

# THE MONOGRAM

NOV.  
1955



IN A REPORT TO A CONGRESSIONAL SUBCOMMITTEE, MR. CORDINER GIVES

## The What, Why, and How of Automation —Its Effects on Society . . . p. 11



# LETTERS

## Most Important Address

Editor:

Exactly one year ago the *Monogram* featured on its cover our Industrial Heating Department ground-breaking ceremonies in an Indiana cornfield.

Since then, we've built a tremendous new plant, just hired our 500th employee, we're in solid production, and we're living up to what you'd expect from One Progress Road, Shelbyville, Indiana.

E. J. KNEELAND  
Manager—E&PCR



SHELBYVILLE A YEAR AGO



WHAT IT'S LIKE TODAY

The object of the *MONOGRAM* is to keep its readers better informed on General Electric activities and policies so that they may more effectively represent the Company in its relations with the public.

## CONTENTS

Board of Directors . . . . .	1-3
New Appliance Line . . . . .	4-7
Range Progress . . . . .	8
Atomic Energy . . . . .	9
Automation . . . . .	11-19
Computers . . . . .	20, 21
Reagan . . . . .	22
Construction . . . . .	23
What's New . . . . .	24-27
Personality . . . . .	28
People . . . . .	Inside Back Cover

Lawrence W. O'Brien, Editor

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## BOARD OF DIRECTORS

### Electronics Field Trip

The General Electric Board of Directors visited Syracuse October 27 and 28. It was one of a series of semi-annual inspection tours in which directors have been, for the past several years, acquiring a firsthand knowledge of the manner in which the various product departments conduct their highly diversified businesses.

The Board was given a full-dress review of the part electronics will play in America's future. They saw a demonstration of the latest in color television and were brought up to date on military electronic equipment.

The directors also saw how electronic technology as utilized in automation, computers, and industrial television will have an impact in General Electric's atomic

energy, major appliance, small appliance, x-ray, and heavy apparatus businesses.

The directors held their monthly meeting at Electronics Park.

At a press meeting, President Cordiner told reporters that he sees the electrical manufacturing industry doubling in the next eight-and-a-half years, while the electronics industry, moving at an even more rapid pace, may well double in the next four or five years.

Mr. Cordiner told reporters that developments in electronics were one of the principal reasons why more than 70,000 persons are employed today by G.E. on products that did not exist in 1939.

He said that General Electric expects present record high business activity to continue unabated at least through 1956, and that the Company has geared its production and marketing plans accordingly.

He also reported that 1955 may be the largest sales year in the history of the General Electric Company.

**DIRECTORS** Colt, Dickey, Reed, Cordiner and Weinberg preview the new electronic oven.

**PHOTO FACSIMILE** unit is demonstrated for Director McElroy by G-E Vice President Baker.



Members of General Electric's Board of Directors represent (1) a broad geographical cross section of the country, and (2) a wide variety of industrial backgrounds.

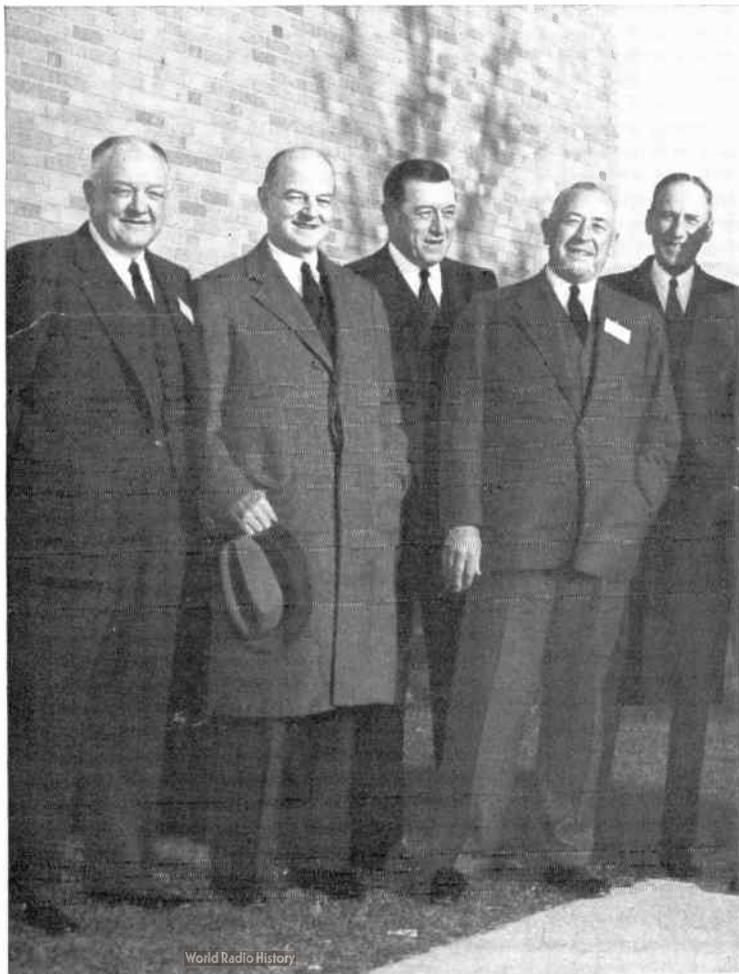
The eighteen have business headquarters in ten different cities: Atlanta; Boston; Chester, Pa.; Chicago; Cincinnati; Cleveland; Dearborn, Mich.; New York; Pittsburgh; and San Francisco.

