 is capable of close support bombing missions as well as air to air combat.

Larger than most existing fighters, the Super Sabre is 45 feet long, 14 feet high, and has a wing span of 36 feet. The supersonic fighter has a service ceiling above 50,000 feet and a combat radius of more than 500 nautical miles.

In addition to its thin, highly swept wing and tail, the F-100 design incorporates other features which reflect an answer to the problems of supersonic flight. The new, heat-resisting metal, titanium, is used extensively throughout the plane. A low-drag, ultra-streamlined fuselage and canopy with but one air intake duct helps make supersonic speed possible. Other features include automatic leading edge slats and a low-positioned one-piece horizontal stabilizer.

The plane has an automatically regulated air conditioning and pressurizing system and automatic fuel system.

Particular attention has been given to placement of all controls, equipment and instruments for ease of operation.

The one-piece clamshell canopy, besides affording excellent all-around visibility, has been designed for maximum safety and pressurization. A redesigned ejection seat makes it easier for pilots to leave

the plane in an emergency.

An additional safety feature for landings on icy, wet or short runways is a drag chute landing installation which shortens ground roll.

All serviceability features proven in combat operation of the F-86 in Korea have been incorporated in the F-100. In addition, ground crews will have easier access to radio, radar and electrical equipment.

TINY ALNICO MAGNET DOES SIX JOBS AT ONCE

An Alnico magnet that performs six distinct jobs simultaneously has been developed for use in an electronic recorder of unusual design. The Alnico V permanent magnet, less than 1/4-inches square, is made of nickel, aluminum, cobalt and iron. It gets magnetized in the process of being heat-treated.

When attached to the pen arm of the Multi-Record Dynalog Recorder, the tiny Alnico V permanent magnet provides for precise and dependable measurements of temperature, pressure, humidity and other variables all at once.

Its function is to pick off, either at once or in sequence, six differently colored pens so that each pen will be inked by its own pad and no other. It is shaped to hold the pen points in precise position while the dot is penned on the chart. A full day's or week's record of up to six measurements can be completed on one circular chart.

In operation it does the work of six instruments but uses only one chart and one pen arm for recording all of them. An electric signal causes the pen arm magnet to pick up any or all of the six pen points and ink the chart according to the impulses received.

Applications in industry are nu-

(Continued on Page 22)



North American F-100 Super Sabre



THIS NEW FLASH POINT TESTING MACHINE is so accurate that a sample with as little as 1/10 of 1% unsafe material in it will cause a rejection. Recently developed by Standard Oil's Engineering Research Department, this revolutionary device reduces the average time from 20 minutes for a flash test to two and a half minutes, avoids human errors in testing flash point, can be used right at the loading rack.

The flash point testing problem that was solved with the machine shown above is only one of the many problems presented to Standard Oil's new and growing Engineering Research Department.

In the last few years, it has developed and put into operation instruments to measure vapor pressure, 158° point, acidity and viscosity. Ultrasonic generators have been built for general use in providing energy for experimental purposes. The department is studying application of radioactive isotopes to instrumentation and control problems related to refinery operation.

One of our research divisions is carrying out an extensive theoretical study

of stresses in pressure vessels having flat, conical, hemispherical, toriconical or torispherical heads.

In our work on product evaluation, we have developed a new test for quenching oils based on the fundamental heat transfer relationships involved.

Problems such as these are the daily fare of Standard Oil's Engineering Research Department. Here is a challenging opportunity for young men with advanced training in chemistry and engineering. Many and varied problems continually arise in the design, construction and operation of petroleum industry equipment.

Standard Oil Company

910 South Michigan Avenue, Chicago 80, Illinois



merous: In open hearth furnaces, for example, the recorder measures the temperature of the checker chambers. In brewing, the instrument stands guard over the pasteurization process to assure the quality of the bottled brew. In power stations, compressors, generators, pumps and similar machinery are protected from overheating by the instrument.

New Burnishing Wheel

A two percent reduction in the unit cost of Micarta plastic helmet liners has resulted through the use of an improved burnishing wheel now being utilized in the Micarta Division of Westinghouse Electric Corporation.

The new wheel, which is one inch thick and 12 inches in diameter, is constructed of alternating layers of fibre glass cloth impregnated with a resin. It is a material similar to that used in the armed forces famed "shrap jackets" for stopping bullets and shell fragments.

This wheel has proven particularly successful in the finishing of blunt, irregularly contoured edges of army helmet liners. Over half a million of these liners were finished with

little or no attention to the burnishing wheels.

Grooves are cut in the thick edge of the wheel with a carbide-tipped tool and it is in these grooves that the actual grinding operation is done.

The abrasive action is due to a combination of the glass and high speed. The fact that end, edge, and cut fibres are intermittently coming in contact with the work gives a combination action of prompt removal of flash and polishing in one operation.

Ultra-Sonic

Burglar Alarm

A revolutionary new burglar alarm that capitalizes on the use of inaudible sound, traps intruders by their motion anywhere in a room or similar enclosed area.

Operating on the principle of magnetostrictive vibrations, the supersensitive burglar alarm reports any disturbance of the ultra-sonic waves transmitted within an enclosed area.

The Alertronic system appears to be a simple device. Mounted on a wall, it looks like half a coffee can painted grey. From within the "can", which is really a diaphragm, ultra-sonic waves are generated. A similar "can" on an opposite wall receives the waves. Any motion that

disturbs the waves causes the receiving "can" to transform the sound into electricity, feed it into an amplifier and then sound the alarm.

The sensitivity of the system is controlled just as you would the volume of your radio. It is usually set to detect a body as small as a child's, but can be tuned to such high sensitivity that a deep breath, a wink of an eye, or wiggling finger will start it.

This sensitivity extends to the masses of air set in motion by fire. According to Mr. Samuel Bagno, the inventor, the alarm can be set off simply by igniting a wad of newspaper.

Ultra-sonic vibrations are generated from four nickel rods, thin as wooden matches and twice as long. The rods are riveted to the bottom of the "can" and wound with copper wire to set up a magnetic field. As the rods shrink and relax, 19,200 times per second, they vibrate the "can" or diaphragm which sends out waves into the surrounding area. 19,200 cycles is beyond the hearing range but not so high that the air would absorb the waves.

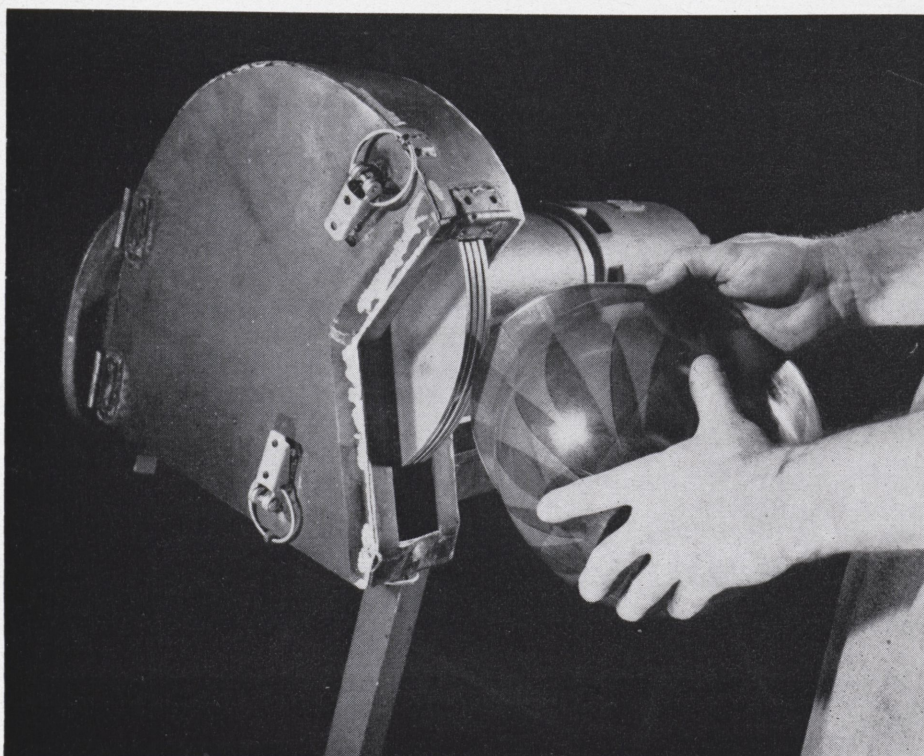
The system not only detects burglars and fire but it has been found to kill mice and temporarily drive rats away. In a test by a Houston, Texas, school, six white mice caged near one of these devices were found dead in 30 minutes. In plants, mice were found with their skulls crushed, indicating they raced around in a frenzy until they hit something and died.

The Alertronic alarm system has received the approval of The Underwriters' Laboratories, who set standards for detection. Insurance underwriters allow up to 60 per cent discount on premiums where this system is used under strict conditions and in conjunction with a central station alarm system.

New Explosion-Proof Fluorescent Lighting Fixture

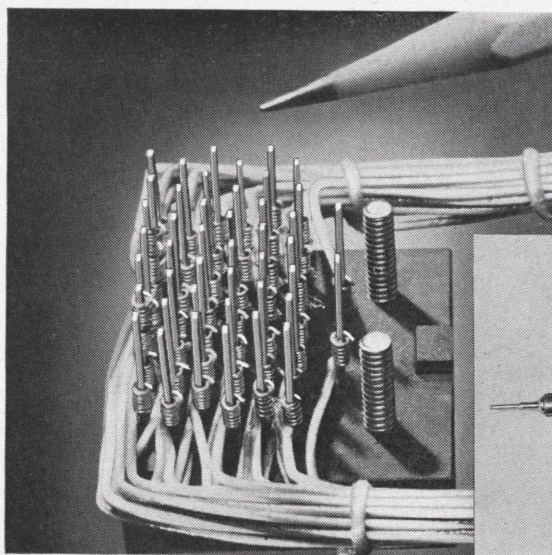
A new type explosion-proof and dust tight fluorescent lighting fixture is for use wherever the presence of explosive gases or vapors or com-

(Continued on Page 32)

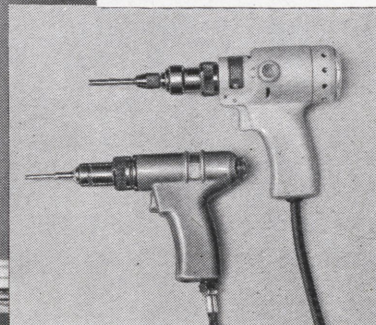


A whiz of a wheel

Good Connections ...electrically speaking



New solderless method permits the making of very closely spaced connections, as shown on this experimental terminal block.



