

Rose-Hulman Institute of Technology

## Rose-Hulman Scholar

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Student Newspaper

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Winter 12-1956

### Volume 68- Issue 3- December 1956

Rose Thorn Staff

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Thomas A. Beattie, class of '47,  
speaks from experience when he says:

“At U. S. Steel one has a great amount  
of varied experiences.  
There is truly never a dull moment.”



After receiving his B.S. in Mechanical Engineering in 1947, Mr. Beattie entered the employ of U. S. Steel as a student engineer. That was on September 22, 1947, and included service in the United States Navy from 1943 to 1946.

Mr. Beattie's progress from that date onward is typical of that of many engineering graduates who plan their future with U. S. Steel. For, within two years, we find Mr. Beattie advanced to the position of Process Engineer, Maintenance Department. Then on April 16, 1951, he was promoted to Relief Foreman, Shops, Maintenance Department. On March 1, 1952, he was made Turn Foreman, Blooming and Bar Mills, Mechanical Maintenance Department. And on January 1, 1955, he was promoted to his present post of Assistant Superintendent, Maintenance Department, of U. S. Steel's National Tube Division's National Works.

In this position, Mr. Beattie's responsibilities are numerous. They include the Service Power House and Skelp Mill area; maintenance of four blast furnaces and blast furnace auxiliaries, plus a sintering plant; maintenance of two blooming mills and soaking pits; maintenance of one bar mill; maintenance of three Bessemer converters, three open hearth furnaces, three open hearth auxiliaries, and seventy overhead cranes ranging from two to 200 tons. He supervises 680 men.

As Mr. Beattie remarks: "A steel plant includes all departments . . . every craft known to industry. In the space of three years, a U. S. Steel engineer can obtain experience that may take three times as long under different employment circumstances.

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*Building the first large liquid-fuel reactor for a utility power plant.*

## ... A PROBLEM IN ATOMIC POWER

The first large homogeneous reactor for a utility power plant is now being designed by Westinghouse engineers and scientists, in partnership with the Pennsylvania Power and Light Company, for whom the plant will be built. The plant will have a capacity of 150,000 kw.

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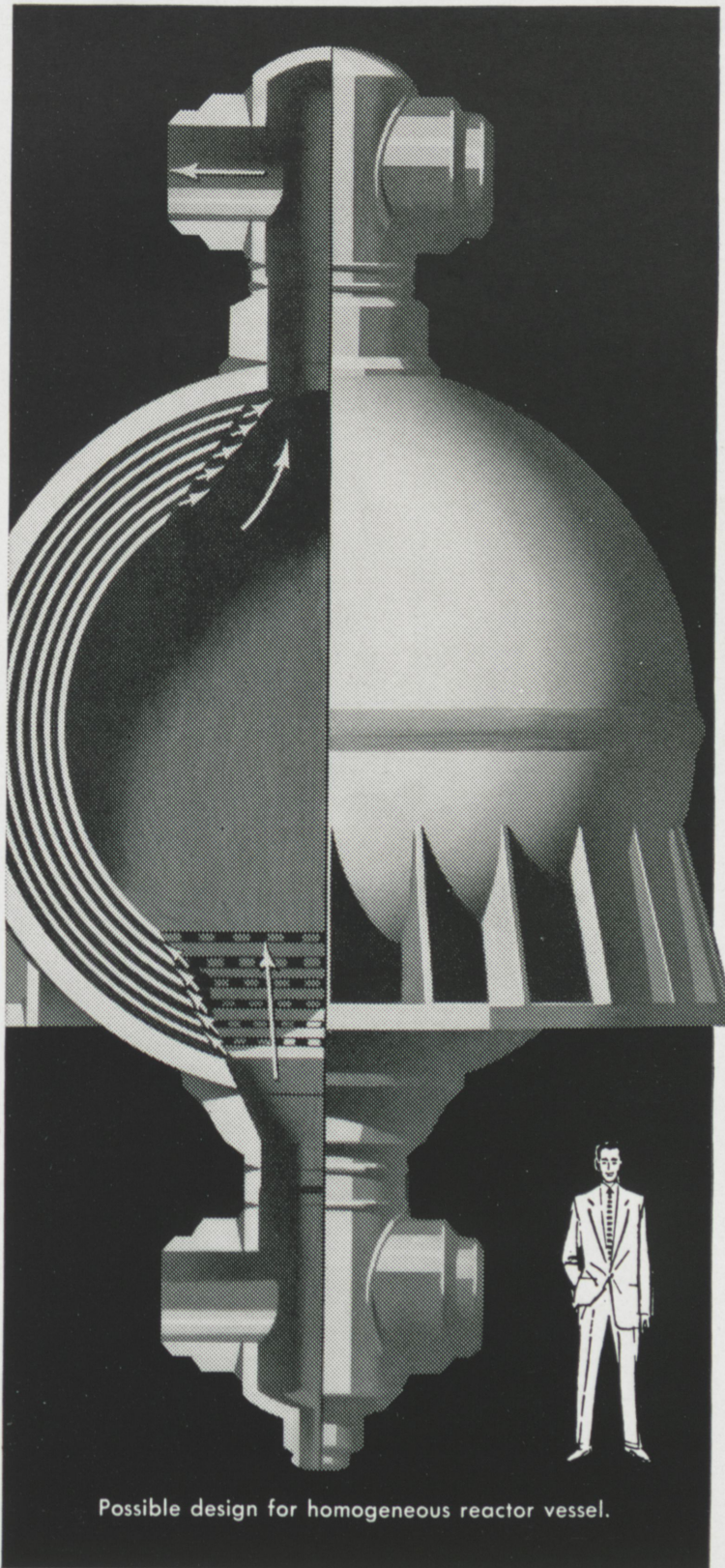
Rapid expansion of manufacturing capacity and entry into new fields like radar, automation and semiconductors, enable capable young men to advance rapidly.

Your opportunity to build a career at Westinghouse is not left to chance. A well-planned program of training . . . continued education at graduate school level (at company cost), and advanced management and professional development courses . . . all create a favorable and exciting climate in which to grow.

For further information, talk to your placement officer or ask him to make a date with the Westinghouse interviewer. Meanwhile, write for *Finding Your Place in Industry* and *Continued Education at Westinghouse*.

Write: Mr. C. W. Mills, Regional Educational Co-ordinator, Westinghouse Electric Corporation, Merchandise Mart Plaza, Chicago 90, Ill.

**Westinghouse**<sup>G-10301</sup>



Possible design for homogeneous reactor vessel.



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At Phillips you can decide among *many* promising careers in an industry with an unlimited future. And Phillips policy of "promotion from within" offers you the opportunity for advancement to positions of increasing responsibility and importance.

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Bartlesville, Oklahoma



Send this coupon for the new booklet "Career with a Future," describing your opportunities with Phillips.

D. R. McKeithan  
Technical Employment Consultant  
Phillips Petroleum Company  
Bartlesville, Oklahoma

Dear Mr. McKeithan: Please send me your new booklet "Career with a Future."

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# Rose Technic

VOLUME LXVIII, NO. 3

DECEMBER, 1956

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369 Lexington Avenue,  
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and 605 N. Michigan Avenue,  
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## Cover

The ROSE TECHNIC joins Rosie and Santa in wishing all students, faculty, and alumni a Merry Christmas and a Happy New Year. Cover designed by Tom Reese.

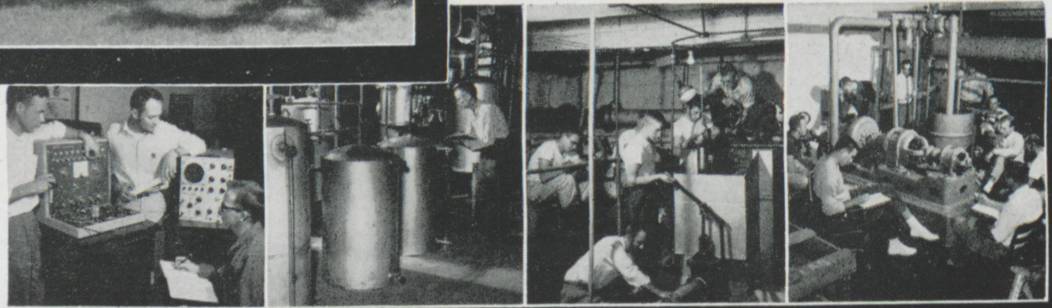
PRINTED BY MOORE-LANGEN PRINTING AND PUBLISHING CO.  
140 North Sixth Street, Terre Haute, Ind.

Published monthly except June, July, August, and September by the Students of Rose Polytechnic Institute. Subscription \$2.00 per year. Address all communications to the ROSE TECHNIC, Rose Polytechnic Institute, Terre Haute, Indiana. Entered in the Post-office at Terre Haute as second-class matter, as a monthly during the school year, under the act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized December 13, 1918. This magazine does not necessarily agree with the opinions expressed by its contributors.





# ROSE



ROSE POLYTECHNIC INSTITUTE

TERRE HAUTE, INDIANA

HIGH SCHOOL GRADUATES OF 1957

You are cordially invited to visit Rose Polytechnic Institute where you can earn a degree in:

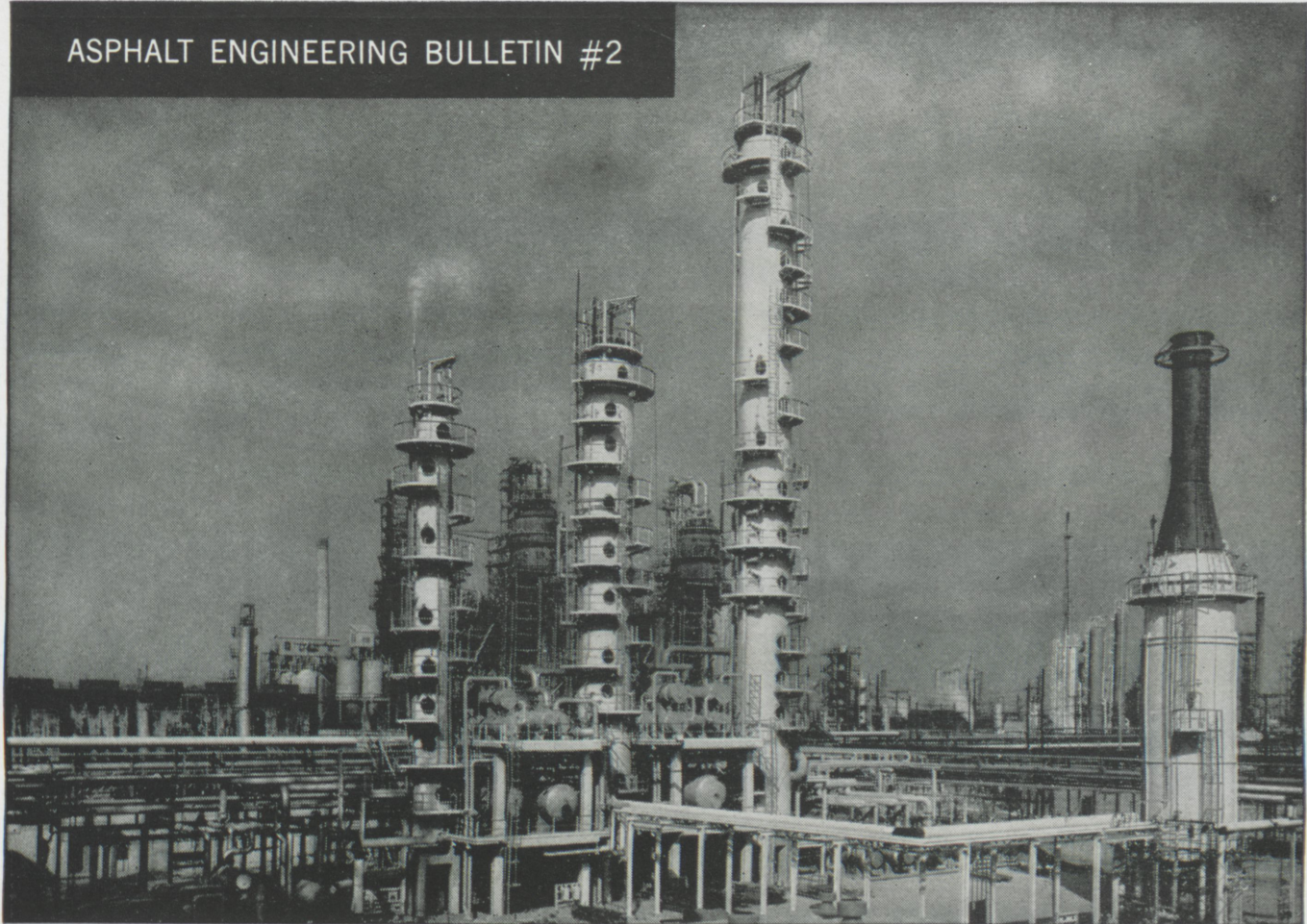
- CHEMICAL ENGINEERING
- ELECTRICAL ENGINEERING
- MECHANICAL ENGINEERING
- CIVIL ENGINEERING

*The next freshman class will be admitted  
September 9, 1957*

*Office*  
OF ADMISSIONS

ROSE POLYTECHNIC  
INSTITUTE  
TERRE HAUTE, INDIANA





An array of standard types and grades of Asphalt comes from refineries in volume for a wide variety of engineering and industrial applications.

## Asphalt is a versatile family of materials

"ASPHALT" denotes a class of material produced from crude petroleum . . . it is inherently durable, waterproof and adhesive.

Asphalt is produced in a variety of consistencies from hard solids to liquids. The harder types are called *Asphalt cements*. The more fluid types are called *liquid Asphaltic materials*.

### ASPHALT CEMENTS

By far the largest proportion of the Asphalt family. Semi-solid to solid, Asphalt cements answer virtually any logical demand for the properties desired in hot-mix types of pavement, pipe-coating, water-proofing and similar engineering and industrial products.

### LIQUID ASPHALTIC MATERIALS

Fluid at normal temperatures, but developing high-binding ability shortly

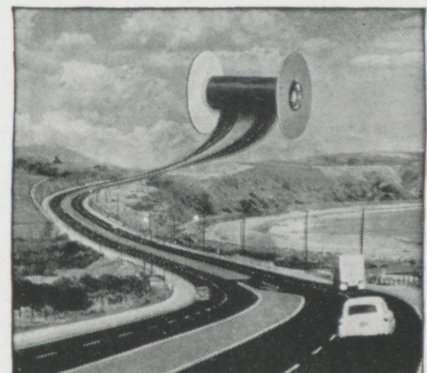
after application, liquid Asphaltic materials are comprised of: (1) Cutback Asphalts and Road Oils, and (2) Emulsified Asphalts.

The first are blends of Asphalt cements and various amounts and types of petroleum diluents, in three standard types: Slow Curing, Medium Curing, Rapid Curing. The Rapid Curing type contains, relatively, the most volatile diluent. "Cutback" Asphalts are versatile paving materials. They also fulfill various industrial needs.

The emulsified Asphalts consist of minute Asphalt globules suspended in chemically-treated water. Also, in three standard types: Rapid Setting, Medium Setting, Slow Setting. When deposited upon stone or soil, as in road construction, the emulsions "break," allowing the water to escape and

leaving an Asphalt film on the aggregate. Names of the types indicate relative rates at which their Asphalt globules coalesce.

Study the characteristics and applications of Asphalt. *Keep a complete file of these bulletins.*



Ribbons of velvet smoothness . . .  
MODERN **ASPHALT** HIGHWAYS



**THE ASPHALT INSTITUTE**, Asphalt Institute Building, College Park, Maryland



# "A new era is beginning..."

"As I review the progress in aeronautics within so short a span, and marvel at the complex aircraft of today, I call it an achievement little short of miraculous.

"Today, electronically-guided planes take off and land without human touch. Lethal sky missiles seek and destroy invisible targets with uncanny precision. And still other fantastic achievements in both man-controlled and pilotless flight are now in the offing.

"When men go to the moon and planets, electronically-controlled sky craft will take them there. Aviation maps will be studded with stars as well as with cities. New developments in aeronautics will go on and on. Success opportunities and careers will continue to develop for ambitious young men in this exciting field where a new era is beginning."\*

LEE De FOREST

Appropriately qualified to speak for aeronautics and other fields in which his own scientific achievements play an important part, Dr. Lee de Forest gives helpful counsel to young graduates headed for successful, rewarding careers.

His expression, "a new era is beginning," has particular significance at Northrop, world leader in the design, development and production of all-weather and pilotless aircraft.

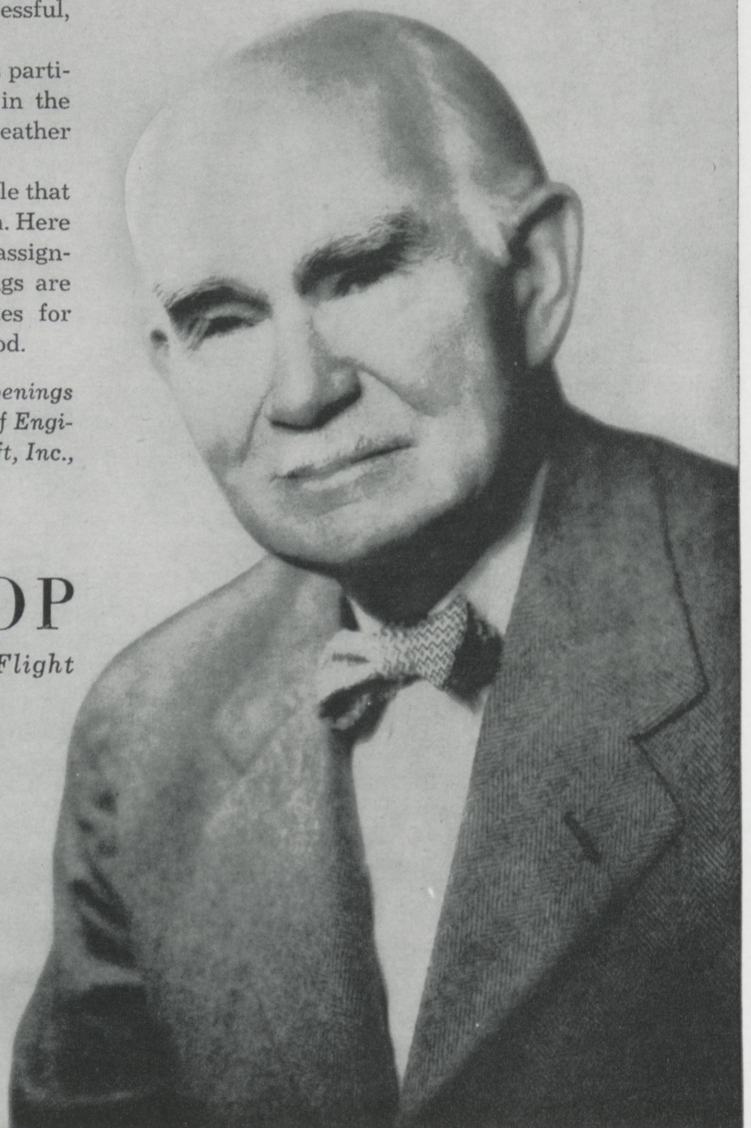
At Northrop, permanent positions are available that offer full play for individual talent and ambition. Here the graduate engineer will find interesting assignments for which he is best fitted. Surroundings are attractive, co-workers congenial, opportunities for advancement unceasing, the compensation good.

