Fall 11-1956

Volume 68- Issue 2- November 1956

Rose Thorn Staff
Rose-Hulman Institute of Technology, library@rose-hulman.edu

Rose Technic

Member Engineering College Magazines Associated

November, 1956

Leroy J. Sauter, class of '49,
speaks from experience when he says:

"The variety of jobs open to engineers with United States Steel offers satisfaction and a great future."

IN 1949, Leroy J. Sauter was graduated from the University of Pittsburgh with a B.S. in Metallurgical Engineering. Today, Mr. Sauter holds the important post of Superintendent, Open Hearth and Bessemer Department at National Works of United States Steel's National Tube Division.

Before his college days, and as far back as October, 1939, Mr. Sauter was employed as a chipper, a molding helper, and helper on an electric furnace at the United States Steel's Johnstown Works. Then, from 1943 until 1945, he served in the U. S. Navy. He entered the University of Pittsburgh in 1946, graduating within three years.

In February of 1949, Mr. Sauter was employed by United States Steel as a student engineer. In October, 1950, he became a process engineer in the Open Hearth and Bessemer Department. In April, 1952, he was advanced to practice engineer in the same department, and three months later, July, 1952, Mr. Sauter was appointed Assistant Superintendent of the Open Hearth and Bessemer Department. His elevation to his present position of Superintendent of this department occurred in December, 1955.

Today, Mr. Sauter supervises 316 men, being responsible for and assuring the productivity, quality of product, and general morale of this group. His responsibility further extends to the complete operation of his department, operating costs, meeting ingot requirements and complete scheduling of equipment.

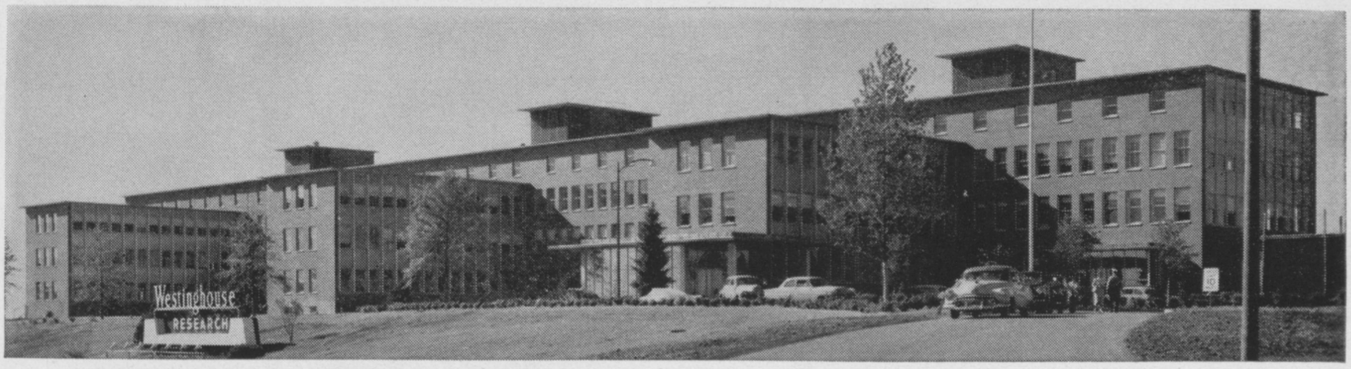
Mr. Sauter's rapid advancement is not unusual at United States Steel. USS training programs make it possible for men of vision and energy to reach responsible goals within a minimum of time. Mr. Sauter says, "With the vast expansion of the steel industry, opportunities to men presently graduating from colleges and universities throughout the country as engineers are unlimited. United States Steel offers such engineers the opportunity to practice using a large variety and range of specific engineering talents. In the steel industry practically every craft known to man is utilized."

If you are interested in a challenging and rewarding career with United States Steel and feel that you can qualify, you can obtain further information from your college placement director. Or we will gladly send you our informative booklet, "Paths of Opportunity," upon request. Just write to United States Steel Corporation, Personnel Division, Room 1622, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

UNITED STATES STEEL

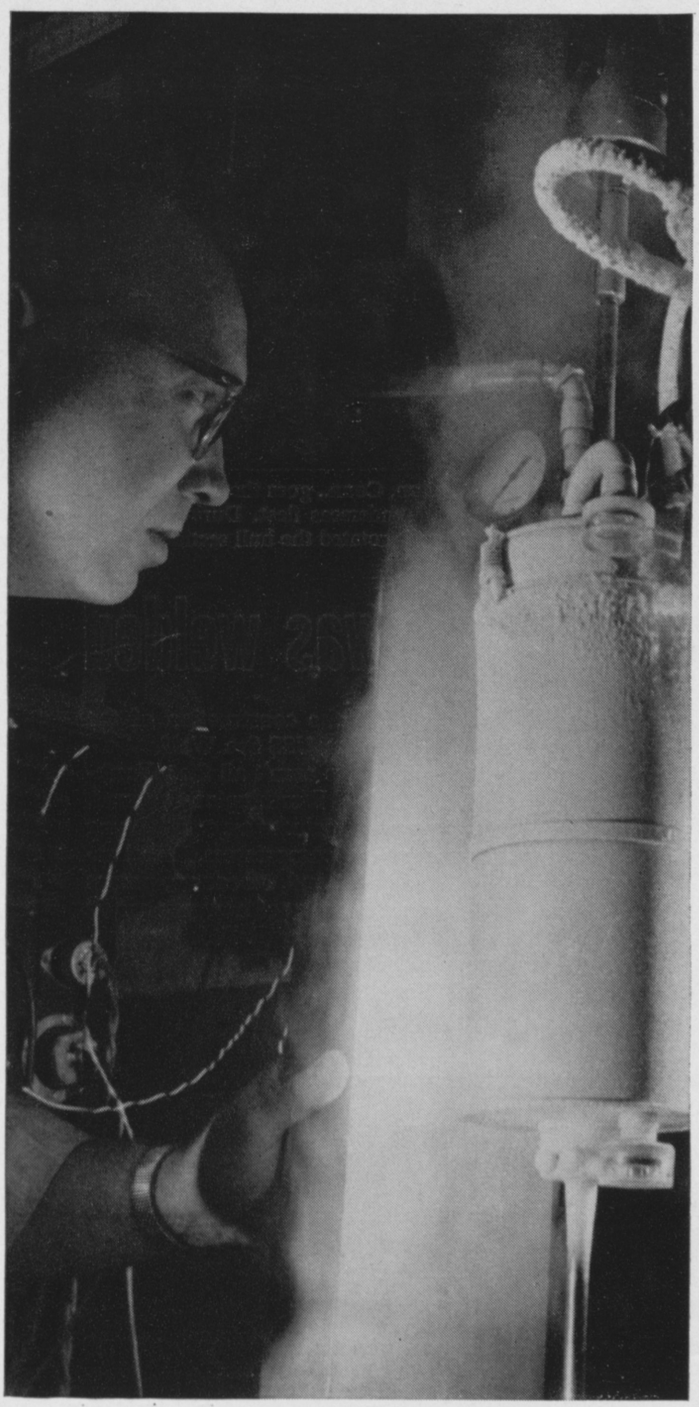
SEE THE UNITED STATES STEEL HOUR. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

AMERICAN BRIDGE . . AMERICAN STEEL & WIRE and CYCLONE FENCE . . COLUMBIA-GENEVA STEEL . . CONSOLIDATED WESTERN STEEL . . GERRARD STEEL STRAPPING . . NATIONAL TUBE OIL WELL SUPPLY . . TENNESSEE COAL & IRON . . UNITED STATES STEEL PRODUCTS . . UNITED STATES STEEL SUPPLY . . *Divisions of* UNITED STATES STEEL CORPORATION, PITTSBURGH
UNITED STATES STEEL HOMES, INC. • UNION SUPPLY COMPANY • UNITED STATES STEEL EXPORT COMPANY • UNIVERSAL ATLAS CEMENT COMPANY



Westinghouse Research

. . . AN INVESTMENT IN YOUR TOMORROW



From its earliest days, Westinghouse has built a farsighted research program knowing that it was an investment in the future of the nation and in scientists and engineers like yourself. Recent evidence of that faith in tomorrow is the new Westinghouse Research Laboratories where more than 750 scientists, technicians and other staff members strive to make the unknown known.

This research facility is an exciting frontier in the fields of Chemistry, Electromechanics, Electronics and Nuclear Physics, Insulation, Magnetics, Mathematics, Mechanics, Metallurgy, Physics, Semiconductor and Solid State Physics, and other technology. Pioneering here affects not only Westinghouse activities, but serves all industry and defense as well.

You are cordially invited to become a part of Westinghouse research leadership. Challenging career opportunities await you in a variety of locations, and continued education at Westinghouse expense is available in 22 universities.

Ask your placement officer to arrange a date with the Westinghouse Interviewer who will be on campus soon. Meanwhile, write for *Finding Your Place in Industry*, and *Continued Education in Westinghouse.*

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

G-10303

Westinghouse

SLIDING DOWN THE WAYS at Groton, Conn., goes the USS Nautilus, newest and fastest member of our underseas fleet. During welding, Worthington heavy-duty turning rolls rotated the hull sections.

How the world's first atomic sub was welded

Welding the hull of the USS Nautilus, world's first atomic submarine, presented a tough problem.

Submerged-arc automatic welding seemed to be ideal for the job. Question was—could you rotate the hull sections of the Nautilus to take advantage of this fast, high-quality welding method?

Worthington's answer to General Dynamics Corporation's Electric Boat Division, builder of the Nautilus, was the largest turning roll ever built.

The result? Welding of the Nautilus hull was accomplished in record-breaking time — and cost less than originally estimated. Unchanged, the Worthington roll set-up is also being used in the construction of the nation's second atomic sub, the USS Sea Wolf.

Turning rolls for submarines aren't all that Worthington makes. The long list of Worthington-designed, Worthington-built equipment includes air conditioning units, construction machinery, compressors, Diesel engines, steam power equipment and, of course, pumps of all kinds. For the complete story of how you can fit into the Worthington picture, write F. F. Thompson, Manager, Personnel and Training, Worthington Corporation, Harrison, New Jersey. You may be glad you did.

4.25 B

See the Worthington representative when he visits your campus

See the Worthington Corporation exhibit in New York City. A lively, informative display of product developments for industry, business and the home. Park Avenue and 40th Street.

WORTHINGTON

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

AIR CONDITIONING AND REFRIGERATION • COMPRESSORS • CONSTRUCTION EQUIPMENT • ENGINES • DEAERATORS • INDUSTRIAL MIXERS
LIQUID METERS • MECHANICAL POWER TRANSMISSION • PUMPS • STEAM CONDENSERS • STEAM-JET EJECTORS • STEAM TURBINES • WELDING POSITIONERS

Rose Technic

VOLUME LXVIII, NO. 2 NOVEMBER, 1956

Content

Cover

A front view of the new Baur-Sames-Bogart Hall which was opened to student residence this fall. The building is located on the small campus lake and houses 132 men.

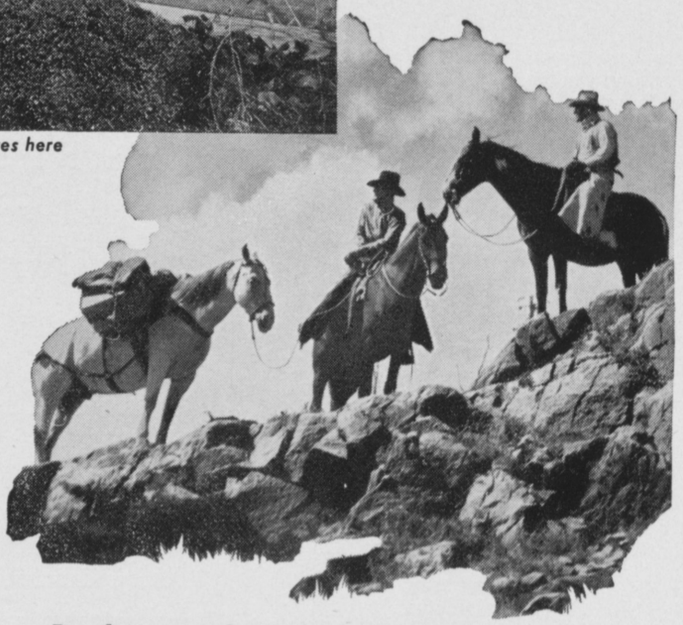
PRINTED BY MOORE-LANGEN PRINTING AND PUBLISHING CO.
140 North Sixth Street, Terre Haute, Ind.

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.

Engineers... Look ten years ahead!

A Douglas engineer lives here

Will your income and location allow you to live in a home like this... spend your leisure time like this?



They can...if you start your Douglas career now!

Douglas has many things to offer the career-minded engineer!

...there's the stimulating daily contacts with men who have designed and built some of the world's finest aircraft and missiles!

...there's enough scope to the Douglas operation so a man can select the kind of work he likes best!

...there's security in the company's $2 Billion backlog of military and commercial contracts!

...and there's every prospect that in 10 years you'll be where you want to be professionally, and you'll be in both the income level and geographical location to enjoy life to its full.

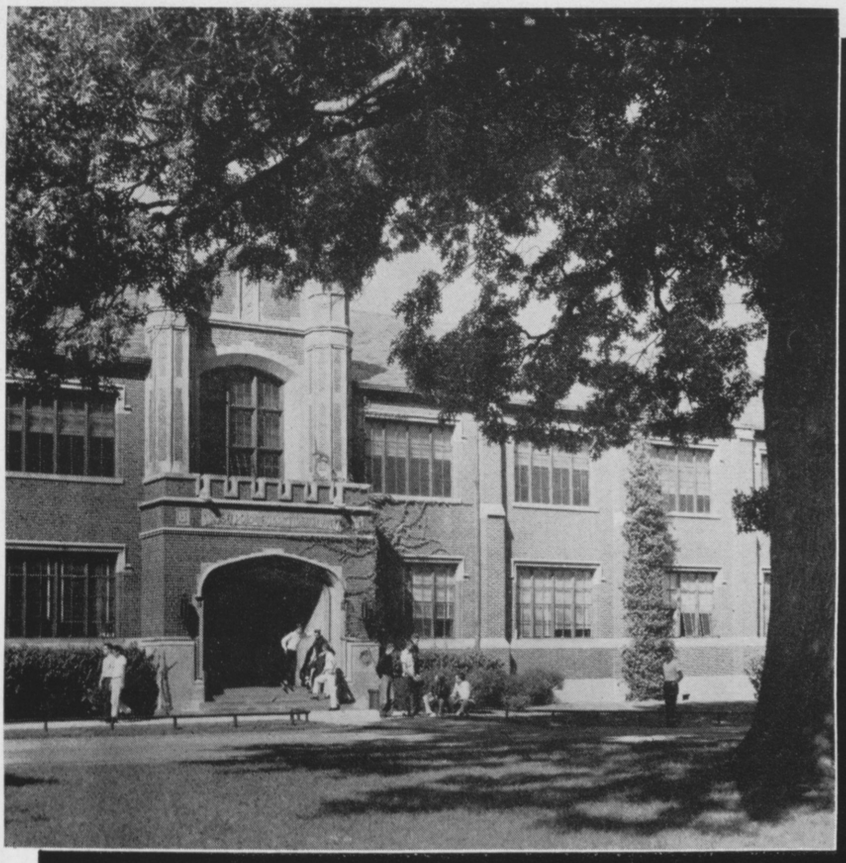
Brochures and employment applications are available at your college placement office.