Electrically powered "wire wrap" tool (above) and compressed air tool (below) for making wrapped solderless connections.

GOOD CONNECTIONS are mighty important to us for, you see, we make more than a billion electrical connections each year. It takes that many to manufacture and install complex telephone equipment in the Bell System.

That's why the revolutionary new method of making electrical connections *without solder*—a method created by Western Electric engineers together with their teammates at Bell Telephone Laboratories—is indeed one of the significant engineering achievements of recent years.

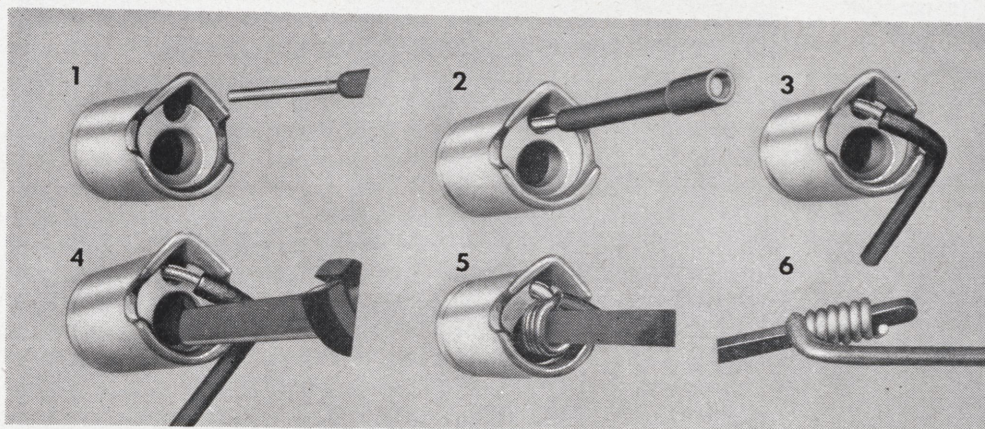
Like most really creative engineering jobs, the development of a tool to make solderless connections grew out of a problem. We had to find a way to connect our newly designed wire spring relay to other components in giant bays of switching equipment. This new relay—something of an engineering achievement itself—can have as many as 36 terminals in an area only 1-3/8" by 11/16". Obviously, the conventional method of hand-wrapping and soldering wires onto the terminals is extremely difficult in such a small area.

After more than five years of research and experimentation, the engineers came up with a pistol-like power tool

capable of making mechanically sound solderless connections. Shown above are two tools now used at Western Electric manufacturing locations. They literally shoot wire onto terminals . . . and do it surer, faster and less expensively than conventional methods using solder. That's not all. The new "wire wrap" tool keeps equipment free from solder splashes, wire clippings and reduces bent and distorted terminals. Electrically, the "wire wrap" tool gives a far better connection than can be made manually . . . the high pressure contacts are stronger, cleaner, more compact and more uniform.

In keeping with the Bell System policy of sharing technical know-how with all of industry, Western Electric will make this tool commercially available to electrical manufacturing companies, such as radio, television and communications producers, through licensed tool manufacturers.

You're right if you think we're more than a little pleased with our accomplishment. And as we have been many times before, we're proud of the engineers in all fields—electronics, mechanical, electrical, metallurgical, chemical, industrial—who uphold our reputation for leadership in fundamental manufacturing techniques.



How a solderless connection is made: (1) Skinned wire approaches the small flared opening in the tool tip. (2) Wire is inserted in hole. (3) Wire is bent and anchored by means of notch in side of gun tip. (4) Gun tip is slipped over rectangular wire terminal. (5) Spindle of gun tip rotates to wrap wire around terminal. (6) Six wire wraps around terminal complete electrically sound joint without soldering.

Western Electric



A UNIT OF THE BELL SYSTEM SINCE 1882

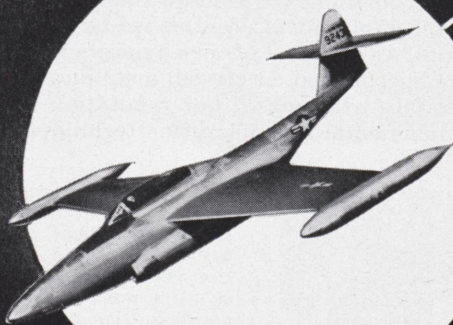
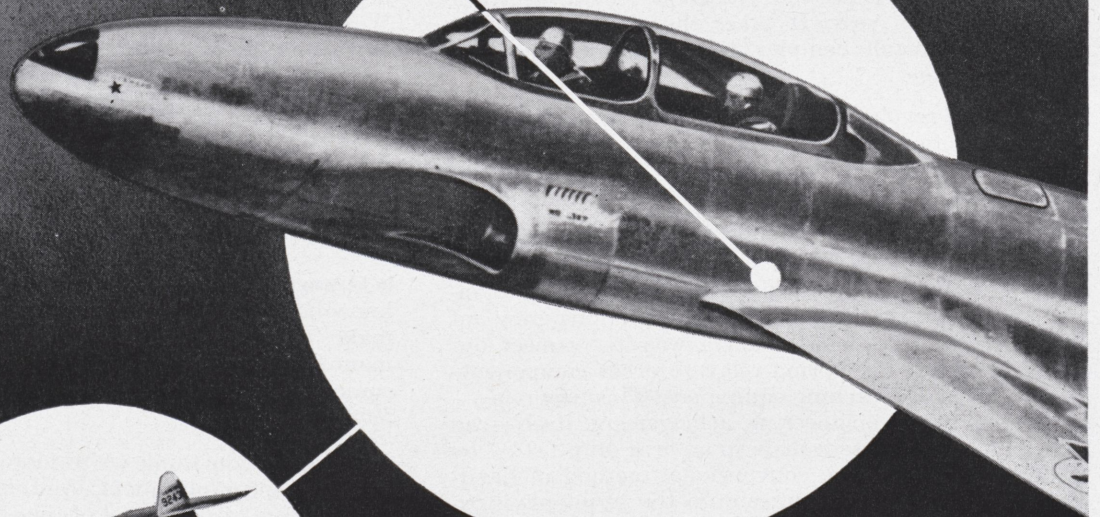
Manufacturing plants in Chicago, Ill. • Kearny, N. J. • Baltimore, Md. • Indianapolis, Ind. • Allentown, Pa. • Winston-Salem, N. C. Buffalo, N. Y. • Haverhill, Mass. • Lawrence, Mass. • Lincoln, Neb. • St. Paul, Minn. • Duluth, Minn. Distributing Centers in 29 cities and Installation headquarters in 15 cities. Company headquarters, 195 Broadway, New York City.

Twigg

— keynote to dependability

... coordinating the skills of the

fabricating experts with the ever-increasing demand for faster delivery



Twigg means precision and skill in the fabrication of components and assemblies for jet aircraft: combustion chambers • transition liners • turbine casings • tail cones • burner supports • brackets • all type spinings • tube bending • other essential components.

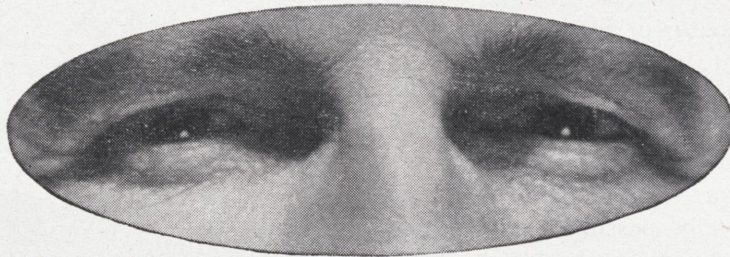


TWIGG INDUSTRIES INC

BRAZIL • INDIANA



WHAT GOOD WOULD YOU EXPECT



STEEL MEN TO SEE



IN PLASTIC PIPE ?

● Is it reasonable for men who make steel to recognize that plastic pipe can do things steel cannot?

Certainly they're quick to see steel do many things plastics can't.

Republic Steel produces plastic pipe. But Republic also lists among its products titanium sheet, aluminum windows and powdered iron. Each has qualities that outdo steel on some jobs.

Republic Steel Corporation is not only iron ore mines and blast furnaces. It is men earning a living by providing other men materials for them to use in earning their livings. It is men providing pipe where pipe is needed—seamless steel pipe; welded steel pipe (three

types), and plastic pipe. Republic Steel's production of plastic pipe augments Republic's 3-STEP SERVICE FOR STEEL USERS:

1. to make more and better kinds of steel than any one else:
2. so that we can recommend the precisely exact steel for your job:
3. then to share with you our unexcelled knowledge of how to fabricate steel in order that you can get the best results for your product.

We see steel as the world's most versatile material—but certainly not the be-all and end-all for every job. This realistic attitude toward our main product is one reason why you can depend upon our recommendations.

REPUBLIC STEEL

GENERAL OFFICES • CLEVELAND 1, OHIO



WORLD'S WIDEST RANGE
OF STEELS
AND STEEL PRODUCTS

Library Notes

By Carson W. Bennett and Nina J. Mahaffey

INTO THE BLUE!