Even more impressive is the number of important industrial fields which their leadership encompasses. They bring to our Board distinguished experience in banking and finance, education, food, agriculture, mining, manufacturing, marketing, and transportation.

Only two, Mr. Cordiner and Board Chairman Philip D. Reed, are officers of the Company.

**DAVID, DICKEY, WOODRUFF, MONTGOMERY, GARDNER,**

Board of Directors at Electronics Park, where they toured product departments and held their monthly meeting



"This breadth of background is appropriate," Mr. Cordiner said, "because General Electric's activities are nationwide and because electricity today plays its part in every phase of American life."

Pictured below during their visit in Syracuse, are left to right: Donald K. David; Charles D. Dickey; Robert W. Woodruff; George G. Montgomery; G. Peabody Gardner; Board Chairman

Philip D. Reed; Francis L. Higginson; President Ralph J. Cordiner; Ray H. Luebbe, vice president, general counsel, and secretary; Sidney J. Weinberg; Neil H. McElroy; S. Sloan Colt; Gilbert W. Humphrey; Henry S. Morgan. The other five directors, who were unable to attend, are: Henry Ford, II, John Holmes, George H. Love, Thomas B. McCabe, and Lewis B. Williams.

**REED, HIGGINSON, CORDINER, LUEBBE, WEINBERG, McELROY, COLT, HUMPHREY, MORGAN**



## Sales, Earnings Are Up

General Electric Company sales for the first nine months of 1955 totalled \$2,245,958,000, an increase of four per cent over sales for the same period in 1954. President Ralph J. Cordiner announced last month. Last year's sales for the first nine months were \$2,167,397,000.

Company earnings during the period amounted to \$141,359,000 or \$1.63 per share. Mr. Cordiner reported. This was a four per cent increase over the record \$136,191,000 or \$1.57 per share, earned during the first nine months of last year. Earnings per dollar of sales amounted to approximately 6.3 cents for the first three quarters in both 1954 and 1955.

**"The Company's sales** for the first three quarters were second only to the record sales of the first nine months of 1953 and are particularly satisfying in view of the substantial drop in sales of defense products, which was anticipated," Mr. Cordiner said. Sales of commercial products were higher during the first nine months of this year than for any similar period in the Company's history.

Mr. Cordiner said that sales of the Company's consumer products and industrial products lines continued substantially ahead of 1954. Sales of heavy apparatus were slightly behind nine months' sales for 1954, but Mr. Cordiner indicated that such sales for all of 1955 are expected to be approximately equal to 1954 heavy apparatus sales.

**A dividend of 40 cents** per share declared in September was paid on October 25, for a total of \$1.20 per share paid in dividends declared this year. This compares with \$1.13½ per share for the corresponding period in 1954.

## The 1956 Line

Major Appliance distributors recently previewed the 1956 line of G-E appliances in Appliance Park's new Monogram Hall, built for just such purposes.

What they saw was a line of products representing an outstanding combination of beauty, usefulness and value for the consumer. It is not as full of surprises as last year's line which introduced such outstanding pace-setters as the wall refrigerator, kitchen center, and mix-or-match colors. These industry leaders will of course be retained. And there are a considerable number of new features and improvements.

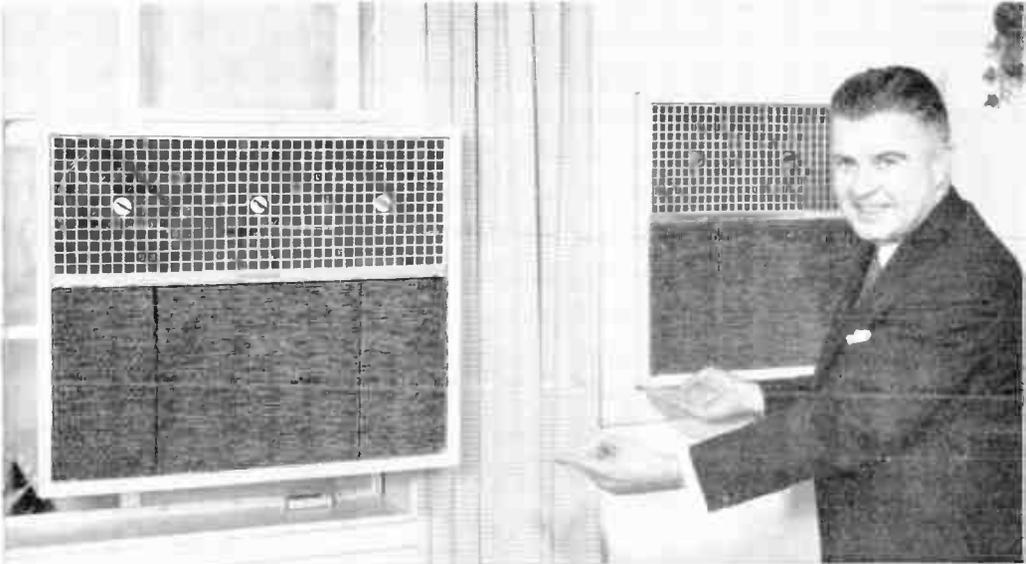
Vice President Charles K. Rieger reports that "Our customers have been very happy with our products—so happy, that by the end of 1955 they will have given the Major Appliance Division the best year in its history.

"Judging from the way the distributors and dealers have accepted our 1956 line, next year will be good, too. In fact, the future for many years ahead looks very bright for the major appliance industry."