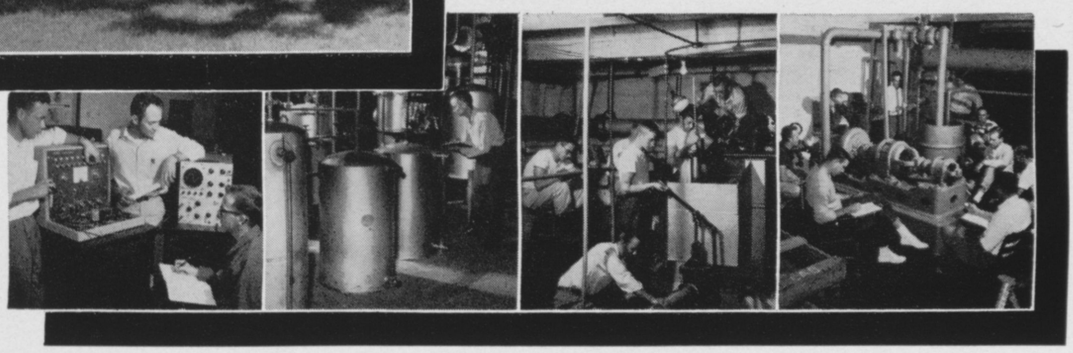
For further information about opportunities with Douglas in Santa Monica, El Segundo and Long Beach, Calif. and Tulsa, Okla., write today to:

DOUGLAS AIRCRAFT COMPANY, INC.
C. C. LaVene, 3000 Ocean Park Blvd.
Santa Monica, California

DOUGLAS **First in Aviation**

ROSE





ROSE POLYTECHNIC INSTITUTE

TERRE HAUTE, INDIANA

Office OF ADMISSIONS

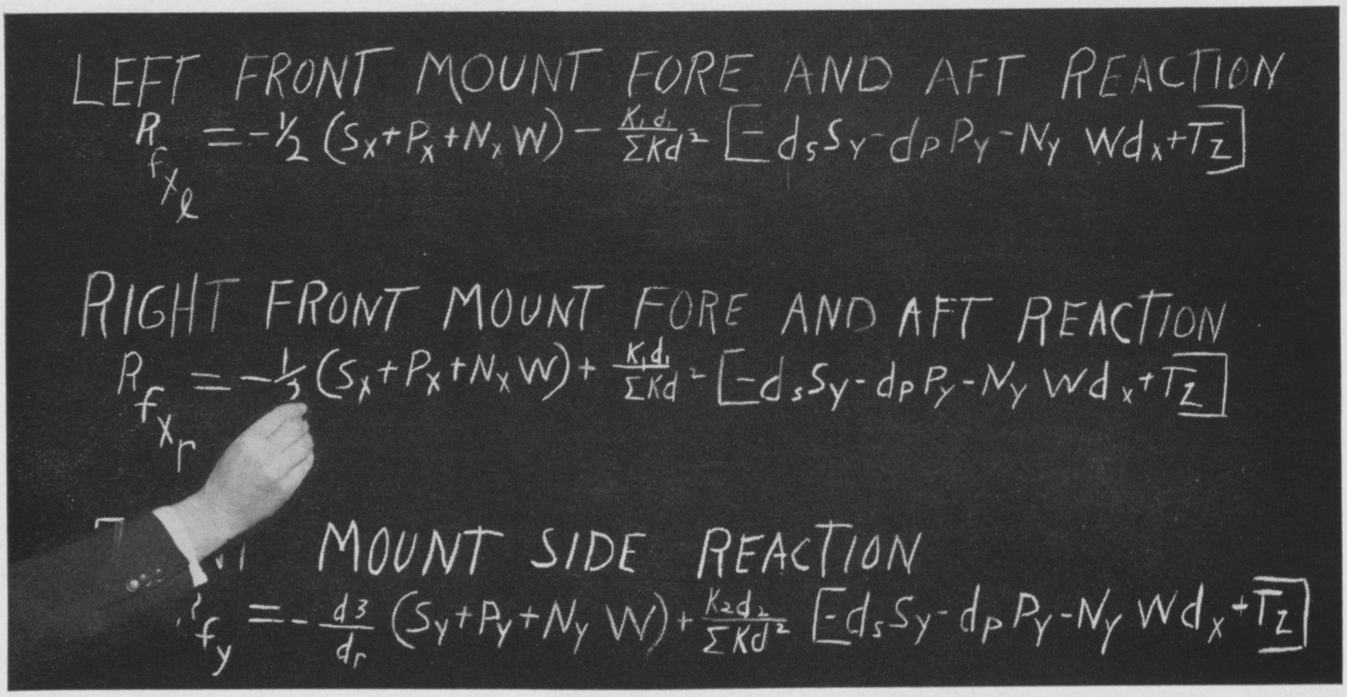
ROSE POLYTECHNIC
INSTITUTE
TERRE HAUTE, INDIANA

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



GRADUATE TRAINING AT ALLISON PICKS UP WHERE CAMPUS LEAVES OFF

With the completion of your academic training, you're basically qualified to start your career in engineering.

What then?

If you plan to go ahead and further your education to prepare for greater things later on you'll be interested in the Allison Training Programs.

Starting your engineering career at Allison, you are given the opportunity to continue learning while you work alongside top-level engineers in the aircraft engine industry.

Should you want to work toward an advanced degree, you can, for we have arrangements with an outstanding engineering school which conducts classes within the plant. You get your Master's degree in engineering while you continue to work and earn.

A variety of refresher courses at college level and other specialized, non-credit courses are always available at Allison. Lectures on curent problems and practices are conducted by prominent university men, consultants and Allison's own specialists in their respective fields.

We'd like to tell you more about the many benefits, advantages and unlimited opportunities awaiting you at Allison. Write for full information: Personnel Dept., College Relations, Allison Division, General Motors Corporation, Indianapolis 6, Indiana.

OUR ENGINEERS WORK HERE

This is our new Administration Building, hub of the new Allison engineering Research and Development Center in Indianapolis.

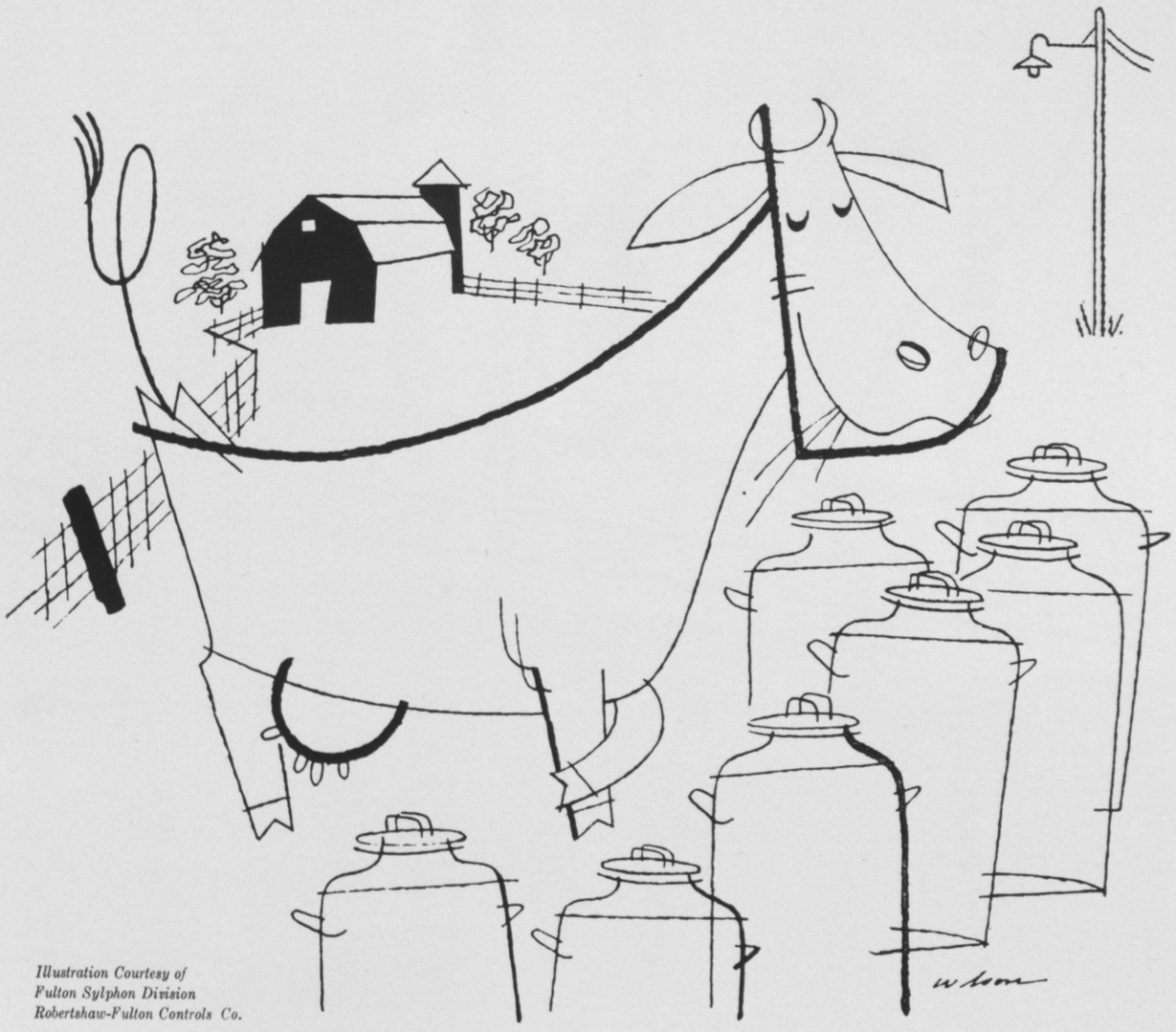


Illustration Courtesy of
Fulton Sylphon Division
Robertshaw-Fulton Controls Co.

There's satisfaction in meeting a challenge

For engineers worth their salt, challenge is stimulating. We live in such an atmosphere at Detroit Edison, a company internationally known for its bold, imaginative engineering. But let's be specific.

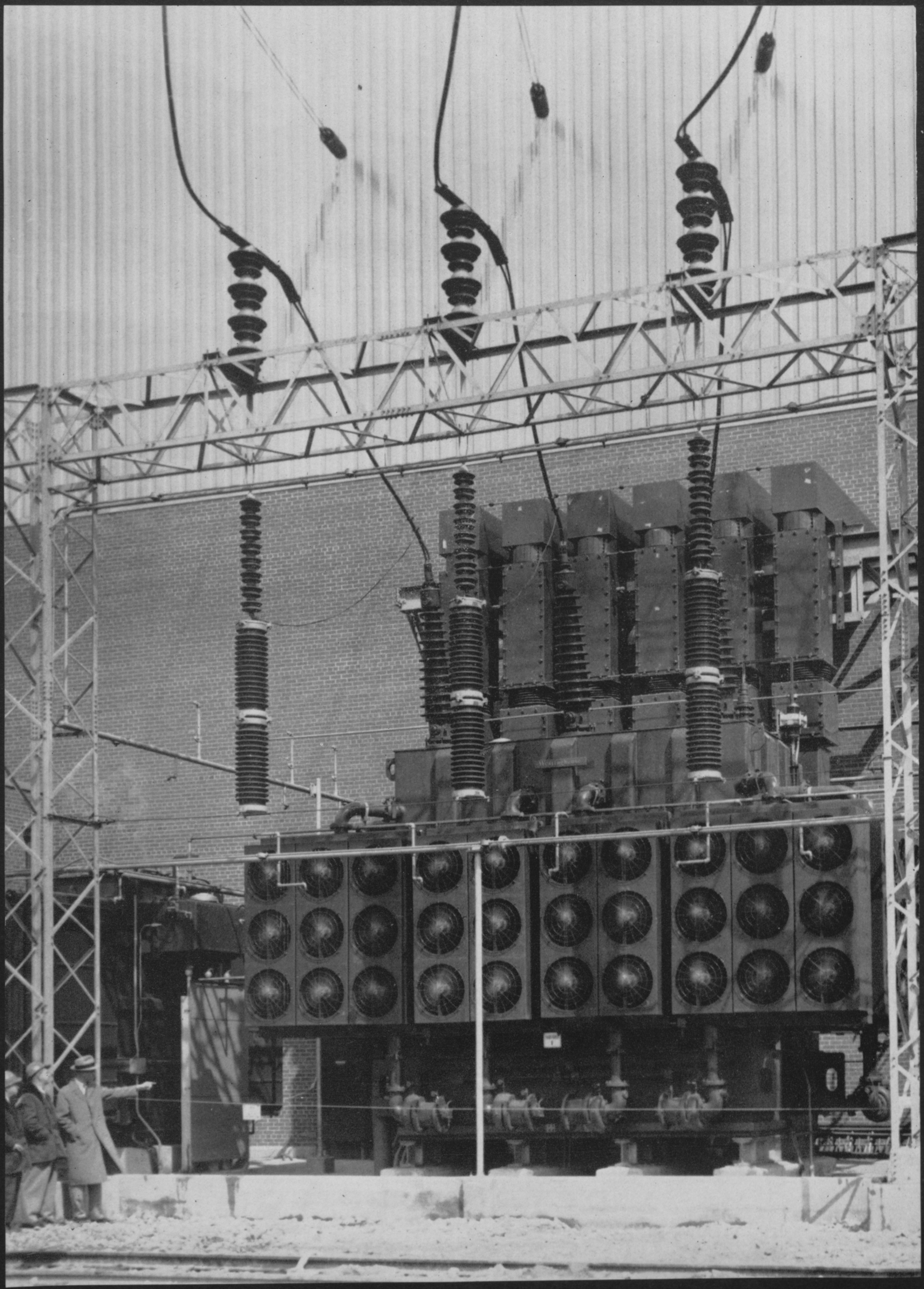
Soon it's going to be sound economics for us to transmit energy at 345 kv. There's not much precedent to draw on; much remains to be clarified about system design, operation, radio interference, line losses, relays, system integration, lightning performance. Where does the challenge stop?

Or take the problem of heat exchange. We're deep in atomic power plant design, where sodium is the primary coolant. Efficient heat exchange is essential! There's the same problem with respect to gas turbines and critical-pressure boilers, too.

We also plan to use our digital computers, and like equipment, in new, untried ways. Applying them to engineering and management problems, for example. But it will take time AND talent to do some creative engineering first.

If these challenges—a few at random—suggest a career that appeals to you . . . well, you appeal to us. Stop at your Placement Office and arrange an early interview.

DETROIT EDISON



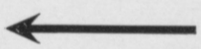
The Ethics Of Job Seeking

Following their graduation in June, 1957, most of the present Rose seniors are going to begin a career in industry as professional men—engineers. Since they will be starting their professional life at that time, they should begin now to assume the responsibility which rightfully belongs to a member of a profession.

A student has the opportunity to develop professionally by conducting himself according to high ethical standards in his relationships with prospective employers. First of all, before a student actually signs up for an interview, he should carefully study the entire list of firms which are visiting his school and select a few companies in which he is genuinely interested. After signing for an interview but before the interview actually takes place, he should become acquainted with the company through available literature. This will save his time as well as that of the interviewer, and it will better prepare him for the interview. Also, he should appear promptly for all interviews, and if he is unable to make an appointment, he should notify the placement office. All correspondence from prospective employers should be answered promptly. An applicant should not accept a position before he has completed all the interviews for which he has obligated himself. And finally, if a company should invite a student to make an out-of-town visit at company expense, the applicant should be fair with his school by arranging the trip so that he does not have to miss too many classes, and he should be fair with his prospective employer and submit an honest expense account. Unethical practices reflect adversely not only upon the applicant but also upon the college which he attends.

If all Rose men who are interviewing prospective employers this year will follow these suggestions, they will be taking the first step on the road to full professional status.

John L. Bloxsome Jr.



This 315,000-kva Westinghouse transformer, the world's largest, has recently been installed in the Detroit Edison Company's new River Rouge Power Plant. The transformer, weighing 325,000 pounds, was shipped upright in a one-piece tank, less bushings and cooling equipment. The installed unit weighs 448,000 pounds and is about 24-½ feet high (from foundation to bushing tips), 16-⅔ feet wide, and 26 feet long.

Portable Gas Turbine

By Tom Hale, soph., m.e.

An adequate supply of electric power in military theaters of operation is one of the many responsibilities of the Corps of Engineers. Support of civilian economy in such theaters to the extent necessary to prevent disease and unrest requires operation and maintenance of such facilities as water supply, sewage disposal, lighting, heating, and some industrial activity. All of these require electric power at the voltage and frequency of the locality involved. The need for an intermediate-sized power supply that can be transported readily seems to be best fulfilled by a railway-mounted unit.

Railway-mounted steam plants developed and constructed during World War II appear too complicated and cumbersome for extensive use. (For example, eight cars were required for a 5000-kw steam turbine and its necessary auxiliary equipment.) Recent developments in gas turbines suggested a portable power plant of medium capacity suitable for use anywhere in the world. The gas turbine's simplicity, light weight, compactness, and freedom from cooling-water requirements offer distinct advantages for this kind of service. The many problems of adapting a gas turbine to the application prompted the Corps of Engineers to have a pilot model built, which will be used to establish criteria for further procurement and to train operating personnel.

Many limitations and requirements contributed to the problem of designing and constructing a suitable unit. The car could not be designed around the equipment since length, width, and height of the cars must meet the Berne International Clearances. Consequently, the equipment had to be designed in many cases to conform to these established limits. Other special requirements such as track gauge, type of couplers, and brakes had to be considered to make the plant capable of being transported over foreign as well as American railroad lines.

One of the first problems that had to be solved was the requirement for multi-gauge operation. The cars and their trucks had to be adapted not only for the standard American gauge of 56½ inches but also for 60-, 63-, and 66-inch gauges that are encountered elsewhere in the world. Therefore, the special trucks are adaptable to the four different track gauges named. Additional brake lugs have been cast integral with the truck frames so that the brake equipment can readily be shifted as needed for the various gauges. Each different track gauge will require a different set of axles, with wheels pressed on to the proper dimensions to accommodate the desired track gauge. With axle and wheel sets stored at strategically located overseas depots, it becomes relatively simple to convert the railway cars to the track gauge required. The structures housing the draft gears have been designed to accommodate foreign couplers.