In 1926, on a beautiful moon-clear night, a young pilot of the airmail route between St. Louis and Chicago conceived the ambition to fly a plane nonstop from one hemisphere to another, bridging the waste of water that separates continent from continent. This dream, the tiny seed of incalculable things to come, would not be denied. But how to fulfill it? Could a plane capable of carrying sufficient fuel for such a flight be bought? Would it be possible to get the necessary financial backing? Would business-men believe in so seemingly foolhardy a project? The months that followed saw a very determined young man wrestling with these problems. On May 21, 1927, Charles A. Lindbergh took off from New York, and, after thirty-three hours alone in the cockpit of his single-motored plane, the *Spirit of St. Louis*, hurtling through canyons of cloud and storm over 3,600 miles of Atlantic, landed on Le Bourget Aerodrome, Paris, thereby completing the first non-stop flight between the continents of America and Europe. The dream conceived on that moon-clear night had found fulfillment. This is Lindbergh's own narrative of the planning and the execution of the first nonstop airplane passage between the continents of America and Europe, concluding with an hour-by-hour account of that momentous, desperate, triumphant first flight over trackless water. Read *The Spirit of St. Louis*.

SAILING! SAILING!

After seeing and hearing Alan Villiers' thrilling account of *The Quest of the Schooner Argus* we just naturally have to mention some of our newer adventure tales. If you enjoyed the program as much as we did, you will want to look at the books by Mr. Villiers that we have in the library. Besides *Quest of the Schooner Argus*, we also have *The Set of the Sails*, autobiography of a Cape Horn sea-



British clipper ship "Lightning"

man, and *Monsoon Seas*, the story of the Indian Ocean.

MOON AHEAD!

Someday soon—a few years hence, as many engineers reckon—huge rocket ships may pierce the last veil of atmosphere and carry their human load into the vast void of space. Many authorities believe that this development is inevitable. They point to the modern rocket airplane, hoping that its fierce power of propulsion will soon carry it into space. No matter whether we share this hope or not, we cannot afford to ignore it. The nation that first assembles a station in space, an ever-circling satellite from which the whole earth can be surveyed and threatened, will be in control of this planet. Similar to the atomic monopoly a few years back, the exclusive control of space all around the earth may well spell the difference between war and peace.

The most optimistic rocket designers have left unanswered only the slightest engineering details of space-going rocket ships. Yet there arises the big question: Will not, where the Machine may succeed, man himself fail? Will he be able to survive the journey beyond the sheltering atmosphere and live to fulfill his mission in space?

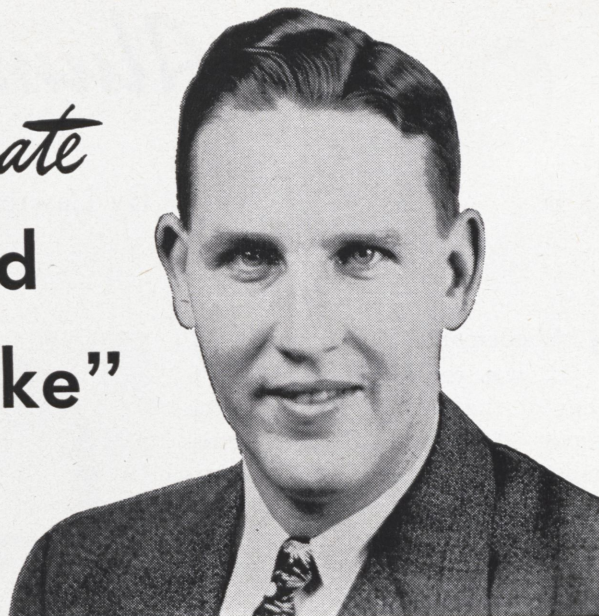
Man In Space is a fascinating story, in which medicine and astronomy, physics and psychology, are pooled to portray man's environment in space, to show how he will react and how he may be protected in this domain of alien laws. It clears away popular misconceptions concerning space flight and substitutes the equally—if not more—entertaining facts, giving our imagination a real foothold on space. Finally, in a realistic and critical analysis, the author shows how the short comings of man's earth-conditioned frame and mind will eventually determine the ultimate limits of the "space frontier."

Then there is *The Silent World*, by J. Y. Costeau and Frederic Dumas. First to use the aqualung, they have been able to dive, nearly naked, into pressures that have crushed submarines, in depths ranging to 306 feet, Dumas's world record.

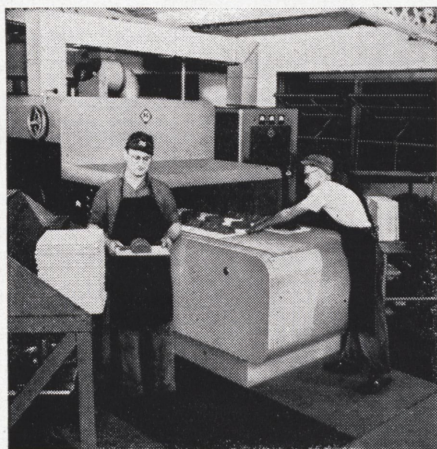
In this fascinating report Costeau and Dumas tell what it is like to be a "manfish" swimming in the deep twilight zone with sharks, mantas, whales and octopi. They tell of exploring sunken ships, some torpedoed in World War II, and one that sank in 80 B.C., and of the treasures they brought up. They describe ventures into undersea grottoes and an inland water cave that all but claimed their lives, and their crazy human-guinea-pig experiment with under-water explosions. Costeau writes brilliantly of his audacious 50-fathom dive into the zone of rapture, where divers become like drunken gods; and of the 396-foot dive that took a brave companion's life. He writes of seeing blood flow green, of waltzing with an octopus and hitch-hiking on a tortoise, of his pioneering feats of undersea photography and submarine archaeology, of swimming into an octopus city and hunting giant fish with explosive harpoons. For the first time he tells the inside story of a fantastic depth dirigible that made a free descent of nearly a mile. □

"Allis-Chalmers Graduate Training Course Helped Me Find the Work I Like"

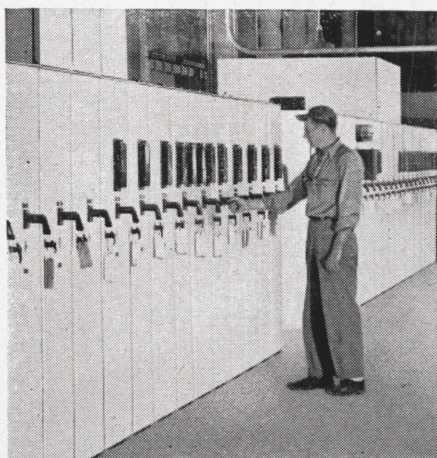
says **HUGH C. SELLS,**
Syracuse University, BS—1942
and now Manager, Knoxville District Office



"I guess I was like many graduating engineers. I didn't really know what I wanted to do. When the Allis-Chalmers representative visited the campus, and



ELECTRONICS—Modern way to dry sand cores is with Allis-Chalmers *Foundromatic* Sand Core dryer. Revolutionary new process dries cores in minutes instead of hours.



POWER—Neat, compact and safe switchgear installation is big improvement over open framework and knife switches in older installations.

described their Graduate Training Course, it sounded like the type of postgraduate training I really needed.

"What appealed to me then—and still does—is the broadness of the program. Here is a company filling a unique spot in industry. It makes important, specialized equipment for almost any industry you can name."

Wide Choice of Activity

"It's like a big department store for industry. But that isn't all! In addition, it offers a wide choice of activity within each of these many product groups . . . whether it be sales, design, research or production.

"After getting the broad look at indus-

try the program offers, my interest began centering on Service and Erection of large equipment. This led me into many departments of the company, and I learned about everything from steam turbines to sifters for flour mills."

Valuable Background

"The transition from service to sales was natural. The background of service and erection work proved very valuable.

"So you see, whether you think you know what you want to do or not, the Allis-Chalmers Graduate Training Course is so flexible, so broad in its scope, you have a real chance to find yourself. Best of all, you don't have to waste time doing it."

Facts You Should Know About the Allis-Chalmers Graduate Training Course

1. It's well established, having been started in 1904. A large percentage of the management group are graduates of the course.
2. The course offers a maximum of 24 months' training. Length and type of training is individually planned.
3. The graduate engineer may choose the kind of work he wants to do: design, engineering, research, production, sales, erection, service, etc.
4. He may choose the kind of power, processing, specialized equipment or industrial apparatus with which he will work, such as: steam or hydraulic, turbo-generators, circuit breakers, unit substations, transformers, motors, control pumps, kilns, coolers, rod and ball

mills, crushers, vibrating screens, rectifiers, induction and dielectric heaters, grain mills, sifters, etc.

5. He will have individual attention and guidance in working out his training program.

6. The program has as its objective the right job for the right man. As he gets experience in different training locations he can alter his course of training to match changing interests.

For information watch for the Allis-Chalmers representative visiting your campus, or call an Allis-Chalmers district office, or write Graduate Training Section, Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

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C-5677

Alumni News

By Lawrence Ogborn, sr., e.e.

'03 Wiedemann, H. Edmund, Ch.

E., was recently honored by a dinner at the Crystal Room of the Missouri Athletic Club, St. Louis, commemorating his fiftieth anniversary in professional work. Among the guests were a large per cent of the Rose Alumni in and around St. Louis. The testimonial honoring this distinguished alumnus was organized and carried out by the St. Louis chapter of Alpha Chi Sigma, professional chemistry fraternity of which Wiedemann is a past grand master alchemist or national president. During the course of the evening, numerous speakers praised the life and services of the "doctor of perpetual youth" as he was termed by Dr. Jules Bebie, St. Louis consultant and a native of Switzerland, who recounted many humorous details of his introduction to American life and customs at the hands of his good friend. Also present for the evening's events was Dr. Frank E. Wiedemann, ten years older than the honoree but still actively practicing medicine in Terre Haute, who recounted his brother's early history. The highlight of the evening was the presentation of gifts and a handsomely bound volume of testimonial letters to the guest of honor. Included were a scroll of honor from the Supreme Council of Alpha Chi Sigma and a copy of the *Hexagon*, national journal of the fraternity, for October, 1953, carrying an article on Wiedemann's career and his services to the profession and to the fraternity.