**Magnetic doors**—which close by themselves—have done away with old-fashioned locks on all seven models of the 1956 refrigerator line. Powerful, permanent Alnico magnets made by the Carboly Department hold the doors closed tightly, yet a slight pull opens them.

The new magnetic doors are "child safe," since the pressure needed to open them is so slight that a push from a child—who may have crawled inside accidentally—would easily open them.

A newly developed plastic gasket with glass fiber lining has eight times greater sealing surface than former door gaskets



G-E THINLINE 1956 room air conditioners (16½ in. front to back) can be installed in window or through wall, as Room Air Conditioner General Manager Augenstein shows above.

GREATER FLEXIBILITY is keynote of 1956 kitchen center below, with its built-in radio, glass-doored cabinetette backsplash, and appliance cord center. The wall oven is optional.



which sealed only along a thin edge. Two models have a full-width plate at the bottom which opens the door at the touch of a toe. Three models have revolving shelves. All models are available in mix-or-match colors.

**Greater flexibility** and three new features are the highlights of the kitchen center for 1956. A cabinet— with sliding glass doors and a radio at the left end—runs the entire length of the basic unit. It rests on the backsplash and provides convenient storage space. A cord center at the left end of the backsplash has two receptacles and two retractable cords for appliances such as a coffeemaker. A wall oven, mounted on a special cabinet base, is optional. (See photo on foregoing page.)

To suit various space and functional requirements there are eight basic variations possible in the '56 kitchen center. Under-counter cabinets may be substituted for

**MARKETING MANAGER SLATTERY** points out the self-closing doors, held shut by magnets.



either the washer-dryer or the low oven.

**All 1956 G-E ranges** feature a "faster-than-gas" Calrod® surface cooking unit. In addition, the Liberator and Stratoliner ranges offer an automatic griddle and an electric meat thermometer.

The automatic speed griddle, made of thick aluminum, rests on the two left-hand surface units. When the griddle is plugged into place, both surface units are controlled by the automatic control for the front unit.

An electric meat thermometer consists of a probe with a flexible cable in the oven and a lighted indicator on the top of range. When the probe is inserted into a roast, the exact internal temperature of the meat is shown on the indicator—ending guesswork, pecking, and poking.

**"G-E automatic washer sales** for 1955 will be up approximately 75 per cent, and dryer sales will rise about 95 per cent over last year," according to Halbert B. Miller, general manager of the Home Laundry Department.

"This year's sales increase is largely attributable to the introduction of product features that the consumer wants, and the heavy promotion of these features by distributors and dealers," Miller said. Examples: the Filter-Flo washing system, introduced last January; and the new automatic, one-dial-control dryer which operates on either 230- or 115-v, introduced in July.

"Substantial further increases in sales of automatic washers and dryers are anticipated in 1956," Miller added.

**The 1956 Mobile Maid** and under-counter dishwashers will be available January 1. Washing performance of both models has been improved with two power pre-rinses which do away with hand-rinsing of dirty dishes, by flushing excess



A GLANCE AT THE DIAL on the back panel of the 1956 range reveals the internal temperature of the roast in the oven . . . an electric thermometer does it. At right above, the new speed griddle.

food particles off plates and out the drain before detergent wash begins. An automatic detergent cup is designed with two compartments to provide an optional double-detergent wash when dishes are very heavily soiled.

Faster operation due to a redesigned shredding mechanism makes the 1956 line of Disposalls® even more efficient. All three models fit standard drain openings, and, in a typical household, operate on a yearly electrical cost lower than that of an electric clock.

**Room air conditioners**, completely redesigned and known as the Thinline, will measure only 16½ inches from front to back—eliminating excessive overhang inside *and* outside the window. The Thinline units can be mounted in upper as well as lower frames of double-hung windows and in such a manner that the window can be

raised or lowered at will.

Other features of the Thinline series: high cooling capacity, reduced noise levels, improved high power factor (90 per cent or better), and high dehumidification, ventilation and exhaust capacities. A seven-day timer is available optionally.

The three models in the Thinline series are: a ½-hp, 115-v “plug-in” model; a ¾-hp, 115–230-v model; and a 1-hp, 230-v model. Rounding out the line will be a 1½-hp Custom horizontal model, and a 1-hp All-Weather horizontal unit with automatic switching from heating to cooling.

Sales of G-E room air conditioners are up 60 per cent above a year ago, according to Department General Manager Paul M. Augenstein, who adds that, “In the five years we have been in the business, G.E. has become an industry leader.”



**ABOVE:** 50-year-old G-E electric range with 13 plug-ins for appliances.

**AT RIGHT:** The 1913 "black beauty," a proud single unit and a good performer.

**BELOW:** J. R. Poteat and a range from the 1956 G-E line.



## ELECTRIC RANGES

### 50 Years of Progress

General Electric's 1956 line of electric ranges marks the Company's 50th year in the business.

Shown above is the original Model 1, which came out in 1906 and featured 13 separate plug-in appliances. The particular Model 1 range ensemble shown here was in perfect working order when it was acquired for display purposes. It had cooked food daily for 46 years for its original owner.

The early electric range evolved by 1913 into a single unit. Typical was the "black beauty," also shown on this page.

In contrast, a sleek, efficient G-E range from the 1956 line is shown at left by J. R. Poteat, general manager of the Range & Water Heater Department. Poteat has



been in charge of ranges for more than 25 years.

Poteat, affectionately known throughout the range industry as the "father of electric ranges" predicts that "Within my lifetime . . . say the next 15 years . . . electric cooking will obsolete all other forms of cooking because of its versatility, its cleanliness, and the fact that it's cooler and it's healthier."