The plant must be self-contained so that no additional equipment is required except that necessary for fuel supply. Power must be produced at either 50 or 60 cycles at the proper voltage, depending upon the locality in which it is used. Since the plant may be called upon to operate in any part of the world, it must be able to start and operate at any temperature encountered in tropical or arctic climates. This presents the problem of ventilation in warm climates and prevention from freezing in cold climates. During transportation from one location to another and during times when the main unit is not in operation and is disconnected from any external power supply, light, heat, or cooling must be provided for safety and for the comfort of operating personnel.

The turbine-generator car is shown during construction by the car builder, Pudget Sound Bridge and Dredging Company, at their yards in Seattle, Wash. The removable roof sections and hinged sides provide for easy access for major maintenance.

The components comprising the railway-mounted power plant are arranged on two 54-foot long railway cars. The turbine-generator car contains the following equipment: (1) 5000-kw turbine-generator unit with exciter; (2) 150-hp wound-rotor starting motor connected to the turbine generator by a clutch-type coupling; and (3) turbine auxiliary control panels.

The transformer-control car contains: (1) 6250-kva outdoor transformer; (2) 150-kw diesel-generator unit; (3) 50-kw diesel-generator unit; (4) 30-kva transformer; (5) high-voltage switchboard; (6) low-voltage switchboard; (7) remote turbine control panel; and (8) all auxiliaries such as car-heating boilers, air-conditioning, 32-volt batteries, and 4-kw axle-driven generator.

The roofs of both cars are constructed in removable sections to provide access to equipment for major overhaul. The sides of the turbine-generator car are equipped with filters in hinged frames and adapted for easy removal for cleaning. These filters are covered by hinged steel sections when the turbine-generator unit is not in operation. Also, the sides of this car, and of the other car at the diesel-generator sets, fold down to form a catwalk, which facilitates adjustments and minor repairs. The sides of the transformer-control car, except where diesel engines are located, are not hinged and are not removable.

The control room, located in the transformer-control car, is equipped with air conditioning and heating equipment to provide comfortable working conditions for the operator under all ambient temperatures that are likely to be encountered during operation.

The 5000-kw gas turbine takes air from both sides of the car through filters and an inlet silencer. It passes through a 16-stage axial-flow compressor where it is compressed to approximately six atmospheres, then to six combustion chambers enclosed in an annual housing where fuel is burned. The air expands through a five-stage reaction turbine and is discharged to atmosphere through a 12-foot collapsible exhaust stack.

The casing of the compressor, combustor, and turbine is built with sufficient strength to maintain alignment of the rotating parts, thus eliminating the necessity for an additional bedplate under the turbine unit. The compressor and turbine rotor are a single unit with two end bearings, thereby providing access to the bearings without disturbing the main turbine. This two-bearing design also eliminates all high-pressure air seals and bearings adjacent to the hot metal parts of the turbine and combustor, and minimizes the effect of possible external misalignment. Leakage air is not lost from the cycle and a path for the cooling and for the turbine rotor and stator is provided without the need of any external cooling connections.

To facilitate maintenance, a single horizontal joint is provided on the compressor, combustor, and turbine covers so that they can be lifted individually or as a unitized assembly without disturbing the rotating element. The stationary vanes are removable, so that a complete inspection of all blading can be made without disturbing the rotating element.

The bearings are standard pressure-lubricated sleeve type and the residual thrust load of the compressor and turbine combination is carried on a segmental-type thrust bearing at the inlet to the compressor. The compressor casing is fastened rigidly to the reduction-gear case. The turbine end is supported on vertical trunnion supports to allow for axial expansion. The rotating element is connected to the reduction gear through a flexible quill shaft, thus minimizing the effect of any thermal misalignment between the turbine, compressor, and gear.

The reduction gear consists of two sets of double-helical pinions and gears for reducing the speed from 5745 to 3600 rpm for 60-cycle operation, and to 3000 rpm for 50-cycle operation. In order to facilitate changing from 60 to 50 cycles, the reduction-gear sets are interchangeable and designed so that gear-ratio changes can be made without disturbing alignment of the auxiliaries.

The fueling system consists of two 600-gallon day tanks mounted beneath the gas-turbine car from which

(*Continued on Page* 38)

This 5000-kw gas-turbine power plant, mounted on two 54-foot railway cars, is suitable for service throughout most parts of the world. The gas turbine offers the most compact railway-mounted power plant of any prime mover of equal capacity.

ECONOMICS OF

SECONDARY CAPACITORS

By Hugh Lynch, soph., e.e.

The secondary capacitor has proved a "shot in the arm" to many overloaded secondary systems. The evolution in the pattern of electric utility load cycles brought about by increased use of small-motored appliances has created an important role for secondary capacitors. Recent load growth has lowered power factor noticeably; many costly secondary systems are operating with power factor as low as 80 percent, while residential overhead secondary systems must sometimes cope with overload at 70 percent power factor.

The southern utilities, with large air conditioners operating at as low a power factor as 40 to 50 percent were first to feel the effect of the changing load pattern. In previous years nearly all domestic use was limited to resistive type appliances. The increased loads at a lower power factor require more and better equipment while the revenues do not increase due to the reading on the meter being related to power factor. Measures are being taken by the manufacturers to correct and improve power factor in appliances but until this is accomplished power companies are turning to the secondary capacitor.

By improving power factor in the secondary circuit secondary capacitors provide increased load capacity, reduce load losses and improve voltage to a level not possible with an equal amount of primary capacitance.

These same benefits can be obtained by installing larger transformers, heavier conductors, shorter runs, voltage boosters or regulators, or by such circuit rearrangements as banked secondaries, and overhead networks. Therefore, to be justified economically, secondary capacitors must provide the benefits at lower cost than other methods. Experience has shown this to be the case if the improvement necessary is within the range obtainable by power factor correction.

Capacitors have been used on secondary circuits for many years, but in limited quantity, and usually because of some special situation. Generally these capacitors were adaptations of industrial equipment or were especially designed for a particular installation. While they served their purpose well the increased demand for secondary-network capacitors and overhead distribution units has resulted in equipment developed specifically for secondary circuit application. The availability and the installation economies resulting from these new capacitors-nit designs have contributed greatly to their widespread use.

Application of fixed capacitors—Prior to 1948 the lighting load was the predominant factor and the early winter darkness is indicated by the peak in power demand. With the advent of air conditioners a change in the nature of load demands is observed. The load factor has been improved but at the expense of power factor.

Overload relief may be obtained by offsetting the decreased power factor with secondary capacitor. However, secondary capacitors are fixed capacitors, there being no economical method yet available for switching them with load changes. Therefore, it is required that they be applied to handle the minimum reactive KVA that flows at light rather than peak load. Actually this is not a problem if in installation the fixed secondary capacitors are coordinated with the existing primary capacitor. The primary capacitors can be switched at no great expense to handle peak load requirements.

In order to evaluate the benefits of secondary capacitors it is necessary to consider the results obtained and their relative importance. The useful results are threefold: (1) Release of thermal capacity for peak loads; (2) reduction of load losses; (3) improvement of the customers voltage. The relative value of these benefits will vary with the individual system.

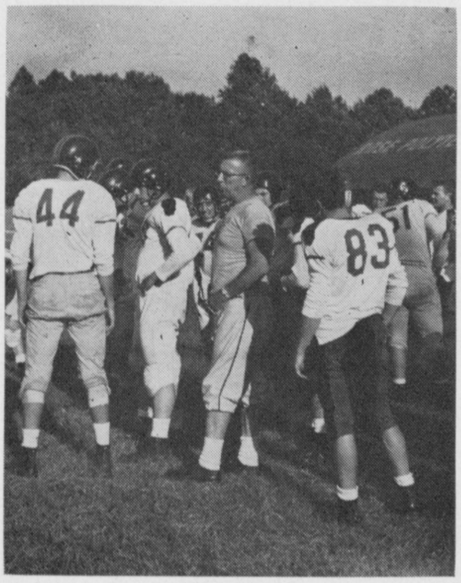
Economic Analysis of Secondary Capacitors

The economic worth of secondary capacitors may vary widely with individual system conditions. This applied particularly to capacitors on overhead secondary circuits, where the economic value of capacitors is admittedly more marginal than for underground works. Although the overhead secondary cost is much lower than that of equipment suit-

(*Continued on Page* 32)

MEET THE FACULTY

By John Williams, jr., m.e.



"Pappy" Brown giving advice.

Phil "Pappy" Brown has been Director of Athletics and football coach at Rose Polytechnic Institute since 1928. His tenure of 29 consecutive seasons with the engineers is one of the longest of any coach in football today.

Born in Indianapolis, he attended Arsenal Technical High School where he played amateur baseball. This was before Tech entered a program of inter-scholastic sports. His college years were spent at Butler University. At Butler, he lettered in football, baseball, track and tennis. Following a long standing tradition in his family, he was a member of Phi Delta Theta Fraternity. His major subjects were History, English and French. During World War II, Mr. Brown taught History at Rose.

It was not his intention to enter either the coaching or teaching fields when he graduated, but fate stepped in to direct his path toward coaching. He was the only senior on the great Butler football squad that defeated the University of Illinois. The fame of the Butler squad spread after this victory, and the Superintendent of Schools in Marshall, Illinois wrote Butler asking if there were any seniors on the team who wanted to coach football. Not having any other job at the time, Phil took an interview and wound up as coach of the Marshall High School football team.

He coached at Marshall for two years, and then decided to get out of the coaching field. He and his wife left for Portland Oregon in a Model T. They took tents and camped out on the trip. In Portland, he worked for the Chamber of Commerce and the New York Surety Corporation. He also played basketball in Portland. While in the West, he managed to turn down several coaching jobs.

Mr. Brown returned to Hoosierland in 1926 when his father became quite ill. He accepted a position as football coach at Washington College in Maryland in the fall of 1926.

The beginning of the football season of 1928 found Phil Brown at Rose Poly as Director of Athletics and coach of all sports. He succeeded the late Heze Clark in this position. Throughout his years at Rose, "Pappy" has coached football, basketball, tennis, track and golf. He notes that his major contribution as golf coach was scheduling the matches.

Phil coached the Rose Engineers basketball squad to victory over Indiana State in 1931, the first win over State in 18 years for Rose. His best football teams were those of the early forties when they lost one game in two years. That loss was to Wabash, by a score of 14 to 13. It was under Phil's tutelage that Eddie McGovern became the nation's leading scorer, scoring 165 points in 6 games. Phil has also coached many outstanding track men, too numerous to mention.

Coach Brown's hobbies are fishing and boating. Until this year, he was Director of a boy's camp in Onterio, Canada during the summers. He also managed to sneak in some fishing while up in the wilds. In earlier years, he listed literature as one of his hobbies, but his duties no longer give him enough leisure time for literary pursuits.

"Pappy" Brown favors strict adherance to amateur rules and is proud of Rose's record as a strictly amateur school. At no other school wth the possible exception of The California Institute of Technology, do players compete under the same conditions as Rose Men. To participate in sports at Rose, a man must carry a full academic load, adhere to strict scholarship requirements and still spend several hours a night in practice after his classes are over. The men who are in a sport at Rose do so because they love the game. This may not be so true at other schools. It is this love of sport that has made Phil feel that he is fortunate to be a coach here at Rose Poly. Under Phil Brown's guidance, Rose Poly's athletic program has grown to become one of the finest in the nation for a school of its size. We can offer our men the opportunity to compete in almost all major inter-collegiate sports.

Phil gave this summation of his years at Rose: "Being coach hasn't been the easiest job, but I am lucky to have been here. I have the deepest respect for those who compete in our sports. Rose men, students, alumni and associates have been very considerate and have given me many years of pleasurable existance."

Phil and his wife, Alora, otherwise known as "Al", have been married since 1924. They have one son, Philip Ward Brown, who is a First Lieutenant in the United States Air Force.

Controversial Corner

By Dean Herman A. Moench

Are Engineers Professional?

This was the question bothering a recent graduate attending a meeting of professional engineers. A thoroughly competent product of an outstanding West Coast curriculum he was struggling to establish in his own mind a sound basis for a professional outlook. In effect he asked me how he, a young salaried employee of a big manufacturing enterprise, could really consider himself to be a professional man doing professional work. Not an easy question to answer, his query arises in the minds of many alert young men starting their careers—as most do, even in this day of clamor for more engineers—way below the "executive" level.

By their actions many engineers —old as well as young—show that they do not believe that their work is in a different category from highly skilled labor. Some campaign vigorously for a nation-wide program to organize employee engineers into a powerful bargaining group that will deal as militantly with management as does organized labor. During the last ten years numerous local engineer unions have been formed. A confederation of such groups totaling perhaps over 30,000 members is Engneers and Scientists of America which seems to be especially active in the aircraft and electronic industries. ESA, in a continuing program to promote its philosophy among young engineers, has in the last few years distributed widely on college campuses its literature on the advantages of collective bargaining for engineers. The claim is made that collective bargaining is simple and effective, does not demean or detract from the professional status of those who engage in it, and is therefore in no way incompatible with professionalism.

Such assertions bring us squarely up to the problem—what kind of engineering practice is professional? Dean N. W. Dougherty has said "First and foremost a profession must serve an indispensable social need; it must heal the sick, comfort the discouraged and direct the strong, protect the rights of citizens from each other or from ambitious government; it must take the loads from the backs of men and animals and place them on machines and processes. In this latter function we place our engineering practioners, though they also protect the health of the community; they make the records that show property rights; they are the key to transportation and communications, and they are the master builders of the cities, towns and industries."

Identifying the most important element in maintaining the professional status of engineering, Vannevar Bush, famed engineer and scientist, put it this way, "The true spirit of any profession has always been ministration to the people. A career or vocational group that does not maintain that spirit as its basic motivation will not endure very long as a profession. The chief business of the engineering profession is, of course, the application of science to the needs of mankind."

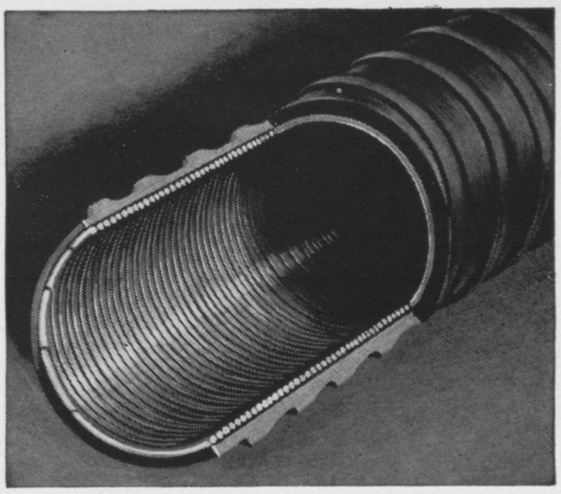
To this primary and indispensable spirit of service must be added two more ingredients—a specialized body of knowledge acquired by rigorous formal education and a loyalty to the profession itself which transcends personal advantage and company affiliation. This latter element of group consciousness brings the members of a profession together for the exchange of ideas and experiences and leads to unselfish service in the interests of the national technical socities in the various engineering fields.

All of us can picture this kind of profession activity exemplified in the work of a revered consulting engineer, rich in years of experience, a keen analyst of unusual problems, solidly grounded in the wide fields of physical and engineering sciences, a man of wisdom and discretion much sought after in the planning of major enterprises. But what of the young engineer just out of college? Feeling perhaps somewhat submerged under layers of supervisors, working out some detail in the design or production of a commercial or military item, is he a professional? The answer must depend on the individual, of course, but to me it seems clear that the durable satisfactions of a creative career at the higher levels of engineering can be achieved only through a positive attitude toward professional status. During the years following graduation the young engineer must be not only an engineer-in-training but also a *professional-in-training*. This is not easy. It calls for disciplined adherance to standards of good design, safety, economic proportion, equipment reliability, and simple honesty. It rejects inferior performance, poor workmanship, and a shoddy product as well as a yielding subservience to unwise policies, whatever their origin, which might lead to unsatisfactory results.

(*Continued on Page* 40)

Communications Superhighways of the Future

Another example of the pioneering opportunities at Bell Telephone Laboratories



Experimental waveguide, of tightly coiled copper wire in jacket, takes waves around bends. Solid wall pipe can be used for straight runs.

Careers with Bell Telephone Laboratories offer young engineers and scientists the chance to take part in pioneering exciting new developments in the field of communications—developments that look ahead to the needs of the future.

For example, the Bell System anticipates greatly increased demands for the transmission of telephone conversations and TV pictures. Communication links of giant capacity will be needed. Bell Labs scientists and engineers are experimenting with a new kind of long distance transmission medium which consists of round waveguides—empty pipes—and is theoretically capable of carrying hundreds of thousands of telephone conversations simultaneously with hundreds of television programs.