*For detailed information regarding specific openings in your field of specialization, write Manager of Engineering Industrial Relations, Northrop Aircraft, Inc., 1001 East Broadway, Hawthorne, California.*



## NORTHROP

*Pioneers in All Weather and Pilotless Flight*



*\*A statement by  
Dr. Lee de Forest,  
pioneer in radio.*





## YOUR FUTURE—Chemistry and Koppers?

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This frontier has been pushed slowly back ever since the days of the pioneer 18th and 19th Century chemists. Their theories, proved in laboratories, were made useful by the mechanical genius of engineers such as Heinrich Koppers, designer of the modern chemical recovery coke oven. These early scientists laid the foundation for the diversified chemical industry that has grown so rapidly in the 20th century.

And what are the results? An industry that has helped mankind by developing entirely new and better products for more pleasant living; an industry that has extended the life of man by developing new or improved medicines; an industry that has extended the life of many materials, conserving our natural resources.

Your future? It's going to be touched by chemistry to an extent never dreamed of by earlier college classes. That's why a future in the chemical industry can be such a rewarding one for those who are not afraid of the challenge of responsibility, the new and the difficult.

In addition to chemicals and plastics, Koppers produces tar products, metal products, pressure-treated wood. It designs and builds coke, steel and chemical plants.

If you would like to know more about

a future in chemistry or engineering with Koppers, contact your College Placement Director. Or write Industrial Relations Manager, Koppers Company, Inc., Koppers Building, Pittsburgh 19, Pennsylvania.



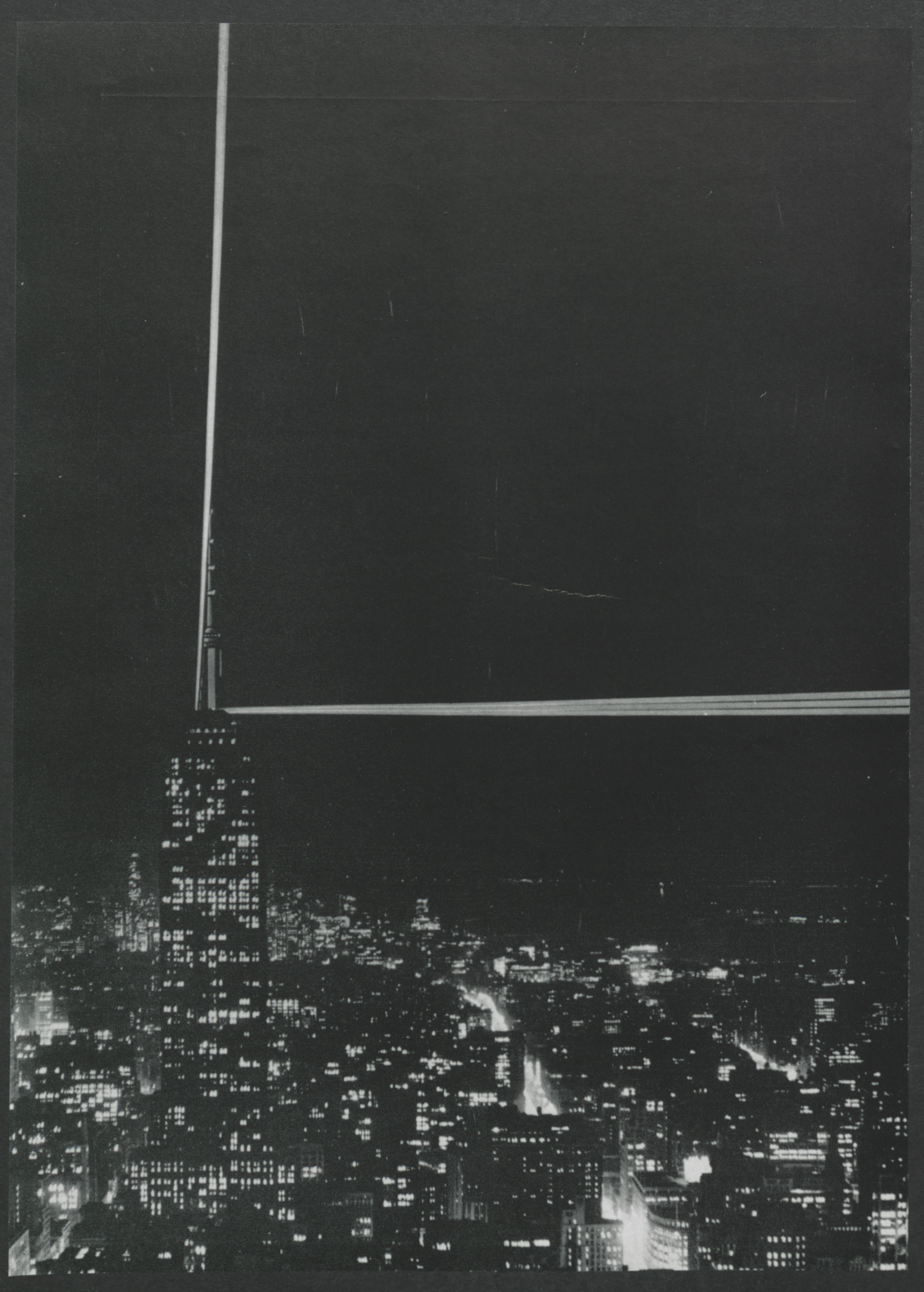
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*Consider a Career with Koppers*



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## *Editorial*

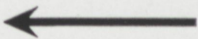
"Am I making the most of my time in college?" This is a question which many college students should ask themselves. In the past, the general low grades of the freshmen and sophomore classes at Rose seem to indicate that perhaps some students don't know how to make wise use of their time.

There are a great many different things each day which demand time of a student. These include eating, sleeping, grooming, extra-curricular activities, commuting, recreation, relaxation, and of course studying. The student should give each the proper amount of time. This requires some careful planning on the part of the student, and some measure of self-control to follow the plan. This plan need not be rigid or formal, but it should be kept in mind practically all of the time. The simple question "Am I wasting my time?" applied throughout the daily routine can do much to make room for more constructive activity.

Not only is wise application of time important in college, but it is important professionally as well. Certainly, the engineer who makes wise use of his time will produce more, faster, than the engineer who wastes a great deal of time. On the shoulders of these more productive engineers new and greater responsibilities are laid, which require even a more efficient utilization of time.

The sooner time is utilized fully, the sooner more time will be available for work and for other activities. It is surprising how much can be crammed into a twenty-four hour day and still do a satisfactory job at each thing.

*Gerald C. Rose*



FRONTISPIECE—The Empire State Building lights up the skies of much of the northeast, through the addition of four mighty searchlights. Installed just above the observation platform, the beacons are powerful enough to be seen under ideal conditions as far away as Boston and Baltimore. Cut Courtesy of Westinghouse Electric Corporation.



# Rosie Rides The Gridiron

By J. Thomas Pebworth, sr., ch.e.

How often have you been sitting in a bull session and someone has said, "Did we ever beat Notre Dame?" or, "Did Rose ever have an undefeated season?" or, "How long has 'Pappy Brown' really been here?" Well, we found ourselves in just such a discussion a little while back and we decided to try and find out some facts. We dusted off some old, bound editions of the *Rose Technic* (including the edition that the editors were using to prop the door open) and also consulted an edition of *Intercollegiate Football* from the R. P. I. library. This is what we found out.

## BEFORE 1900

Rose Poly's first recorded score was a 34-0 loss to Butler in 1894. The *Rose Technics* don't start until 1896 and the only other score available is an 8-4 loss to Indiana in 1895. The records for 1896 gives Rose a winning season of 3 and 2, thanks to a pair of wins over Terre Haute High School. Substitutes were valu-

able even in those days, as the *Technic* reports. Against I. U., "Moore was running with the ball, and his trousers were nearly torn off by Hellweg (I.U.), who only got a hold of them with one hand in tackling. The game was delayed while Moore hastily changed clothes with one of the substitutes."

In 1897 only three scores are recorded. Rose tied I. U. 6 to 6 and later lost to them 12-0. Oh yes, the Rose frosh beat a school named Indiana State (State Normal) by the score of 16 to 0! Rose had a fullback named Meriweather who averaged sixty yards a punt! We could use him now.

In 1898 Rose had a poor season. However, against Louisville, Rose went ninety yards in five plays through mud in just one minute and forty-five seconds for a T.D. Purdue put seven men on the All-Indiana team, I. U. added two and Rose contributed Stone and Meriweather. Mighty Notre Dame was unable to put a man on the first eleven.

In 1899 Rose had another mediocre season but don't feel too bad; We beat DePauw 16 to 0. Purdue only beat them 8-0 and Notre Dame squeaked by the Tigers 4 to 0.

## ROSE IN THE BIG LEAGUE

The turn of the century marked Rose's entrance into competition with big time teams. The Engineers suffered losses to Illinois and Purdue but battled Butler and DePauw to scoreless ties and got their only win over Wabash. We weren't outclassed though, because Illinois never gained more than ten yards on a single play and Purdue only scored two touchdowns, relying on field goals for the rest of their points.

1901 and '02 were lean years with losses of 56-0 to Indiana and two each to DePauw and Washington of St. Louis.

1903 marked the sign of things to come. Shortridge H. S. beat us in the second half 12-0 but we snapped back to take a pair from Terre Haute H. S. 11-6 and 25-0 and swamped Butler 31-0. We finished the season with a good 7 and 3 record. You had to be tough to play football in those days. At Franklin, the team dressed in a twenty degree room and then walked a mile to the game!

1904 started a string of eleven undefeated games. Shortridge beat us 10 to 5 (a T. D. was worth five points then) but we took two from Butler, two from Millikan and one from Indiana State, who finally fielded a team worthy of our varsity. Culver Military Academy (another high school) finally ended the streak in 1905 but that was the only loss of the year. 1906 was a poor year with a 33-0 loss to Vanderbilt being the worst one. Vandy also beat Georgia Tech 37-6, Texas 45-0, Ala-



Football team, 1906.



bama 78-0 and Mississippi 29-0 in the same year.

The next two years were also poor. A loss to Kentucky was highlighted by the Kentucky referee slugging a Rose player when he protested a decision.

### ROSE AGAINST THE GIANTS

1909 was a big year for Rose from the standpoint of competition. Rose opened against Illinois Normal and won easily 75-0. A 28-0 loss to Vanderbilt followed, then Notre Dame. Rose lost 60-11 but that was no disgrace. Notre Dame was ranked *third in the nation* that year and Rose was the only team to score a touchdown against them (we got two). The only other team to score on them was Michigan who got three points. Rose bounced back to take DePauw 8-5. We lost to Kentucky, then beat Butler. We lost to Purdue 24-3 (the closest we ever came to beating them) and closed with a win over Franklin.

The next few years were not spectacular. Rose suffered defeats to such teams as Purdue, Vanderbilt, Notre Dame and DePauw and beat Butler and St. Louis U. 1913 produced the most lopsided victory Rose has ever had. We beat Moore's Hill (who wasn't heard of before or since) 121 to 0.

The next year was Rose's worst defeat. We didn't win a game and crowned it with a 103-0 loss to Notre Dame, who didn't use a single forward pass. That proved that big time football had passed us up and the Rose and White was never again seen in South Bend.

A forfeit to Hanover in 1916 seemed to be well justified. Five times Rose was allowed only three downs to make ten yards. The crowning blow came near the end of the game with the score tied 20-20. A Hanover man was running with the ball and he was knocked out of bounds but kept going. He was knocked down and he crawled eight yards to the goal line and the score was allowed. Rose walked off the field.

1917 was a mediocre year but Rose beat Missouri 20 to 0, which is probably the biggest team we ever beat. "Doc" Orr and "Scroob" Howard

were the stars.

The following years were uneventful although we added St. Xavier to our list of big teams. 1923 started the rivalry with I. S. T. C. as we beat them 19-0.

In those days many unusual plays developed. The ball was not returned to the center of the field after it had been downed on the sidelines so a favorite trick was to run a play to one side so that the ball ended up on the sidelines. This meant that on the next play the whole line would have to line up on one side of the center and some terrific power plays were run.

Another trick was to sew a leather patch on every player's jersey, resembling a football. When the ball was snapped everyone would put his arms across his chest and run in a different direction. It took pretty good guesswork to find the ball carrier.

The Rose team put grease on themselves to make them hard to tackle and by the end of the half everyone was covered with grease. Phil Brown tells about the time Butler played us while he was in school. He played across the line from a fellow who chewed tobacco. Early in the game the Rose man was hit in the mouth. He had a trickle of tobacco juice out of one corner of his mouth and a trickle of blood from the other corner. Needless to say, Phil took a shower after the game.

Rose liked to run up the middle and they beat more than one fast team by flooding the sides of the field into a quagmire so that the only solid ground was—you guessed it—up the middle.

### THE COMING OF BROWN

Phil Brown roared into Rose in 1928 with a crash—we didn't win a game. It took Phil a couple of seasons to get warmed up but by 1930 he was going strong and won seven straight before suffering a 7-0 loss to I.S.T.C. That game ended in a riot that the police and fire departments had to break up.

The rest of the '30's brought good years and bad years but greater things were to come.

### THE RENAISSANCE

In 1941 Rose Poly began to regain some of its football glory. We were undefeated in seven games and Eddie McGovern was Indiana's leading scorer. We were the Indiana Conference champs.

1942 was the year of Rose's "Touchdown Twins" (which for the benefit of the freshmen were not a pair of guards named Sutton and White). They were McGovern and Hillenbrand. McGovern was the leading scorer in the nation with 165 points in six games, but wherever McGovern went Hillenbrand was sure to follow, including the goal line and he was the third scorer in the state.

Rose scored 262 points to their opponents 51 and only a 14-13 loss to Wabash kept them from being undefeated.

The war suspended activity and when play was resumed Rose was no longer among the mighty but as long as the Rose and White races onto the gridiron, the memories of yesterday will be fresh and clear.

A few records for our team to shoot at:

Largest score: 1913 Rose 121 Moore's Hill 0

Largest Homecoming Score 1942 Rose 69 Earlham 7

Most points in one year 1942—262  
And here is one for us to shoot for:

Largest crowd: 1909 Rose vs Franklin 2500 fans.



Nation's leading scorer in 1942, Eddie McGovern.



# Electronic Computers

By Norman Huntley, fr.

## PART ONE

It is a little known fact that some twelve years ago there were no computers in existence as we know them today, although the potentialities of such a tool were recognized as long ago as the early 19th century. Now, however, computers are used by practically every business and scientific organization in the United States which finds itself concerned with analyzing and comparing large quantities of data. Were it not for the electronic computer, the coming of the Atomic Age would have been long delayed, for analysis of the data necessary to mathematically assure the feasibility of nuclear and thermonuclear reactions required a magnitude of mathematical operations almost too difficult for the unaided human mind to handle. Computers

have the ability to do such difficult calculations continuously, rapidly, and with absolutely no error. As an example, there are some models which are able to give answers to as many as ten differential equations in ten unknowns in very short periods of time. On the lighter side, however, these same computers are versatile enough to be able to play checkers, index words in a book, and compose music and poetry.

The machines, in spite of their internal complexities, are made as functionally simple as possible in order to have the desired characteristic of versatility. Their inherent design provides them with the ability to carry through such basic operations as multiplication, division, addition, subtraction, comparison of number size, transposition of num-

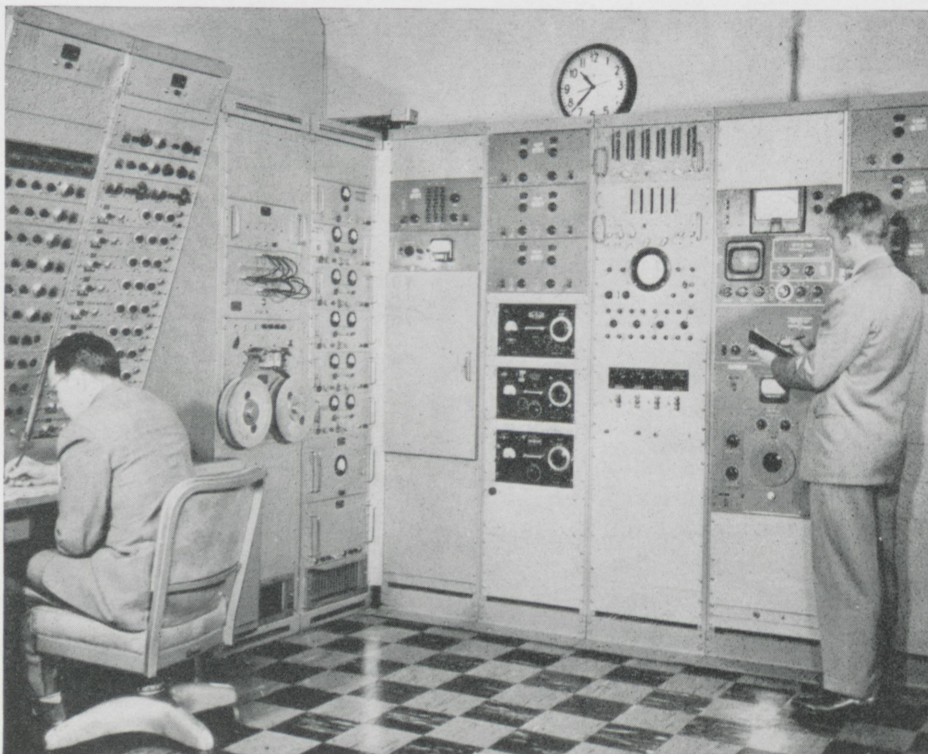
bers within the "memory", storing of data, erasing of data, and the printing of information to be read by the machine operator. The complexity of the computer, therefore, is not in its functioning, but in its memory which stores not only the data concerning the problem at hand, but also the necessary instructions (or program) for working the problem.

Proper and thorough programming for the method of solving a particular problem is a necessity, otherwise the machine will find itself receiving data to be processed and no logically complete method at hand for processing it. However, once a complete method of solution has been fed into the machine, it may be stored in the machine's "memory" indefinitely, if so desired, to be used later as occasion demands.

In addition, just as the level of human mental ability appears to be proportional to the brain's speed of operation and the number of brain cells available for fact storage (about  $10^{10}$  cells), so is the ability of an electronic computer determined by the amount of data it can store in its "memory" and the speed with which it can operate. Two of the largest computers now in operation, the IBM 704 and UNIVAC II, have million-bit memories and are able to produce a given bit of data in about  $10^{-7}$  seconds.