The Company's 50 years of range progress will be featured on the General Electric Theater on November 20, and in a display at the Pillsbury Bake-Off in New York's Waldorf-Astoria on December 12.

## ATOMIC ENERGY

### Room for Development

The Company has taken options on a 1,585-acre tract some 40 miles east of San Francisco for use as a possible site for a G-E nuclear development facility. Long-term purpose of the installation would be work in the application of atomic energy in a wide range of peaceful uses.

Francis K. McCune, vice president and general manager of the Atomic Products Division, said plans for use of the land will depend upon results of studies now being made of the specific requirements of such a development facility. Problems of zoning, etc., would have to be resolved before purchase of the property.

One of the important initial projects at the new site would be support of the work on the 180,000-kw. all-nuclear plant the Atomic Power Equipment Department will build for the Commonwealth Edison Company in the Chicago area. Temporary headquarters for the Commonwealth Edison project staff are at the G-E motor plant at San Jose, Calif.

## Idaho Falls Reactor

Engineers and scientists of the Atomic Power Equipment Department will design the reactor core and facilities within the pressure vessel of an engineering test reactor which Kaiser Engineers division of Henry J. Kaiser Company will build for the AEC at Idaho Falls, Idaho. The reactor will cost an estimated \$15 million and will provide irradiation facilities larger than any now available.

## Atomic Exposition

The largest conference of its kind will be the Nuclear Engineering and Science Congress which will meet in Cleveland, December 12-16. Running concurrently—December 10-16—also in Cleveland, will be the International Atomic Exposition, which is expected to attract exhibits of the latest world-wide nuclear developments.

General Electric scientists and engineers will present 19 papers by 22 Company authors at the Congress. A 30x50 ft. General Electric display at the exposition will present the Company's latest achievements.

### DISPLAY FOR ATOM SHOW



## Bomber Guns Tested Indoors

Aircraft Products Department engineers have completed a dynamic accuracy tester which will enable them to put airplane armament systems through combat tests right in the indoor range at Johnson City, N. Y. Previously, expensive and time-consuming flight test programs have been required for evaluating new systems, and even then cameras had to be used in place of guns.

Fred B. Law, general manager of the Department, in explaining the new development, said that the new indoor tester checks the radar tracking and includes actual firing of the guns.

The tester, composed of a control panel and a series of cams and recording devices, is used to set up combat firing problems which the armament system's radar and computer must solve. The cams position a radar target horn at the point where the guns should fire, and give the correct solution to the problem for comparison with the armament system's solution. System error can easily be checked and pin-pointed when the results are compared.

According to Department engineers, only a few check flights will be needed to verify and correlate the ground test results, thus substantially reducing the cost and development time for the new systems.

Aircraft Products Department makes armament systems for the Air Force's Boeing B-17 *Stratojet* and Douglas B-66 bombers, both capable of carrying an atomic bomb.

The Department has been instrumental in developing many complex armament systems for today's supersonic aircraft.

## SPECIAL REPORT

From October 10 to October 28, a subcommittee of the Joint Congressional Committee on the Economic Report conducted an inquiry into the social effects of automation and technological change. Under the chairmanship of Representative Wright Patman (D., Texas), the Subcommittee on Economic Stabilization heard testimony from leaders of industry and labor, as well as from management consultants, college professors, scientists, and various government officials.



CORDINER

On October 26, at the invitation of the Subcommittee, President Ralph Cordiner went to Washington to present General Electric's views and experience. His testimony—widely commended for its scope, thoughtfulness, and specific information pertinent to the inquiry—is presented in digest form on the following pages.

A complete text of Mr. Cordiner's testimony has been prepared in booklet form. It can be obtained by writing to Public Relations Services, Building 2, Schenectady.

# AUTOMATION

**WHAT is it? WHY is it necessary?**

**HOW is industry adjusting to it?**

**What are its effects**

**. . . on employment?**

**. . . on prices?**

**. . . on living standards?**

These questions are the ones your friends and business contacts outside the Company will be asking. You'll be in a position to give a more informed answer, once you've read the following digest of Mr. Cordiner's report to a Congressional Subcommittee reviewing the social effects of automation and technological change—Ed.

## **What Is Automation?**

**F**OR PRACTICAL PURPOSES in planning manufacturing facilities, General Electric defines automation as "continuous automatic production," largely in the sense of *linking together* already highly mechanized individual operations.

Most products are first made by hand, or with hand tools. Then industry mechanizes: it introduces machines for some parts of the process, although many hand operations usually remain. As the economics of the situation warrant, the machines are made more and more automatic. Finally, where we can do it technically and where economic considerations warrant the investment, we link together parts of the process to achieve more continuous and automatic

## **AUTOMATION . . . A DIGEST OF MR. CORDINER'S REPORT TO CONGRESS**

operation. Automation is a way of work based on the concept of production as a continuous flow, rather than processing by intermittent batches of work.

Progress toward greater automation is nothing new; only the expression "automation" is new. Automation is only one phase in the process of technological progress, a natural evolutionary step in man's continuing effort to use the discoveries of science in getting the world's work done.

### **Why Is Technological Progress Toward Automation Necessary?**

**Technological progress is necessary in order to maintain our national security.**

Many of the key items of military equipment today, such as radar, gunfire control systems, guided missiles, and atomic weapons, are themselves products of automation principles. These military developments have spurred industrial technology; but even more important, continuing progress in industrial technology is essential as a source of knowledge for further improving the nation's military equipment.