One type of guide, designed to be flexible, is bent on wooden forms to study effect of curvature on transmission. Left is A. C. Beck, Radio Research Engineer, E.E., Rensselaer Polytechnic Institute. Right is A. P. King, Radio Research Engineer, A.B. in Physics and Engineering, California Institute of Technology.

A crucial difference between this new waveguide system and present systems is that the *higher* the frequency of the waves transmitted, the *less* the attenuation. This is exactly the reverse of what is true for other forms of long distance transmission, such as the coaxial cable. To explore at frequencies higher than any now used, Laboratories scientists are devising new techniques and apparatus. Thus, they have developed a new reflex klystron tube able to generate a wide band of frequencies near 60,000 megacycles per second.

This new waveguide system is another result of the Bell System's unending effort to anticipate America's future communications needs. Projects like this are typical of the challenges that offer absorbing careers to able, imaginative young engineers and scientists. Your placement officer has more information about careers with Bell Telephone Laboratories, and also with Bell Telephone Companies, Western Electric and Sandia Corporation.

BELL TELEPHONE SYSTEM

Fraternity Notes

Lambda Chi

The Lambda Chi oblongers are on the way to the top in the Inter-fraternity football league. After a first game loss to Theta Xi, coach Harold Brown and his fighting 8 came back for two decisive wins over Alpha Tau Omega 33 to 18 and Sigma Nu 32-6. Teaming center plunges, end runs, and passes the Lambda Chi's are really moving the ball toward the goal.

In the fall honor assembly Harold Brown was tapped for both Blue Key and Tau Beta Pi. Honor Keys were awarded to Frank Molinaro, Larry Kirts, Carl Herakovich, and Dan Mook.

A very successful open house was held Oct. 5th with the Alpha Omicron Pi sorority of Indiana State. The parties at the home Friday and Saturday nights of Homecoming were attended by many alumni and most of the actives who were all in very high spirits. Refreshments were served and were well received by all.

Sigma Nu

Sigma Nu is starting out with what looks like a prosperous and most successful year. First of all, we have redecorated two rooms, two baths, and the hall of the second floor of the house. This completes the job of redecoration on the second floor. Second, we have finished new unfinished furniture for these rooms.

On Tuesday, October 2, the chapter was paid a visit by our Division Commander Brother Charles Messersmith, who is a Professor of Mechanical Engineering at Purdue University. He had many favorable comments for the chapter which helped stimulate the brothers.

Although Rose Poly's football team has not fared so well so far, Sigma Nu was well represented on the team. We have playing for the team Brothers Tom Clark and Richard Irey and Pledges Ned Kurtz and Jim Neal.

Congratulations to Brothers George South and Tom Clark who were tapped for Blue Key and Brother Don Carrell who was tapped for Tau Beta Pi. Also the chapter would like to congratulate Pledge Jim Neal on his engagement to Mary Ellen Boyland.

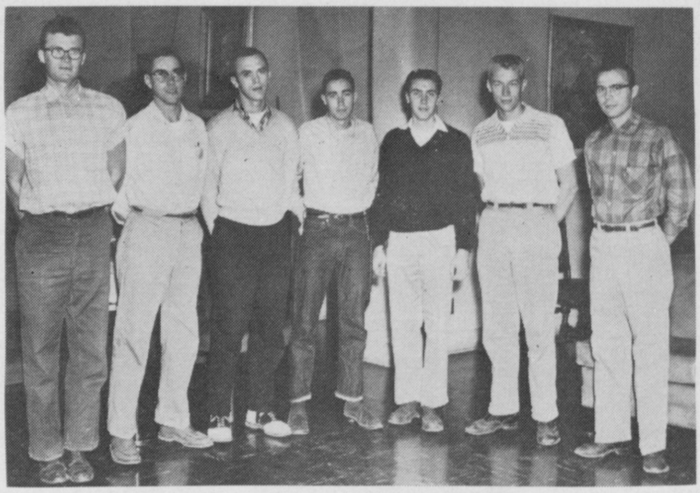
Kent Sharp,

Theta Xi

Well, here it is Homecoming time again. Theta Xi has many things planned for the weekend. There is to be a buffet dinner at the House from 6 to 8 p.m. Then after an Alumni meeting, the doors will be open for all to inspect the House and meet everyone. We are looking forward to a large turn-out to help us celebrate Homecoming. Congratulations to Bill Stafford, who became engaged over the summer. Much to our delight, the inter-fraternity sports program has turned out well for us. Our football athletes have played hard for us, and we're quite proud of them. Just keep in there fightin' boys! Two-fold congratulations to Gene Blastic. Besides being accepted into Blue Key, Gene is the new Junior class president. Nice going, Gene! All the members are looking forward to our coming field hockey game with St. Mary. Though usually snowed by their superior abilities, we try to be good losers, and everyone always has a good time. Theta Xi has acquired several new pledges. They are: John Burson; Karl Hassler; Don Lacas; Ron Nowling; Dick Rahn; John Stearley; and Marlin Trimnell. Welcome to the family! The House is finally getting straightened up. Everyone pitched in and helped; and with the new furniture that's ordered, the House should look very nice. Work is progressing quite well on the Homecoming display. We believe we have a good theme, and hope to fully develop it. Well, that's about all the news to date, so see you in the next Technic.

Eugene Amick

(*Continued on Page* 40)

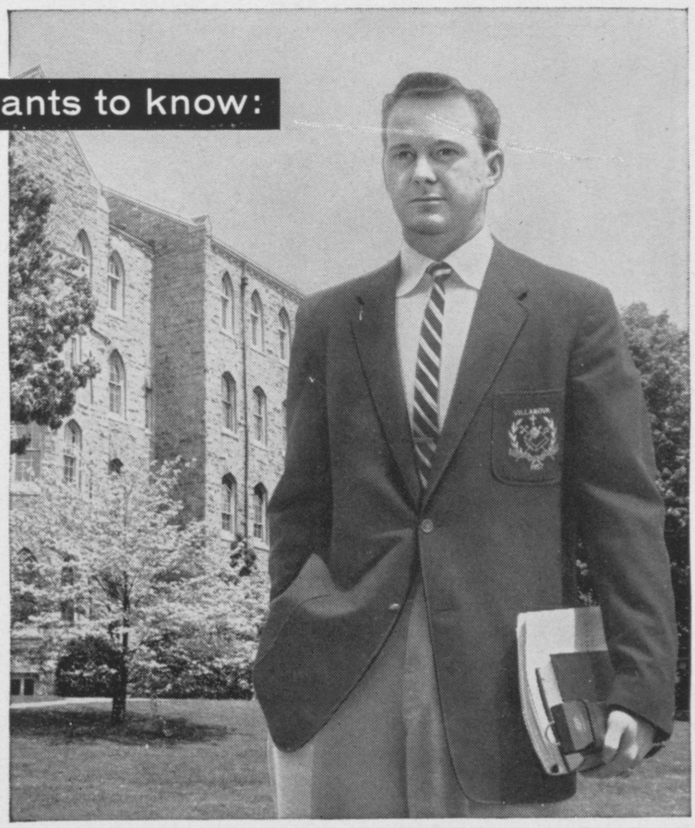


Recent Theta Xi pledges include left to right, Lucas, Stearley, Trimnell, Knowling, Rahn, Hassler, and Burson.

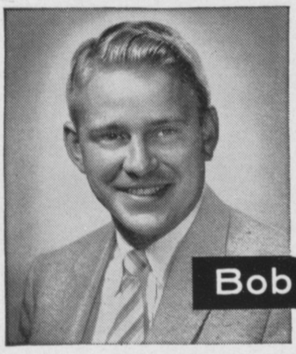
Sigma Nu's new Commander Richard Wegrich and his pin girl check over the latest additions to the scrapbook.

John Nettleton wants to know:

How would a graduate degree affect my chances for advancement at Du Pont?



John C. Nettleton expects to receive his B.S. in chemical engineering from Villanova University in June 1957. He has served as president of the student chapter of A.I.Ch.E., and as secretary of Phi Kappa Phi fraternity. John is now wondering about the pros and cons of advanced study in his field.



Bob Buch answers:

Robert J. Buch, M.S., Ch.E., came to the Engineering Development Section of Du Pont's Grasselli Research Division from the University of Louisville four years ago. Since then, he has engaged in many kinds of chemical engineering work, from pilot-plant operation to evaluation of the potential of proposed research programs. Within the last year, Bob has taken the responsibility of procuring B.S., M.S., and Ph.D. technical graduates in all phases of chemistry and chemical engineering for the Grasselli Research Division.

AN advanced degree would undoubtedly have a *favorable* effect in technical work, John, but let me enlarge on that just a little. In your own field (and mine, too) a higher degree is considered to be evidence of ability in carrying out original research. It is therefore helpful in obtaining work in research and development, where that skill is definitely important. You might say that it gives a man a head start in proving his ability in those areas.

It's less important in some other areas, though. For example, in production or sales work ability for handling human relationships is just as important for advancement as technical competence. If an engineer is sold on production work or sales, a graduate degree in marketing or business administration might be more helpful to him than advanced technical training in getting started.

But I've noticed this at Du Pont. Once a man lands a job in his chosen field and actually begins to work, his subsequent advancement depends more on demonstrated ability than on college degrees. That's true throughout the entire company—in scientific work, administration, or what not.

So an advanced degree is not a royal road to anything at Du Pont, John. But when coupled with proven abilities, it is unquestionably helpful to a man in research and development work. It often gets him off to a faster start.

LEST WE FORGET

By John L. Bloxsome, sr., e.e.

Graduation from college with a bachelor's degree in engineering will not automatically guarantee success and happiness to the recipient. Graduation does, however, present a great opportunity for achieving success and happiness. Some engineering graduates believe that a college diploma is a ticket to easy and successful living. This erroneous idea arises because almost any senior, no matter what his scholastic standing, has some sort of lucrative job awaiting him after graduation, and many seniors have at least a half dozen attractive offers to choose from. The current job opportunities are the best that have ever been offered to college graduates, for they provide not only high beginning salaries but also excellent chances for advancement.

What the young engineer should not forget is that he has been educated for a professional life and that he should continue to live such a life after graduation. In college he had a basic plan or objective—that being to obtain a degree in his chosen field. After he finishes his college work, he should set up his own objectives which will keep him always moving forward. Although scholastic success in college is important in obtaining a job, it is not always the measuring stick of performance on the job. In a recent survey, Frank Endicott, placement officer at Northwestern University, asked ninety-seven companies to list the characteristics of men hired five years ago who are outstanding today. The companies ranked the attributes in the following order: ability to work with people, ability to get things done, mental ability, initiative, leadership, hard work, good judgment, and adaptability.

Although mental ability received only half as many citations as ability to work with people in the survey mentioned above, scholarship records showed that seventy-five percent of these men performed above average while in college, while another twenty-five percent had average records. Thus, scholarship is important, not only before graduation but also after graduation. A real and sincere interest in learning is important to the graduate as well as to the student in college. Most organizations with which engineers are connected have some sort of training program. Young engineers should take full advantage of early training opportunities so that they will have a broader as well as a better understanding of their work. When possible, engineers should continue their formal education after graduation, and by all means they should take an active interest in their professional engineering societies.

If the young engineer wants a well-rounded and happy life, he must assume the responsibilities of a good citizen. This means taking an active part in his community. By doing this he not only helps himself but he also helps to build a better community for his family, and he will find that helping other people brings to him a sense of satisfaction. In every community there are various organizations and activities that need good members and leaders, especially professional men and women who have much to contribute. Participation in many of these organizations will help to give the young professional man a better appreciation of some of the cultural aspects of our society, an area which he may have neglected while busy in college. A person who participates in a variety of worthwhile group activities learns important lessons about getting along with people, obtains happiness by unselfish devotion to good causes, and probably will become a more productive employee.

In this materialistic world every human being needs to hold to a basic philosophy of life that is related to some power higher than himself. We need the sense of security that religion gives to us. We need to be in harmony with the world around us. Every well-adjusted person has beliefs and ideals which help to keep him on the right road.

When a person graduates from college he does not automatically acquire character, integrity, and the ability to work hard; yet these attributes are very important to his success and happiness. A good engineer must possess more than technical competence. He must always be absolutely firm in his desire to do the honest thing at all times; he must be absolutely trustworthy under all conditions, and he must be willing to put forth extra effort in order to do a good job. Mr. Alfred P. Sloan Jr., retired chairman of the board of the General Motors Corporation, offers this success formula:

> "Get the facts, recognize the equities of all concerned. Realize the necessity of doing a better job each day. Keep an open mind and work hard. The last is the most important of all. There is no short cut."

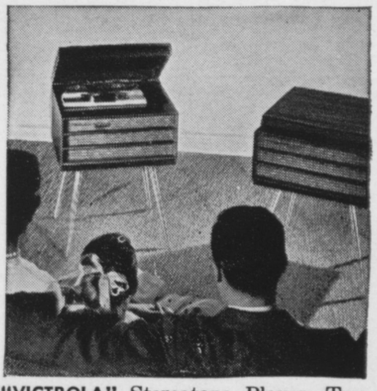
RCA–First to bring your home the stereophonic sound you've heard at movies

Now in your own home you can hear music in *perspective*, just as in the concert hall. Strings from the left. Brass from the right. The secret lies in amazing new RCA Victor Stereophonic Tape, pre-recorded with 2 sound tracks. The RCA High Fidelity Stereotape Player reproduces sound through two separated groups of speakers . . . gives recorded music new dimensions.

RCA, originator of many other "firsts" in sound, continues to pioneer in "Electronics for Living" at its David Sarnoff Research Center in Princeton, New Jersey — "trains" the electron to make life fuller, easier, happier.

WHERE TO, MR. ENGINEER?

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



"VICTROLA" Stereotape Player. Two units—tape transport, amplifiers and 3 speakers in one; 3 speakers in other. 8STP2. Both, complete, **$350.00.** Available also in matched luggage-styled cabinets at **$295.00.**

RCA® RADIO CORPORATION OF AMERICA
ELECTRONICS FOR LIVING

Campus Survey

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

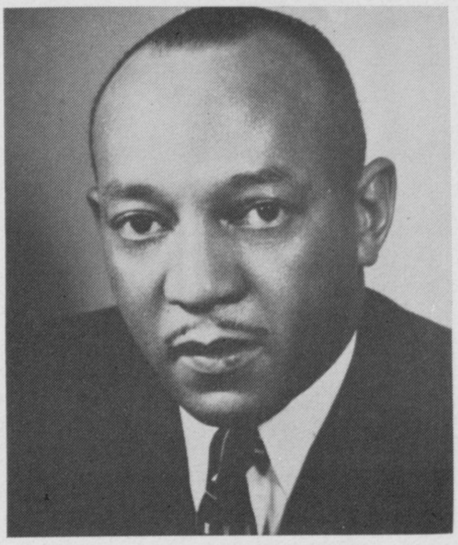
ELECTION—JUNIOR CLASS

The Junior Class elected officers for the year in an election held Wednesday, October 3rd. Gene Blastic was elected president; Tom Reese, vice-president; and Larry Kirts, secretary-treasurer. Congratulations men, and good luck, the class is behind you.

CONVOCATION SPEAKER JESSE OWENS

This month one of the greatest of all American athletes visited our campus to speak at a convocation. He proved to those who attended that he was a great man as well as a great athlete. Mr. Owens spoke of the place of athletics in our colleges and also of the position of the Negro in America. He drew from his experience as a director of athletic clinics in the Far East to illustrate his points.

His speech was well received by an audience of students and guests. I am sure that everyone who attended this convocation was moved by this man's sincerity and integrity. This is a fine example of the fine convocations that are available to us. Let's make sure that this policy will remain with us by attending convocations regularly.



Jesse Owens visits the Rose Campus.

CONVOCATION HONORS ASSEMBLY

The annual assembly honoring outstanding men of the Rose campus was held on Thursday morning, October 4th. Various organizations, such as the Blue Key and Tau Beta Pi organizations, tapped for new members during the convocation. John Bloxsome, President of Blue Key, presided at the event.

Charles Skidmore, Financial Secretary of the Student Council, presented honor keys to seventeen men for their participation in extra-curricular activities. Recipients were: Dick Hirst, Jim Martin, George South, Don Grantham, Tom Reese, Paul Cella, John Kassabaum, Dick Trueb, Frank Molinaro, Larry Kirts, Jim Oakes, Carl Herakovich, Dan Mook, Larry Logue, Bill Kuchar, Bob Manning, and Mike Munro.

The Blue Key organization, composed of junior-senior men possessing outstanding personality, character, scholarship, and leadership ability, tapped or pledged new members at that time. Congratulations to: George South, Harold Brown, Harry Bitner, Gene Blastic, Tom Clark, Tom Reese and Charles Skidmore.

Following the Blue Key ceremony, Tau Beta Pi pledges were introduced by organization president Jerry Rose. Tau Beta Pi is a national undergraduate honorary fraternity which selects its members on the basis of scholastic achievement. The following men were tapped for membership: Larry Thomas, Bill Shaw, Charles Corbin, Harold Brown, Don Carrell, Ernie Davidson, Max Hippensteel, and John Hornung.