Thus, with respect to the central position it occupies in the function of the computer, it is quite easy to see that the memory device is, in large part, the determining factor in the operational ability of the entire machine. In fact, the usual method of determining the magnitude of a computer is by the amount of information that can be stored in its

*(Continued on Page 32)*

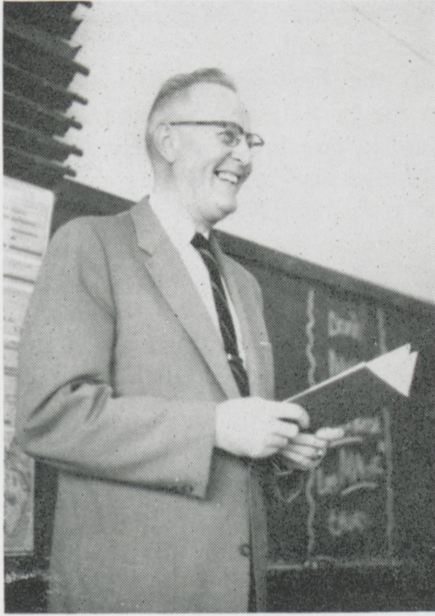


Typical Computer installation with a tape memory system.



# Meet The Faculty

By Jim Griffith, sr., e.e.



Professor John L. Bloxsome, Head of the Department of Humanities and Social Sciences.

"I can't get into extra-curricular activities — I'm too busy with school work." — a familiar cry in the halls of R.P.I., but few of us know the meaning of the word "busy" as well as Professor John L. Bloxsome. During his twenty-seven years at Rose Poly and in Terre Haute, Professor Bloxsome has held eleven presidencies, four chairmanships of Boards and Societies, three Trusteeships; has been on the Board of four organizations and a member of eight others — in addition to his "school work."

Mr. Bloxsome was born in 1905, at Marion, Indiana, received his preliminary schooling in nearby Pennville, and, after only three years at DePauw University as a Rector Scholar and member of Delta Upsilon Social Fraternity, received his A.B. degree and accepted a position as head of the high school English department at Alexandria, Indiana, where he met Miss Merceda Covalt. In the fall (just before the crash) of 1929, Professor Bloxsome was appointed Head, and only member, of

the Department of Humanities and Social Sciences at the Rose Polytechnic Institute. He lived as the faculty representative in Deming Hall until June of 1932, when he was married to Miss Covalt who was then teaching in Kokomo High School.

On the Rose campus Professor Bloxsome has been chairman of the committees for Freshmen, Library, Attendance, and Athletics. He also coached a fine debating team and served as Librarian, both for a number of years.

In the year 1936, Professor Bloxsome added eight more letters to his title; M.A., with the help of the University of Chicago and F.A.T.H.E.R., with the help of Mrs. Bloxsome and John Jr. The Bloxsome's also have a daughter, Janet, who is now a senior at Wiley.

Professor Bloxsome's interests soon spread into civic affairs. He was elected as a City School Board Trustee in 1947 and has served continuously on the Board since January, 1948, as its Secretary, Treasurer, and four times its President. He was also twice President of the Indiana School Boards Association, twice Chairman of the Mid-West Association of School Boards, comprising eleven Mid-Western states, a division of the National School Boards Association. His other presidencies are of the Indiana College English Association, Community Theatre of Terre Haute, Vigo County Public Welfare Board, Rotary Club of Terre Haute, Vigo County Chapter of the National Foundation for Infantile Paralysis, Wilson Junior High School Parent-Teachers Association, and Central Index, a Community Chest Agency.

He is a Past Master of Social Lodge No. 86 Free and Accepted Masons and of the Lodge of Perfection, Terre Haute Scottish Rite and

has been Chairman of the Board of the Centenary Methodist Church, the English Section of the Illinois-Indiana Division of the American Society for Engineering Education, and of several committees for the National School Boards Association. In 1955, he was on the program for the A.S.E.E. at their national convention. His other memberships include the American Association of University Professors, National Commission for Adult Education Finance, National Council of Teachers of English, Vigo County Historical Society, National College English Association, Indiana Teachers of Speech and the Indiana Academy of Social and Political Sciences.

Mr. Bloxsome has spent several of his summers in industrial jobs and is visiting lecturer at Indiana University. He studied one summer on a fellowship at Case Institute. He has taught several Adult Education classes throughout the state and has been guest speaker at many meetings of Rose Tech Clubs.

Governor Schricker in 1951, presented Professor Bloxsome with the Distinguished Service Award as "the school board member in Indiana who has made the greatest contribution to public education." He has also been named to Who's Who in Indiana and to Who's Who in the Mid-West and is listed in the Directory of American Scholars.

This is far from a complete listing of Professor Bloxsome's activities both in and out of the field of Education, but enough to prove that school teachers do a little something besides teach. Mr. Bloxsome truly is a living example of "busy."

Incidentally Professor Bloxsome has been Faculty Advisor for the Rose Technic for 16 years and his hobbies are grading papers on Sunday, cutting jokes from the Technic, and playing the clarinet.



# Controversial Corner

By Norman Huntley, fr.

## A CASE AGAINST COMPULSORY MILITARY TRAINING

The introduction of compulsory military training into our daily lives does not appear to have solved as many of our national problems as the originators of the plan initially hoped it would. On the contrary, it has created a great many very urgent, very demanding situations, especially in the administration of the Selective Service laws. One of the most important of the difficult problems facing the administrators is the question of deciding who shall serve and who shall be exempt.

According to the law, no able-bodied, unmarried male between the ages of 18 and 26 is exempt from military call at any time. To the mass of male college students across the nation, this description applies markedly well. In the face of this situation, the average college student must either serve an active duty term plus the required reserve period upon the completion of his schooling, or commit himself to an extremely lengthy period of active reserve time which demands of him a part of each summer for military training. While this may appear to approach an ideal arrangement, I contend, in one particular case at least, that it is detrimental to the welfare of our nation as a whole and contradictory to the purpose for which compulsory military training was instituted — the strengthening of our national security. My objection lies in the fact that the law does not intelligently discriminate between just any member of the total group of college students and those particular students who are successfully pursuing a scientific or engineering career.

During the period of the Korean Conflict, the Selective Service Administration and the military, as a whole, were woefully unrealistic in their attitude toward science and engineering students. So obsessed were they with enforcing the young

student's "patriotic duty," that, with little regard for the consequences, they plucked promising young scientific men from practically every campus in the nation, not considering those student's greater long-range usefulness in scientific fields. The National Science Foundation, for one, earnestly pleaded for a reappraisal of this shortsighted action, but, as is so often the case, could do little toward causing the authorities to alter their tactics. As a result, with due indignation, one must lay much of the blame for the now severe shortage of scientists and engineers upon that obstinate and myopic action instituted by the Selective Service Administration. I am fully aware that such other factors as student disinterest in science studies and an increase in the demand for scientists and engineers must be considered as contributing to the present shortage; however, and I do not stand alone in this, I consider that these factors have merely emphasized the original error to the extent that the nation now has an urgent need for 35,000 to 40,000 engineers alone.

It should be common knowledge by now that our future, not only as a nation, but as a democratic system of government as well, hangs, in large part, upon our acute ability to exceed the Soviet Union in scientific and technological progress. Theodore Roosevelt once said, "Speak softly, but carry a big stick." Much of our present scientific efforts are directed toward the development of that "big stick"; however, to do this requires a tremendous army of scientific men. To bring my point home with effect, our "cold war" opponent has been for the past twenty-five years, and is now, producing something in the area of 1½ to 2 times as many men of science than we in spite of our recent best efforts to equal them; and they ap-

pear to be ahead of us in several of the vital fields of basic scientific research as well.

In the face of this threat, what are we to do? Are we to continue to penalize our budding scientists and engineers for being young, healthy, and unmarried? Are we to continue to penalize our nation and jeopardize its future through an irrational unwillingness to recognize the intrinsic value of these students, a value which would be acknowledged and properly utilized by excluding them from military duty. They are as essential to our national safety as a standing army, and, as such, should be allowed to pursue their course of study and be encouraged in every way possible to do so.

Certainly, no course of research will ever be useful unless it is carried to completion. In the same sense, no course of scientific study will ever be useful for our national security unless it is allowed to continue undisturbed. When the military service takes such a promising student in the midst of his graduate or undergraduate studies, or upon completion of them, the continuity of his training is destroyed and much valuable time is wasted while the ex-student spends between one and two unproductive and unstimulating years under conditions which, for the most part, tend to vitiate the scientific personality, if I may use that term, of the good engineer or scientist. The seriousness of unselective army induction may be inferred from the fact that in 1954 alone, the enrollment of students in graduate science study dropped almost 4000, and that induction during the same period disrupted the graduate studies of another 3500 students.

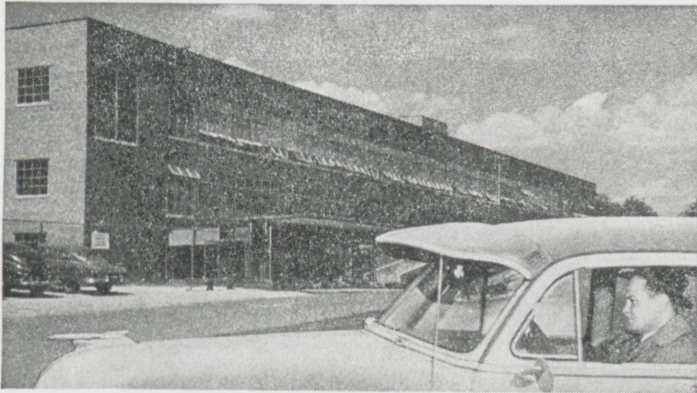
As for the student who must spend a part of each summer in military training, it would be better for him and for our nation that he spend his

*(Continued on Page 34)*



# Meet Dick Foster

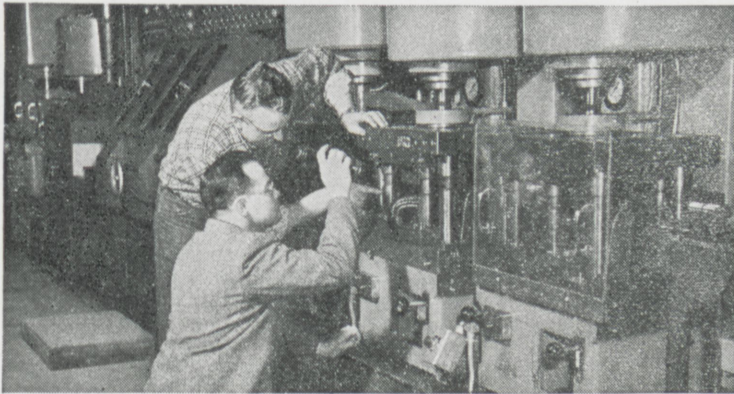
*Western Electric development engineer*



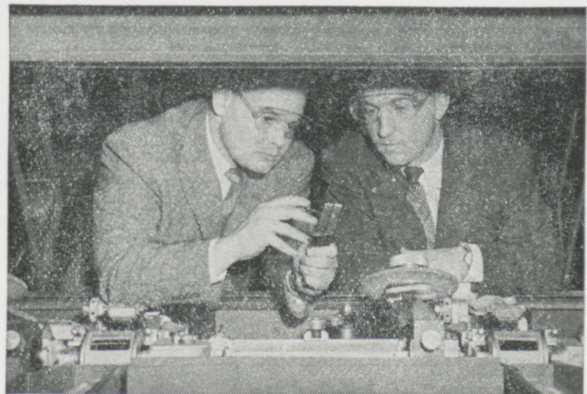
Dick Foster joined Western Electric, the manufacturing and supply unit of the Bell System, in February 1952, shortly after earning his B. S. in mechanical engineering at the University of Illinois. As a development engineer on a new automation process Dick first worked at the Hawthorne Works in Chicago. Later, he moved to the Montgomery plant at Aurora, Illinois where he is pictured above driving into the parking area.



Dick's day may begin in one of several ways: an informal office chat with his boss, a department "brain session" to tackle a particularly tough engineering problem (above); working with skilled machine builders in the mechanical development laboratory; or "on the line" (below) where he checks performance and quality and looks for new ways to do things.



Here Dick and a set-up man check over the automatic production line used to manufacture a wire spring relay part for complex telephone switching equipment. This automatic line carries a component of the relay on a reciprocating conveyor through as many as nine different and very precise operations—such as percussive welding in which small block contacts of palladium are attached to the tips of wires to within a tolerance of  $\pm .002$ ".



Examining the plastic molded "comb" components of the wire spring relay Dick recalls his early work when he was involved in working-up forming and coining tools for the pilot model of the automation line for fabrication of wire spring sub-assemblies for relays. At present he is associated with the expansion of these automation lines at the Montgomery Plant.



Dick finds time for many Western Electric employee activities. Here he is scoring up a spare while tuning up for the engineers' bowling league. He is active also in the golf club, camera club, and a professional engineering society. Dick, an Army veteran, keeps bachelor quarters in suburban Chicago where he is able to enjoy the outdoor life as well as the advantages of the city.

Western Electric offers a variety of interesting and important career opportunities for engineers in all fields of specialization in both our day-to-day job as the manufacturing and supply unit of the Bell System and in our Armed Forces job.

If you'd like to know more about us, we'll be glad to send you a copy of "Your Opportunity at Western Electric" which outlines the Company operations and specific job opportunities in detail. Write: College Relations Department, Room 1030, Western Electric Co., 195 Broadway, New York 7, N. Y.



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# Fraternity Notes

## SIGMA NU

Beta Upsilon initiated eight men this month. The new Brothers are Bob Crisp, Jerry Parr, Chuck Crum, Bob Jackson, Ned Kurtz, Jim Neal, Ron Shaw and Don Slack.

After initiation Brother Bob Crisp was awarded the 'Outstanding Pledge Trophy' for merit and outstanding services performed during pledgship. Brother Jerry Parr was then awarded the 'Scholarship Trophy' which is presented to the pledge having the highest cumulative average.

On November 10th, the new actives "topped off" the occasion with the traditional 'New Initiates Dance,' held at the chapter house. Running true-to-form the new actives provided the festive atmosphere, which was thoroughly and completely consumed by the "old actives."

Another potential link was added to the chain of Sigma Nu with the pledging of Dan Maffucci. Thus the chain becomes longer and stronger.

The fraternity is looking forward to the basketball season. We think we have good chances in winning the 'Interfraternity Basketball Trophy' in that we have four starters returning from last year.

Kent Sharp

## THETA XI

The TX Tigers, inspired by Brother Bock, have completed a successful season chalking up six wins and no losses. The fraternity is eagerly awaiting the IF football trophy, which will be placed on the living room mantle — waxed daily by Brother Blickhahn.

The brothers of Kappa wish pledges Buxson, Lucas, Rahn, Nowling, Thimnel, Stearley, and Hassler a successful pledgship. Congratulations are also in order for Bill Stafford who is now engaged to the attractive Miss Louise Talbert, Ken Hollingsworth pinning Miss Shirley Purcell, Bob Briers pinning Miss Nancy Lyon, Bill (daddy) Starks pinning Miss Mary Ruth Allen, and

Scary Leavitt surrendering his pin to Miss Marge Thralls. The chapter also wishes Gene Blastic much success in his new office as Junior Class President.

Mr. Richard Jones, assistant traveling secretary of the Theta Xi Fraternity, visited the Rose Campus this month. Dick complimented the chapter on its continual progress in the last few years, not only on campus, but from a national standpoint.

This year homecoming proved to be not only a traditional celebration for old grads, but a social highlight as well for the TX's. Most of this new found enthusiasm was probably due to the many good times shared by the brothers in building our "Magical Elephant" to compete in the house displays. With the help of a few very talented "Magical Elephant Builders" from St. Mary-of-the-Woods College, we were able to turn out an attractive display, even though it didn't win us the trophy.

Bob Coma

## ALPHA TAU OMEGA

Pin talks are a great institution! If it weren't for these talks, the Taus would never know who our secret romeos are. Cupid really has been working on the sly because congratulations are due for the following Taus. Ron (Poos) Meredith is engaged to Roberta Cole, OX Arnold has pinned Joanie Sutherland — OX, I'll never get pinned, Arnold had better watch out for those phone calls and football games. Bart Hartsock has given away his single life and is engaged to Kathy Moore. Bob Mewhinney has pinned Joanie Kochendoerfer from Dayton, Ohio. He really surprised Kuch when Bob borrowed his car for the weekend. Never thought he would go to Dayton. Bob Dinning is pinned to Doris Colyer. Silent Bob really floored us at home-coming. What a secret romeo. Wow! Cappy Stevens has pinned Nancy Lou Cheek. Congratulations to all of the Brothers.

Social events have left us gasping

for time. A November Hay-Ride gave the bathroom baritones a chance to show just how good they really are. We really had a wonderful time even with all the baying at the moon. An open house with the Alpha Omicron Pi's from I.S.T.C. gave us a chance to meet some of the sorority girls.

Currently the Taus and the Delta Gamma's are planning the annual Christmas Party. Really makes one realize how fortunate he is when we give toys to these little boys and girls. We've got a new candidate for Santa—Mike Munro. Got him on the scales and that little old 246 rolled up. Congrats Mike. Mom's cooking has a walking advertisement roaming about the halls of Rose.

Congrats to TX on their winning the intra-fraternity football trophy. We tried hard to win and still had a lot of fun.

Congratulations are in order to Paul Harder and Bob Burnter for their election as President and Vice President of the Student Council.

Also Congratulations to our new Brothers: Max White, Vern Fellows, and Chuck Skidmore. Glad to have you as Brother Taus.