'27 Fairhurst, John A., E.E., is now working in the Electronics Countermeasures Branch, Radiation Laboratories of the Wright Air Development Center in Dayton, Ohio. Mr. Fairhurst was formerly Assistant Inspector of Naval Materials.



William J. Kestermeier

'29 Andrews, F. O., E.E., was recently promoted to the position of Cost Studies Engineer with the Illinois Bell Telephone Company. Mr. Andrews has spent the last five years as Studies Engineer with Illinois Bell.

'36 Shattuck, Robert was recently elected president of Marbon corporation, Gary subsidiary of Borg-Warner corporation. Shattuck graduated from Rose with a B.S. in Chemical Engineering in 1936.

'49 Hildebrand, Carl R., E.E., and wife announce the birth of their second child, a daughter, Jayne Louise, on November 5, 1953. Mr. Hildebrand is sales manager with P. R. Mallory Company, Inc. at Madison, Ohio.

'51 Kestermeier, William J., M.E., has joined the fuel metering engineering staff of the Bendix Products Division of the Bendix Aviation Corporation at South Bend, Indiana. Kestermeier will be participating in an engineering program which includes a technical staff of more than 6000 in all divi-

sions of Bendix. The program includes new developments in such fields as aviation electronics, guided missiles, aviation and automotive components, television and many others. He was formerly a 2nd Lt. in the U. S. Corps of Engineers.

'53 Hicklin, Gene C., E.E., recently completed infantry basic training at Fort Knox, Kentucky under the guidance of the Third Armored Division.

'53 R. Alan Klaus, B.S. in Chemical Engineering, Class of 1953, has accepted a position with the Proctor & Gamble Company. Mr. Klaus was a former editor of the *Rose Technic* and also winner of the Heminway medal of the class of '53. He is presently working at the Company's Ivorydale, Ohio, factory, which manufactures part of the \$850 million worth of synthetic detergents, soaps, glycerine, edible fats, cottonseed oil, and chemical cellulose.

Write Your Own Alumni News

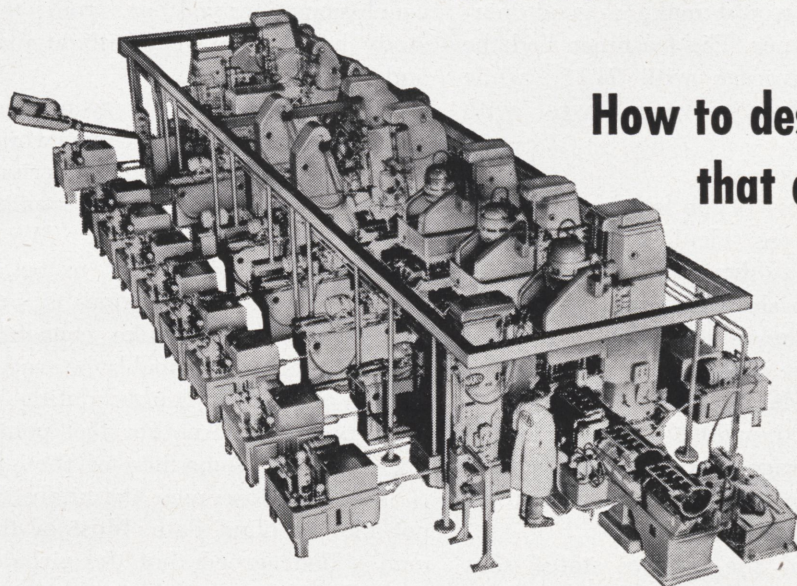
Your fellow alumni are interested in news about you. The *Technic* welcomes all contributions for this page by alumni.

Address all news to:

ALUMNI NEWS
ROSE TECHNIC

Another page for

YOUR BEARING NOTEBOOK

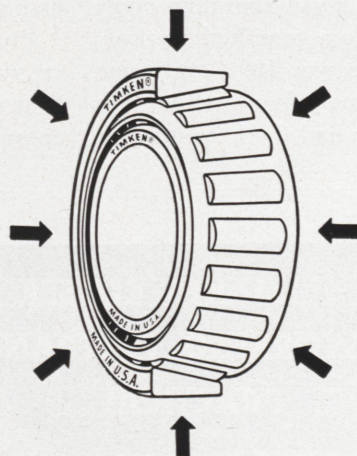


How to design precision into machine that does 98 operations a minute

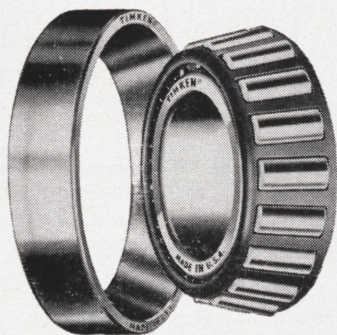
In designing a machine that performs 98 facing operations every 1.1 minutes, machine tool engineers had to be sure of extreme precision in spindle shafts. Spindles had to be held rigid to eliminate vibration and chatter. Engineers solved this problem by mounting all spindle shafts on Timken® tapered roller bearings.

How TIMKEN® bearings hold spindle rigid

The line contact between rollers and races of Timken bearings gives spindles wide, rigid support. Deflection is minimized and end-play eliminated because the tapered construction of Timken bearings enables them to take radial and thrust loads in any combination. Spindles are held rigid for long-lasting accuracy.



Want to learn more about bearings or job opportunities?



TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

Many of the engineering problems you'll face after graduation will involve bearing applications. For help in learning more about bearings, write for the 270-page General Information Manual on Timken bearings. And for information about the excellent job opportunities at the Timken Company, write for a copy of "This Is Timken". The Timken Roller Bearing Company, Canton 6, Ohio.



NOT JUST A BALL ○ NOT JUST A ROLLER □ THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL ⊙ AND THRUST —○— LOADS OR ANY COMBINATION ☼

MARCH REPORT

(Concluded from page 13)

Education

The seniors were 100% in agreement that education would matter. The junior and sophomore classes had slightly lower averages with 74.3% and 71.5%, respectively. The freshmen class went on record with 80%. The overall average was 79.5%.

Freshmen indicated that 53.8% preferred girls of high school level. All other classes, local students and out of town students preferred girls of college standing. Overall, college girls were preferred to high school girls by 67.6%.

Homemaker

A high percentage of the men stated that this ideal feminine companion should be a good homemaker. The senior class was 100% in favor of a good homemaker, while the sophomore class had the lowest aver-

age with 82%. Overall average was 89.7%.

Marriage Partner

Overall, 90.7% of the men thought this girl would make a good marriage partner. The freshmen had the highest average with 94.1% while the sophomores were lowest with 85.7%.

Comments

A number of the fellows wondered where these ideal girls could be found, and others wanted to be notified when she was found.

One fellow stated that he thought the results of this survey should be made public.

Others thought the report lacked full coverage. Also some thought that too much emphasis was given to physical features.

Some of the fellows stated that the girl they had described was their own girl.

Probably the cutest comment given was to this effect, "I'm not going to get married until my kids are old enough to support me."

CONCLUSIONS

A report of this type involves factors that are somewhat beyond the realm of accessibility. The facts and conclusions arrived at from this study have given very enlightening and revealing facts.

First, Rose men are very particular as to the type of girls they would prefer to date. This can be arrived at from the results of the personality part of the questionnaire. While family background seems to be of minor importance, religion is just the opposite. They like congenial girls and this can probably be traced to the fact that double dating is often preferred. Another fact pointing along the same line of thought is that the Rose men definitely do not like to blind date. Most of the men polled agreed that the girl described in the questionnaire was well suited for their marriage partner. This all indicates that the final results of the poll are the characteristics that Rose men are interested in when selecting a mate. Ω



**MAKES CLOSER
WORKING TOLERANCES
PRACTICAL**

**NEW No. 955
Electronic
Caliper**

Here's another new aid to precision production from Brown & Sharpe — enables you to specify closer tolerances and know they're practical. This new No. 955 Electronic Caliper permits production gaging in units from .0001" to .00001", often without removing work from machine or fixture . . . or without lifting work from the bench. Readings are taken on the No. 950 Electronic Amplifier. Four interchangeable jaws provide a measuring range from 0" to 4" . . . only one master needed for each setting. Aligning attachment also available to facilitate measuring long work pieces. Write for the new illustrated Bulletin. Brown & Sharpe Mfg. Co., Providence 1, Rhode Island, U. S. A.