Each year Tau Beta Pi presents an award to the freshman student who has the highest increase in his accumulative grade average during the second semester of that year. The award went to Dick Rahn.

Next on the program, Dr. Wilkinson presented the coveted Hemmingway Bronze Medal to James Barrick for being the top student scholastically of the freshman class.

Recognition of outstanding ROTC students was given by Lt. Col. Clifford E. Cross. Nine men were cited as top military men: John Bizal, John Bloxsome, Bob Bright, Jim Griffith, Jerry Rose, Gene Mrava, Bob Travis, Jack Foltz and Larry Thomas.

Several students were cited for outstanding work in their chosen field. Dr. Oran Knudsen introduced Harold Brown, selected by the American Chemical Society as the outstanding senior in Chemistry at Rose. James Barrick, a sophomore Chemical, was also recognized for his leading work as a freshman.

Dean Moench disclosed that the General Electric Company had awarded Paul Lewis, a senior Electrical, a substantial scholarship for his future schooling.

Next Dean Moench presented class honors to some fifty students. To qualify for class honors, a man must have an accumulative of 3.1 or better for the preceding year. A certificate was awarded to each of the following: Bob Bright, Charles Corbin, John Derry, Leroy Friel, Jr., Clyde Frump, Henry Jackel, Jr., Paul Lewis, Robert Martin, Gene Mrava, Robert Overpeck, Jerry Rose, William Shaw, Robert Stearly, Law-

rence Thomas, Gordon Whitesell, David Bailey, Harry Bitner III, Leon Cole, Ernest Davidson, Kenneth Denny, Frank Denton, Jr., Philip Eubank, Max Hippensteel, James Massey, Thomas McPherron, Glen Miles, Thomas Reese, Charles Skidmore, Richard Wegrich, John Williams, Gordon Wolfe, Stanley Amik, James Barrick, Richard Brown, Marlin Eaton, Robert Hall, Charles Hamilton, William Hollingsworth, John Jardine, Don Johnson, William Kuchar, Lawrence Logue, William McDonald, James Mills Dan Mook, Hugh O'Donnell, Jr., Jerry Parr, James Richardson, Don Slack, and Jan Sonner.

MILITARY BALL

November 17 is the date which has been selected for the Annual Rose Military Ball. This dance, which is sponsored by the student post of the Society of American Military Engineers, promses to be again the biggest and best dance of the social season.

Members of the S.A.M.E. have engaged a band from out of town again this year. Remember last year's band? This one is even greater! Popularly known as the WAYNE LUBY SEXTET, this band is comprised of Indiana University students. Wayne Luby, himself, has played with such great dance bands as Artie Shaw, Claude Thornhill, Buddy Morrow, Jack Fina, Henry Busse, and Jimmy James. The now famous Wayne Luby Band has played at Indiana University, Butler, I.S.T.C., Purdue, Miami, Ohio State, and the University of Louisville, as well as numerous engagements with night clubs and television stations.

The highlight of the Mil Ball will be the commissioning of an "Honorary Colonel." This girl, who will be elected at the dance by the student body, will command the Rose Regiment until the Military Ball of 1958. The present "Honorary Colonel" is Miss Lou Ann Tangeman of Indiana University. Bob Travis was Lou Ann's proud and beaming escort. The "O'Grady Drill," a competitive drill contest, is also on the evening's program.

Last year's Military Ball was one of the most popular dances in many years. This year's Military Ball, which promises to be even better, is November 17 in the Mayflower Room of the Terre Haute House. Better make your plans to attend now.

BOB WERTZ
Publicity Chairman

ENGINEERS BEST HUSBANDS, SAYS MARRIAGE AUTHORITY

Everybody is taking a poll of one sort or another these days, but the newest one is on what sort of a professional man would make the best husband. According to the Kentucky Engineer, guess who it is—the Engineer. And they have a doctor's report to back it up.

Engineers are the best marriage prospects, and will also make the best husbands, says Dr. James Bender, director of the National Institute of Human Relations.

"They have the best hearts, for marriage," is the way he puts it. But, he warns, they are shy, and the girl who wants to catch her engineer will have to be somewhat aggressive.

Dr. Bender goes on to enumerate the sterling qualities of the typical engineer who, according to his summation, appears to be the ideal mate. Indeed, one wonders whether there is much hope for the girl who marries a mere doctor, lawyer, or public accountant.

Engineers, it seems, are the least neurotic of all vocational groups and rarely quarrel. They are "tender lovers" and good parents who like large families. They are religious and good church goers. They are homebodies and like to putter around the house. They apply logic to morals, economics, science, and job-loyalty. And while they are a bit shy, they are one-woman men who don't get involved with their secretaries.

The lucky, lucky girl who gets an engineer might as well know what a model man he is, according to the scientific analysis undertaken by the institute. It seems probable that there will be quite a run on the available supply of engineers, as, Dr. Benders report gains circulation.

It stands to reason, with the facts here presented, that every single college boy should invest the $25 or so needed for a decent slide rule and switch majors if he is in any other field besides engineering. After all, who wants to go through life not knowing how to putter around the house?

(*Continued on Page* 36)

New Blue Key pledges. Left to right, Blastic, Brown, Clark, Reese, Skidmore, Bitner, and South.

WHAT'S DOING at Pratt & Whitney Aircraft . . .

Pratt & Whitney Aircraft engineer checks a bread board model for a subminiature, encapsulated amplifier built with transistors.

A rig in one of the experimental test cells at P & W A 's Willgoos Laboratory. The six large finger-like devices are remotely controlled probe positioners used to obtain basic air flow measurements within a turbine. This is one of the techniques for obtaining scientific data vitally important to the design and development of the world's most powerful aircraft engines.

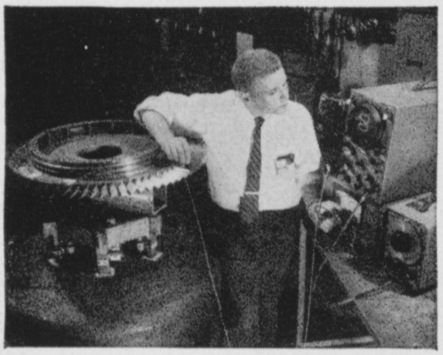
. . . in the field of INSTRUMENTATION

Among the many engineering problems relative to designing and developing today's tremendously powerful aircraft engines is the matter of accumulating data — much of it obtained from within the engines themselves — and recording it precisely. Such is the continuing assignment of those at Pratt & Whitney Aircraft who are working in the highly complex field of instrumentation.

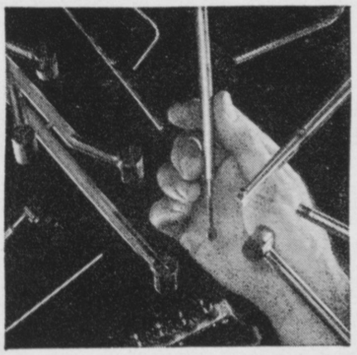
Pressure, temperature, air and fuel flow, vibration — these factors must be accurately measured at many significant points. In some cases, the measuring device employed must be associated with special data-recording equipment capable of converting readings to digital values which can, in turn, be stored on punch cards or magnetic tape for data processing.

Responsible for assembling this wealth of information so vital to the entire engineering team at Pratt & Whitney Aircraft is a special group of electronic, mechanical and aeronautical engineers and physicists. Projects embrace the entire field of instrumentation. Often involved is the need for providing unique measuring devices, transducers, recorders or data-handling equipment. Hot-wire anemometry plays an important role in the drama of instrumentation, as do various types of sonic orifice probes, high temperature strain gages, transistor amplifiers, and miniaturized tape recording equipment.

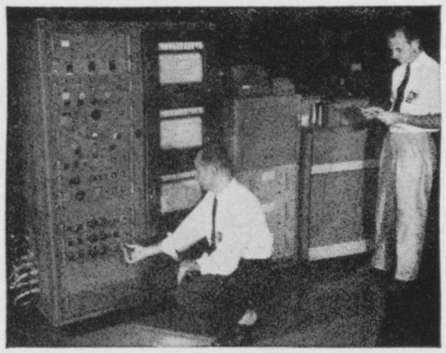
Instrumentation, of course, is only one part of a broadly diversified engineering program at Pratt & Whitney Aircraft. That program — with other far-reaching activities in the fields of combustion, materials problems, mechanical design and aerodynamics — spells out a gratifying future for many of today's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



Instrumentation engineer at Pratt & Whitney Aircraft is shown investigating modes of vibration in a blade of a single stage of a jet engine compressor.



Special-purpose probes designed and developed by P & W A engineers for sensing temperature, pressure and air flow direction at critical internal locations.



The "Plottomat", designed by P & W A instrumentation engineers, records pressure, temperature and air flow direction. It is typical of an expanding program in automatic data recording and handling.

World's foremost designer and builder of aircraft engines

PRATT & WHITNEY AIRCRAFT

Division of United Aircraft Corporation

EAST HARTFORD 8, CONNECTICUT

Locker Rumors

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

Varsity Football

The football season is drawing to an end, and Phil Brown's boys are finishing up a good year. They started out a little slow but have been improving all along. The first game, played under the lights at North Central College was a tough one. The Engineers were fired up and did their best to take it, but they were simply overpowered and went down 13 to 7. Captain Bill Payne injured his foot in that game and had to go easy on it in the following week in the opener at home.

Georgetown College of Kentucky brought a big team for the second game. They outweighed the Red and White by 20 pounds per man. Rose held their own with the Tigers until the last period when Georgetown scored a touchdown to take the game 13 to 6. No doubt both teams felt the heat that day, as the temperature soared into the 80's. The newly formed booster club cheered so loud and long that there was no talking in class for several days due to sore throats.

After two weeks practice the Rose men were in top shape for the Homecoming game. Rocky Herakovitch was back in uniform after a torn ligament in his leg sidelined him early in the season. The Homecoming activities turned out to be a great success. Rose played a fine game against the Eureka Red Devils to top off the weekend.

Varsity Basketball

If you see some students running over hill and dale around the campus, don't be surprised. They are not fleeing from irate professors. They are Jim Carr's men loosening up stiff muscles in preparation for the basketball season which starts in a couple of weeks. Freshmen have been practicing every evening since October 10th, while the upperclassmen have been out since the 17th. The first game will be December 1, with Concordia of Springfield. Lettermen returning from last year are: Captain Bob Bright, Harold "Dink" Brown, Gary Giffel, Ned Kurtz, Jim Oakes, and Jim Tobias.

Intra-Mural Football

Again this year, a varied intramural program has been put into operation. The program is designed to hold interest in at least one sport for all students of R.P.I.

Touch football seems to be the one particular type of contest which is attracting the larger share of participation. Five different teams have been organized and have been exhibiting their wariness on the gridiron.

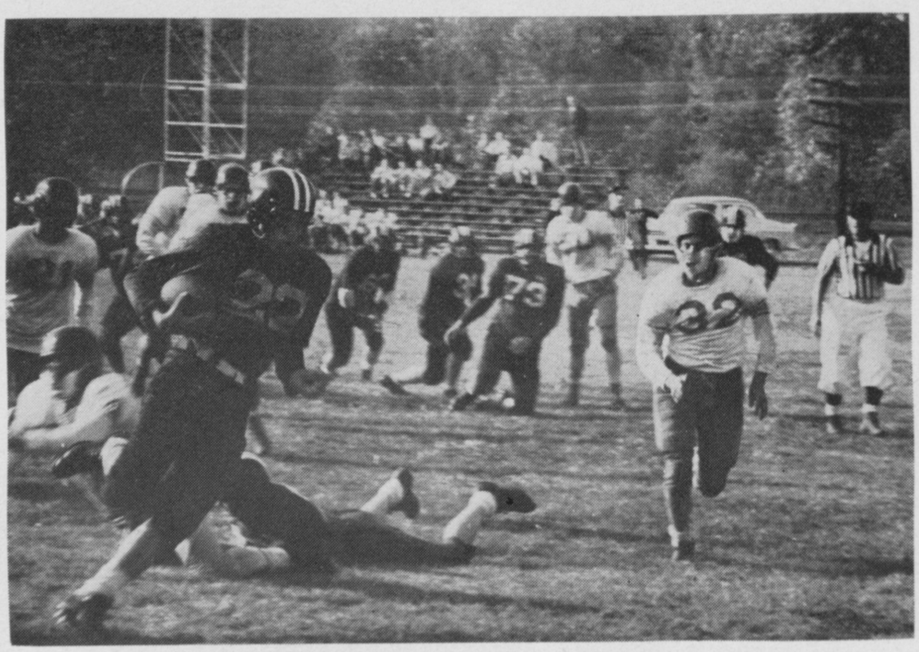
The "rain gods" have been giving a welcome assist after creating quite a problem last year. So far, there have been no games rained out.

The "word" from Kelley is that all of the football teams in the league are outstanding this year. A championship is not going to be easily won by any crew.

The Junior Red Riders and the Sophomore Mechanical-Civils opened the league, with the Red Riders coming out on the favorable end of a 26-6 score.

The newcomers to the intra-mural program, more commonly known as Freshmen, were because of their large class, able to draw from their ranks, two teams with which to bid for the glory of victory for the "greencaps". In an opening contest between themselves, the Freshmen Red emerged only slightly ahead of their Green counterparts by a score of 6-4.

(*Continued on Page* 34)



Touchdown Path.

Boeing engineers design America's first jet transport

Pictured above is the full-scale cabin mock-up of the Boeing 707, America's *first* jet transport. In developing this interior, Boeing engineers helped design features and innovations as advanced as the 600-mile-an-hour performance of the aircraft itself.

Pioneering revolutionary new types of aircraft like the 707 is one of the sources of excitement — and satisfaction — that engineers and scientists enjoy at Boeing. This new jet-age transport has already been ordered by 10 major overseas and domestic airlines. These commercial orders, together with Boeing's tremendous backlog of military contracts, mean that this company will continue to expand during the years ahead.

Growth is a Boeing habit. During the past 10 years, for instance, the number of Boeing engineers has increased 400%. Expansion at this rate spells job stability — and plenty of opportunity to move ahead. Boeing promotes from within, and holds merit reviews every six months to give each engineer a *personal* opportunity for recognition, advancement and increased income.

Boeing engineers don't get lost in the crowd. They work in small integrated teams — on such projects, in addition to the 707, as the advanced B-52 and B-47 multi-jet bombers, the BOMARC IM-99 guided missile, the 502 gas turbine, and other developments still under security wraps.

Qualified engineers and scientists of *all* types are needed at Boeing — now. You'll find high starting salaries, and stimulating contact with men outstanding in the world of engineering. Other advantages include liberal insurance and retirement plans, and a choice of modern, young-spirited communities in which to live. Boeing helps arrange special work schedules for engineers taking graduate studies, and pays all tuition and fees. You're missing a bet if you don't at least *find out* how Boeing can help you get ahead in your engineering career.

For further Boeing career information consult your Placement Office or write:

JOHN C. SANDERS, Staff Engineer — Personnel
Boeing Airplane Company, Seattle 24, Wash.

F. B. WALLACE, Staff Engineer — Personnel
Boeing Airplane Company, Wichita, Kansas

A. J. BERRYMAN — Admin. Engineer
Boeing Airplane Company, Melbourne, Florida

BOEING

Aviation leadership since 1916

Seattle, Washington Wichita, Kansas Melbourne, Florida

Library Notes

By Carson W. Bennett and Anita Walden

It would have been better if things had been so arranged that an empty head, like an empty stomach, wouldn't let its owner rest until he put something in it.

FROM THE NEW BOOK SHELF

The Mind Goes Forth, by Harry and Bonaro Overstreet

In their new book the Overstreets have come to grips with the central problem of our times: that of overcoming the hostilities and extremisms that separate man from man. They believe that the most important skill we now have to learn is how to make living space for one another's minds and opinions.

The greatest drama in which we engage, say the Overstreets, is the drama of understanding. This is the drama of the mind's going forth to meet life more than half way. Wherever this drama is enacted—whether between individuals, groups, or nations—the qualities that make us human have a chance to find expression and to endow life with meaning.

With their special gift of bringing new light into common human situations, the Overstreets show us how we can get through the walls of suspicion and antagonism that rise between individuals, between generations that live under the same roof, and between people who must live and work together. They show us how to make room for others instead of shutting them out; how to find ways of openmindedness to replace a readiness to misjudge and condemn; how to build creative confidence between ourselves and others.

Don't go Near the Water, by William Brinkley

If you are curious as to why that lacy battle flag is flying from the cruiser's mast on the front jacket of the book, a quick way to find out is to read Chapter 8.

An even better way is to start right at the beginning; you'll be at Chapter 8 and beyond before you know it. The affair of "The Lacy Battle Flag" is only one of the many hilarious episodes in a novel that is as good-humored and heart-warming as it is side-splitting.