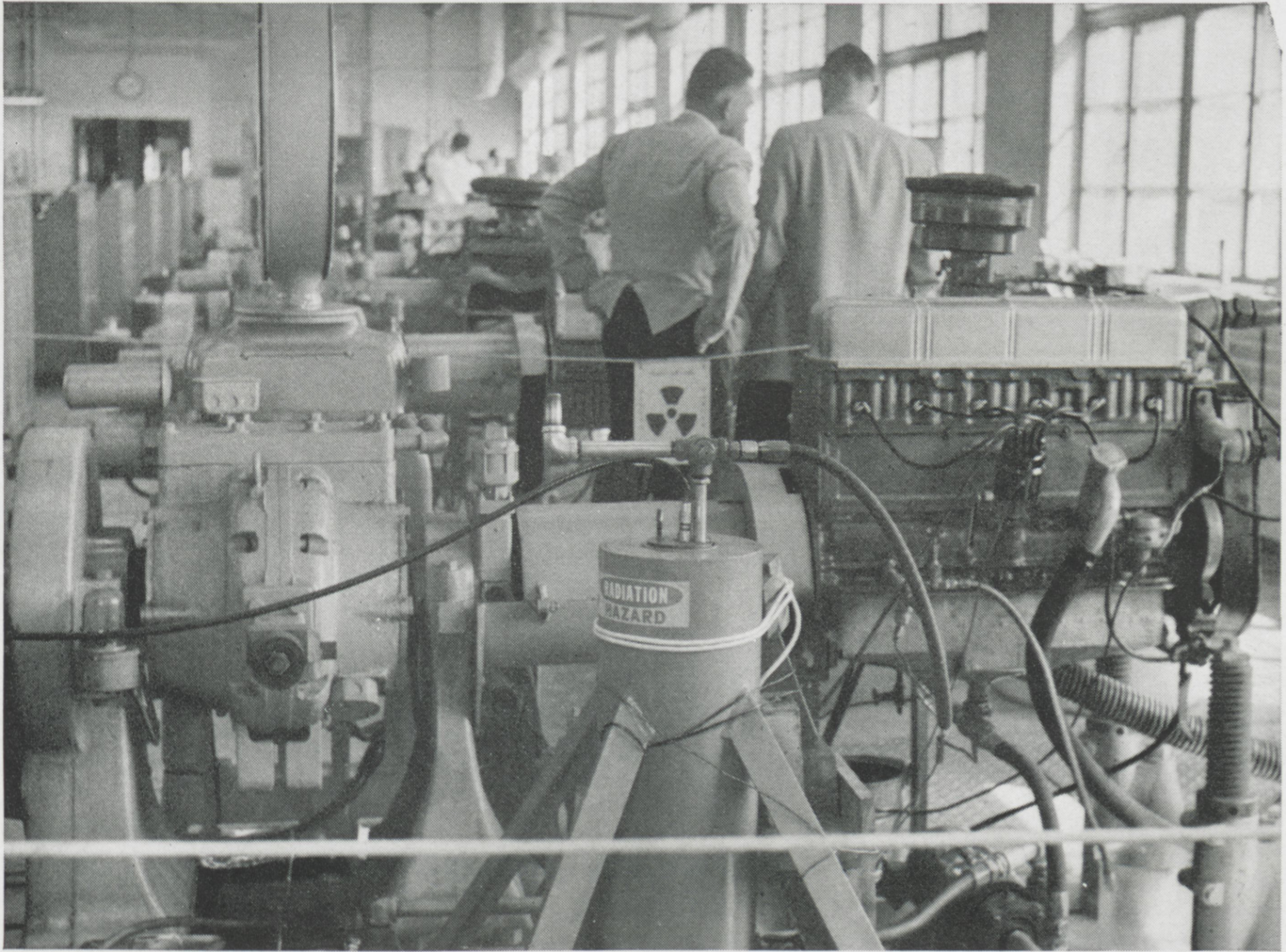
Also congratulations to Jack Fenoglio on his election as Sophomore Class President. Tom Reese

## LAMBDA CHI ALPHA

The Lambda Chi house was really jumping during the month of October with several parties and two open houses. Homecoming weekend along with our annual White Rose Dance in the spring are the social events of the year. This year's homecoming weekend started with a buffet supper for the alumni, members, and dates, Friday evening before the bonfire. Food of all varieties was everywhere and before any of us could go to the bonfire we all had to sit awhile and talk over "the old times." After the bonfire a party was held at the house that was quite merry and enjoyed by all. Singing the old

(Continued on Page 42)





*Modern and advanced engines log up hundreds of test hours daily in Standard's automotive laboratory at Whiting. Radioactive carbon traces deposits in the guarded engine (foreground).*



## Would you like to work on the same team as this man?

LAMONT ELTINGE is a group leader in the Automotive Research Division of Standard Oil's great Research and Engineering Laboratories at Whiting, Indiana. He and his group dig freely and fruitfully into just about every area you can think of in diesel, automotive, gas turbine, and jet fuels. Current studies range from air pollution problems arising from diesel smoke to laboratory use of radioactive carbon tracers for the basic study of deposits in gasoline engines.

Mr. Eltinge earned his B.S. in mechanical engineering at Purdue in 1947. He is a member of SAE, Tau Beta Pi, Sigma Tau, and Pi Tau Sigma. Along with the important contributions

he makes to Standard as a regular member of our team, he finds time to attend Illinois Institute of Technology where he recently received his M.S., and takes an active interest in church work

Lamont Eltinge and hundreds of young men like him are going places and doing things at Standard Oil. Each concentrates on his own special field of interest and experience, but none is limited to it. Chemists, metallurgists, engineers, physicists and others maintain a continuous relationship for the broad exchange of ideas. Perhaps you, too, would enjoy membership on Standard's team of engineers and scientists.

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# Lightweight Trains

By Joe Bronnert, soph., e.e.



To compete with ever increasing services offered by the other travel methods, U. S. railroads are trying to spruce up their passenger services with new, lightweight cars. It also means that some of the roads plan to make their trains faster and more economical to run by adopting lightweight locomotives to haul the new cars. (The Pennsy says, "that the problem right now is not new motive power, but how to build passenger cars that can travel as fast as the engines. When cars can hug the rails better than engines, that will be time enough to worry about new engines.")

Earlier this year, the "Jet Rocket," new streamlined stainless steel beauty of the Rock Island Lines, entered regular service on the 161-mile long route between Chicago and Peoria, Ill. And, as a glance at the timetable will indicate, the passengers have been happier ever since. For the train reduces running time for the trip to a mere two and one half hours—and that includes making five intermediate station stops. But to the experienced rail traveler, as well as the casual trackside observer, the real difference between this speedster and other streamliners of today lies in design. It's lighter,

lower, and has bigger windows than ever. Fuel costs are cut in half, and there's a host of other engineering advances which provide a new approach in coach car comfort, safety, and ease of maintenance.

The 489-foot long train is powered by a diesel-electric locomotive and seats more than 300 passengers in its four gleaming all stainless steel-sheathed cars. Unlike conventional equipment, however, each car is built in three sections which literally bends at the joints. This feature of flexibility, coupled with the train's thirteen-inch lower center of gravity, and unique guided axle construction, reduces side-sway considerably. Thus the train can take curves at high speeds in greater safety.

The bright stainless steel exterior on the coaches provides more than just beauty and glamour appeal. The strength-to-weight ratio of stainless steel permits the use of light, but exceptionally strong sheets of metal for enclosing the cars. This ensures maximum strength for safety's sake, while keeping weight down to a minimum. In fact, the weight of each car is one half that of standard coaches.

Maintenance is reduced substantially, too, through the use of stainless steel. Since the metal resists rust and corrosion and is so easy to clean, the exterior will require only a simple periodic washing to maintain its shining, natural beauty.

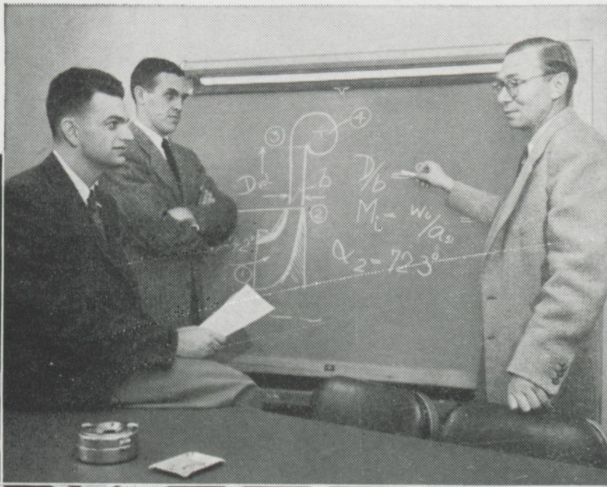
American railroaders have to take their hats off to some of the performances of the French and Italians. The flossiest and most radically designed trains in the world are run the 195 miles between Florence and Milan, Italy, at speeds of 100 mph. The world's fastest stop-to-stop run was over that route at a 102 mph average, with top speeds up to 126 mph.

A lightweight streamliner, the pastel-colored Italian train features an observation car at the front, instead of the rear, where passengers can "play engineer," touches 107 mph on runs from Paris to Lyon at 90-plus averages for 140 miles.

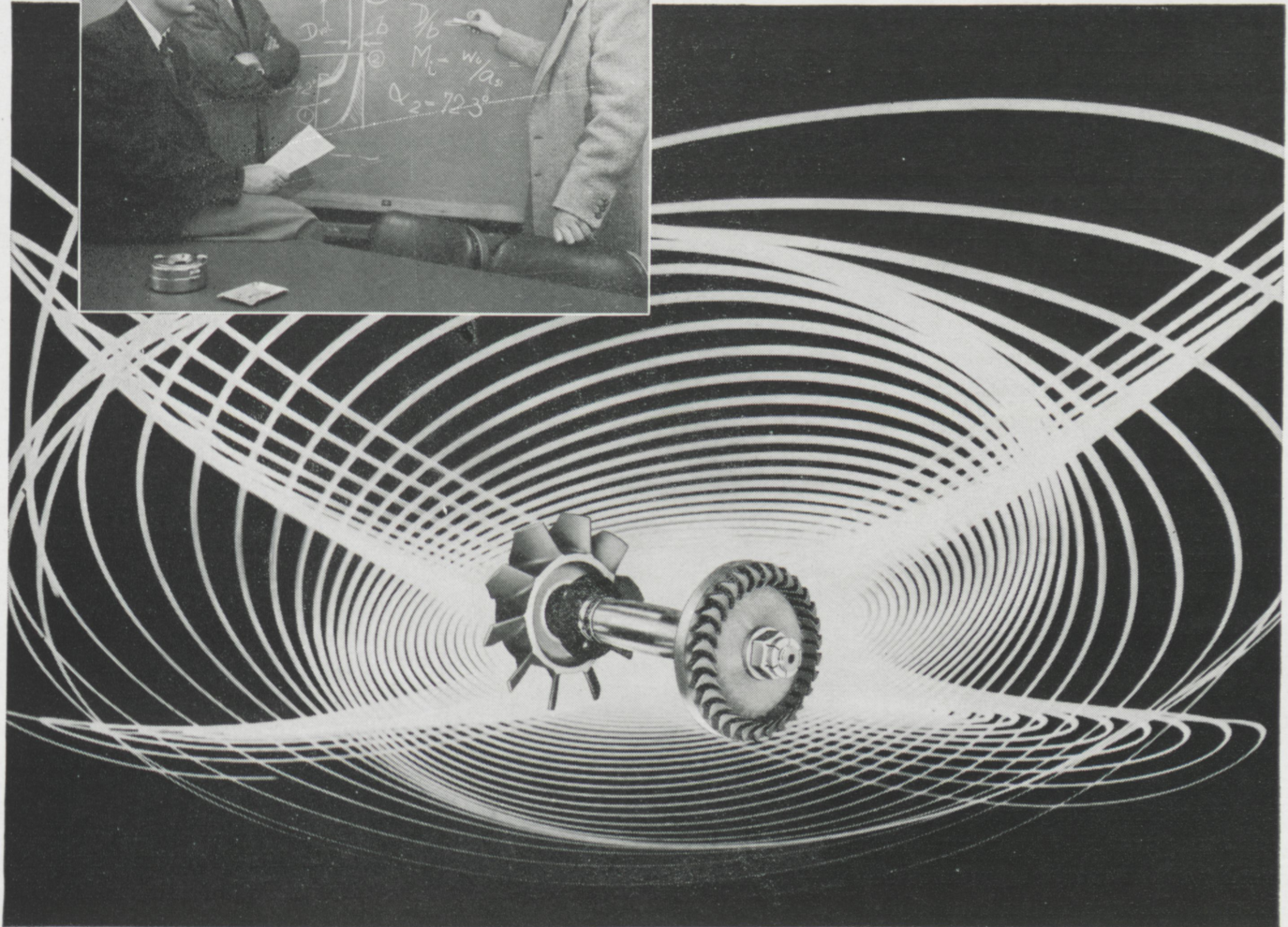
But as all's said and done, American Railroads are becoming more streamlined every day with the additions of the Pennsylvania; Santa Fe; New York, New Haven & Hartford; and the New York Central Railroads in the lightweight train swing.



# To the engineer who intends to blaze new trails...



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# Campus Survey

By Larry Logue, soph., e.e. and Dan Mook, soph., m.e.

## A.I.E.E.

The student branch of A.I.E.E. journeyed to Louisville, Kentucky on October 24 to visit General Electric's Appliance Park. The men from Rose were made honorary Kentucky Colonels on their arrival at the plant by being presented with Kentucky Colonel ties to wear throughout the day.

In the morning the group toured the plant's refrigerator manufacturing and testing areas. After a luncheon, which included a talk by the refrigerator division engineering director, was a tour of the washer and dryer manufacturing plant. The tour ended with a question and answer period conducted by Ernie Shell, '43, after which the "Colonels" returned to the Hoosier state.

## POLITICAL MINDED STUDENTS

Though it's true in the State of Indiana that eighteen-year-olds can't vote, never let it be said that they, as well as older people, don't take an active interest in politics.

Recently, on November 5th, the eve of election day, students from Rose successfully organized an impromptu parade supporting Mr. Handley in the race for governor of Indiana. Although much campaigning was done for Mr. Handley, the main purpose seemed to be to defeat the local candidate.

The parade, composed of Rose students and maybe a few from ISTC, seemed to upset local officials and before the evening was over, nearly ten students were escorted to police headquarters. The demonstration was in no way unorganized and proceeded in a rather orderly fashion contrary to reports passed by a few "individuals."

The few who were taken downtown were released and turned over to the Discipline Committee at Rose.

## MODULUS

SIXTEEN — yes, sixteen pages of

color are included in the '57 MODULUS! This year's MODULUS proves to be the best one yet. Thanks to the ingenuity of the editor, Bob Burtner, a unique idea of layout was conceived, dealing with the Rose Student, his work, his play, where he lives, and his spiritual life.

Several new ideas were brought to mind at the yearbook conclave held at Indiana University in October. The editor and Crone Knoy, Business Manager, attended the conclave and found that our yearbook compares favorably with the big ten college yearbooks and far surpasses those yearbooks of other schools our size.

Thanks to the hard working Layout and Copy Editors, Harry Bitner and Bob Hall, we are now ahead of our first deadline. Doing a wonderful job of coordinating the staffs, is Ron Reeves, Managing Editor.

This year we have altered our publication procedures in order to insure delivery of the book before the end of the school year. This has been the fault of the book in the past, but this year by special arrangements with Edwards Brothers, Inc., Lithographers, we have alleviated this situation.

Now, you ask, "How can I get my copy of this stupendous 1957 MODULUS?" It is very simple. Just drop in the MODULUS office between 10:00 a.m. and 1:00 p.m. any week day, or see Jim Martin, Jerry Marlow, Vern Fellows or Bob Doom. Prices are as follows: \$3.75 until December 1; (Better Hurry), \$4.00 from December 1, to April 1; and \$4.25 from April 1, to delivery date.

Get on the stick and buy the biggest bargain of your lifetime!!

"Ernie" Crone Knoy,  
Business Manager

## ELEGY TO AN ENGINEER'S SWEETHEART

Here is another side of the story which appeared in last month's

Campus Survey. Reprinted from "The Bent of Tau Beta Pi."

Verily, I say to you, marry not an engineer;

For an engineer is a strange creature possessed of many evils;

Yea, he speaketh eternally in parables, which he calls formulae;

He wieldeth a calibrated stick which he calls a slide rule, and his Bible is a handbook.

He thinketh only on stresses and strains and without end on thermodynamics.

He showeth only a serious aspect and seemeth not to know how to smile.

Neither does he know a waterfall save by its power, nor a sunset except that he must turn on the lights, nor a damsel except by her live weight.

He carries always his books with him and entertaineth his sweetheart by steam tables.

Verily, though his damsel expecteth chocolates, when he calls, she openeth the package but to find ore samples.

Yea, he holdeth his damsel's hand but to measure the friction thereof.

His kisses are only to test viscosity, and in his eyes there shineth a far-away look, but neither that of love nor longing—rather a vain attempt to recall the formula.

There is but one key to his heart—that is Tau Beta Pi.

The only love letter which he yearneth to receive is an "A;"

When his damsel writeth of love and signeth with "X's," he taketh not these symbols for kisses—but for unknown quantities.

Even as a boy, he pulleth girls' hair to test its elasticity;

As a man, he discovereth different devices, for he would count the vibrations of her heartstrings and reckon the strength of her materials.



He seeketh ever to pursue scientific investigations;  
Even his flutterings he counteth as a vision of beauty, and inscribeth his passion as a formula.  
His marriage is a simultaneous equation involving two unknowns—and yieldeth diverse results.  
Verily, I say to you, marry not an engineer.

### TAU BETA PI BONE-UP SESSIONS

The R.P.I. "student brain trust" is holding "bone-up sessions" for freshmen this year. Before each test in Math, Chemistry, or Engineering computations the Frosh are invited to attend evening review classes taught by the Tau Beta Pi members. Attendance at the sessions has been very good and the Frosh seem to be cracking the tests. Congratulations to Tau Beta Pi, keep up the good work.

Afterthought: we have been asked when the first bone-up session would be held in applied mechanics, but Tau Beta Pi members have sidestepped the issue.

#### R.P.I. vs. I.S.T.C.

This year's homecoming saw a brief revival of the traditional rivalry between students at Rose and Indiana State. Both campuses were scarred but Rose Frosh managed to keep the bonfire intact and captured two intruders who were appropriately punished. One evening was particularly enlivened by mass gathering of students on both campuses and the arrival of police to maintain the peace. After the shouting was all over, the student councils of both schools met to reaffirm the old peace treaty and to inform their respective student bodies that this is all really a thing of the past. Well, I suppose it's over for another year.

### ROSE SCHOOL SPIRIT

By BILL PERKINS, fr.

"The men at Rose Polytechnic Institute don't seem to have very much school spirit." That would probably be the opinion voiced by a visitor at a Rose football game, basketball game, or pep session.

The facts seem to support the visi-

tor's conclusion, too. Attendance at Rose athletic contests is very poor, regardless of the sport. At R.P.I.'s first home football game this year, the crowd numbered only a meager two hundred, of which sixty or seventy were Freshmen supposedly compelled to attend. Add to that sixty or seventy the number of faculty members and visitors present, and we find that less than one hundred, less than one third, of the upperclassmen were present.

From talking to upperclassmen, I find that attendance at basketball games, although better than at football contests, is still miserable. The spring sports—track and baseball—are played before little or no audience. Pep rallies seem to be a flop, too; one was held after a convocation recently, and a large percentage of the two hundred men who attended the convocation left before the rally.

If our visitor who made the statement would investigate certain other school activities, again he would say, "Lack of school spirit!" The "Rose Technic" has trouble getting enough competent help, and so does the MODULUS, the yearbook. Sales of the MODULUS are low, too; in 1955-1956 only two hundred fifty of the four hundred fifty enrolled students bought a yearbook. More signs pointing to lack of school spirit!