For example, during World War II our industrial engineers helped design radical new systems of aircraft armament in which the aerial gunner had push-button control over his guns, and even had computers to help him aim the guns. In coming up with the gunfire control systems for the B-29, the A-26, the B-36, and other airplanes, the engineers used circuits and equipments originally developed for industrial use. The amplidyne generator in the B-29 was originally developed for the steel industry. Thyatron tubes—very important in the B-36 armament—were originally industrial electronic tubes developed for the paper and resistance welding industries. The totally new approach in electric generating systems for the B-29 was directly based on our industrial experience.

Our margin of safety in modern arms depends on continuously increasing the productivity of American industry, which produces them. For example, the United States could not even consider a radar defense system if it did not have highly productive electronics and

communications industries to design and produce the necessary elements in the huge quantities required.

Another example is jet engines. When the Korean War broke out, the Air Force needed thousands of jet engines as fast as possible. By applying the principles of mechanization and automation in our Evendale, Ohio, plant, we were able to boost our monthly production of engines 1200%. These J-47 jet engines powered the F-86 *Sabres* which scored a 14-to-1 edge over the Communist jet aircraft in the Korean War. As an illustration of technical progress, the thrust of these engines has been increased 23% through design improvements, and the present J-47 engine has an allowable flying time of 1200 hours, compared to 150 hours five years ago.

**It is necessary if we are to continue to raise the American standard of living even at the same rate as in the last decade. It is even more urgent if we are to accelerate the rate of progress.**

According to our Company's estimates, the United States will require about 40% more goods and services by 1965—with only 14% more people in the labor force. To produce 40% more goods and services with only 14% more people, either everyone must work harder and longer—which is neither a realistic nor a good solution—or industry must be encouraged to invest in more productive machinery and methods. Faster progress in the newer field of automation seems to us to be the only available solution to this problem—particularly in situations where we have exhausted the known economic possibilities in the more familiar field of simple mechanization.

From all that we can foresee, it appears that there will be a shortage of men and women to fill the work opportunities in the coming decade. After 1965, when the proportion of labor-force to the total population increases, some feel that there may be a trend toward the shorter work week. But our feeling is that the demand for goods may rise so fast in the 1970's that we will still be hard put to produce enough goods to satisfy the market on a 40-hour basis—and the American public will choose more goods in preference to a shorter work week.

**Technological progress is also necessary from the point of view of individual companies; those companies, large or small, which continually modernize in order to serve their customers better, will prosper in our competitive economic system.**

## **How Will Industry Adjust to Increased Automation?**

The fear that automation will move too swiftly for orderly adjustment overlooks the powerful factors which govern the pace of technological advance. First of all, there is the difficulty of actually thinking through and designing workable automation developments. Second, the financial risks involved must be evaluated—and they are serious enough to make a businessman weigh carefully each investment in automation. And third, management must work out in advance some way to assure the wider, steadier market which will justify the investment in new machinery and methods.

Good planning for automation includes planning for the all-important human problems as well as the mechanical and financial problems. In the General Electric Company, due to the gradual nature of the improvements and the small ratio of the improvements to the continuing base of operations in the plant by unchanged methods, it is seldom that a person is put out of work by an improvement.

At General Electric, we try to plan any substantial technological changes in such a way that normal attrition of our work force—the people who quit, retire, or die—will absorb the shift in employment. In the past 12 months, General Electric has hired about 40,000 new employees to replace those who quit, died, retired, or whose employment terminated for reasons other than lack of work. In the same period, at least 33,000 of our employees changed jobs within the Company because of promotions, technological changes, and the normal internal shifts of the work force due to lack of work in one area. This is how General Electric—and probably industry generally—takes care of short-term adjustments.

## **What Are the Effects of Increased Automation?**

Progress toward greater mechanization and automation is in the best interests of all the groups that business must serve—customers, share owners, employees, suppliers, and the public.

## 1. Lower Prices.

On a weighted average [with 1939 as a base year], General Electric prices have gone up 57%, while the price of all commodities (except farm and food) rose 102%. That difference represents money saved by consumers. In the same period, we have had an increase of 144% in the cost of our basic raw materials, and a 177% increase in average earnings and benefits paid to our employees.

PRICE REDUCTIONS IN G-E CONSUMER PRODUCTS		
	1950	1955
Vacuum Cleaner	\$89.95	\$79.95
Television	230.90 (12-inch)	199.95 (21-inch)
Automatic Blanket	52.95	34.95
Refrigerator	329.95 (8 cu. ft.)	228.00 (9.2 cu. ft.)
Automatic Washer	394.95	279.95
Automatic Dryer	249.95	189.95

The housewife buying many of our consumer products will find a lower price tag now than she did in 1950, even though the products have been improved. Much of this price reduction can be attributed to our investment in more automatic production.

In spite of the cost of making more than 20,000 design improvements [in the J-47 jet engine], we were able progressively to reduce the price by about \$15,000 per engine. This resulted in a total saving to the taxpayers, from cost reductions on jet engines, of about four to six million dollars.

## 2. Increased Employment.

Technological progress sets off a sort of chain reaction of economic growth: more productive machines reduce costs and prices; this increases volume of business, creating a need for more workers. This period between the installation of new machines and the build-up of business is generally very short. It *has* to be, or the company could not afford to invest in the machinery. The reverse is also true: if a company fails to modernize, it will lose business, and fewer workers can

EMPLOYMENT IN TOTAL ELECTRICAL INDUSTRY		
	1939	1954
Utility	284,000	395,000
Manufacturing	500,000	1,400,000
Contracting	58,000	155,000
Wholesale & Retail Trade	258,000	510,000
Service Trades	28,000	140,000
Total	1,128,000	2,600,000

**2. Increased Employment . . . Cont'd.**

be employed. A company owes it to its customers, share owners, and employees to modernize and thus remain competitive.