The story concerns a unit of landlocked mariners for whom the immortal naval watchword DON'T GIVE UP THE SHIP becomes DON'T GO NEAR THE WATER. They were Public Relations officers, and most of them, like their leader, Lieutenant Commander Clinton T. Nash (formerly in charge of a Midwest branch of a brokerage house), were commissioned "without the corrupting effect of any intervening naval training." By 1945, the time our story begins, they had bravely faced the wartime adversities and shortages existing on the remote island of Tulura and had converted it into a kind of Radio City of the Pacific.

One of the greatest adversities, of course, was the short supply of women; but they met this problem with the same ingenuity and devotion that they applied to all others: they met it, if not head-on, at least halfway, and made do, so to speak, with what supply there was. It all adds up to a rousing entertainment, broadly farcical, but with—as a counterplot in another mood—a gentle and tender love story running through it all.

The Power Elite, by C. Wright Mills

Those who have read C. Wright Mills's *White Collar* have already discovered the excitement and scope of his work. In *The Power Elite* he depicts the style of life of the men and women at the pinnacles of fame and power and fortune in mid-century America. Celebrities and the Big Rich, Admirals and Generals, Politicians and Corporation Executives are examined—as well as the nature of the mass society of which these higher circles now constitute the elite.

It is the author's theory that these groups form a center of power in our society that is tightly knit and basically irresponsible. The ideas and conclusions this book presents are so provocative that even those who disagree with its thesis will find it absorbing.

The thousands of readers of *White Collar* will be eager to read this new book, as will everyone interested in the American social structure.

The Immortal Woodshed, by Janius Edwards

In the year 1886, in the family woodshed behind his father's house in Oberlin, Ohio, young Charles Martin Hall discovered a new and cheap way to produce aluminum.

From this woodshed laboratory, Hall started a long search for men with money and vision to promote his process. In Pittsburgh he interested Alfred E. Hunt and a small group of friends in building a test plant to produce what has become the vital metal of today. Hall's determination and inventive genius, in combination with the faith and business ability of his associates led to success in the first small plant which grew, in the course of time, into the Aluminum Company of America of today.

Disappointments, legal wrangles over patent rights, and the long search for markets for this new metal were all obstacles to be overcome, but a combination of invention, business skill and work firmly established a great industry before Hall's death in 1914. This story, written by a man who for thirty-five years has been unearthing facts about Hall and Alcoa, is rich in the interest of Hall's letters to his sister, with a wealth of information about the career of one of this country's great inventors and the development of one of its key industries.

To the *creative* engineer...

AiResearch two stage lightweight gas turbine compressor provides pneumatic power for aircraft main engine starting and serves as auxiliary power source for a variety of ground and in-flight services.

The rapid scientific advance of our modern civilization is the result of new ideas from creative minds that are focused on the future. Our engineers not only have ideas but have the ability to engineer them into products.

That's why The Garrett Corporation has grown in both size and reputation to leadership in its areas of operation. That's why we are seeking more creative engineers to help us maintain and extend our leadership. If you fall in that category, you'll find working with us fulfilling in stimulation, achievement and financial rewards. In addition, financial assistance and encouragement will help you continue your education in the graduate schools of fine neighboring universities.

All modern U.S. and many foreign aircraft are Garrett equipped. We have pioneered such fields as refrigeration systems, pneumatic valves and controls, temperature controls, cabin air compressors, turbine motors, gas turbine engines, cabin pressure controls, heat transfer, electro-mechanical equipment, electronic computers and controls.

We are seeking engineers in all categories to help us advance our knowledge in these and other fields. Send resume of education and experience today to: Mr. G. D. Bradley

THE GARRETT CORPORATION

9851 S. SEPULVEDA BLVD., LOS ANGELES 45, CALIFORNIA

DIVISIONS: AIRESEARCH MANUFACTURING, LOS ANGELES • AIRESEARCH MANUFACTURING, PHOENIX • AIRSUPPLY
AIRESEARCH INDUSTRIAL • REX • AERO ENGINEERING • AIR CRUISERS • AIRESEARCH AVIATION SERVICE

Alumni News

By Max Hippensteel, jr., e.e.

'18 **Bolton, John F.,** ch e, M.S. Ch.E. '25, retired in 1955. Mr. Bolton was formerly Director of Research for the Lunhenheimer Company. The committee on copper and copper alloys of the American Society for Testing Materials presented him with a scroll in appreciation of his long and useful service.

'24 **Stone, John T.,** ee, has been named manager of User Industries Sales of General Electric in the Indianapolis area. This department is part of the company's Apparatus Sales Division. Mr. Stone has been with General Electric since 1924 and was formerly Manager, Apparatus Sales Office in Cleveland.

'24 **Fitterer, Dr. G. R.,** ch e, M.S. Carnegie Tech, '27, Ph.D., Pittsburgh, '30 writes that he was unable to attend the homecoming celebration because he was attending a U.N. meeting in Sao Paulo, Brazil. Dr. Fitterer is Dean, School of Engineering and Mines, and Director, Engineering Research Division, University of Pittsburgh.

'32 **Butler, Frank P.,** ee, is now in Tel Aviv, Israel as counselor for Economic Affairs in the Embassy of the United States. Mr. Butler was formerly First Secretary of the Embassy of the United States of America in Vienna, Austria.

'41 **Jeffries, Quentin R.,** ch e, with honors, M.S. Michigan, '48, Ph.D. Illinois '53, rejoined Commercial Solvent's Terre Haute Research and Production Center after receiving his Ph.D. and spending three years with the Battelle Memorial Institute as Principal Chemical Engineer.

'42 **Hochstetler, William M.,** ch e, is another of the Rose Alumni to be named to "Chemical Who's Who" for distinguished service to the Chemical Industry. Mr. Hochstetler is with the Commercial Solvents Corporation at the Stirlington, Louisiana, plant. He has been with the company since 1946 and is now Superintendent of Methanol and Nitrogen Solutions Productions.

'42 **McConnell, G. F.,** me, with honors, has been promoted Product Engineer to Projects Manager, Refrigeration Systems Section, of the Whirlpool-Seegar Corporation of Evansville, Indiana. Mr. McConnell presented a paper at the A.S.R.E. 52nd Annual Meeting entitled "Refrigerator Systems for Proper Storage Temperatures and Humidities Under Service Conditions."

Oct. '43 **Haas, Vinton B., Jr.,** ee, with high honors, S.M., M.I.T., '49, was recently awarded his Ph.D. by M.I.T. He will rejoin the faculty of the University of Connecticut as associated professor of Electrical Engineering.

'54 **Heady, Derald,** ee, **Matthews, James B.,** me, and **Leonard, Rex D.,** me, were all recently promoted to first lieutenants, U. S. Army. Lieutenants Heady and Matthews are both stationed at Fort Belvoir, Virginia, while Leonard is in Leghorn, Italy.

'55 **Bosshardt, Richard A.,** me, second lieutenant, U. S. Army, recently completed a 14-week officers' basic training course at the Engineer School, Fort Belvoir, Virginia.

Why THINK For Yourself?

Reprinted from September, 1956 General Electric Review

We have to take a lot for granted these days. Civilization has made so much progress in the past hundred years that we just can't keep up with all the angles any more. The more complicated things get, the harder it is to understand them.

In the old days, anybody could understand the ice box. Nowadays the electric refrigerator does a better job, but it's not so easy to understand.

It's the same way with candles and kerosene lamps. When they were used for lighting they were easy to understand. But electric light is much better—and more complicated.

We're living in an age of specialists. It's just about impossible for one person to know everything about everything, so he concentrates on one thing—he specializes.

Yes, more and more we're finding that even everyday subjects are not as simple as they used to be, or we thought they were. And for that reason, we have to depend more and more on other people—the specialists, that is—for the facts.

Is that good? Well, it isn't bad. And in one respect it's very good indeed. For if the specialists work as a team, they can do a better job than any one of them could do alone. And by the pooling of knowledge, we can carry on to much greater accomplishments than we could as lone wolves.

Building on Foundations

For we build on the foundations laid down for us by our ancestors. Edison and other pioneers provided such a foundation in electricity. Others following in their footsteps, built better and better machines and devices, worked out better and better ways of doing things electrically.

It's the same thing in all fields of knowledge — physics, chemistry, metallurgy, medicine, law, civil engineering, math, and so on. By pooling his knowledge, man sets himself apart from animals and uses the brains which God gave him.

Yes, we have to take other people's word for things. We can't know everything ourselves, so we accept what others tell us.

But, on the other hand, we can't just swallow everything that anybody tells us. Or we can't be like those people who believe whatever they see in print.

All right, you say; then what are you to believe? You know you can't accept everything anybody tells you as fact. And when you hear conflicting reports about something, which one do you believe—if any?

The answer, of course, is that you have to do some thinking for yourself. And that brings up another problem: How can you be sure you use the best judgment?

Probably the best answer to that one is general education, in addition to the specialized kind. Not only do you have to specialize in your own field if you want to compete with the other fellow, but you also have to get a good background of general, all-around education so you can use the best judgment in everyday life. With such a background, you can use the intelligence you were born with to decide when to believe one thing, when to believe another, or when to decide that the truth is somewhere in between.

Importance of Economics

For instance, let's take economics. Although there are a lot of subjects we ought to have some kind of general knowledge about, economics is one of the most important. Some of the toughest arguments are in this field.

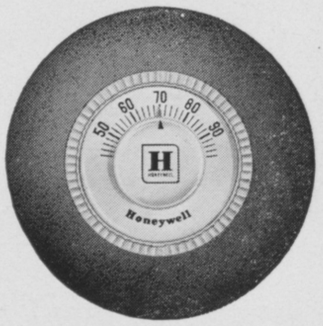
You don't have to be a brain to know something about economics. It doesn't have to be hard to understand. It can be very simple, and very interesting. And everybody should know something about it.

For economics deals with the things we need or want in life—what the economists call goods and services. It goes into such matters as how many of these goods and services there are, how they get from where they grow or are made to where they are used, what it takes to make them valuable to us, how much they cost, and so on. Economics can be as close to you as buying an automatic electric toaster, or it can be as remote from you as international negotiations over Near East oil fields.

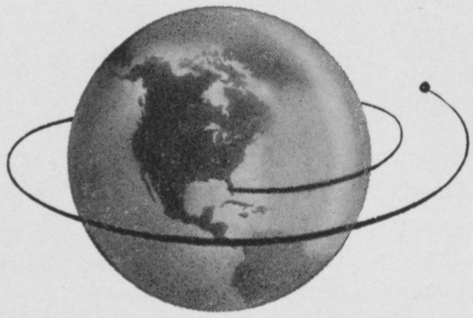
Much of the fundamental disagreement between the free world and Russian communism is over questions of economics. Most of us think of it as a question of freedom versus slavery—and we're right—but that's not all it is. One of the roots of the disagreement is the question of how goods and services will be produced,

(*Continued on Page* 42)

Honeywell...*from thermostats to inertial guidance for satellites...*



Two of Honeywell's 12,000 different automatic controls are the Honeywell Round—first entirely new thermostat design in 70 years—and an ultra-sensitive type of inertial guidance system, which will direct the rocket placing the world's first man-made satellite in its orbit.



Over thirty years ago in the *American Mercury* the inimitable journalist H. L. Mencken wrote, "Of all the great inventions of modern times, the thermostat has given me most comfort and joy. Not for a dozen Marconis, a regiment of Bells, or a whole corps of Edisons would I swap the great benefactor of humanity who invented the incomparable thermostat."

Honeywell began in a basement, with the invention of a simple bimetallic thermostat to open furnace dampers on chilly mornings. But extensive research into electricity and electronics, pneumatics, gases, metallurgy, chemistry, plastics, and plain and fancy physics has diversified Honeywell by means of engineering and new-product development into *automatic control for almost every known purpose.*

EXCITING GROWTH: Today, after 72 years, Honeywell has grown and is growing still—the world's leading designer and manufacturer of all kinds of automatic controls. Sales have more than doubled every five years. In the *last 7 exciting years alone* Honeywell has increased sales more than fourfold—from $57 million in 1948 to $244 million in 1955. In these 7 years over 20,000 new employees from all over America have joined Honeywell to find new opportunities. Honeywell now has 31 factories and 160 sales and service offices throughout the world.

MAIN FIELDS: Basically, Honeywell operates in three main fields: heating and air conditioning, industrial instrumentation, and aeronautical controls and ordnance equipment. But the common denominator is always *automatic control.* Heat, color, density, liquid level, humidity, weight, or any other measurable factor—such as attitude deviations of planes or missiles in flight—can all be recorded and controlled.

REMARKABLE DIVERSITY OF PRODUCTS: More than 12,000 *different* Honeywell products give you an idea of the range within which you can build a highly rewarding career. Because Honeywell is operating in almost all the fields known as growth industries, our continuing drive to provide new markets, new products, and new systems promises you a rewarding future.

SMALL UNITS MEAN OPPORTUNITIES FOR YOU: Our employees operate primarily through *personal contacts* with supervisors and fellow workers. Our small units present multiple opportunities for early managerial experience as (1) project leaders, (2) section heads, (3) foremen, (4) department heads, (5) chief engineers, or (6) sales managers. As Honeywell continues to grow, advanced positions are filled largely by men who have worked up from within. So, as an employee, you too will have real opportunities to fill Honeywell's future managerial needs. And Honeywell needs restless men who can accept and discharge responsibilities.

SCIENTIFIC MANAGEMENT: The men who run Honeywell are a top management-science team. Year after year the American Institute of Management has rated Honeywell "excellent"—the top rating among America's best-managed companies. Honeywell's management recognizes that our growth in the challenging future depends in the largest measure upon the initiative, intelligence, and interest of the young people now starting with us.

MODERN PLANTS NEAR SUBURBAN NEIGHBORHOODS: In these expanding units—each conveniently located near pleasant suburban areas with adequate housing, schooling, and recreational facilities—Honeywell offers you rewarding opportunities to do your best work with the most modern facilities:

1. Heating and air conditioning: Complete engineering and manufacturing plants in Minneapolis, Chicago, Wabash, and Los Angeles. We now produce scores of dramatic new controls and systems applicable to *all* types of temperature-control equipment in homes and industry, public and commercial buildings of every type, ships, planes, trains, and buses. Included are systems of zone control, individual room temperature control, pneumatic controls, appliance controls, highly flexible electronic controls, control panels, and the entire range of air conditioning controls.

2. Industrial instruments and controls: Complete engineering and manufacturing plants in Philadelphia. There is hardly a processing industry where Honeywell controls do not function as mechanical and electronic

brains regulating processes better than could be done by human hands or judgement. Honeywell instruments, for instance, are presently in use on every U. S. atomic reactor. Instrumentation holds sweeping potentialities as industry becomes increasingly complex and as automation is applied to more and more of its processes. Typical industrial products include indicating, recording and control types of potentiometers, pyrometers, pressure gauges, industrial thermometers and flow meters, electronic control panels, and thousands of other devices.

3. Aeronautical controls: In addition to extensive research, engineering and manufacturing facilities in Minneapolis, another complete plant is being built in St. Petersburg, Florida, expressly for the development and manufacture of inertial guidance systems. There is also a complete Engineering Development Center for aircraft and missile controls in West Los Angeles. Some challenging engineering interests include automatic flight control systems; hydraulic and pneumatic jet, ram jet, and rocket engine controls; instrumentation; and airborne digital and analog computers. Honeywell is a major supplier of automatic pilots, bombing systems, gyroscopes, and integrated weapons systems for aircraft and guided missiles. The Honeywell electronic fuel-measuring system is the standard of the industry, and Honeywell leads in developing transistorized instruments for aircraft.

4. Precision switches: Engineering and manufacturing in Freeport, Illinois; with additional plants in Warren, Illinois and Independence, Iowa; plus research facilities in Denver. Honeywell's 5000 variations of electrical MICRO SWITCH snap-action and mercury switches are used in countless ways. They permit a slight motion or a small physical force to control an electric motor or current. They are particularly useful where space or weight limitations are important—as in aircraft, missiles and rockets, automatic machine tools, dictating machines, and automatic transmissions for automobiles.

5. Ordnance: Engineering and manufacturing in Minneapolis; a complete new Engineering Development Center for missiles in Monrovia, California; and engineering laboratory facilities in Seattle, Washington. In this Division a great many vital defense products and systems—such as complete missiles and components, fire-control systems, and proximity fuzes are produced.

6. Servo components: Honeywell engineering and manufacturing plants in Boston produce precision synchro motors, gyroscopic instruments, and electro-mechanical servo components for standard use in jet fighters, guided missiles, and bombers. The newest development is a vital control device for the automation of manufacturing processes.

7. Oscillographic and Photographic equipment: The Honeywell plant in Denver produces high speed recording oscillographs, scientific laboratory equipment, and a complete line of Heiland photographic flash equipment.