But let's quit looking around Rose to see where we don't have school spirit, and let's see if we do have any!

Let's notice the happenings our visitor wouldn't notice in his short stay. The constant Freshman-Sophomore haggling—the Freshman Commandments, "laking", road hikes—it's all school spirit. The towering Homecoming bonfire the Freshmen must build—it takes school spirit to build that. Maybe the "Technic" and the MODULUS aren't as well supported as they could be, but look at the many other flourishing organizations—the Rifle Club, the Camera Club, the Hi-Fi Club.

To top all these examples of school spirit we point with pride to the record of financial support from our alumni. If after they graduate, Rose men donate enough to the school to pay for new buildings and improvements, then they must have plenty of school spirit.

Perhaps the visitor was right if he had made his statement apply to particular phases of school life, such as athletics and literary publications. Rose, however, was not intended to have great football teams and literary works of art. Rose was intended to build men and develop engineers. That she does, and she instills plenty of school spirit in her men.



Dr. Bankoff speaks at Tau Beta Pi Banquet.



# Research and Development

By Phil Kennedy, jr., e.e. and John Kassebaum, jr., e.e.

## NEW WESTINGHOUSE METALS PILOT PLANT TO ANSWER NEED FOR NEW ALLOYS

A metals Pilot Plant designed to bridge the gap between laboratory and commercial production of new alloys and processes has been opened by the Westinghouse Electric Corporation at Blairsville, Pa. The \$6,000,000 facility combines under one roof virtually all types of metal processing equipment.

Created to be the final link in Westinghouse's rapidly expanding metallurgical development facilities, the 173,000 square foot plant will help provide the new and better alloys that product design engineers are now demanding. The plant is designed to process both wrought and cast alloys with equipment flexible enough and large enough to permit actual manufacturing conditions. In this way, the Blairsville plant is more than a pilot plant, and its moderate production output will uncover problems that can only be found under actual manufacturing conditions.

Need for the plant became apparent several years ago when it was recognized that the key to advanced design in steam and gas turbines, generators, transformers, nuclear power reactors, etc. was the development of new metals having better temperature, strength, and magnetic characteristics. New titanium, molybdenum, expansion, and resistance alloys show particular promise.

As important as the alloys themselves is the need for practical commercial processes to manufacture these alloys into finished products. With this in mind, a large portion of Blairsville is concerned with processing techniques such as forging, hot and cold rolling, heat treating,

shell mold and investment casting, and powdered metallurgy.

In choosing the equipment for the plant, Mr. Warren Trigg, manager of the Blairsville plant, stressed flexibility and multipurpose usefulness.

As an example, he cited the induction vacuum melting installation that can accommodate heats ranging from 300 to 2000 pounds. This installation can be used for vacuum casting of large ingots as well as low temperature vacuum annealing of titanium.

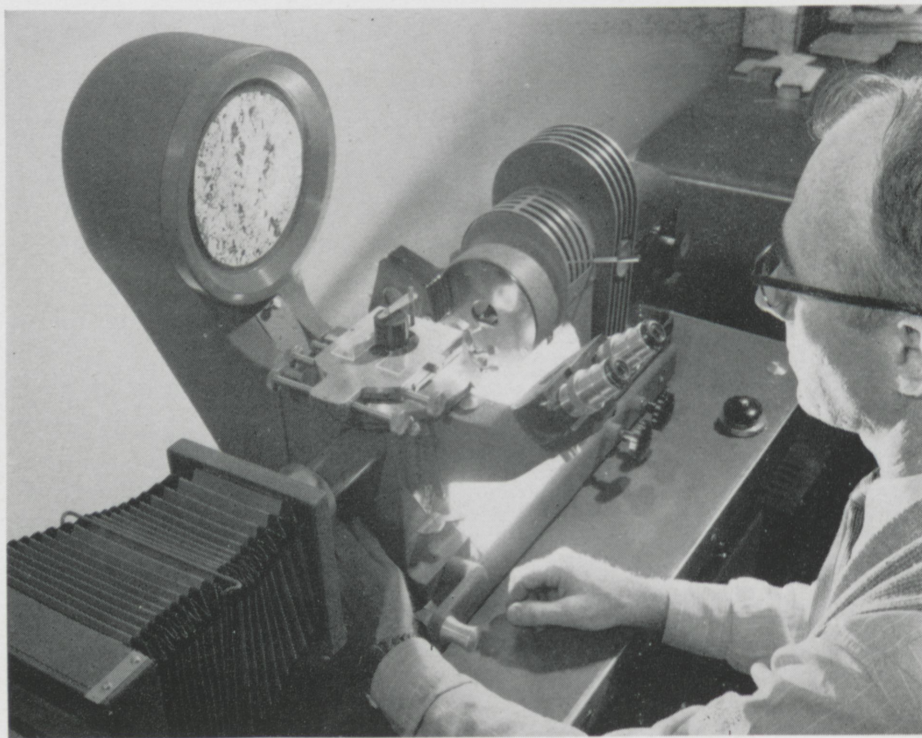
"Equipment in the Blairsville plant is larger than that found in most pilot plants," Mr. Trigg said. "This permits the manufacture of specialty metal products at competitive costs, thus allowing reasonable loading of tools that normally cannot be loaded fully on development work

but also provides trained operating crews for all the equipment. It is an important consideration," he added, "if rapid effective pilot plant service is to be provided."

The plant is situated on a 540 acre tract 40 miles east of Pittsburgh and has been designed to make possible future expansion easy. But room is included within the present facilities for the manufacturing of nuclear reactor fuel elements.

Included in the plant, believed to be the largest pilot plant of its type in the country, is an 18,000 pound and 3 smaller forge hammers; a 1000 ton steam-hydraulic forge press; 7 forge furnaces; 3 induction melting furnaces varying in size up to 5000 pounds; a cold hearth furnace; a

*(Continued on Page 34)*



A Balphot Metallograph for determining grain size or showing microstructural abnormalities. The instrument is used at the new Westinghouse pilot plant.





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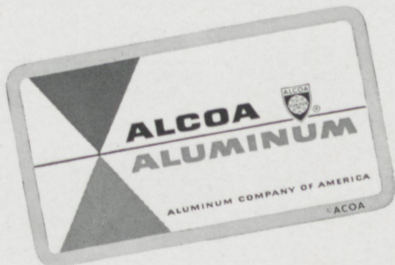
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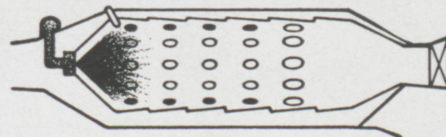


One indication of accomplishment in the combustion field: the J-57 engine, augmented by afterburner, provided the thrust which made supersonic flight practical for the first time.

This special periscope gives Pratt & Whitney Aircraft engineer a close-up view of combustion process actually taking place within the afterburner of an advanced jet engine on test. What the engineer observes is simultaneously recorded by a high-speed motion picture camera.



# at Pratt & Whitney Aircraft in the field of Combustion\*



Historically, the process of combustion has excited man's insatiable hunger for knowledge. Since his most primitive attempts to make use of this phenomenon, he has found tremendous fascination in its potentials.

Perhaps at no time in history has that fascination been greater than it is today with respect to the use of combustion principles in the modern aircraft engine.

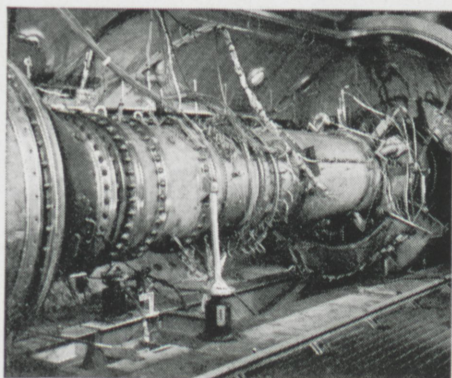
At Pratt & Whitney Aircraft, theorems of many sciences are being applied to the design and development of high heat release rate devices. In spite of the apparent simplicity of a combustion system, the

bringing together of fuel and air in proper proportions, the ignition of the mixture, and the rapid mixing of burned and unburned gases involves a most complex series of interrelated events — events occurring simultaneously in time and space.

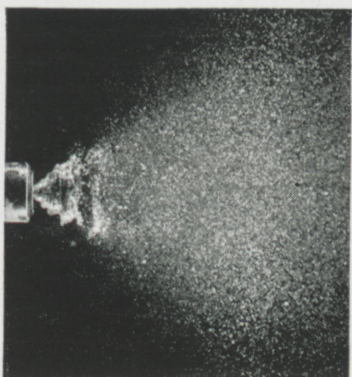
Although the combustion engineer draws on many fields of science (including thermodynamics, aerodynamics, fluid mechanics, heat transfer, applied mechanics, metallurgy and chemistry), the design of combustion systems has not yet been reduced to really scientific principles. Therefore, the highly successful performance of engines

like the J-57, J-75 and others stands as a tribute to the vision, imagination and pioneering efforts of those at Pratt & Whitney Aircraft engaged in combustion work.

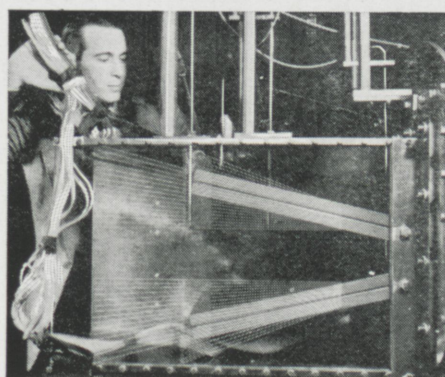
While combustion assignments, themselves, involve a diversity of engineering talent, the field is only one of a broadly diversified engineering program at Pratt & Whitney Aircraft. That program—with other far-reaching activities in the fields of instrumentation, materials problems, mechanical design and aerodynamics — spells out a gratifying future for many of today's engineering students.



Mounting an afterburner in a special high-altitude test chamber in P&WA's Willgoos Turbine Laboratory permits study of a variety of combustion problems which may be encountered during later development stages.



Microflash photo illustrates one continuing problem: design and development of fuel injection systems which properly atomize and distribute under all flight conditions.



Pratt & Whitney Aircraft engineer manipulates probe in exit of two-dimensional research diffuser. Diffuser design for advanced power plants is one of many air flow problems that exist in combustion work.

\*Watch for campus availability of P & WA color strip film on combustion.



*World's foremost designer and builder of aircraft engines*

## PRATT & WHITNEY AIRCRAFT

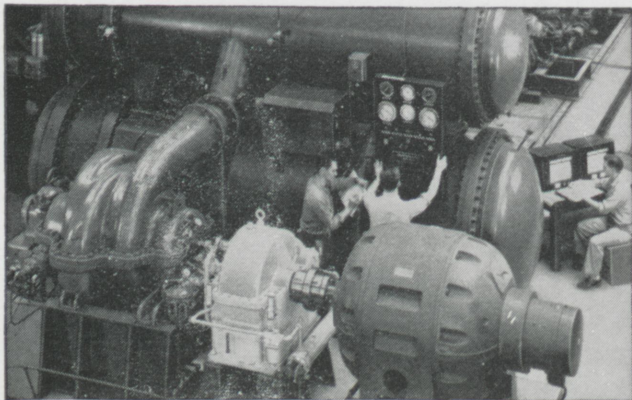
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**COMPREHENSIVE TESTS** are run on a Worthington centrifugal refrigeration unit (lower left) now in service as one of the Arabian American Oil Company's central air conditioning units in Dhahran, Saudi Arabia.

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That's why we built one of the world's largest hydraulic test stands at our plant in Harrison, New Jersey. Here, over a half-acre "lake," we can check the performance of anything from a fractional horsepower unit to pumps handling over 100,000 gallons a minute. When you realize there are thousands of sizes and types of centrifugal pumps alone, you get an idea of the versatility we had to build into our proving-ground.

Naturally, our new test equipment is a big help to our research engineers, as well as our customers. Now they get performance data on products quickly and accurately. Using it, we can save months, even years, in developing new Worthington fluid and air-handling devices—equipment for which this company has been famous for over a century. For the complete story of how you can fit into the Worthington picture, write F. F. Thompson, Mgr., Personnel & Training, Worthington Corporation, Harrison, N. J.

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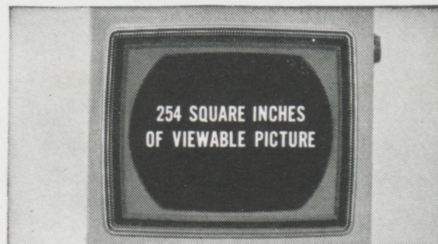
Your talents are needed in research — in TV receiver design — in network operations — even "backstage" at TV studios. The experience and knowledge you gain can take you anywhere!

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RCA offers careers in TV and allied fields — in research, development, design and manufacturing—for engineers with Bachelor or advanced degrees in E.E., M.E. or Physics. Join the RCA family. For full information write to: Mr. Robert Haklisch, Manager, College Relations, Radio Corporation of America, Camden 2, New Jersey.



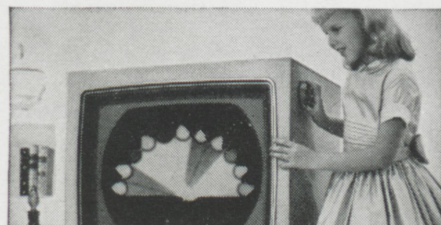
Like 2 sets in 1—get Color and black-and-white shows, too! It's RCA Victor Compatible Color TV. See the great Color shows in "Living Color"—regular shows in crisp, clear black-and-white. With Big Color, you see everything.



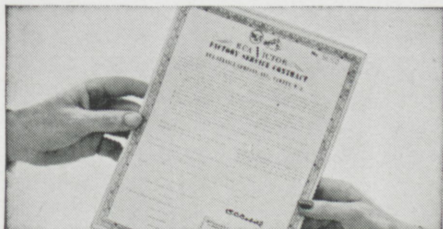
Big-as-life 21-inch picture tube — overall diameter. Actually 254 square inches of viewable picture area. And every inch a masterpiece of "Living Color." Here are the most natural tones you've ever seen—on a big-as-life screen!



Color every night — right now! Something for everyone! You'll have "two on the aisle" for the best shows ever—drama, comedies, Spectaculars, children's shows, local telecasts. For now 216 TV stations are equipped to telecast Color.



Big Color TV is so easy to tune, even a child can do it! Turn two color knobs and there's your Big Color picture! It's easy, quick, accurate. It's a new thrill when the picture pops onto the screen in glowing "Living Color."



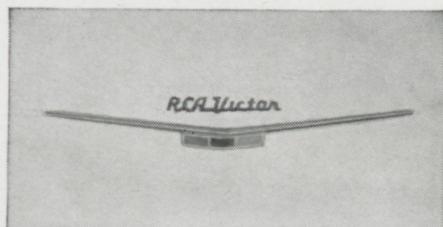
Practical and trouble-free! Service at new low cost! Big Color is dependable Color. And RCA Victor Factory Service is available in most areas (but only to RCA Victor owners). \$39.95 covers installation and service for ninety days.



Color TV is a common-sense investment—costs only a few cents a day. It's sure to become the standard in home entertainment for years to come—yet you can enjoy Color every night right now! And you can buy on easy budget terms.



Now starts at \$495 — no more than once paid for black-and-white. This is the lowest price for Big Color TV in RCA Victor history! There are 10 stunning Big Color sets to choose from—table, console, lowboys, and consoles, too.



Make sure the Color TV you buy carries this symbol of quality. Because RCA pioneered and developed Compatible Color television, RCA Victor Big Color TV—like RCA Victor black-and-white—is First Choice in TV.



**RADIO CORPORATION OF AMERICA**  
ELECTRONICS FOR LIVING



# Locker Rumors

By Jim Roach, sr., m.e., and Tim Zimmerman, sr., m.e.

## VARSIITY

With the advent of cold weather the sports spotlight has moved inside to the warmth of the fieldhouse to focus on the Rose hoopsters. Jim Carr has mustered up a great team and the Engineers have made a fine showing in the first two games at home with Concordia of Springfield and Marion College. The team is shaping up to a very good season. Helping the cause along are the following men: Nick Beers, Larry Berger, Danny Cummings, Larry Cunningham, Monte Goodwin, Allen Lefevre, Jim Sargent, Sherm Smith, Ron Staggs, Tom Wilson, Bill Washburn, and Bob Dinning.

We have 10 home games this year and we would like to fill the field house for every one. Let's carry the Booster Club on into the round ball season.

Pappy Brown's gridiron men have finished up a fine season. They have

scored the most points this year of the last four years. Following the national trend, they have been beset by injuries. About half the team has been on the sick list at one time or another. A freshman, Larry Lavery, was drafted to play quarterback in the Franklin game when all the regulars were out of action. The Prairie Conference title was decided in the last game of the season with Principia.

Phil has been quite pleased with the spirit all year and plans on fielding a strong team next year. Only four seniors will be lost. They are captain Bill Payne, Ron Meredith, "Ox" Arnold, and Bill White. They will all be missed from the lineup. The tentative list of men winning letters is composed of: Gary Anderson, Len Arnold, Gene Blythe, Tom Clark, John Davis, John Fenoglio, Bart Gronberg, Terry Hallcom, Dick Irely, Bill Kuchar, Ned Kurtz, Frank

Molinaro, Bob Manning, Ron Meredith, Bob Mewhinney, Dan Mook, Mike Munro, Jim Neal, Bill Payne, Don Scott, Elwood Stroupe, Bob Sutton, Bill Tanner, Max White, Dick Tucker, and Harry Bitner, and Phil Kennedy, manager.

A note on the Prairie Conference: this year we scheduled Illinois College twice. This was an experiment to build up more competition in the conference. It seemed to work out pretty well, so you can expect to see several teams on the schedule twice next year.

## FRATERNITY FOOTBALL

The championship trophy for I-F football, this year, went to Theta Xi for showing superior action which brought them out on top of the won-lost column.

Also on this scene, the story has now been changed to one concerning the hoop, where it looks as if there seems to be some thrilling battles between the "Greeks."

## INTRAMURAL SPORTS

The pigskin has now been retired in favor of the old "roundball" in the intramural world at R.P.I.

The nets have been flying since November 26.

All crews are playing like they are well aware that a new champion must be crowned this year, as the defenders were graduated last year.

Volleyball competition was started on November 27, while many hard-fought battles on the courts are now in the history books of C. Kelley.

The two football teams with the greatest records for the 1956 season were the Junior Red Riders and the Senior Comets. The gridiron was placed in mothballs after holding the enthusiasm of the majority of Rose men during the past season.

That about empties everyone's locker of rumors for this month. Let's all get out and boost the basketball team!