Brown & Sharpe 



**One for every place—
One place to get them all . . .**

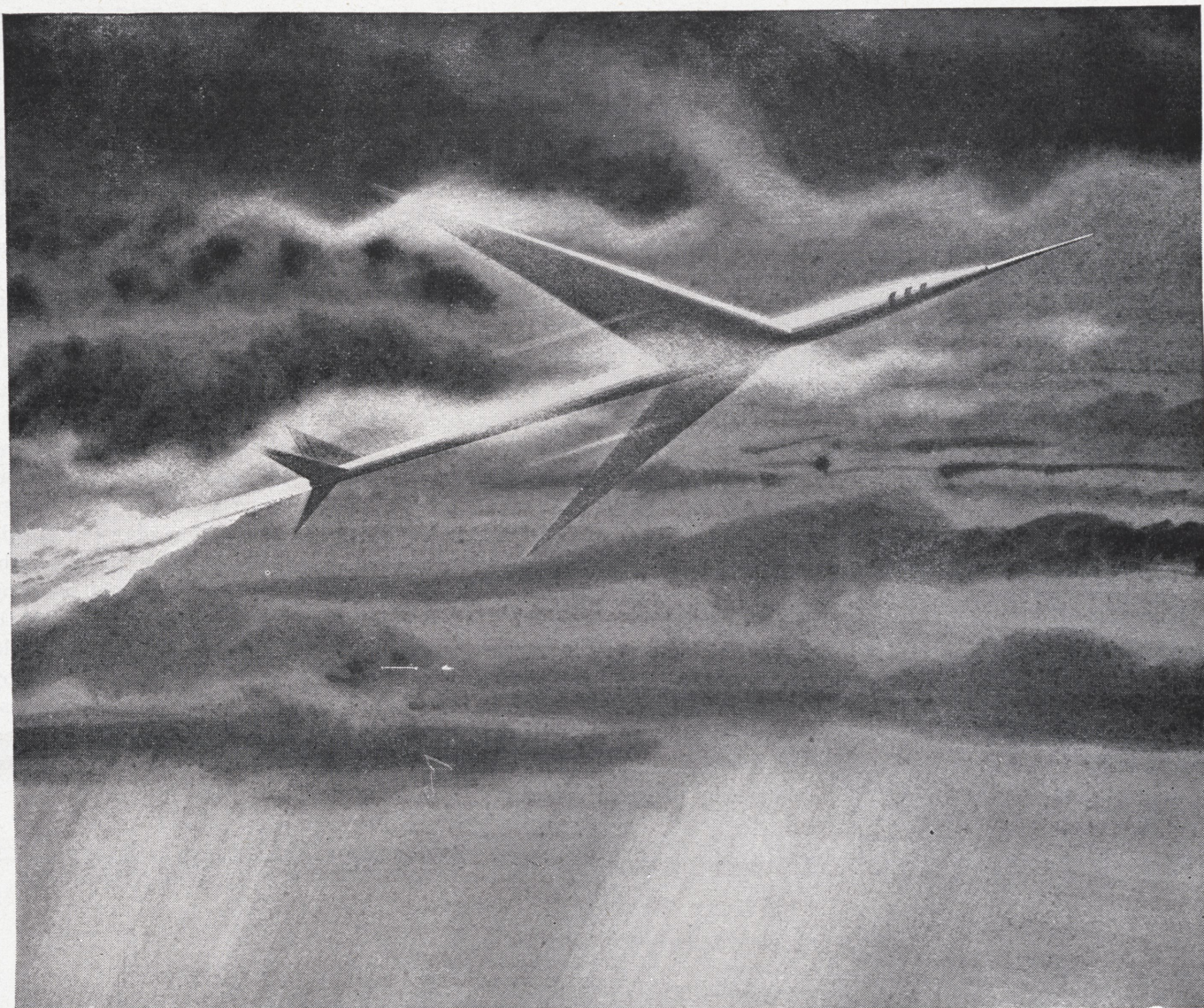
Out on the job . . . irrespective of your engineering role . . . you'll be coming to grips with the problem of eliminating wasteful friction.

You can look to **SKF** for the practical solution to anti-friction bearing problems.

SKF makes all of these eight types of bearings which serve virtually every equipment need. Rely on **SKF** for putting the right bearing in the right place. 7417

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.
—manufacturers of **SKF** and HESS-BRIGHT bearings.





Do you want to get ahead in engineering?

Then—after you graduate—join a company that's expanding in fields where big engineering futures lie.

At Boeing you'll find plenty of room to get ahead in such projects—with a future as a major guided missile program . . . research in supersonic flight and nuclear-powered aircraft . . . America's first-announced jet transport . . . and the revolutionary B-47 and B-52 jet bombers.

You'll find Boeing a stable 37-year-old company, that has grown practically continuously. For example, Boeing now employs 6000 engineers in contrast to 3500 at the peak of World War II. And although Boeing is a large concern, it is so organized that each engineer is

an individual who stands out—and progresses—in proportion to his ability.

Boeing is constantly alert to new techniques and materials—and approaches them without limitations. Extensive subcontracting and major procurement programs—directed and controlled by engineers—give you a varied experience and broad contacts with a cross section of American industry. No industry, in fact, matches aviation in offering such a wide range of experience, or breadth of application—from pure research to production design, all going on at once.

Boeing engineering activity is concentrated at Seattle in the Pacific Northwest, and Wichita in the Midwest. These

communities offer a wide variety of recreational opportunities. Both are fresh, modern cities with fine residential and shopping districts, and schools of higher learning where you can study for advanced degrees.

There are openings in ALL branches of engineering (mechanical, civil, electrical, aeronautical, and related fields), for **DESIGN, RESEARCH and PRODUCTION**. Also for servo-mechanism and electronics designers and analysts, as well as physicists and mathematicians with advanced degrees.

*For further information,
consult your Placement Office, or write:*

RAYMOND J. B. HOFFMAN, Administrative Engineer
Boeing Airplane Company, Wichita, Kansas

BOEING

Research and Development

(Continued from Page 22)

bustible dusts requires safe, practical lighting.

The fluorescent tube is housed in an individual tube of heat-resisting glass. The tube ends are reversed tapered and sealed into cast aluminum housings which also contain the lamp receptacles.

The fixture's reflectors are accurately formed sheet metal of interior white enamel and exterior aluminum finishes. Securely attached by spring clips, they may easily be inserted or removed after the fixture has been hung.

End-to-end placement of the fixture on close centers to other fixtures of its same type is no handicap. A link member that is part of the supporting stem assembly allows the relamping end of the fixture to be lowered several inches for easy access without interference by adjacent fixture.

To relamp, the relamping end of

the fixture is lowered by unlocking the link member, after which the threaded receptacle covers are removed. Removal of these covers exposes the lamp receptacle and mounting plate assemblies.

Tools are unnecessary to release lamp receptacle and mounting plate assembly, which is locked into the housing by a bayonet joint. A slight twist of the wrist locks or unlocks it.

LABORATORY DISHWASHER

Many scientists who now spend much of their valuable time washing test tubes, flasks, and beakers will soon be freed of this tedious and time-wasting task by a fully automatic dishwasher adapted especially for laboratory work. The dishwasher, developed by Chemical Rubber Company, is designed primarily for use in laboratories to free highly paid and highly skilled scientists from a task that can be easily done by a low-cost machine.

Believed to be the first automatic dishwasher adapted especially for

laboratory use, the CRC Labwasher will have the same operating cycle and general outside appearance as today's electric dishwashers for home use. With the advantages of front opening and top loading, the dishwasher was chosen as being ideally suited for laboratory use as counter top space is limited in most laboratories.

The washing action of the CRC Labwasher is also especially suited for laboratory use since nothing moves inside the washer but the water once it starts operating. The glassware remains stationary in the racks while an impeller swirls the water upward at an angle to assure efficient distribution of water inside and over every piece in the Labwasher. With this type of washing action, the thin-walled glassware is handled more gently than it would be if washed by hand — and by eliminating a large amount of glass breakage, the Labwasher is expected to reduce laboratory operating costs.

(Concluded on Page 34)

X IS TO **Y**

AS

D-X IS TO YOUR **CAR**



Hundreds of Gasolines

but

Only One **D-X**

**Edw. S.
LAMMERS**

**Paint & Glass
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1201 Wabash Ave.

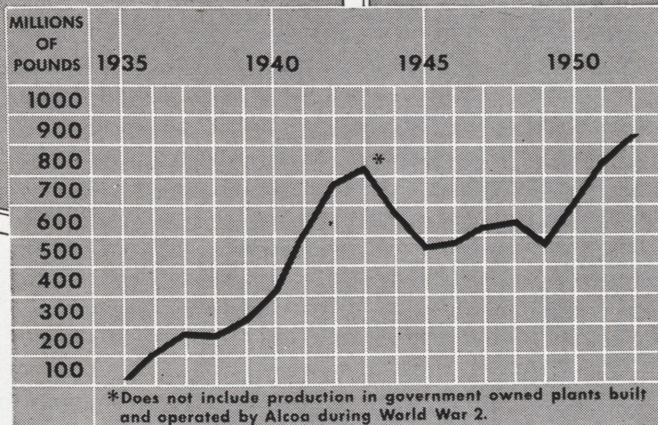
C-9581

Can you see your future through this Window?



This is an aluminum window, one of four million that will go into buildings in 1953. Twenty

years ago, it was just an idea in the mind of an Alcoa development engineer. Ten years ago, only a few thousand were made annually. Now, production is *increasing* at the rate of over half a million a year. This is just one of a torrent of new uses for aluminum which means that Alcoa must continue to expand. Consider the opportunities for you if you choose to grow with us.



What can this mean as a career for you?

This is a production chart . . . shows the millions of pounds of aluminum produced by Alcoa each year between 1935 and 1952. Good men did good work to create this record. You can work with these same men, learn from them and qualify yourself for continually developing opportunities. And that production curve—is still rising, we're still expanding, and opportunities for young men joining us now are almost limitless.

Ever-expanding Alcoa needs engineers, metallurgists, and technically minded "laymen" for production, research and sales positions. If you graduate soon, if you want to be with a dynamic company that's "going places", get in touch with us. Benefits are many, stability is a matter of proud record, *opportunities are unlimited.*

For more facts, consult your Placement Director. ALUMINUM COMPANY OF AMERICA, Pittsburgh, Penna.

Alcoa



Aluminum

ALUMINUM COMPANY OF AMERICA

Research and Development (Concluded from Page 32)

The CRC Labwasher has been designed primarily for the industrial laboratory. It effectively washes and dries glassware containing either oil or water soluble material. It will accommodate almost all types of flasks up to two or three liter size, as well as beakers, funnels, cylinders, graduates, and many other shapes and forms.

PENICILLIN "O"

A new type of penicillin has been isolated and developed by the Upjohn Co. It possesses a definite advantage over present types of penicillin because of its non-allergic quality. Standard type "G" penicillin has caused allergic reactions ranging from 1.5 to 10 percent. These include abscesses, fever, skin disorders and even death due to shock. The initial tests of the new type "O" were carried out on research staff members at Upjohn's who were sensitive to standard forms.