8. Transistors: The Boston plant develops and manufactures high-output power-type transistors.

9. Research: In a complete Research Center in Hopkins, a suburb of Minneapolis, emphasis placed on fundamentals has led to comprehensive basic research programs in the fields of: solid state physics, metallurgy, ceramics, magnetic and dielectric materials, physical chemistry, electronics, heat transfer, and mechanics. Honeywell is continuing its steadily increasing expenditure for fundamental research.

AT HONEYWELL YOU WILL FIND ADVANCEMENT OPPORTUNITIES IN TECHNICAL AND MANAGEMENT FIELDS:

Research—Development—Production: One of Honeywell's great strengths is the specialized engineering knowledge we can concentrate upon each of many highly technical operations and products. A consistently growing investment in research and engineering projects has in the postwar period increased at a rate almost double that of sales increase. The aggressive policy of "engineering for tomorrow while producing for today" means one out of every ten Honeywell employees is engaged in some phase of our engineering activities.

Almost every type of technical college training can be utilized to advance the art of automatic control. Engineers, scientists, chemists, physicists, metallurgists, and sales engineers are particularly needed. You should possess an intellectual curiosity that compels you to think into and through and around a problem. Yet you should have something more: the faculty of working in close cooperation with fellow engineers on common problems.

Whatever scientific or engineering activity you choose at Honeywell . . . research, design, development, manufacturing, application, or sales . . . you will enjoy the satisfaction of knowing that you are vital to an organization whose growth has helped lead and will continue to lead our country's technical advancement.

Engineering Sales: Honeywell has a great need for the man who likes and wants to sell . . . who is able to find new product applications and expand markets . . . and who can cultivate those markets with consistent energy. You will receive up to five months of special training in one of Honeywell's well-equipped and expertly staffed divisional sales schools.

Honeywell's Training Program: Training at Honeywell is handled in various ways: organized programs for "Learning By Doing"; formal classes during and after working hours; orientation and development programs tailored to individual requirements; and outside study programs, on both undergraduate and graduate levels, with the Company sharing your tuition costs. Honeywell's various locations furnish access to the nation's best technical schools.

NOW, LET US HEAR FROM YOU!

If you would like to know more about the opportunities for you at Honeywell, contact your College Placement Office. Or please write directly to H. T. Eckstrom, Personnel Administrator, (Dept. C56), Minneapolis 8, Minn.

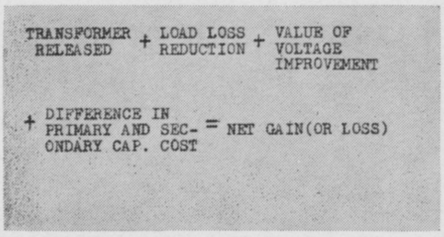
MINNEAPOLIS **Honeywell**

First in Controls

SECONDARY CAPACITORS

(*Continued from Page* 12)

able for underground vaults, the potential saving is lower because of the smaller investment. The customary analysis can be simply outlined in the formula;



It may be noted that the secondary KVAR is about twice as costly as equal primary KVAR. However, when balanced against other benefits of secondary capacitance over primary capacitance this cost is often offset.

Released transformer capacity — The value is easily calculated, using appropriate installation cost and overhead charges. The addition of secondary capacity will make possible a load increase at various power factors. Thus, with an allower overload of 25% a 15 KVA transformer would have a peak rating of 18.75 KVA. Six KVAR of secondary capacitance would a 16% increase in allowed load for 80% power factor.

Load loss reduction—It is often questioned whether credit can be taken for loss reduction and increased capacity at the same time. However consider that for equal loads, the combination of capacitor and transformer is more efficient than a sufficiently larger transformer alone, simply because the capacitor reduces the amount of current that has to flow through the transformer and the affected line. It can be seen that the loss saving is real.

Voltage improvement— Economic evaluation of voltage presents difficulties but there is much to substantiate the possibility of a tangible return. For example a 180 KVAR capacitor was installed at a heavily loaded feeder and switched on and off at 24 hour intervals. Wattmeter readings showed a substantial increased return. The proportion of the load accounted for by lighting and heating will increase about as the square of the voltage improvement. Over the year this would mean a substantial increase in revenue.

Conclusions

The usefulness of low voltage capacitors on secondary distribution systems is a relatively recent development brought on by the changing wants of the consumer. Application engineering can be reduced to simple considerations based on tested rules. The economic value of secondary capacitors is being established by thorough study on the part of many electric-utility companies and the increasing need of this type of equipment on present day systems is now recognized. The high value of secondary capacitance to relieve overloaded circuits is of no small importance, however, the fundamental benefits revealed by careful analysis have made the secondary capacitor a very profitable investment for many companies.

ADVERTISING INDEX

"When I look over the fence...

"Since the day when man made his first brief airborne flight, the advance in aeronautics has been little short of fantastic. Tremendous achievements have opened new avenues of progress that were but idle dreams of yesteryear. We live in a new dimension!

"To the young men of today, these new avenues of progress in aeronautics and the related sciences reveal almost limitless opportunities for success. As an engineer in quite another field I am constantly drawn to look over the fence to see what I see. And I am fascinated with the great and fast-growing opportunities that are there. So much so, that to the potent message of a previous century, 'Go West, young man,' I am prompted to add...'Look *up*, young man, reach for the stars, for they lead to great things.'"*

CHARLES LUCKMAN
Partner – PEREIRA & LUCKMAN
Planning – Architecture – Engineering

Out of his own successful engineering career, Charles Luckman sets a sure course for today's trained young man when he says "reach for the stars."

In the aircraft industry, the expression is strikingly exemplified by the records of thousands of far-seeing young men who have graduated into secure positions that offer lasting success. What was yesterday's single field has today come to include a multitude of specialized sciences.

At Northrop Aircraft – world leader in the design and production of all-weather and pilotless aircraft – the young engineer is provided a host of activities from which to choose. Each offers success opportunities positively unbounded.

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

**From an address to the American Society of Civil Engineers, Los Angeles, California*

LOCKER RUMORS

(*Continued from Page 24*)

In a third game, the efforts of the Junior Red Riders who proved successful in their first encounter, were slowed when the Senior Comets held them to a 6-6 stalemate.

Intra-Mural Tennis, Horseshoe, Volleyball and Basketball

In other fields of intra-mural endeavor, men have taken to the tennis rackets and the horseshoes Singles and doubles are being played in both. The periods within which certain scheduled matches must be played, grow shorter as the league grows older. Those concerned are urged to stay within these limits else they forfeit the contest.

Soon it will be time for the winter intramurals to begin rolling on their competitive ways. Teams have been organized for basketball and volleyball. The championship teams in both of these sports, were graduated last year leaving the crowns open to new and worthy holders this season.

Volleyball is the only one of the I.M. sports where the participants may choose their own team members. This has proven to be a popular system and is best suited to the volley ball league.

Lockers have been made available to those participating in these indoor sports and are still obtainable to those wishing to participate.

Last year a total of one hundred and fifteen basketball games were played in the I.M. program which is a fine example of the success of the program since the appointment of Clarence Kelley as Director.

Fraternity Football

Fraternity "touch" football is inspiring, again this year, the high competitive spirit among members of the Greek organiaztions.

In the first round of play, Alpha Tau Omega proved superior on the turf, to Sigma Nu by coming out best in a score of 31-0. Theta Xi went home with glory under their belt by beating the defending champs, Lambda Chi Alpha, by a tally of 12-6.

Later action saw Theta Xi pick up their second victory with a 7-0 win over Sigma Nu. The other half of the field was being beaten down by a rousing game in which Lambda Chi emerged with a 32-18 margin over the ATO's.

Senior Comets on the move.

Four top scientists discuss creative thinking before fellow research men and engineers at a Joint Technical Conference held in French Lick, Indiana, by Standard Oil and its affiliates. Panel members were, left to right above, E. L. d'Ouville, G. W. Ritter, P. C. White, and T. A. Abbott. Moderator was Joseph K. Roberts, left inset, general manager of research and development for the parent company.

The Very Idea!

PETROLEUM scientists and engineers have a habit of coming up with the *very* idea to solve a problem at the very moment it is needed. They have created hundreds of new products and have improved others, putting the petroleum industry in the van of American industrial progress.

The contributions of Standard Oil scientists, working in extensive laboratories and with the finest equipment, have been outstanding. To give them even greater opportunity to exchange and develop ideas, Standard Oil uses the most modern techniques for stimulating creative thinking.

Groups of our scientists now meet in informal and relaxed creative sessions. Through "brainstorming" and similar devices, they contribute fresh, new thinking to the solution of specific problems. These men are creative by nature, and they "pop" even more ideas, faster, at sessions where one idea stimulates another.

In such an atmosphere of progress, young scientists and engineers find great opportunities to make positive contributions and build interesting careers.

Standard Oil Company

910 South Michigan Avenue, Chicago 80, Illinois

Campus Survey

(*Continued from Page* 21)

HI FI CLUB FOR THE DORMITORIES

High Fidelty is a common term today, and the recent formation of a Hi Fi Club early this year bears out its popularity. At the beginning of the present school year, about twenty five dedicated audiophiles met to discuss the possibilities of a Hi Fi Club. This club is the first hobby club to be formed under the direction of the Campus Club.

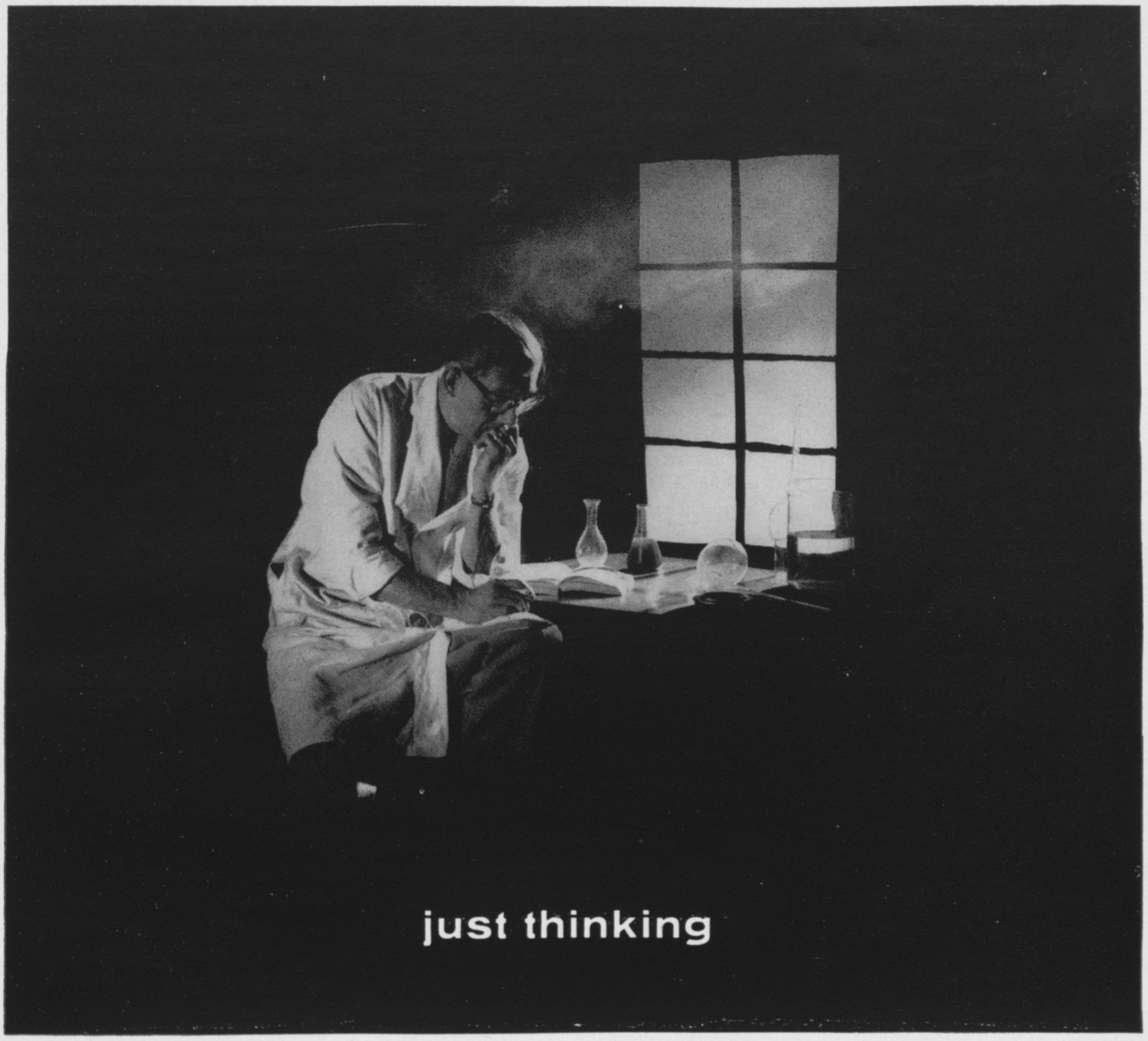
One of the purposes for organizing the Hi Fi Club is to provide listening facilities for high-quality music reproduction. A room, specially soundproofed for the purpose by club members, will provide good listening facilities and eliminate the problems encountered with individual systems in dormitory rooms. Permanent high-quality equipment would be purchased to become the property of the club.

Another future development will be the addition of work space so that members may build and test their own systems, learning about amplifier circuits and speaker systems. There would also be a great deal of opportunity for appreciating good music.

The third main purpose in organizing the club is to build and operate a carrier-current transmitting system for broadcasting music to both dormitories. Perhaps a little explanation of the function and operation of the carrier current transmitting system would be helpful.

This type of system is currently in use in over one hundred fifty different campuses. The signal is an ordinary A.M. signal, transmitted through the power line instead of being permitted to radiate through the air as ordinary radio stations do. The radiation from the power line is very small, and may be received only on a receiver placed close to the line. No authorization is needed from the Federal Communications Commission, and the program is received as any other A.M. signal. The main reason for constructing and operating this station is the fact that radio reception in the Baur-Sames-Bogart Hall is very poor because of the interference from fluorescent lights and the effective shielding of the steel-frame building. There would be two main sources of program material, private record collections, and F.M. programs received and rebroadcast with a sensitive F.M. tuner and authorized outside antenna.

We of the Hi Fi club feel that much enjoyment will be derived by all the members of the Campus Club.



Chemical progress is autoclaves, test tubes, distillation towers . . . hydrocarbons, heterocyclic compounds . . . processes, polymerizations, products.

But mostly, chemical progress is thinking . . . men thinking. Little men, big men, medium size men . . . in lab coats, business suits, overalls . . . all of them, always, thinking.

Thinking up new products . . . new ways to make chemicals and new ways to use them. Thinking up more comfort, more convenience, better health, for everyone.

Always, the old things have to be improved, and the new things have to be proved. It takes more thinking. The thinking never stops. And so chemical progress never stops. It's that way at Koppers.

You can be one of these men, thinking. You can create some of the chemical progress that's made at Koppers. The products are many . . . the opportunities myriad. Consider a career with Koppers; send the coupon today.

KOPPERS

KOPPERS CHEMICALS

Koppers Company, Inc.
Industrial Relations Manager
Dept. C-116, Koppers Building
Pittsburgh 19, Pennsylvania

Please send the 24-page brochure entitled "Your Career at Koppers."

Name .....

School .....

Address .....

City ..... State .....

PORTABLE GAS TURBINE

(*Continued from Page* 11)

a fuel pump, direct driven from the gear, takes suction for supply of fuel to the gas turbine. The level of fuel in the day tank is maintained by a rotary pump, controlled by a float switch. Fuel oil can be stored in tank cars spotted alongside the two car power plant and connected to the day tank through flexible hose. The gas turbine is equipped to burn distillate fuel oil, which requires only a small amount of heat in the day tank to keep the distillate fuel fluid for ambient temperatures as low as -40 degrees F. Since lubricating oil is cooled which might cause freezing or corrosion difficulties.

The tested performance of the power plant, based on the higher heating value of fuel oil, shows an overall plant efficiency of 18.5 percent at rated load and 19.5 percent at 125 percent of rated load, including all auxiliaries.

The high-voltage switchboard controls the output from the 500-kw generator at either 50 or 60 cycles. It provides switching to allow the generator's output to be transmitted directly to the system or to the 6250-kva transformer and then to the system. This switchboard is located at the end of the transformer-control car in the control room. A draw-out air circuit breaker, rated at 2000 amperes, may be inserted in either of two locations, thereby providing a foolproof interlock between direct feed and transformer feed. An air circuit breaker was chosen to eliminate the periodic maintenance of oil required for oil breakers. The air circuit breaker is withdrawn to the test position when the power train is in transit to prevent damage from shock. The truck on which the air circuit breaker is mounted is provided with a jacking arrangement to remove the truck wheels from the floor and lock the breaker in the test position. The arc shields are also removed during transit and stored in a rack provided for this purpose.