The service industries provide new employment. Our economy, as it progresses toward greater automation, spends less of its effort (proportionately) in making things, and more in selling, servicing, and using things. In 1947, purchase of services accounted for 31 cents of the consumer dollar. Today, the figure is 36 cents—up 16% in eight years. Technological progress creates more leisure and wealth for cultural and educational activities. Hobbies, sports, travel, entertainment, and retail trade are increasingly important sources of employment.

There is a wave of new employment opportunities that runs in front of automation and technological change—the employment involved in designing, selling, building, and installing the new machinery and controls, along with the new buildings required. In addition, there is additional employment required to maintain and service the equipment after it is installed—and to sell and service its increased output.

Entire new industries, employing thousands, are created by the new technologies. On the horizon we see an atomic energy industry, a transistor and semi-conductor industry, an industry for the production of the super-metals like titanium and zirconium, and even the man-made diamonds that came out of the General Electric Research Laboratory this year. These and many others will grow into sizeable areas of employment. Advanced manufacturing techniques help make such difficult products possible, and of course create new employment.

As industry moves its operations up the scale toward automation, there is a greater demand for more highly trained people to handle the larger responsibilities. In General Electric, 70,000 of our employees work on new types of products we did not make in 1939, such as television, jet engines, chemical products, and atomic energy. Not only research, but advanced manufacturing methods, make such new products possible.

The computer, extending man's mental capacities beyond anything we can imagine, will create fantastic increases in human knowledge—and thus vastly increase the number of things we can make and enjoy.

Based on our experience with these machines, it may well be that the computer-derived technologies will be a major source of new employment in the 1960's and 1970's, and they will keep us perpetually short of manpower to take advantage of our opportunities.

The manufacturing industries which have gone the farthest in automation, and the industries which supply equipment for automation, are the ones in which employment is rising the fastest. Employment at General Electric has been increasing since 1939 at a rate six times as fast as the country as a whole. The number of employees at General Electric has tripled from 71,500 in 1939 to 230,000 today, including those employed on atomic projects. Thus, 158,500 General Electric employees hold positions that did not exist in 1939—certainly evidence that technological progress, together with skillful marketing, creates *new* employment opportunities.

General Electric's progress from technological advance has been shared by other businesses, large and small. Since 1939, our payments for materials, supplies, and services have gone up more than 10 times. At the present time we have about 40,000 suppliers, most of them small businesses, and many of them aggressively mechanizing and automating their operations. This flow of business to other companies of course creates growing employment opportunities. In addition, roughly 400,000 small companies gain all or part of their income from selling and servicing our products.

### **3. Higher Standard of Living.**

Employee compensation and other benefits paid by the Company have grown more than eight and a half times, from \$145,000,000 in 1939 to an estimated \$1,257,200,000 in 1955. Translating that into individual terms, in 1939 the average General Electric employee earned \$2028 a year including the value of benefit programs. Today, a General Electric position is worth \$5613 a year, on the average, and that includes a splendid package of pension, insurance, vacation, holiday, and other benefits providing better economic security. When you take out the effect of inflation, since 1939 the average employee has had a 44% increase in real purchasing power, except for taxes. This increase also reflects the general up-grading of jobs as we advance toward greater automation. Work is cleaner, safer, and more pleasant in modern factories and offices.

For the 341,728 owners of General Electric, their equity in the Company—their money in the business—has tripled, mostly through retained earnings. But their percentage return on the equity has stayed about the same. Dividends remain at about 13% of equity.

#### **4. Better Stability in U.S. Economy.**

Automation programs require long-range, detailed planning of capital investment, and the pursuit of these plans regardless of temporary ups and downs in annual sales. Thus investment in automation will increasingly serve as a general stabilizer in our economy.

As automation and mechanization are introduced into a company's operations, fixed costs go up. With high investments in machinery, industry has one more incentive to keep those machines running as steadily as possible. This provides a great stimulus for better planning, more professional marketing, and all the other techniques for maintaining steady demand and employment.

### **Conclusions**

Automation is *not* a menacing development. It is, in fact, a concept which has already raised the nation's standard of living and has had a stimulating and stabilizing effect on the economy. It will continue to have this welcome effect in the future.

American industry has a challenging opportunity to increase its productivity, reduce the cost of goods, and increase the real wealth and purchasing power of all Americans—by using every feasible application of the automation concept all along the line from factory to customer. We will at the same time be taking the danger and dullness and drudgery out of industry, and giving people more satisfying work to do, at higher pay for higher skills.

It is in the public interest to have tax policies and other economic policies which will encourage business to invest in research and greater productivity, because these are the sources of new employment and national wealth. They are the real and substantial sources of increased purchasing power throughout the economy—not only among the 25% of the labor force engaged in manufacturing, but among all the families in America. Concepts like automation are at once an

expression and an instrument of the vitality of the American people. They serve us well, in our continuing search for better ways to work and live.

In General Electric, we have been mechanizing, improving methods, and automating as fast as we can economically develop and apply the required technology. We are proud of it, and plan to continue to make our Company a more productive element of society.