Tests performed with type "S" gave some prediction as to what was ahead. Sensitivity to this type was greatly decreased, however its odor and taste were so disagreeable that it was unfit for use.

Clinical testing has proven the success of type "O". Its bacteria killing powers are about the same as type "G" and most patients allergic to this type show no effects from type "O".

"SILENT POWER" MUFFLER

After two years of intensive engineering research General Motors has developed an exhaust system for its trucks that renders exhaust noises inoffensive to the human ear.

A special name, "Silent Power," was originated for the system to indicate not only that GMC has eliminated objectionable exhaust noises but has not had to decrease its engine power to achieve it. Although "Silent Power", costs more to manufacture, it will be standard equipment at no extra cost to the user.

The mufflers are a reverse-flow type, larger than previous units and

made more rigid by the use of heavier gauges of metal. New exhaust manifolding and larger exhaust pipes are incorporated in the system. A different system had to be developed for each of the gasoline and diesel engines because of the different volumes of noise to be stifled.

The "Silent Power" muffler may be the answer to one of the Trucking Association's serious public relations problems, that of truck exhaust noises.

MICRO TRIP

A two-hand clutch control for manually operated power machines, that increases production up to 25 per cent and affords complete protection for operators and set-up men, is another recent development.

The unit, called the MICRO Trip, is available as a package for installation on existing presses.

Installation of the device on manually operated power machines usually results in a 10 to 25 per cent gain in production.



● For many years K&E has pioneered in the manufacture and development of finest quality surveying instruments. K&E surveying instruments are renowned all over the world for their superb performance under conditions of all kinds, for their magnificent workmanship and for special features that come of progressive ingenuity.

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PLUMBING -
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AIR CONDITIONING

ALLEN I. WEINHARDT

CHARLES J. KANTMANN

William R. Parlett, Cornell '48, Sets Sights on Executive Sales Job



BILL PARLETT has learned that helpful engineering suggestions promote good customer relations.

"Within the next ten years", says William R. Parlett, young Worthington Sales Engineer, "many of the officers of the corporation, district office sales managers and top salesmen will be retired.

"Appreciating the fact that someone must fill these jobs, our management is striving to develop capable leadership among the younger men of the corporation.

"As a prospective Worthington Sales Engineer, I received several months of classroom instruction by works managers, top sales personnel and application engineers at all of the Worthington plants. The background I obtained was a sound basis for further development and learning gained in one of

the product sales divisions and then in a district sales office. After obtaining sufficient product knowledge and sales training, I was ready to sell directly to industry. As more important sales assignments are available, I feel I will progress in proportion to my own development and sales performance.

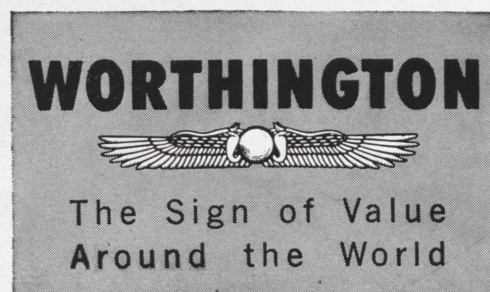
"As a Worthington salesman I contact a class of trade with which it is a pleasure to do business. The company's reputation is a key to a welcome reception by my customers.

"I have found that with Worthington you have job satisfaction, adequate compensation, and unlimited opportunity."

When you're thinking of a good job, think *high*—think *Worthington*.

3.6

FOR ADDITIONAL INFORMATION, see your College Placement Bureau or write to the Personnel and Training Department, Worthington Corporation, Harrison, N. J.



Fraternity Notes

By Owen March, Jack Sawyers, and Ron Smith

SIGMA NU

The Halloween Party at 831 South Center was a real success. All those present had a very good time. Thanks are extended to Col. and Mrs. Jacobs for a fine job of chaperoning.

Competition in inter-fraternity football has become very keen. Sigma Nu lost its first game to the Alpha Tau Omega's 14-8. In the next outing against Theta Xi, a safety by Owen Meharg in the last quarter was enough for a 2-0 victory. In both games Jerry "Crazy Legs" Hebb was outstanding on defense.

Sigma Nu is well represented on the basketball squad. "Roundballers" include Dick Green, Don Fyfe, Hugh Davis, and Phil Boller.

It seems that quite a few brothers have recently lost their hearts and also their pins. Harry Stutts pinned Miss Valorie Marx of Evansville, Joe Leppert pinned Miss Rosemary Zoderer of Indianapolis, Jack Hartley pinned Miss Jo Ann Wilkerson of Effingham, Illinois, and Tom Diener pinned Miss Connie Bolls of Gary.

THETA XI

Each year the chapter presents an award to the person whose accumulative is raised the most. This year Jim Schwartz was the victor with an increase of 0.45.

Just as Rose is proud of winning the Conference Championship, the chapter is proud of Joe Verdeyen who was voted the most valuable player on the 1953 football team. Also, the following brothers have received their varsity awards for football, Verdeyen, Rader, Ulbrich, Sovereign, Scharpenburg, Granlund, Merrelli, and manager Lai.

After the freshmen were shown the fraternity houses Friday, November 20, the brothers gathered for a gala stag party. It seems as if everyone had a good time. But we

wonder why Brother Schramm was locked out of his room and spent the night on the couch.

Kappa wishes to welcome its three new pledges, Jim Seneff, Bill Seneff, and Louie Marshall.

LAMBDA CHI ALPHA

Open house!

(1) On November 6, Lambda Chi opened the doors to an estimated 300 guests from Rose and ISTC. Entertainment for the official "house warming" was provided by Lambda Chi musicians from DePauw University. A fine representation of Rose faculty members and their wives was present for the occasion.

(2) The informal "get acquainted" parties for new students were held November 20 — much talk, much smoke, much shaking of hands . . . lots of new friends.

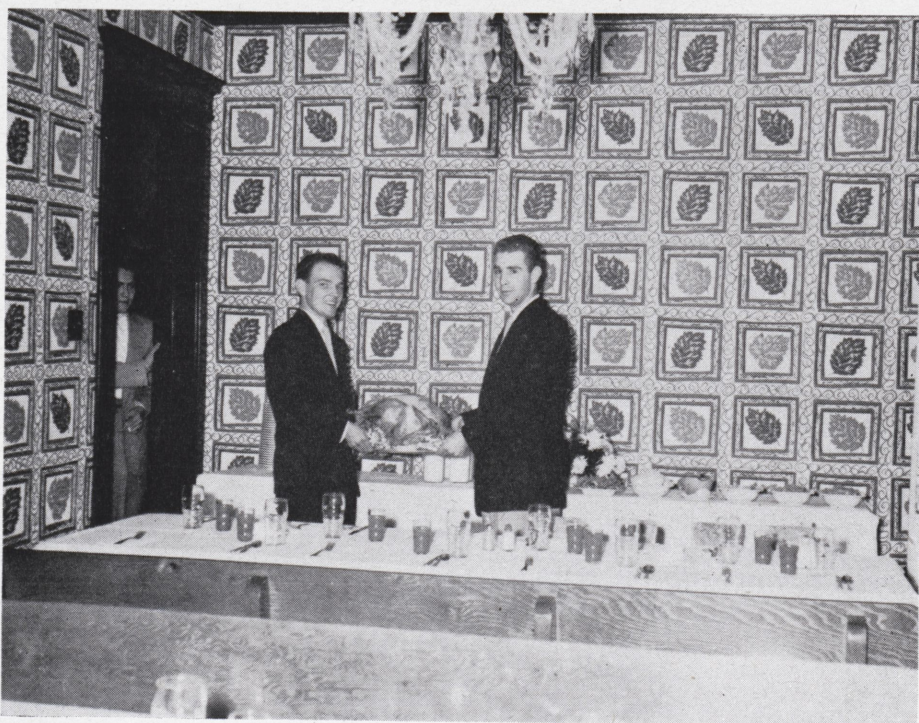
The chapter recently spent an enjoyable Sunday afternoon as guests in the home of Prof. and Mrs. Theodore Palmer.

Informal initiation was held for pledges Jim Calabro, Jack Taylor, Charles Bruner, and Walt Johanningsmeier. To the pledges extreme dismay, rain prohibited a portion of the festivities.

Plans for Lambda Chi Alpha's annual Holly Ball were laid by social chairman Jim Lott and his cohort Jerry Fromholz. The dance was held in the Rose auditorium on December 4.

The appearance of a box of Wolf Bros. "Rum-soaked Crooks" marks the pinning of Bill Crenshaw to Miss Jane Evans of Terre Haute.

A delicious Thanksgiving dinner was served to Lambda Chi's and their dates on Sunday, November 22. Prof. Al Schmidt, culinary artist *par excellence*, prepared two 25-pound birds, while Mrs. Pinson and Mrs. Green, house mothers *summum bonum*, caledied the trimmings. The turkeys were donated by Bill "Turk" Lamb.



Lambda Chi's Thanksgiving

A JOB AT
Allison

● Three Tri-State College Engineering graduates are playing an important part in the construction of a new, modern jet test facility at Allison Division of General Motors Corporation.

William R. Johnson, right, received his B.S. degree in Mechanical Engineering in 1941 . . . the same year he joined Allison as a junior test engineer. In 1952, after several promotions and a period in military Service, he became an engineering supervisor and was assigned the responsibility of engineering the eight jet engine test cells at the new experimental plant. The new test cells—revolutionary in design—make use of huge 100-ton steel tanks calculated to withstand an ultimate internal pressure of 175 PSIG.

H. F. Prang, left, was graduated in '42 with a B.S. in Mechanical Engineering. Later, he joined Alli-

son as a draftsman in connection with the development of sleeve type bearings for aircraft engines. From the beginning of the new test plant program, he has been supervisor of drafting in the "Experimental Jet Facilities Group" which provides all designs of test equipment in the building.