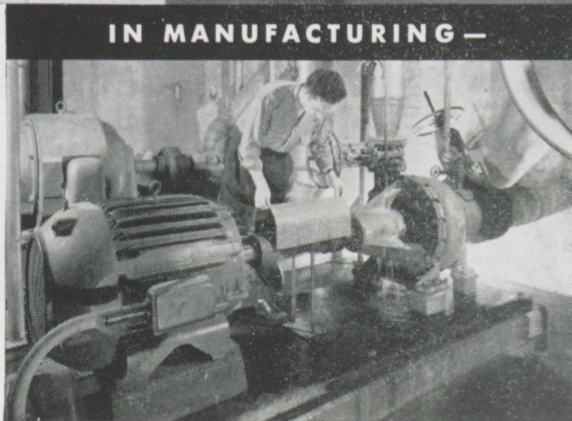
Rose readies for the round ball season.



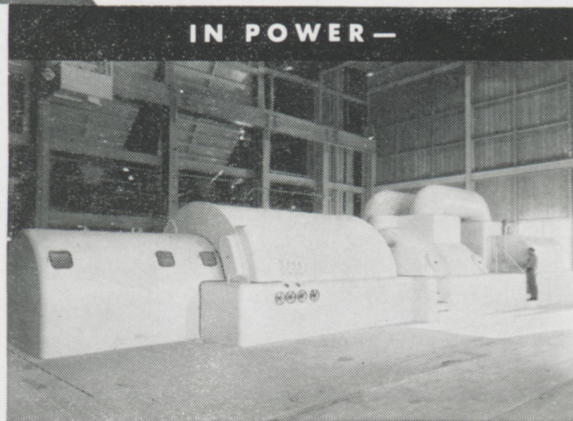


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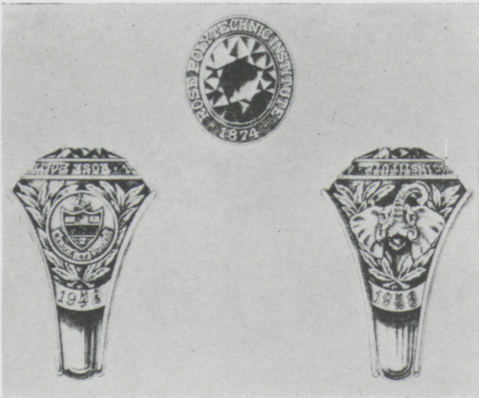


5044



# Alumni News

By Max Hippensteel, jr., e.e.



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'05 **Herbert L. Watson, me**, died recently of a heart attack at his home in Trenton, New Jersey. Mr. Watson was the retired president of DeLaval Steam Turbine Company.

Mr. Watson for more than 20 years had been actively identified with the growth and development of DeLaval. Shortly after graduation he went to work for Allis Chalmers in Milwaukee and eventually became a sales engineer specialist on steam turbine.

It was in 1913 that Mr. Watson came to DeLaval Steam Turbine Company as general sales manager. In 1934 he was elected executive vice president and a director of the company, and in November of 1942 he was elected president. He was also a director of Turbo Engineering Corporation of Trenton, a DeLaval affiliate.

'35 **P. Byrne Terhorst, me**, has been selected for the post of Vice President in Charge of Production for the Power Products Corporation. Mr. Terhorst was formerly with the York Corporation as Works Manager of the Commercial Division.

Feb. '43 **John W. Jessup, ee**, has become Department Chief of the Structural Design and Fire Protection Engineering Department of Western Electric Company's Chicago plant.

'44 **F. Doyle Price, me**, recently became a District Manager with Sweet's Catalog Service, a division of F. W. Dodge Corporation. Mr. Price was formerly an Assistant Development Manager for the U. S. Gypsum Co.

Mar. '47 **Rex E. Blood, ee**, has accepted a position with A. T. & T. Company in the Operation and Engineering Department of the Traffic Division. Mr.

Blood had been a Traffic Engineer with the Indiana Bell Telephone Company.



Rex Blood.

July '49 **Ervan R. Meise, me**, has a new employer, Atomics International, and a new job title, Senior Engineer in Research. Mr. Meise was formerly an engineer with the Blaw-Know in the Construction Equipment Division.

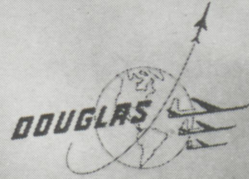
'56 **August L. Eykholt, ee**, has been awarded a Hughes Master of Science Fellowship enabling him to continue his education while employed part time at Hughes Aircraft Company. Mr. Eykholt and 200 others from 75 other universities, who received Hughes fellowships, are taking advanced courses at universities in the Los Angeles area while employed in Hughes research and development laboratories. Mr. Eykholt is attending the University of Southern California and received a salary from Hughes as well as payment of tuition, books and fees.



NORTH AMERICAN AVIATION, INC.



MARTIN



# Our References

CONVAIR

MCDONNELL Aircraft Corporation



CHANCE VUGHT AIRCRAFT

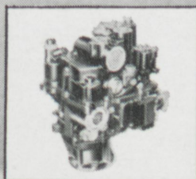
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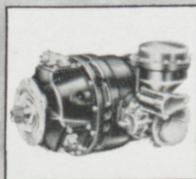
## Hamilton Standard products



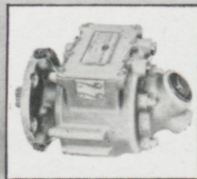
REFRIGERATION UNIT



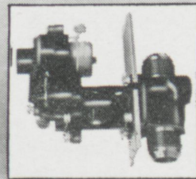
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# HAMILTON STANDARD DIVISION UNITED AIRCRAFT CORPORATION

47 Bradley Field Road, Windsor Locks, Connecticut



## ELECTRONIC COMPUTERS

(Continued from Page 12)

storage system, or memory. The informational term commonly used is the "bit" which represents one binary digit. A word must be said about this binary number system.

The simplest method for expressing a meaning is the familiar (YES), (NO), or (✓), (X) as is used in grading a student's exam paper. The symbols 1, 0 might convey the same meaning; and in terms of electrical circuitry, so might ON, OFF or HIGH-VOLTAGE, LOW-VOLTAGE. Each one of the symbols in a particular set conveys a meaning directly opposite to that of the other and their very simplicity precludes ambiguity. But how can such simple symbols represent a world of information, and how can they be adapted for use by a machine?

Claude Shannon's information theory formulated the concept of the "bit" or binary digit. In this system of notation, all numbers are based on powers of 2, and are expressed in terms of the digits 1 and 0 in a very simple fashion. For example, with these two units (1 and 0) we are able to form four unique bits of information: 00 01 10 11. Each set of symbols forms one bit, and each bit can be made to represent something. With four units (consisting of 1 and 0) we can obtain 16 pieces or bits of information

0000	0001	0010	0011
0100	0101	0110	0111
1000	1001	1010	1011
1100	1101	1110	1111

which will be sufficient to represent the digits 1, 2, 3, 4, 5, 6, 7, 8, 9, 0 which we use in our real number system, and provide a surplus of six bits for future use. However, to represent all 26 of the symbols in our alphabet will require five units of information for one bit, each letter being equivalent to five units (00000=a, 00001=b, etc.). In general, N units will provide  $2^N$  bits of information.

How, then, will this binary or 1,0 symbolic system be adapted for storage in a computing machine? Just as a person can, at least temporarily, store the number 3 by turning three of his fingers up and the other two down, so can a machine store a number by an appropriate electrical or mechanical action. If 1 corresponds to current ON and 0 to current OFF; if 1 corresponds to HIGH-VOLTAGE and 0 to LOW-VOLTAGE; if 1 corresponds to NEGATIVE polarity and 0 to POSITIVE polarity, we have found a very simple means of storing a number in some electrical or electromagnetic network which is to be used as a computer memory. The number 2 might be represented in a system of four units per bit as 0001. In an electronic network, this bit might be stored in a series of four vacuum tubes as

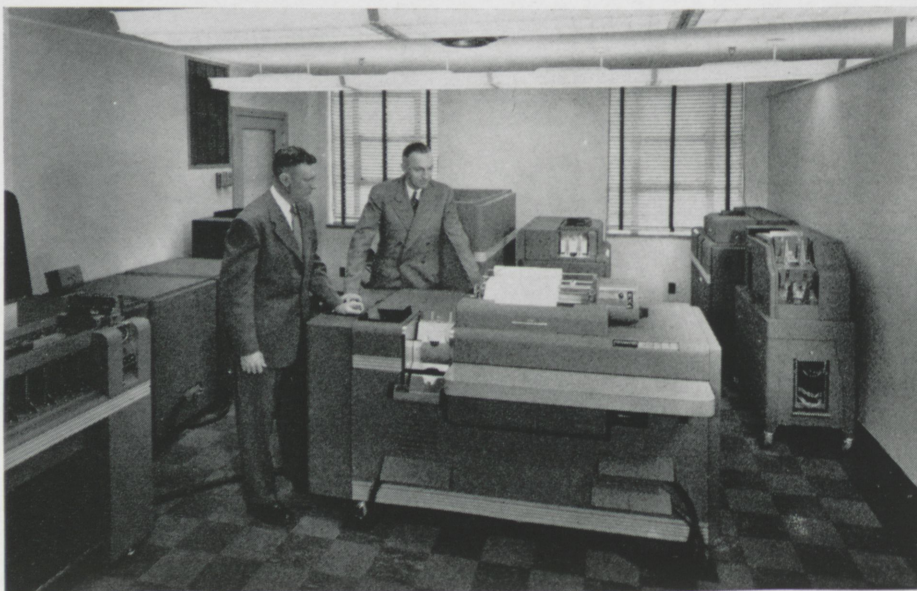
power: OFF OFF OFF ON. Of course, there are other methods of accomplishing data storage as well, but all are similar to this simple operation. We shall consider these other forms a little later.

In any computer, the memory content may be increased almost indefinitely by addition of new storage units; however, as was stated previously, the type or method of its data processing (the basic mathematical operations) are built into the machine and cannot be changed without altering the machine's construction. The circuitry of the computer performs the "thinking" operations of the machine, and the method of thinking is a function of the circuit design. The memory unit, therefore, does not "think", it merely provides storage space for information. In this sense, we can hardly call it a "brain" since it does not compare data or "reason" as does the circuitry; yet, in spite of its sole function as a storage unit, it has the unique property of being the nucleus about which the entire computer operates. This is readily seen in the fact that the memory unit, besides storing data, must also retain the information that literally "tells" the "thinking" circuitry not only what to do, but how to do it as well.

Memory units may be divided into three classifications according to their characteristics: the inner or high-speed memory, the intermediate memory, and the outer or slow-speed memory. For illustrative purposes, one might think of the inner-memory as a pad of paper on which a human calculator will jot down a series of calculations which he intends using again almost immediately; the intermediate memory might be an easily accessible table of logarithms; and the outer-memory might be a library filled with reference material.

The prime function of the inner-memory is to provide short-term storage of data derived within the computer circuits, to handle incoming and outgoing data, and to provide a place for rearrangement of data. Needless to say, it must also

(Continued on Page 44)



Westinghouse Card-Program-Calculator.



○ *Another page for*

**YOUR STEEL NOTEBOOK**

## How to shape a vacuum cleaner like a basketball

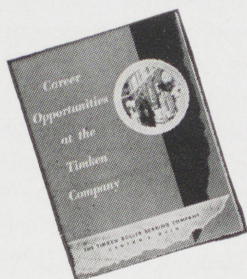


○ **T**O make their new vacuum cleaner functional as well as handsome, engineers at the Hoover Company developed a nearly round design. The problem was how to produce it economically.

The first ring dies they used to produce the shape from sheet steel picked up bits of steel and scored following pieces. Production had to be shut down while the dies were polished. Finishing costs ran high.

After studying the problem, Timken Company metallurgists recommended a special analysis of tool steel for the dies. Graph-Mo<sup>®</sup>, developed by the Timken Company. Minute particles of graphite in Graph-Mo act as a built-in lubricant—keep parts from galling. Diamond-hard carbides in its structure make it wear, give it longer life.

With the new Graph-Mo dies, downtime was cut 50%. Production rolled smoothly. The dies outlasted previous ones 3 to 1. It's another example of how Timken pioneering in fine alloy steels helps solve knotty industrial problems.



### Want to learn more about steel or job opportunities?

For help in learning more about steel, write for your free copy of "The Story of Timken Alloy Steel Quality". And for more about jobs at the Timken Company, send for a copy of "Career Opportunities at the Timken Company". Address: The Timken Roller Bearing Company, Canton 6, Ohio.

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SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



## RESEARCH & DEVELOPMENT

(Continued from Page 22)

1000-hp reversing, hot-rolling mill; a 500-hp reversing, cold-rolling mill; bell type and roller rail box type electric furnaces; a shot pouring facility; shell mold and lost wax investment casting facilities; arc furnaces; and other equipment.

Because of the electrical industry's dependence upon metals with special mechanical and electrical properties, Westinghouse has long been a pioneer in the development of special alloys. High on the list of Blairsville projects is further development of these alloys, including Discaloy, Refractaloy, K-42-B, Hipernik, Hiperco, Hipersil, and Kovar.

The first three on the list are high temperature alloys for application in gas and steam turbines. Here, rotors and blades must withstand stresses at extremely high temperatures and also resist corrosion and remain ductile. Hipernik, Hiperco, and Hipersil are magnetic alloys used in saturable reactors, magnetic amplifiers and choke coils. Kovar is an expansion alloy used where an airtight seal between glass and metal is required, as in electronic tubes, glass bulb rectifiers and x-ray tubes.

Explaining the importance of these new alloys, Mr. Trigg pointed out that 20 years ago steam turbines were being built to operate with steam temperatures of about 800 degrees F and pressures of about 1200 pounds. New units now are being designed for 1200 degrees and up to 4000 pounds pressure. To make these

advances, new alloys were required. And to go any higher in the temperature and pressure scale will require still better alloys. That is what Blairsville hopes to provide.

Equipment has been selected to provide greatest flexibility and multipurpose usefulness so the maximum diversity is achieved per invested dollar. For example, the induction vacuum melting installation which covers a range of 300 to 2000 pounds heat can be adapted to permit vacuum casting of large ingots or low temperature vacuum annealing of titanium. The same principle is applied to equipment arrangement where slab-heating furnaces for the hot strip mill also supply billets to the four-bar mill stands. Special electrical controls have been developed so that the same motor generators and auxiliaries supply both the 2000-hp hot-mill and the 1100-hp cold-mill.

The plant was designed by the Westinghouse East Pittsburgh Works Engineering Department. Contractors were: Navarro Corporation, general; Patterson-Emerson-Comstock, Inc., electrical; and Limbach and Company, mechanical. All are from Pittsburgh. The F. H. McGraw and Company of New York did the equipment erection and installation work including all piping and electrical installations.

### FLESH AND BONE

Using newly-developed xeroradiography equipment General Electric's X-Ray Department produced  
(Continued on Page 38)

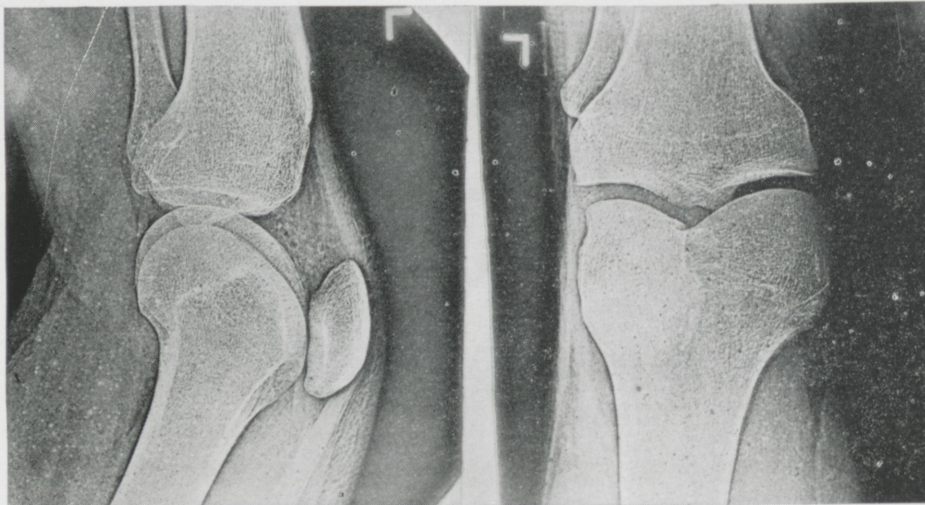
## CONTROVERSIAL CORNER

(Continued from Page 14)

summer months gaining invaluable practical experience in the laboratories of colleges and industries — experience which eventually may contribute more to strengthening our precarious position than would half an army of soldiers in the field. Time is of the greatest importance in this "cold war" struggle; by all means, let us allow the men of science the time they need to do their part, and assure them that their time will be undisturbed.

To have all science and engineering students exempt from compulsory military training is not my intent, although the present acute need for them is reason enough for such an action. A distinction must be made between those who are, as I said, "successfully pursuing these courses of study and those who are less promising. If, perhaps, only the upper half or third of an undergraduate class were so exempt, I believe that few of the laymen would object if the reason were made clear, and the cause of national security would certainly be strengthened. However, I energetically contend that all science students undertaking graduate work should be among those exempt from military service, for it is from the ranks of such men as these that our greatest scientific advances come.

Remember, the questionable philosophy which accompanied and, in fact, caused the initial scientific manpower shortage in 1950, unfortunately, is still at work in the Selective Service Administration. What is needed is a reappraisal of the term "selective service" with proper emphasis upon relative values of the young men involved. The time is past due for the administrative group to take a realistic attitude toward the exemption of these essential students from military service. After all, in the larger sense, a man need not serve in a military uniform to serve his country well. Furthermore, we shall find it far wiser to be scientifically on top in a "cold war" than to be physically on the bottom in a "hot" one.