### **A Case in Point—Electric Power Industry**

When you flip the light switch on the wall, you start up one of the most completely automated processes in the world. From your light switch, back through wires, meters, transformers, substations, switchgear, generators, turbines, right back to the fuel sources such as the coal pile, gas, oil, or waterhead, there are hundreds of self-supervising and self-regulating devices, many of them developed by General Electric engineers and scientists over the past 75 years. The electric power industry is indeed one in which the so-called "Automation Revolution" has already taken place. What have been the effects on society?

1. The electric power industry employs 395,000 persons. The total electrical industry employs 2,600,000 persons. Thus, the highly automatic process of producing and distributing power creates jobs for *six and a half times* its own number of workers.

2. Employment in the total industry has more than doubled since 1939, with increases in every segment of the industry. [See Employment Table, p. 15.]

3. Cost of residential electricity has gone down 2% since 1939, as measured by the Consumer's Price Index, during a period in which the cost of living has risen 93%.

4. Sales of electricity have

doubled every decade since the turn of the century; have increased two and a half times in the past 10 years.

5. The average worker in manufacturing had, during the year 1920, the aid of 3155 kw-hrs of electrical energy to help him do his work. By 1954 the average worker in manufacturing was being aided by 17,900 kw-hrs of electrical energy—the equivalent in human energy of 250 assistants.

6. Between 1920 and the present, the average home's electrical energy consumption per year has increased from 339 kw-hrs to 2550 kw-hrs. The latter figure represents the energy equivalent of 36 servants.

# What G.E. Expects from Computers

After giving his report on automation, summarized on the foregoing pages, Mr. Cordiner presented a separate statement on computers to the Subcommittee, rounding out the automation story. Excerpts follow.

**W**HEN THE HISTORY of our age is written, I think it will record three profoundly important technological developments:

*Nuclear Energy*, which tremendously increases the amount of *energy* available to do the world's work;

*Automation*, which greatly increases man's ability to use *tools*; and

*Computers*, which multiply man's ability to do *mental* work.

Some of our engineers believe that of these three, the computer will bring the greatest benefit to man.

## **1. The computer is an important invention which extends the capacity of the human mind.**

For example, there are certain calculations which will determine the best nozzle and bucket angles in a low-pressure steam turbine. These calculations take from 15 minutes to one hour to do on the computer at Evendale. It is not practical to do this calculation by hand since it would require from one to three years of continuous, error-free hand calculation for each turbine. Obviously, before we had the computer we had to rely on less exact data.

## **2. The computer is essential to our national defense, in the advanced design of military equipment.**

Guided and unguided missiles would be practically unthinkable without computers to calculate their trajectory.

The computers have greatly speeded the development of jet engine and air-frame designs, which are so important to our national security. It costs many months

and many millions of dollars to build and test an experimental jet engine, in order to try out a single new design. Now the computer enables us to explore and test thousands of design possibilities *on paper*, before we proceed to production. This has meant very swift advances in engine design, as well as great savings to the taxpayers.

## **3. The computer will help business to produce better products at lower cost.**

The important point is that the larger, higher-speed machines enable us to explore new possibilities in the area of business information, and to obtain data that we could not economically obtain before.

The most important value derived from business-data computers lies in making available completely new and timely information which will help business to reduce the cost of producing and distributing goods through its ability to plan more stable production and employment.

**4. By providing better and more timely information for management, the computer will help to improve the stability of employment through better planning.**

Using the Louisville computer, we have developed a system of appliance marketing reports which promises to improve our ability to plan production and distribution. These reports give the status of sales and inventories, in units, for major appliances at the three levels of distribution—factory, wholesale, and retail. It also estimates unit sales for the year based on present sales volume, seasonal characteristics, and any other variables injected into the formula by Marketing Research. From these projections, the computer calculates the required levels of inventory and production schedules to support such a sales volume. Exploratory and factual information of such accuracy and timeliness has never been available to management before.

**5. The computer-derived technologies will create new products and new industries which will be major sources of new employment in the coming years.**

As we learn how to use computers, we will give them more work to do. This will require more people to prepare the problems for the computers, more people to operate them, and more people to interpret and use the results produced. What is involved here is a gradual *shift* of employment to higher-grade and more productive work.

These computers help to create so much more scientific information, and introduce so many more technical possibilities, that we need more engineers to put the new information to work. I think this is the pattern of the future: the computer opens up scientific possibilities that were unthinkable before, and will make possible new products and industries that we cannot possibly foresee.

## **A Case in Point—Computers at Evendale**

In 1952, when the IBM 701 electronic computer was installed in our Aircraft Gas Turbine Development Department, we employed approximately 30 young women in that department for manual calculation. Today we employ about 20 in that capacity and 40 more as programmers for the computer. These 40 are more highly paid and more highly trained than were the 1952 employees; they are in much greater demand elsewhere in industry, and eight of them have professional standing. In addition, about 50 male employees analyze and program problems, and operate the night shifts.

To the people in our Evendale plant, the computer is extremely im-

portant to their continued employment. Our engineers with their computers must continue to come up with ever-better jet engine designs to serve the needs of our military and commercial customers, so that we will have employment for the more than 12,000 General Electric employees in Evendale. Here is the *real* impact of the computer on employment stability: not simply providing employment for 80 more people in the computer section, but maintaining employment for the more than 12,000 people in our Evendale plant, and helping to create new industries that will some day employ thousands more.