Edward G. Delaney, center, received his B.S. in Mechanical Engineering in 1951. He was recently promoted to the "Test Projects Control Group" at Allison. His job will

be to use the new equipment and facilities in the testing of jet engines. He will be running individual tests on components, and coordinating proper control installations on experimental engines.

Allison's long range engineering program is expanding, offering unlimited opportunities to young graduate engineers. We think you, too, will like it at Allison, the only manufacturer whose jet engines have accumulated more than 3,000,000 hours in the air!

Allison

DIVISION GENERAL MOTORS CORPORATION • Indianapolis, Ind.

Design, development and production—high power TURBINE ENGINES for modern aircraft . . . heavy duty TRANSMISSIONS for Ordnance and Commercial vehicles . . . DIESEL LOCOMOTIVE PARTS . . . PRECISION BEARINGS for aircraft, Diesel locomotives and special application.

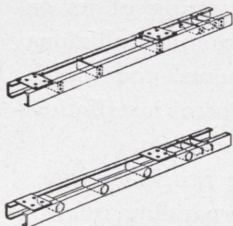
**For a successful engineering career,
thorough background in welded
steel construction is vital since:**

GOOD ENGINEERING DESIGNS DEPEND ON COST

With more and more emphasis being placed on cost of manufacture to meet competition, industry's management today looks to its engineers to initiate money-saving ideas in product designs. As a result, the alert engineering student who can come up with unique money-saving suggestions in his designs will find greater acceptance for his suggestions and a promising future in personal advancement and income.

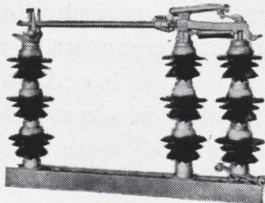
Often too little attention is devoted to how a product design can be simplified to eliminate costly manufacturing manhours once a basic design is established. To achieve this end, where designers reappraise product details for welded steel construction, production costs are being cut an average of 50% compared with manufacture using castings.

The reasons for the lower cost with welded design are basic . . . lower cost of steel per pound, fewer pounds of steel needed and simpler shop procedures. In addition, steel designs are stronger . . . resist fracture from shock . . . are more modern in appearance.



FORMER BOLTED DESIGN of base for electric switch. Bases range from 6 to 10 feet long. Are subject to severe cantilever stresses from opening and closing of switch.

PRESENT WELDED STEEL DESIGN incorporates tubular cross members. Weight cut 20%. Deflects one fourth as much under load. Costs no more to build.



DESIGN DATA for welded steel construction is available to engineering students in the form of *Bulletins and Handbooks*. Write . . .

THE LINCOLN ELECTRIC COMPANY
Cleveland 17, Ohio
**THE WORLD'S LARGEST MANUFACTURER
OF ARC WELDING EQUIPMENT**

HAZING

(Concluded from Page 16)

Response:	Yes	No	Comment
Freshmen	62.9%	35.2%	1.9%
Sophomores	69.3%	30.7%	—
Juniors	80.5%	19.5%	—
Seniors	73.6%	26.4%	—
Student Body	70.4%	29.0%	0.6%

Some qualifications were placed on the answers given to this question. The prevalent feeling among the freshmen, as shown by their comments, was that they should go to assemblies and games only if the upperclassmen do. The decided lack of attendance at football games by the upperclassmen is the main objection to forced attendance on the part of the freshmen.

Another reason given for not forcing attendance at the games was that the freshmen must carry the load when it comes to cheering the team on to victory. As one of the students put it, "At football games, the upperclassmen have the attitude that it would lower them to yell for the team, and that only the freshmen should yell. Even then, upperclassmen boo and heckle the yell-leaders. This is very poor school spirit."

Question: "If accidents or injuries should occur as a result of hazing, how would it affect the school?"

Response:	Fav.	Unfav.	No. Effect
Freshmen	3.7%	79.6%	16.7%
Sophomores	2.6%	35.9%	56.4%
Juniors	—	55.5%	41.6%
Seniors	—	57.9%	31.6%
Student Body	2.2%	61.5%	35.2%

Question: "If hazing activities were abolished at Rose, could you suggest a substitute activity or activities?"

Response:	Yes	No	Comment
Freshmen	25.9%	70.4%	3.7%
Sophomores	20.5%	74.4%	5.1%
Juniors	36.0%	64.0%	—
Seniors	36.8%	57.9%	5.3%
Student Body	28.4%	68.3%	3.3%

The most popular substitute named was increased emphasis on intra-mural sports, with appropriate recognition for the victors. It was

suggested that perhaps the freshmen could be allowed to defend themselves on the basketball court or football field and could remove their greencaps, should they win these events.

While not a substitute for hazing, it was suggested that a help week be set aside when the Freshman Class could serve the community or the school in some worthwhile project.

Also suggested was a definite period for hazing, say from matriculation to homecoming. This would not impose a great hardship on the freshmen and would serve to vent the hazing enthusiasm in a reasonable amount of time.

Question: "If hazing activities were abolished at Rose, should Homecoming activities be abolished as well?"

Response:	Yes	No	Comment
Freshmen	—	100.0%	—
Sophomores	7.7%	92.3%	—
Juniors	16.7%	80.5%	2.8%
Seniors	31.6%	63.1%	5.3%
Student Body	10.1%	88.5%	1.4%

Question: "Do you think the Faculty's attitude toward the hazing question is too reserved or perhaps biased?"

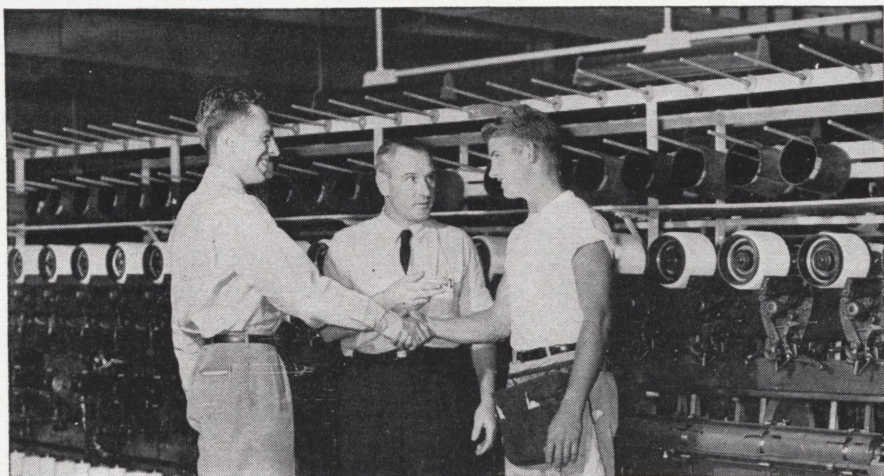
Response:	Yes	No	Comment
Freshmen	37.0%	44.5%	18.5%
Sophomores	82.0%	15.4%	2.6%
Juniors	72.2%	22.2%	5.6%
Seniors	10.5%	84.2%	5.3%
Student Body	63.5%	27.0%	9.5%

Comments on this question were many and varied. It was agreed by several students that any attitude the faculty members may have personally must be held back, and because of their position, the faculty collectively must be against hazing and its manifestations. Some of the students stated a decided yes to the question, with the qualification that one or two members of the faculty were the cause of a biased attitude. However, it could be said that there are those who cannot see the forest for the trees and do not realize the position held by the faculty members is a precarious one. Q

THE DU PONT DIGEST

Production Supervision

Requires Knowledge of Materials, Machines, and Men



Wm W. Kinsley, M.S. in M.E., Penn. State 1949 (left), production supervisor in Du Pont textile fiber plant, is introduced to new operator by foreman.

Keeping production rolling in a modern industrial plant is a job that appeals to men trained in many branches of science and engineering. If you are looking for opportunities in this field, you won't have to look far at Du Pont, where more than 1,500 members of the technical staff are engaged in production supervision.

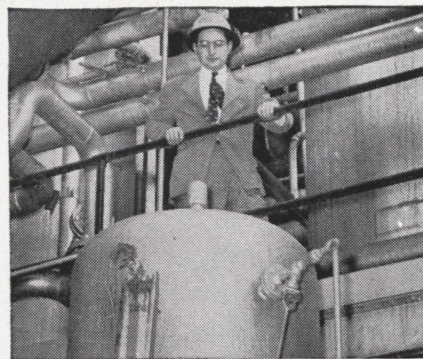
To qualify, a man must be able to understand both the mechanical and chemical phases of production. In addition, he should be a good planner and, above all, have a knack for working with others.

Production supervisors are responsible for care of plant facilities, supply of raw materials, supervision of operation and maintenance, cost and shipment of finished products, as well

as personnel relations, training and safety.

Since Du Pont makes over 1,200 products and product lines, it can offer many opportunities in a wide variety of operations to men interested in production supervision. In Du Pont's *Organic Chemicals Department*, for example, most technical men start in plant development groups, where they gain a background in both the technical and economic aspects of manufacture. Those with interests and abilities in production may then transfer to that field to acquire further, and more detailed, experience. Advancement leads to jobs as Building Supervisor, Senior and Chief Supervisors, and Superintendent.

The responsibilities of these supervisory levels vary, depending upon



George B. Bradshaw, Jr., B.S. Ch. E., M.I.T., Asst. Supt., inspects a unit used in ammonia synthesis operation.

the men, the operation, and the products.

For example, in manufacturing dyes, up to 50 different operations may be carried out. Production and maintenance must be carefully planned and scheduled so that all needs for finished product are met. Temperature, pressure, and quality of reactants must be carefully controlled to insure that each batch of dye will match previous batches exactly.

In making each color, from 6 to 10 different unit processes may be called upon. And, in the course of time, all the unit operations known to chemical engineering come into play. Obviously, production supervisors have excellent opportunities to use and expand their technical knowledge and ingenuity. Equally important, they can acquire background and varied experience that prepare them for advancement to responsible positions in management and administration.