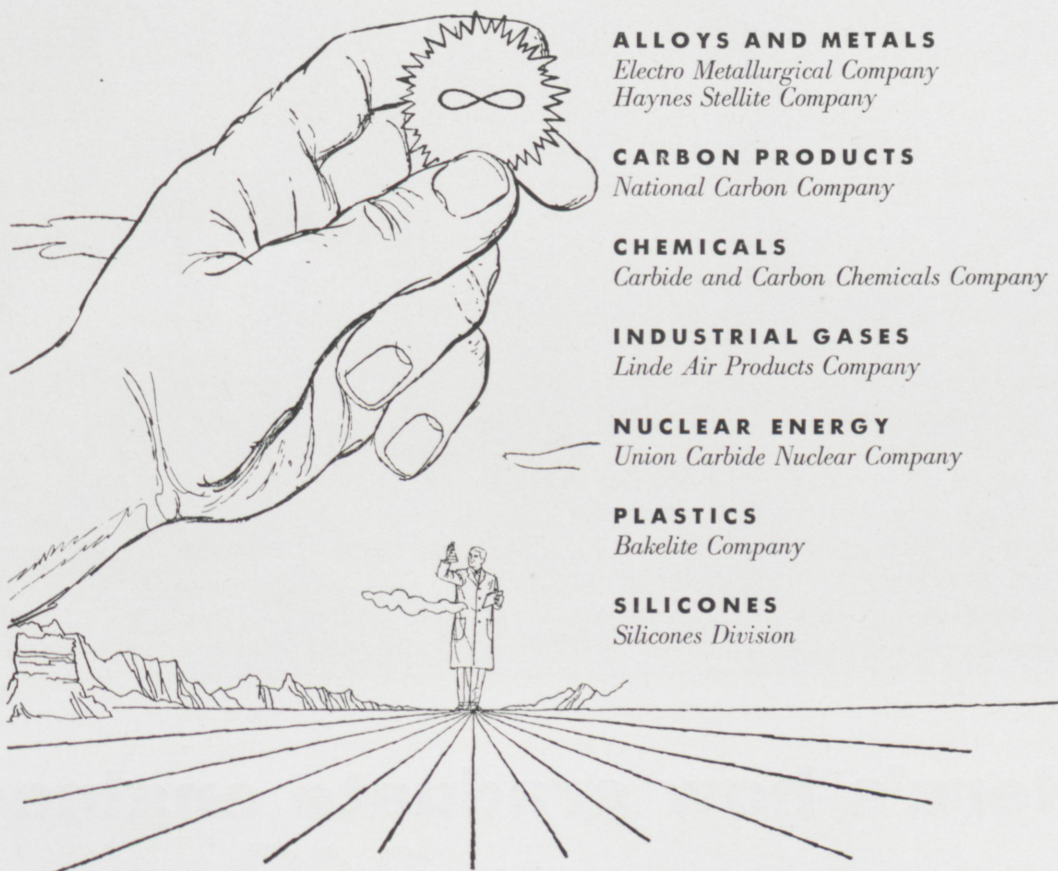


There's no water on this man's knee!



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
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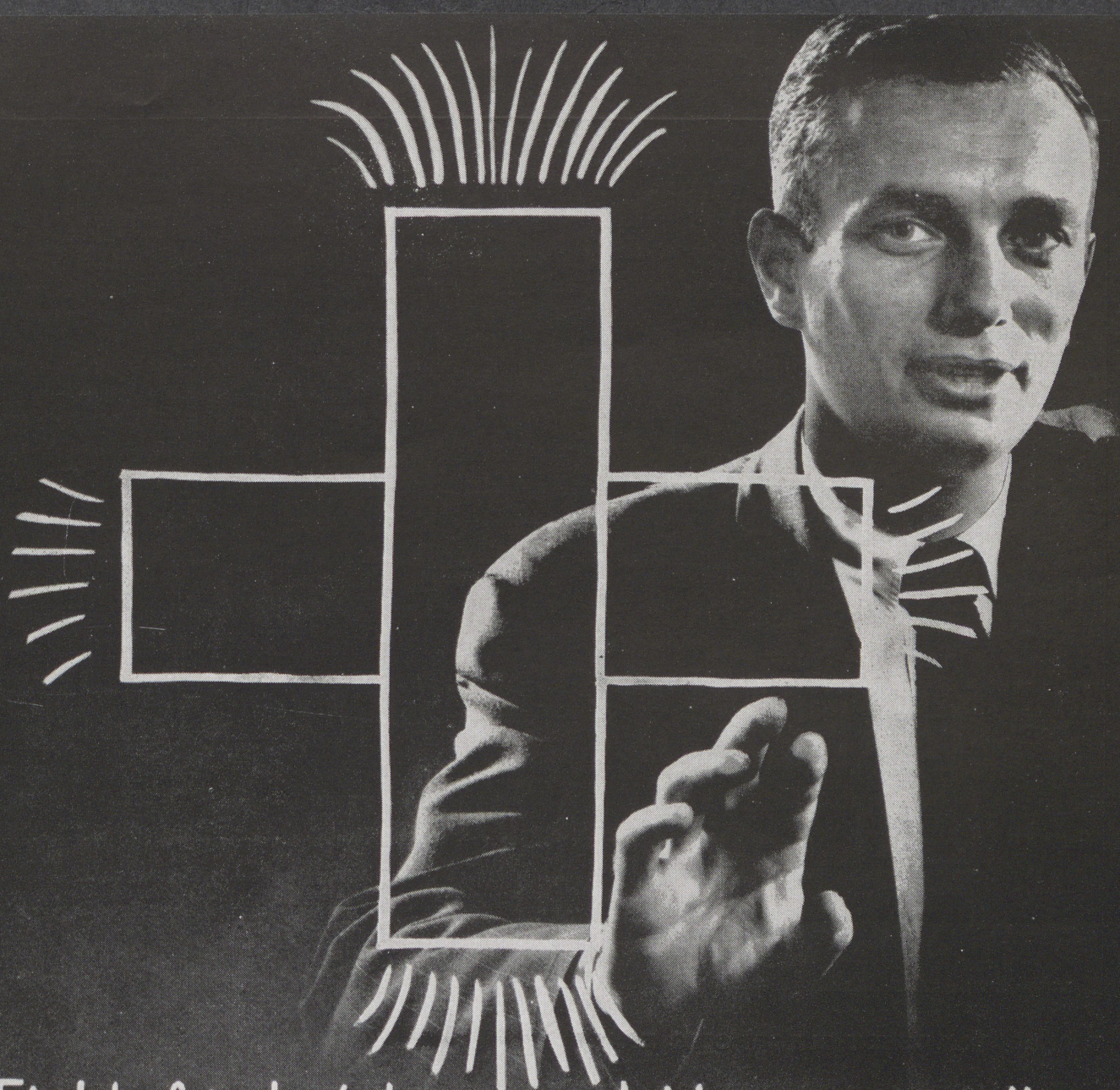


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## Field of today's best available magnetic alloy

Difference between ordinary magnetic iron (left) and Cubex (right) is diagrammed on glass panel by Dr. George W. Wiener, who heads up research on soft magnetic materials at Westinghouse Research

# YOUNG WESTINGHOUSE SCIENTISTS

*open new design frontiers with*

Westinghouse scientists have climaxed an intensive search that promises significant improvements in electrical equipment performance and operating costs. With this new alloy, Cubex,<sup>®</sup> metal crystals are aligned in ice-cube fashion so that magnetism flows readily in four directions instead of two . . . actually turns corners with markedly less resistance.

Now in the development stage, it will bring such important benefits as better performance, higher efficiency and smaller size to users of motors, transformers, and other electrical apparatus.

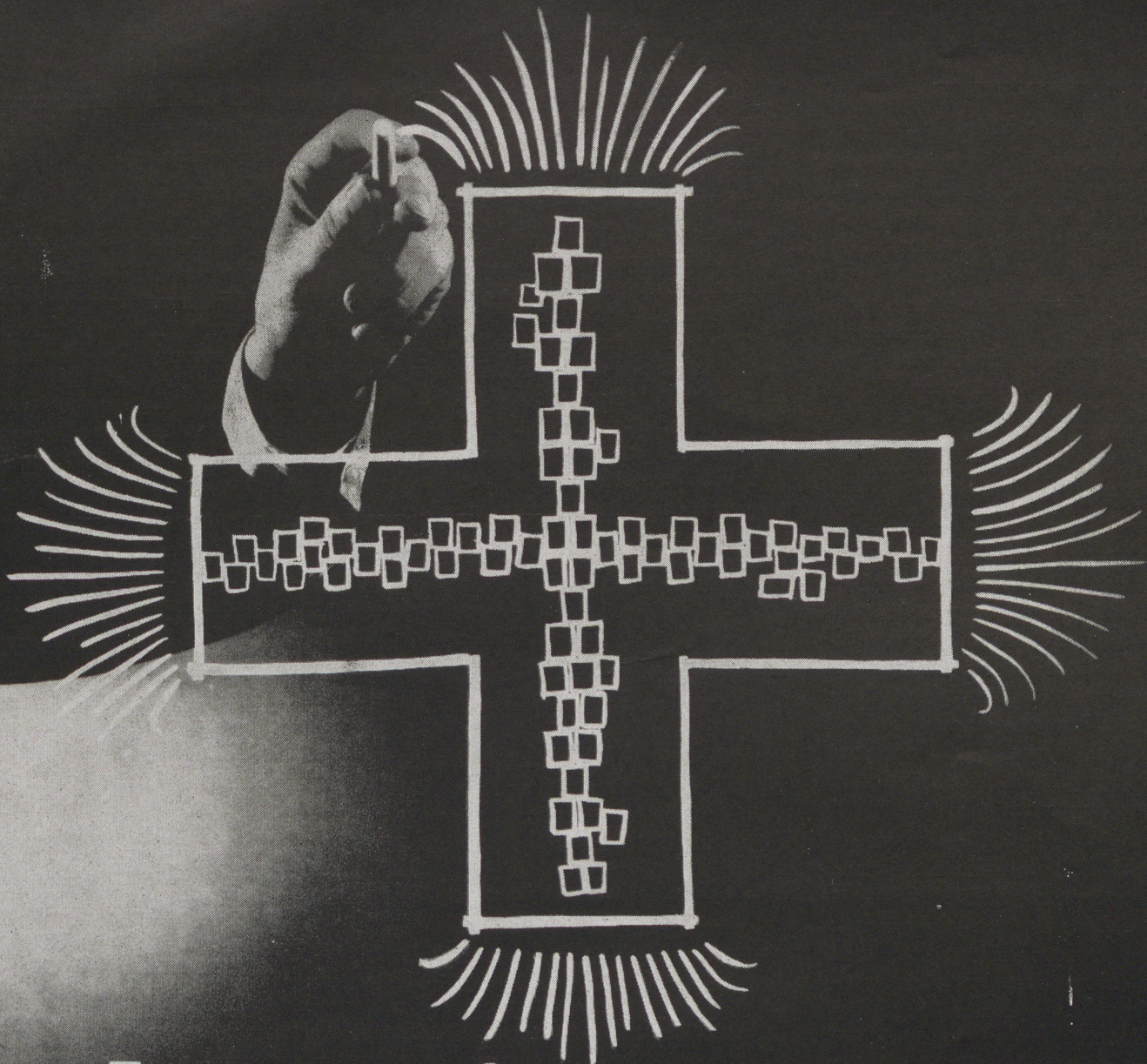
Developed in Westinghouse Research Laboratories,

Cubex is the result of continuous programs of research and development since the 1920's.

This work on magnetism is only one of the many interesting jobs engineers and scientists at Westinghouse are engaged in all the time. Other fields include

ATOMIC POWER	SEMICONDUCTORS
AUTOMATION	ELECTRONICS
JET-AGE METALS	LARGE POWER EQUIPMENT
CHEMISTRY	GUIDED MISSILE CONTROLS
RADAR	and dozens of others.





## Field of new Cubex magnetic alloy

Laboratories. Dr. Wiener got his B.S. in 1943 from University of Wisconsin. In 1953 he earned his Ph.D. at University of Pittsburgh while working at Westinghouse and studying on tuition-free Graduate Study Program.

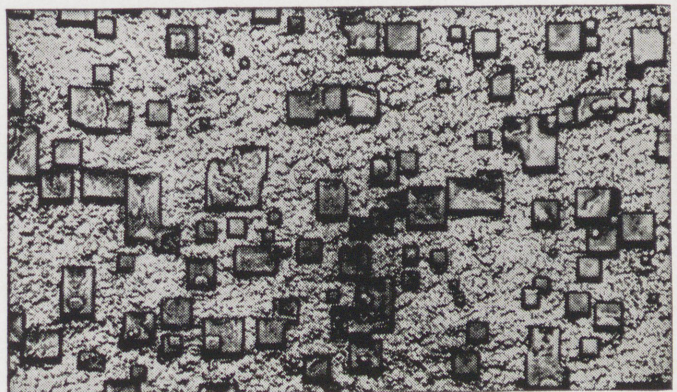
# BREAK THROUGH MAGNETIC BARRIER:

*cube-oriented alloy*

For more information on Westinghouse research in the field of magnetism, or information on job opportunities, write to Mr. J. H. Savage, Westinghouse Electric Corporation, P.O. Box 2278, Pittsburgh 30, Pa.

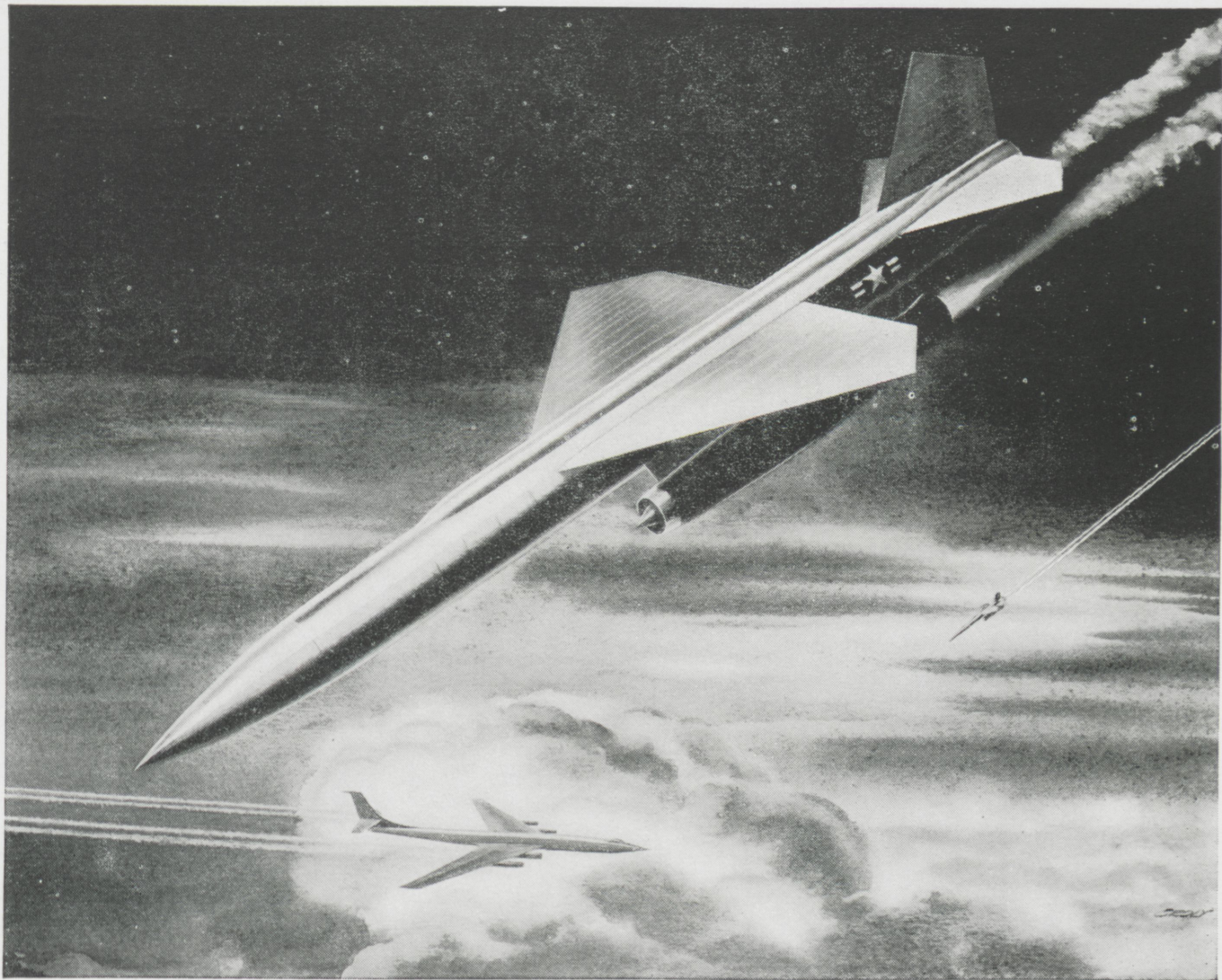
# Westinghouse

FIRST WITH THE FUTURE



Cube-orientation of crystals in Cubex is revealed by "etch pits" in this photomicrograph. Cubex is a silicon-steel alloy, easily magnetized in four directions instead of two.





## Boeing research produces a new defense weapons system

Boeing's BOMARC IM-99 is a long-range guided missile designed to strike enemy bombers while still over areas away from vital targets. It's a supersonic spearhead of an entire defense weapons system that includes communications, bases, logistics.

Engineers and scientists of *all* types contributed to the research that produced this vital weapons system. And they are continuing their contributions, not only to BOMARC, but to other significant advanced projects. Boeing engineers are coming up with solutions that will give direction to developments of the future. If this kind of pioneering appeals to you, and if you enjoy working with engineers of outstanding professional stature, you'll like Boeing.

And you'll find plenty of room for advancement. Boeing's growth — a 400%

jump in the number of Boeing engineers in the last 10 years — assures openings ahead, and job stability. Boeing promotes from within, and every six months a merit review gives each engineer a *personal* opportunity for recognition, advancement, increased income.

Starting salaries at Boeing are high. If you are interested in continuing graduate studies, Boeing will arrange a special work schedule for you and pay all tuition and fees.

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 <p>Northrop F-89D</p>		 <p>Convair YC-131C</p>
 <p>Martin TM-61 (missile)</p>	<p><b>They're ALL ALLISON-POWERED</b></p> <p>And, Allison Engineering will continue to play a leading role in future development of greater <b>AIRCRAFT POWER</b></p>	 <p>McDonald F3H-2N</p>
 <p>Chance Vought Regulus (missile)</p>		 <p>Douglas RB-66 &amp; B-66</p>
 <p>Allison Turbo-Liner</p>		 <p>Martin XP6M</p>

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energy application, and—well, the sky is the limit.