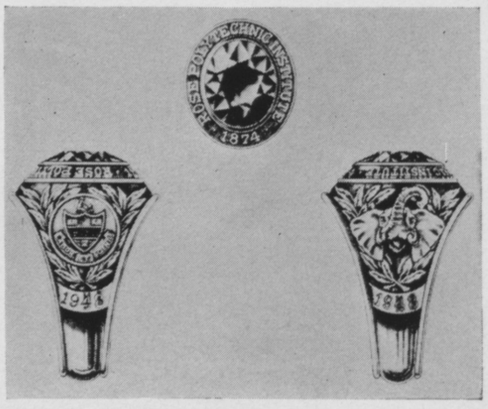
Two diesel-engine generator sets are provided for starting and auxiliary power. One set, rated 150 kw, 440 volts, 60 cycles, powers the 150-hp wound-rotor starting motor, and the other set, rated 50 kw, 440 volts, 60 cycles, is used for auxiliary power. The diesel-generator sets are installed in a separate room adjacent to the control room. A low-voltage switchboard controls the output and distribution of the two diesel-generator units. The primary and secondary of the 30-kva transformer are also controlled from this switchboard. A remote turbine-control panel is mounted adjacent to the low-voltage switchboard.

The 6250-kva outdoor transformer is mounted on the end of the transformer-control car. It is forced-oil and forced-air cooled and will deliver its full capacity at either 50 or 60 cycles. This transformer, including the high-voltage bushings, had to be designed to fit within the Berne International Clearance limits when mounted on the car. Its nominal voltage rating is 2400 to 13,800 volts. The 13,800-volt winding is provided with a no-load tap changer and series-parallel switch to obtain voltages from 2500 to 15,000 volts, all at full kilovolt-ampere capacity. This combination of a no-load tap changer and series-parallel switch makes possible a large number of voltage combinations from 2500 to 15,000 volts.

The gas turbine offers the most compact railway-mounted power plant of any prime mover for equal capacity. This inherent advantage in portable equipment is a large factor in logistical planning of mobile power in times of an emergency.

The gas-turbine plant can travel with both cars coupled together, requiring a minimum of disconnecting. Erection of the 12-foot exhaust stack and connection of a fuel line and electrical leads are the only major set-up operations required.

As liquid fuels keep increasing in application throughout the world and the gas turbine continues toward the use of wider ranges of liquid fuels, this portable power plant becomes more universal for emergency use.



CONTROVERSIAL CORNER

(*Continued from Page* 14)

The young engineer in industry who puts this kind of thinking into his work has already taken a big step toward becoming a full-fledged member of his profession. In effect he is at once a *consultant* to management while still an employee. Although lacking in wide experience he is putting to work his engineering education and training as well as his standards of character and performance for the protection and assistance of his employer. Thus management becomes the client of the young engineer and he, in turn, exercises a measure of the "trusteeship" which is very essence of professional practice. We must be realistic enough to note that even in this day of allegedly enlightened management there may be some employers who want none of such "airs" on the part of their young employees but much prefer docile work-horses. Mobility is a priceless asset to an able and discerning young engineer who finds that he has made an unfortunate first choice.

Fortunately it has become a common practice for many of the larger employers of young engineers to review frequently and carefully the progress of each employee to insure that he, individually, is given responsibility as rapidly as he can assimilate it. Thus the competent engineer-in-training is encouraged to develop professionally, to participate in technical society activities, to become legally registered, and to assume true professional status. It seems evident that collective bargaining and the usual procedures of unionism which submerge the individual into the mass are incompatible with professional recognition of the individual engineer whose contribution will certainly control his compensation. Yes, young engineers *are* professional. To reach complete fulfillment in his chosen field each new graduate must devote his energies to continuing development as a professional-in-training.

FRATERNITY NOTES

(*Continued from Page* 16)

Alpha Tau Omega

The Tau's have done it again. We recently solved the age-old question of the protection of homecoming displays. We are the proud possessors of the world's largest homecoming display raincoat. A raincoat consisting of 2,000 square feet of plastic offered complete protection. With Brother Trueb's ingenious lighting ability, the project of putting it together continued far into the night. We feel that we have a winning display this year; and with the theme, "If we can't win, we'll make the winner set a new record!"

The alumni have given the chapter house a new stair runner, new plumbing fixtures for the bathrooms, and surprised Mom with a new kitchen working cabinet running the entire length of the kitchen. Many Thanks, alum's!!!

Gamma Gamma recently welcomed two new pledges. They are Larry Grimes and Wilbur Steele. Congratulations to you both.

Alpha Tau Omega had quite a few of its members receive honors at the honor assembly. Class honors were awarded to: Bill Kuchar, Bob Hall, Hugh O'Donnell, Tom Reese, Harry Bitner III, Chuck Skidmore, John Williams, and Larry Thomas. New Blue Key pledges are: Harry Bitner III, Tom Reese, and Chuck Skidmore. Larry Thomas was tapped for Tau Beta Pi. Honor Keys were awarded to: Bill Kuchar, Mike Munro, Bob Mewhinney, Tom Reese, Jack Fenoglio, and Dick Trueb.

Congrats to Tom Reese for his election as veep of the Junior class. Also, DOUBLE CONGRATULATIONS to Bob Hall; Bob won a $750 scholarship from Link-Belt Company. The recipient must have demonstrated scholarship, qualities of leadership, and an interest in a career with business or industry

Also, congratulations to Tom Reese, Bob Travis, Jack Fenoglio, Dick Trueb, Vern Fellows, Harry Bitner III, and Bob Dinning for their help in turning out the new edition of the Student Handbook in time for the Freshman class of 1960.

Why Think For Yourself?

(*Continued from Page* 29)

who gets them, and who does what. Many of us believe that those subjects have brought about much of the trouble in other matters like the right of free speech, the right to think as one pleases, or the right to worship God in one's own way.

Most of the controversial issues in local and national politics are economic issues. A depression, for example, is a matter of economics, and one party may make a political issue out of it by saying that another party caused it. Another subject which involves economics is public ownership versus private ownership. And economics has a great deal to do with such things as taxes, minimum wages, and good schools.

Still another very important subject of argument these days is the question of industry or business on the one hand, and organized labor on the other. If labor leaders say industry is making too much profit and should pay higher wages instead, whereas management says it can't afford to pay higher wages, it comes down to a question of economics again. And if you don't know anything about the economics involved you wonder who's right.

So, as we said before, the only way you can really think for yourself on such matters is to learn more about them. If you don't get some fundamental education in economics, you'll never know whom to believe. When an economic subject is being discussed, your views won't be worth much unless you know something about it.

Some Examples

That doesn't mean that each of us has to become a specialist in economics. But at least you can learn something about the subject—enough to help you think for yourself when you need to.

For instance, do you know what money really is? Do you, like so many other people, think that money is valuable for its own sake? If you do, then you don't know much about economics. You can't have a really good understanding of money without learning something about economics.

Or, let's take another example, consider the profits of a business. Do you know what they really are? Do you think profit is what the owners take out of the business for themselves? Do you think profit is all the money the business takes in over and above the cost of running the business? Or do you think it's something in between those two? If you just don't know, you ought to learn something about economics, for the subject of profit is a very important one in this country today.

Other Subjects, Too

What's true of economics is also true of other subjects. By making yourself acquainted with some of the fundamental things about science—say astronomy—you don't have to take it completely on faith when, for example, the astronomers tell you that the stars are really suns like our own, but much farther away. You can understand in a general way how the astronomers know this, even if you don't go through all the business of proving it yourself, every step of the way.

For it really doesn't take much familiarity with technical subjects to give you enough general understanding of them to make it easier for you to think for yourself. And once you have that familiarity, and can think for yourself about subjects, you'll have a better understanding of how scientists and engineers can provide us with so many wonderful things in our modern civilization—things like radio and TV, synthetic materials, and silicones; construction miracles in giant dams and mighty bridges; the wisdom to solve problems with uncanny computers; the research that promises to harness the power locked in the atom; the techniques in automation which are producing for us more and better things for less money—and which employ more people in doing it.

GRIPE PAGE

Once each month during the school year, you are given the opportunity of reading the **ROSE TECHNIC.** For this priviledge you are paying $1.50* a year. Now you have a chance to talk back to the editors who are disposing of your money by publishing the **TECHNIC.**

1. For said rate of $1.50 per year, I feel that I am:

   ..... a. getting a bargain

   ..... b. getting my money's worth

   ..... c. being gypped

2. I think the TECHNIC is:

   ..... a. perfect

   ..... b. good

   ..... c. fair

   ..... d. lousy

3. In order to rate the departments of the TECHNIC, place an X in the appropriate box. (Please try to avoid giving the editors a collective inferiority complex!)

	Enjoy	Indifferent	Detest	Never Read
Editorials	.....	.....	.....	.....
Feature Articles	.....	.....	.....	.....
Research and Development	.....	.....	.....	.....
Locker Rumors	.....	.....	.....	.....
Sly Droolings	.....	.....	.....	.....
Library Notes	.....	.....	.....	.....
Fraternity Notes	.....	.....	.....	.....
Alumni News	.....	.....	.....	.....
Controversial Corner	.....	.....	.....	.....
Meet The Faculty	.....	.....	.....	.....

4. The best article since the February, 1956 issue (if any) was:

   .....

5. The worst article since the February, 1956 issue was: (one only, please)

   .....

6. Remarks: (Praise, suggestions, and gripes)

   .....

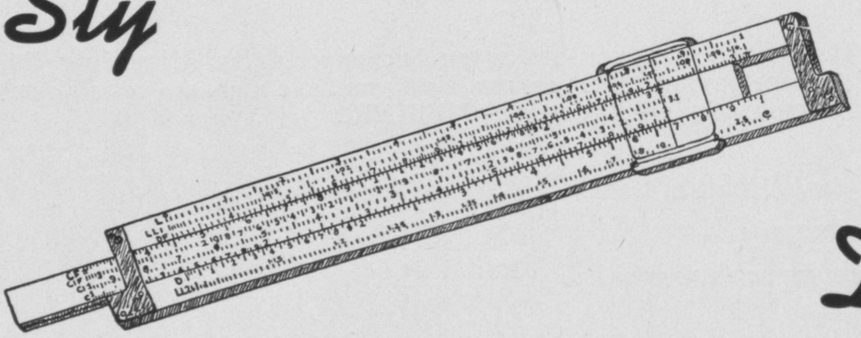
   .....

You could forget about this, but with just a little more effort you could FILL IT OUT AND DEPOSIT IN THE BOX OUTSIDE THE **TECHNIC** OFFICE OR MAIL TO THE **ROSE TECHNIC.**

***Alumni—$1.00 per year.**

CUT ON THIS LINE

Sly Droolings



Stolen by Don Grantham, jr., e.e.

PARTY PARTY

People grasping
Cocktail glasses
Stand in gasping
Teeming masses.
People smoking,
People drinking,
Coughing, choking
Getting stinking.
Some discreetly
Boiled or fried.
Some completely ossified.
Liquor spilling,
Trousers sopping,
Steady swilling,
Bodies dropping.
Glasses falling
On the floor;
People calling,
"Drop some more."
Bodies steaming.
Morals stretching
Women screaming,
Some still fetching,
Heavy smoking,
Air gets thicker.
"No more liquor . . ."
What? What?
No
more
liquor . . .
People snicker,
Unbelieving,
No more liquor?
Let's be leaving
No more drinking?
Groans and hisses!
What a stinking
Party this is.

* * *

Height of confusion: The guy who shouts, "Thank God I'm an atheist!"

Notice in Want Ads:

"Farmer, age 40, would like to meet woman about 30 who owns a tractor. Please enclose a picture of tractor.

* * *

They were huddled close, the lights were low. He pressed his lips into her pink ear and whispered, "What are you thinking about darling?"

"The same thing you are, sweetheart," she whispered shyly.

"Then I'll race you to the ice box!" he shouted gaily.

* * *

"You've heard the story of the lawyer who stayed up all night trying to break a widow's will."

* * *

Prof: "Who split the atom?"
No answer.
Prof: "Who split the atom?"
Student: "Don't jump on me. I ain't touched a damn thing."

* * *

News Item:

A roaring twister last Wednesday carried off Jim Benton's house, and all three of his children are missing. Neighbors donated a bed to give Jim and his wife a new start.

* * *

Joe: "I just brought home a skunk."

Roommate: "Where you gonna keep him?"

Joe: "I'm going to tie him under the bed."

Roommate: "How about the smell?"

Joe: "He'll have to get used to it like I did."

Mottoes:

Freshman Girl: "Mother knows best."

Sophomore Girl: "Death before dishonor."

Junior Girl: "Nothing ventured, nothing gained."

Senior Girl: "Boys will be boys."

* * *

A gullible man is one who thinks that his daughter has got religion when she comes home with a Gideon Bible in her suitcase.

* * *

The birds do it;
The bees do it;
The little bats do it;
Mama, why can't I take flying lessons?

* * *

A college student is one who enters his alma mater dressed in green and emerges as a senior dressed in black. The intermediate process of decay is known as college education.

* * *

Prof: "How many revolutions took place in France during this period?"
Soph: "Four."
Prof: "Enumerate them."
Soph: "One, two, three, four."

* * *

The main trouble with the straight and narrow is that there is no place to park.

* * *

I drink to your health when we're together,
I drink to your health when we're alone,
I drink to your health so often,
I've damned near ruined my own.

PHOTOGRAPHY AT WORK—No. 24 in a Kodak Series

They're coming in for a first landing at a "new" airport

American Airlines uses wide-screen color slides to familiarize pilots with every detail in approaching an airport that is new to them

BEFORE an American Airlines' pilot sets his aircraft and passengers down at a new airport, the field and surrounding territory are as familiar as though he'd come in many times before.

As part of American Airlines' comprehensive airport familiarization program, he has seen the field from many directions, many heights. He has gone over the approach to each runway—correlated what he has seen with the radio and instrument aids.

All this is done through color slide films shown on a wide screen to simulate actual vision from the cockpit. American makes one for each airport added to its system. As a matter of fact, American uses similar slide films to train many of its staff—flight engineers, stewardesses, maintenance employees, cargo handlers, line personnel and ticket agents. It means greater efficiency and money saved.

Photography works in many ways to save money and improve operations for all kinds of businesses, large and small. In research, in development, in production, in sales, it saves time and cuts costs.

Behind the many photographic products becoming increasingly valuable today and those planned for tomorrow lie intriguing and challenging opportunities at Kodak in research, design and production.

If you are interested in these opportunities in science and engineering—whether you are a recent graduate or a qualified returning serviceman, write to the Business and Technical Personnel Dept.

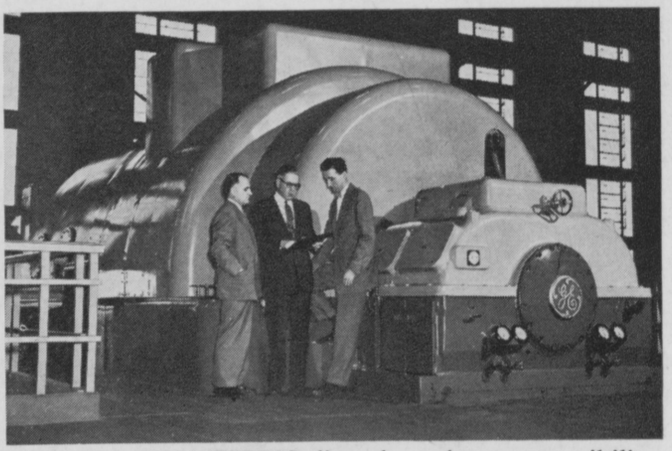
EASTMAN KODAK COMPANY, Rochester 4, N. Y.

Kodak
TRADE MARK

At General Electric . . .

Here's how your engineering background fits you for the broad field of Technical Marketing

IN PRODUCT SPECIALIZATION complete knowledge of certain product lines assures their proper application to best serve the customer's requirements.



IN SALES ENGINEERING lies the prime responsibility for the integration of all sales and engineering activities between General Electric and the customer.

IN HEADQUARTERS MARKETING product planning, marketing research, and sales direction all contribute to successful marketing of General Electric products.

IN APPLICATION ENGINEERING electrical and mechanical components are engineered into the customer's product, power system, or manufacturing process.

IN INSTALLATION AND SERVICE ENGINEERING customer satisfaction is assured by proper installation and service of equipment supplied by General Electric.

MAIL COUPON FOR FULL INFORMATION ON THESE TECHNICAL MARKETING CAREERS

Mr. George E. Mullin, Jr.
Technical Marketing Program
Building 2 Section 956-8
General Electric Company, Schenectady 5, New York

Please send me your descriptive bulletin on the Technical Marketing Program, GEZ-515B.

Name_____

College_____ **Degree & Year**_____

Address_____

_____

GENERAL ELECTRIC