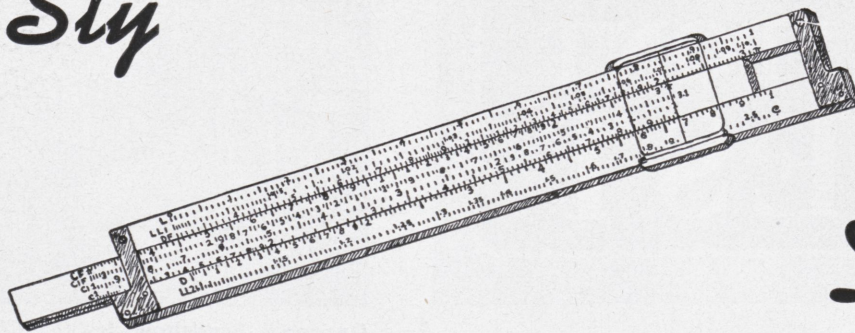
ASK FOR "Chemical Engineers at Du Pont." New illustrated booklet describes initial assignments, training and paths of promotion. Just send post card to E. I. du Pont de Nemours & Co. (Inc.), 2521 Nemours Building, Wilmington, Delaware. Also available: "Du Pont Company and the College Graduate" & "Mechanical Engineers at Du Pont."



BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

Watch "Cavalcade of America," on Television

Sly



Droolings

Stolen by Dick Bosshardt, m.e., jr., and Ralph Branson, m.e., jr.

Then there was the actress who married a director, longed for children, but didn't have any. So she divorced the director and married a producer.

Absent-minded Professor's wife: "You haven't kissed me in three weeks."

Absent-minded Professor: "My word, I wonder whom I have been kissing."

He: "I bet I know what you're thinking about."

She: "Well, you don't act like it."

A man's success
depends, you'll find,
More or less
on his frame of mind.
But a woman can achieve the same
By just depending on the
frame

A lawyer was sitting in his office when the door opened and a woman entered. Without any preliminaries, she said she wanted a divorce. "On what grounds?" asked the lawyer. She replied that she did not think her husband was faithful.

"And what makes you think he isn't faithful?"

"Well," the lady replied, "I don't think he's the father of my child."

The ship was sinking, and the Captain called all hands aft. "Who among you can pray?" he asked.

"I can," replied the ensign.

"Then pray, shipmate," ordered the Captain. "The rest of you put on life jackets, we're one short."

"Who gave the bride away?"

"I could have, but I kept my mouth shut."

Prof.: "Are you cheating on this examination?"

Student: "No, sir, I was only telling him that his nose was dripping on my paper."

"So your husband is one of the big guns of industry."

"Yes, he's been fired seven times."

The day after finals, a disheveled Ch.E. walked into a psychiatrist's office, tore open a cigarette, and stuffed the tobacco up his nose.

"I see that you need some help," remarked the startled doctor.

"Yeah," agreed the student, "Do you have a match?"

A man was perched atop a building in Atlanta and it looked like another attempted suicide. A policeman made his way to the building's roof to persuade him not to jump.

"Think of your maw and family," pleaded the cop.

"Ain't got any."

"Well, think of your girl friend."

"I hate women!"

"All right," said the policeman desperately, "Think of Robert E. Lee."

"Who's he?"

"Jump, you damn Yankee!"

"That liquor you gave me was just right."

"How do you mean, just right?"

"Well, if it was any better you wouldn't have given it to me, and if it was any worse, I couldn't have drunk it."

Then there was the overworked EE (Dick) who told the story about the politically minded ion who heard there was going to be an electron so he went to the poles and vulted.

A very rich deposit of oil was discovered on the farmer's land. Immediately he rushed in to town to purchase a new car. An obliging salesman showed him a sleek roadster selling for \$5,000.

"I am prepared to pay cash," said the farmer. "Will I get a discount?"

"Why certainly," replied the salesman. "We will give you a 10% discount on a cash purchase."

Not being confident of his ability as a mathematician, the farmer said he would think it over and return later.

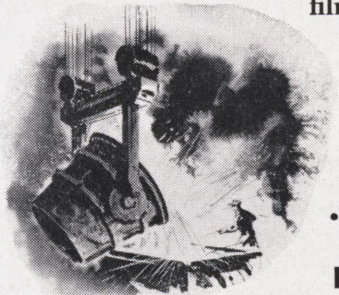
He walked into a restaurant and over his coffee tried to figure what his discount would be, but to no avail. Finally, in desperation, he turned to the waitress and asked, "If I gave you 10% of \$5,000 how much would you take off?"

Blushing prettily, the waitress whispered, "Would my earrings bother you?"

She was only an undertaker's daughter, but gosh what she'd undertake (Eh, Don).

Photography helps a New Steel Mill roll into action

Fairless Works, U. S. Steel's new Eastern Seaboard mill, is now starting operations—and growing—at the same time. And camera and film play their parts in both.



**... to help locate ore,
plot transportation,
lay out plants, control
quality, improve production,
U. S. Steel puts Photography to work.**

From ore through research and production, Photography is one of Steel's important operation tools. It helped locate and appraise the new Venezuelan Cerro Bolivar deposits which sparked this great new seaboard mill. It helped chart the ore's course to the sea—helped plan the plant and keeps a running record of its growth. And day after day it's at work in the research lab improving steel metallurgy, and on the production line controlling quality.

Countless numbers of America's varied industries, large and small, use photography in many ways to save time, speed accomplishment, increase production, and cut costs.

In fact, so many new applications of photography are being found, that many well-qualified graduates in the physical sciences and in engineering have been led to find positions with the Eastman Kodak Company. Returning servicemen, too, have found new opportunity here.

If you are interested, write to Business and Technical Personnel Dept., Eastman Kodak Company, Rochester 4, N. Y.

Eastman Kodak Company
Rochester 4, New York



Kodak
TRADE-MARK

WE ASKED THESE RECENT COLLEGE GRADUATES:

"WHY DID YOU JOIN GENERAL ELECTRIC?"

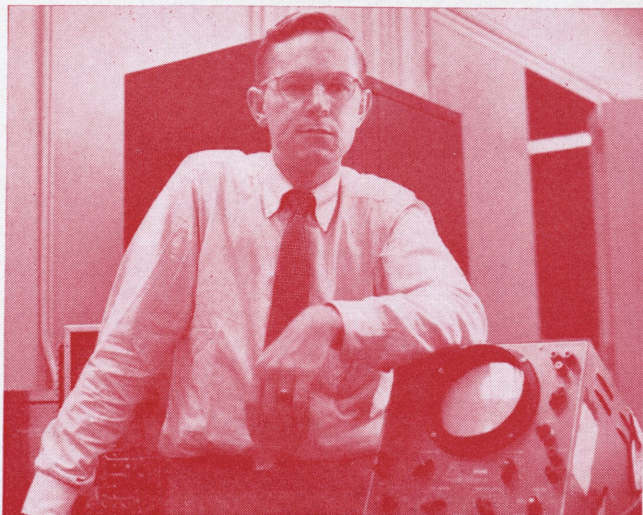
"When I graduated from college I didn't have a definite idea of what field of engineering I wanted to go into. I joined General Electric because I felt that G.E.'s engineering training program offered the best opportunity to move about freely in an organization whose activities include almost every branch of engineering. In this way I found the particular specialty for which I was best suited and most interested.

"This has proved to be the case. In one year I have had assignments encompassing many fields of engineering activities, and I have been given every opportunity to meet and work with experienced engineers in numerous engineering fields.

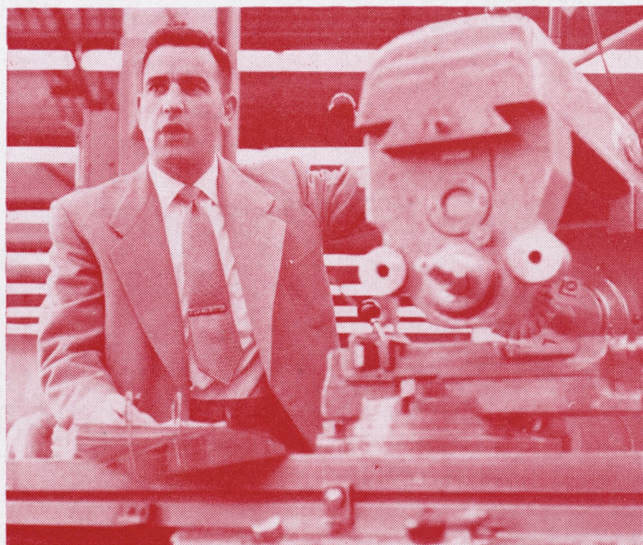
"On the basis of the experience thus acquired, I have been able to make an intelligent choice of the particular field of engineering for which my talents, interests, and abilities are best suited."

"I joined General Electric because of the many opportunities I found available for building a successful career. In my chosen field, manufacturing, a development program gives each individual the opportunity to advance his own abilities and talents under experienced guidance. Work assignments, classroom instruction, and discussion periods give every opportunity for career development. Also, an opportunity for specialization is offered through working assignments in all major divisions of manufacturing.

"Through assignments in these areas a logical decision can be made on final job placement. To me this seems extremely valuable in putting the right man and the right job together, and thereby greatly enhancing the possibility for success."



GERALD R. PETERSON, U. of Calif., BS, electrical engineering.



DAVID J. DILLON, U. of Ill., BS, management.

These are but two of the many reasons why hundreds of college graduates come with General Electric each year. These men are part of the large group of young people who are getting ahead *fast*—in an industry where there is broader scope for your ability . . . where your future is not chained . . . where you work in an atmosphere of vigorous, progressive thinking.

If you are interested in building a career with General Electric see your college placement director for the next visit of the G-E representative on your campus. Meanwhile, for further information on opportunities with G.E. write to College Editor, Dept. 2-123, General Electric Co., Schenectady 5, N. Y.

You can put your confidence in—
GENERAL  ELECTRIC