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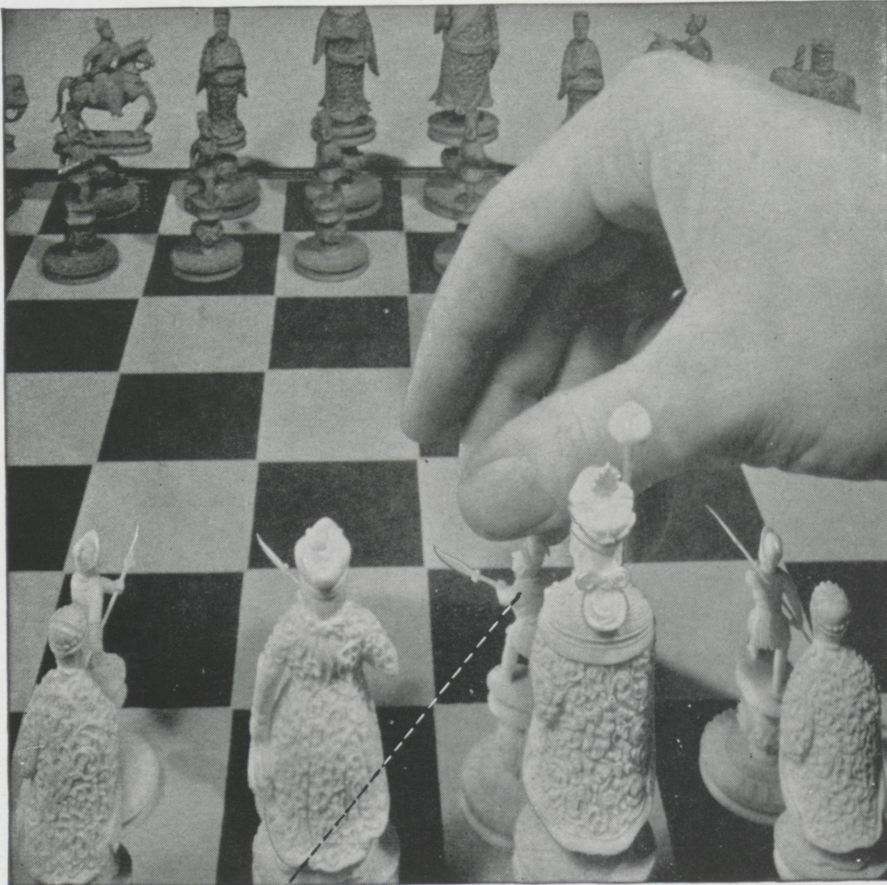
Write for information about your future career at Allison: Personnel Dept., College Relations, Allison Division, General Motors Corporation, Indianapolis 6, Indiana.

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**MOTOROLA**

## FRATERNITY NOTES

(Continued from Page 16)

favorites, dancing, and getting re-acquainted with the grads took far longer than anyone expected. The house was open for guests Saturday afternoon and again Saturday evening after the dance when another party was held. All day Sunday was devoted to the cleaning of the house and picking up accumulated odds and ends.

Two mixers were also held last month: one with the Alpha Omicron Pi Sorority from I.S.T.C. and one with the student nurses from St. Anthony's Hospital. For the latter, the house was decorated in halloween fashion with jack-o-lanterns, crepe pumpkins, skeletons, and balloons covering the basement walls and ceilings.

Two new mixers are in the planning for this month — one with the Delta Gamma Sorority from I.S.T.C. and the other with Union Hospital nurses.

Congratulations to Theta Xi for their winning of the intramural football trophy. Brown's Boys dropped out of contention in the last game with a 13-0 defeat at the hands of the fighting TX.

The following are due a lot of appreciation for their fine showing on Rose's winning football team: Fullback and Captain Bill Payne, Quarterbacks Frank Molinaro and Gene Blythe, who did a fine job of getting injured alternately through the season so Rose was always benefiting from one of their services, Halfback Carl Herochavick, Center and line backer Dan Mook, who played exceptionally well for his first year of football and Guard John Davis.

Along with the starting of the basketball season so are the Lambda Chi's. Captain Bob Bright and regulars Jim Oaks and Harold Brown report that they are in top shape and ready to score many points in Rose's victories. The intramural team is also getting prepared to defend the intramural basketball trophy with a string of wins.

Congratulations to our recent pledge Bill Patton of Terre Haute.

John A Bizal



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### ELECTRONIC COMPUTERS

(Continued from Page 32)

be capable of erasing any or all of the data it contains. In addition, its operation must be rapid enough to fully utilize the inherent speed of the electronic circuitry which it feeds, and to provide this speed it must necessarily be made small. Units which can meet these paradoxical requirements of adequate capacity and small size have, thus far, proven comparatively expensive. At present, storage capacity in this type of unit is relatively low; on the basis of five units per bit, each bit representing a letter of the alphabet, storage varies between 1500 and 6500 English words.

Naturally, a larger storage system must be provided to ensure the machine enough information to adequately cope with the problems it is called upon to solve. Here, the slower operating intermediate memory unit takes over. It is usually a unit which operates perhaps one thousand times slower than the inner memory, but provides from 10,000 to 100,000 English words of storage space. In this memory unit also, the stored data must be easily erasable.

The third, or outer memory, can contain an infinite amount of data, limited only by the long-term storage facilities available; however, the access time for data stored in this memory unit must be measured in terms ranging from seconds to minutes. Perhaps this factor alone, not to mention the difficulty of erasing existing data, invokes some degree of a limit on the storage ability of the outer memory units.

Thus far we have been concerned with some of the general characteristics of electronic computers and their memory devices and have said nothing about the particular devices now in use or in development. In some respects, these components are the most interesting parts of the entire computer for, although their operations are at least similar, their types are many and varied.

(To be continued next month)

### RESEARCH & DEVELOPMENT

(Continued from Page 38)

fact, it is expected to enable a utility helicopter to carry 100 per cent more payload than a piston engine powered helicopter.

The turboshaft T58, with some modification, can be converted to a turboprop or turbojet.

### EMPIRE STATE BUILDING TO LIGHT UP THE SKY

The Empire State Building will light up the skies of much of the northeast through the addition of four mighty searchlights. Installed just above the observation platform, 1,092 feet above the streets of New York City, these beacons will be powerful enough to be seen under ideal conditions as far away as Boston and Baltimore.

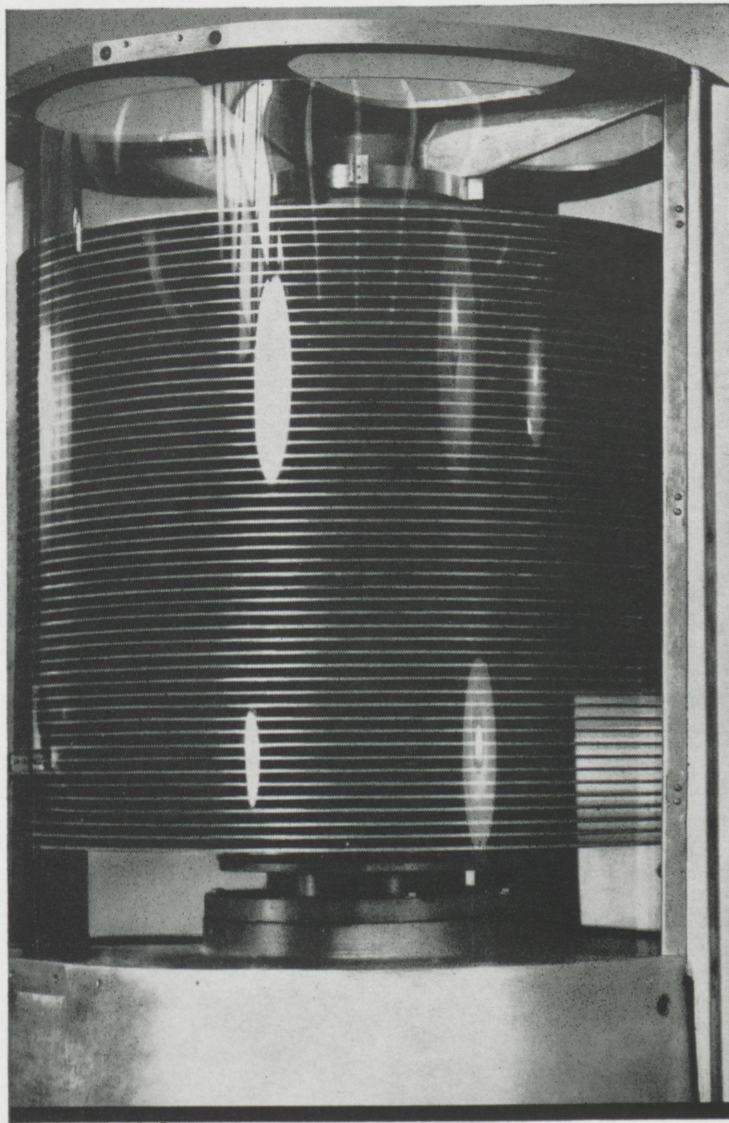
Heart of the searchlights will be the lamps manufactured by the Westinghouse Electric Corporation. These 2,500-watt short-arc mercury lamps, in conjunction with the highly polished reflectors, will produce 450,000,000 candle power of light per beacon. Combined, the four beacons will provide almost two billion candle power of light and are reported to be the brightest continuous man-made source of light.

Originally, the searchlight units were carbon arc lights used as anti-aircraft searchlights during World War II. They have been specially modified to house the Westinghouse lamps.

Temperatures within the searchlights will reach as high as 1500 degrees F. To withstand these extremely high temperatures, the bulbs are made of quartz rather than glass. The quartz is also required to withstand high internal pressures of more than 300 pounds per square inch.

One of the five-foot beacons will point straight up. The three others on the world's tallest building will be directed outward at an angle of five degrees above the horizontal. They will revolve counterclockwise at the rate of one revolution per minute from sundown to midnight.





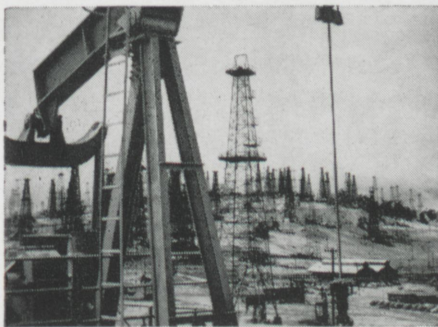
## Machine with "millions" on its "mind"

These whirling disks are the heart of RAMAC®—IBM's revolutionary new random access memory data accounting system. Capable of storing from 6 to 24 million digits in its metal mind, RAMAC offers an entirely new approach to the problems of data maintenance and storage.

RAMAC is a storage instrument permitting management to reach facts almost instantly, without searching or sorting. It supplies immediate, automatically typed answers to queries put to it. For the first time, it makes possible "single step" data processing—the simultaneous processing of transactions *as they occur*. This new wonder tool for American business means record keeping with greater speed, range flexibility and economy than was ever before possible.

### What YOU should remember

RAMAC typifies the electronic wonders being brought to reality at IBM. If you are preparing yourself for an electronics career, you'll find IBM offers excellent opportunities for rapid advancement in the virtually "unlimited" field of electronic computers. A growing company in a growing field, IBM means a chance for you to develop quickly to the fullest extent of your capabilities.



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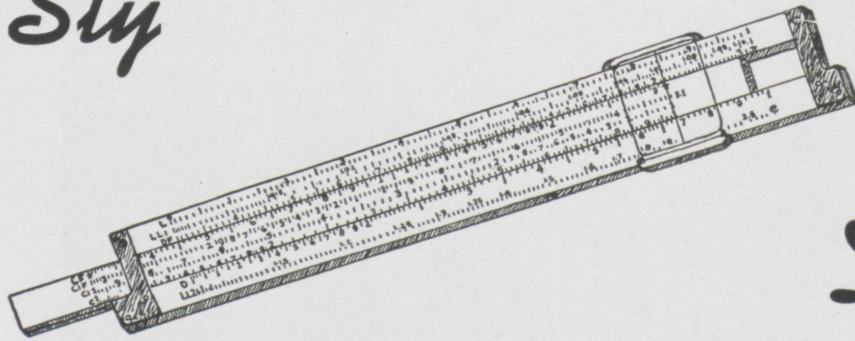
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# *Droolings*

Stolen by Ted Solmundson, sr., e.e. and Gene Blastic, jr., m.e.

First Father: "Has your son's college education proved helpful since you took him into the firm?"

Second Father: "Oh, yes, whenever we have a conference we let him mix the cocktails."

First Bum: "Have you got a nickel for a cup of coffee?"

Student: "No, but I'll manage somehow, thank you."

"What was the hardest thing that you learned at college," asked the proud father.

"How to open beer bottles with a quarter," said the son.

Jiggs: "How do you make an Englishman happy in his old age?"

Biggs: "Tell him jokes when he is still young."

ROTC Student: "I haven't a pencil or paper for the exam."

Sergeant: "What would you think of a soldier who went into battle without a gun or ammunition?"

Student: "I'd think he was an officer."

"Who's that old peddler over there?"

"Oh, that's an economics prof who took a crack at Wall Street."

Fellow to Blind Date: "I never really believed in reincarnation — but what were you before you died?"

They say that things are so dry in Arizona that even the trees are going to the dogs.

"Your girl is spoiled, isn't she?"

"Naw, it's just the perfume she's wearing."

Our favorite professor: "If, in going down this incline, I gain four feet per second, what will be my condition after 2 seconds?"

Sophomore Ch.E.: "You'll be a centipede."

She: "You remind me of the ocean."

He: Wild, romantic, and restless?"

She: 'No, you make me sick.'

Overheard in EEE Lab: "Take hold of that wire."

"This one? Okay."

'Feel anything?'

'Nope.'

"Then don't touch the other one. It's carrying 5000 volts."

Joe: 'If it's heads, we go to bed. If it's tails, we stay up. If it lands on edge we study.'

Familiarity breeds attempt.

Prof: "You students in the rear of the classroom please stop passing notes back and forth."

Student: "They are cards, not notes, sir. We're playing bridge."

Prof: "Oh, excuse me."

A man and his date had waded through a Chinese dinner and were about to order dessert. The man advised his date to order fortune cookies, which, he explained, are little rice cookies with slips of paper inside of which fortunes are printed. When the little cakes arrived the girl promptly broke hers

open and, sure enough, on the slip of paper inside it said, "You will meet a tall, dark man and marry him." This pleased her very much. Then the man broke open his cake and looked at the little slip of paper. It read "Help! I am a prisoner in a Chinese bakery."

Little Jack Horner

Sat in a corner,  
Crib notes under his eye.  
He opened his book,  
And took a quick look,  
And now he's a Tau Beta Pi.

Classified Ad: "Young man transferring from Engineering to Science would like to trade one good study lamp for a good mattress."

"Shay, can you tell me where to find Alcosolicsh Anonymush?"

"Why? Do you want to join?"

"No, wanna resign."

The one who thinks these jokes are poor

Would straightaway change his views

Could he compare the jokes we print

With those we could not use.

The ferocious lion ate a bull. Afterward he felt so wonderful he roared and roared. A hunter heard him roar and shot him.

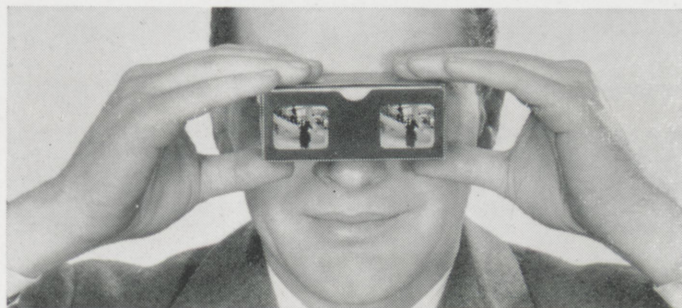
Moral: When you are full of bull, you had better keep your mouth shut!

The man didn't say a word when he ran over his cat with a steam roller. Just stood there with a long puss.





## Stores, Lounges and Coffee Shops fit in a Salesman's case



Design Inc. sells highly specialized services with photography—uses 3-D color slides to show how their work has paid off.

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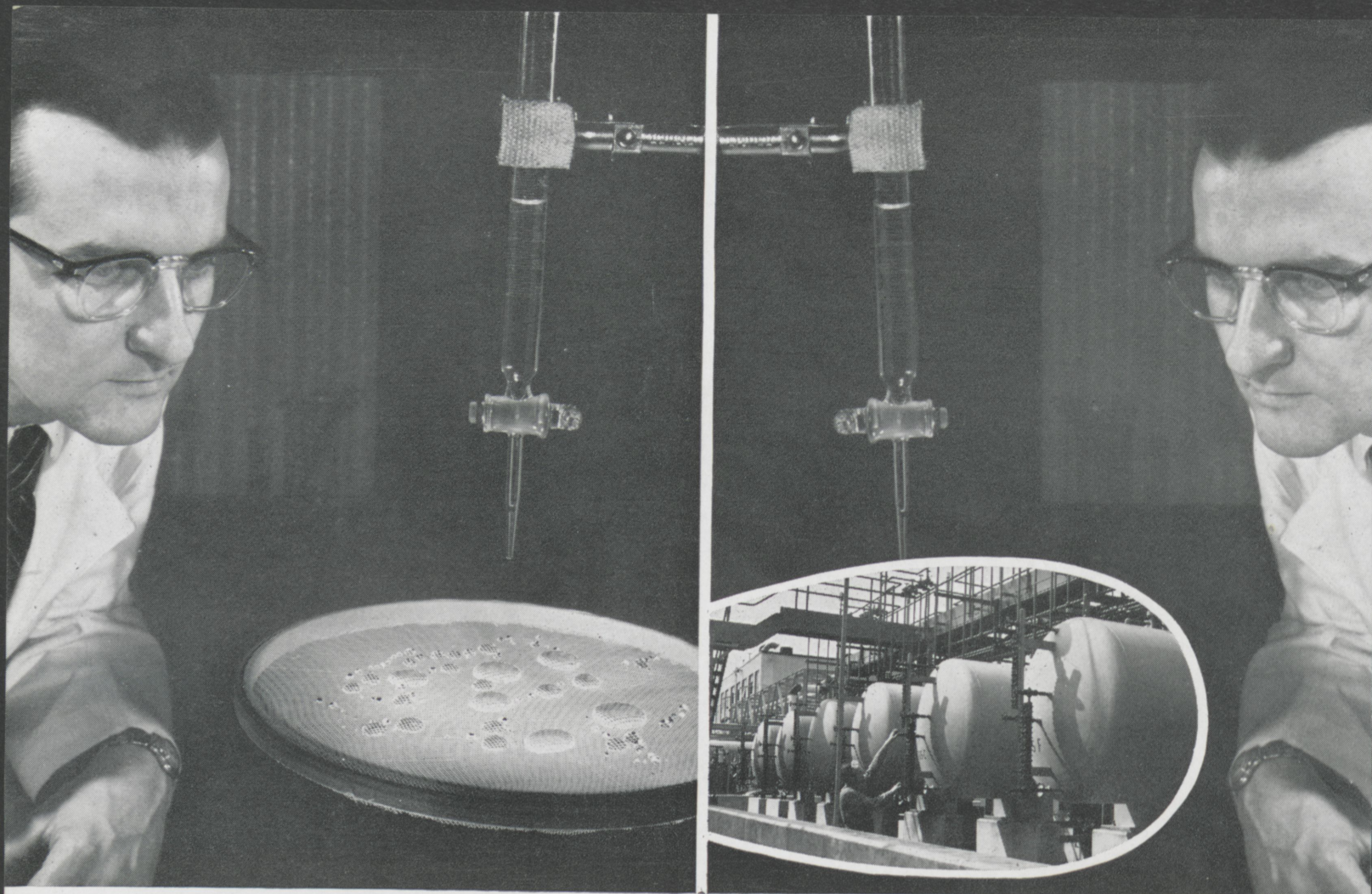
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