## GOODWILL TOUR

### Reagan Rolls On

In Morrison, Ill., (pop. 3,500), an audience of 2,500 turned out to hear Ronald Reagan, G.E. Theater program supervisor, during his recent midwest tour. They gave him a standing ovation at the close of his talk. At the Appliance Control plant in Morrison, his reception was equally enthusiastic.

In Eureka, Ill., at Eureka College, his alma mater, Reagan visited with Dr. Ira W. Langston, president of the college, and Dean-of-Women Margaret Buschor. Having earned part of his way through school by washing dishes in the girls' dormitory, Reagan stopped by to show the new generation how it's done.

Reagan visited G-E installations in Illinois, Indiana, and Wisconsin. From every point came enthusiastic reports.

AT HIS ALMA MATER, Reagan visited President Langston and Dean Buschor (above); then lent a hand to dormitory dishwashing crew (below).



AUTOGRAPHS and greetings at Morrison Plant



#### G-E THEATER SCHEDULE

- Nov. 20—"Prosper's Old Mother," with Ethel Barrymore and Ronald Reagan. (Commercial: Progress in electric ranges.)
- Nov. 27—"A Letter from the Queen," with Paul Muni. (Commercial: Aids to education, G-E comic books, etc.)
- Dec. 4—"From the Top," with Rosemary Clooney (tentatively scheduled). (Commercial: 25th anniversary of photoflash bulbs.)
- Dec. 11—"Seeds of Hate," with Charlton Heston and Steve Cochran. (Commercial: G.E.'s role in television development.)
- Dec. 18—"Let It Rain," with Ronald Reagan. (Commercial: Progress report on appearance design.)

## CONSTRUCTION

As reported by Real Estate and Construction Department:

**Hickory, N. C.**—The \$5.5 million Distribution Transformer Department plant is progressing on schedule with 500 construction workers employed. Movement of 500,000 cu yds of dirt nearly finished. Railroad siding, foundations, structural steel and roof deck almost complete. Above ground mechanical and electrical work, and masonry portion of manufacturing building are under way.

**North Bergen, N. J.**—Foundations are nearing completion and structural steel work is under way on the 130,000 sq ft Apparatus Service Shop and Warehouse. The building is supported by approximately 700 creosoted wooden piles.

**Irmo, S. C.**—Rough grading, building foundations, and structural steel have been completed for the Capacitor Department's new plant here, for production of d-c aluminum capacitors. Factory production will start early next year.

**Roanoke, Va.**—Office building of the Industry Control Department plant is nearly complete, with some personnel starting to occupy it. Installation of equipment in the manufacturing plant is well under way. Included in the facility is an elevator tower for the testing of elevator brakes and similar devices. Pilot plant operations will start this fall, with completion set for January, 1956. Transfer of the department from Schenectady should be completed by early 1957. The Roanoke plant with its 600,000 square feet is on a 96-acre site.

**Tyler, Texas**—Multi-million dollar Home Heating and Cooling Department plant is on schedule. Structural steel erection to be completed this month.

**Kansas City, Mo.**—Construction has started on a 13,000 sq ft Apparatus Service Shop. Provision is made for 1,200 sq ft future expansion when needed.

**Cleveland**—The Large Lamp Department's \$2.7 million Engineering Building is nearly complete. Transfer of personnel and equipment will start near the end of this month.

**Philadelphia**—Foundations are complete on the G.E. Appliances Company warehouse and office building. Underground electrical and mechanical work is in progress. Portions of the floor slab have been started.

**Hendersonville, N. C.**—Installation of manufacturing equipment is in progress at new Outdoor Lighting Department plant. Occupancy is scheduled for early spring. Adjacent to the plant will be an area for demonstrating lighting. The layout will be flexible so that any type of lighting can be demonstrated. Both mercury and fluorescent lighting fixtures will be mounted on steel, wood, concrete, and aluminum standards.

**Syracuse**—Expansion of facilities for the Radio and Television Department are under way with the leasing of a 25,000 sq ft single-story building now under construction in the immediate vicinity of Electronics Park. To be occupied by the product service section about March 1, the building will include a service laboratory, replacement parts inventory, and a replacement parts commercial service.

## WHAT'S NEW

**An honorary doctor** of science degree was conferred upon Dr. C. G. Suits, who was keynote speaker at Drexel Institute of Technology's recent science convocation. In his address, Dr. Suits, who is a G-E vice president and director of research, stressed the future importance of applied scientific research. "To an increasing extent," he said, "we will determine what discoveries need to be made, and then plan to make them." He cited G.E.'s diamond-making process as an example of applied research; the work was planned in detail, the time scale and estimated costs projected over a period of several years, and, because of the wealth of scientific skills and techniques available, the objective successfully achieved.

**Zoo Parade:** The dragons didn't show up at Pittsfield's annual Halloween parade this year, but a jolly, 14-car train of clowns and a zoo-full of "animals" quickly took the dragon's place in the eyes and hearts of the kiddies. The tricks-or-treats set also got quite a kick out of a huge shoe—the

### TRICKS AND TREATS IN PITTSFIELD



one the old woman lived in. Credit for the bang-up show goes to G-E Pittsfield Works employees, who built the floats entirely during their spare time.

**"Bloomfield Tech":** Meeting the needs of increasingly high skills required for modern air-conditioning design and engineering is the purpose of an advanced course currently being conducted by the Air Conditioning Division for its graduate engineers and those holding technical degrees. Called the "University of Air Conditioning," the course consists of 30 sessions—one 2-hour class and four hours of homework each week. Initial enrollment for the course, which began November 9, was about 50.

**Pocket Book English:** General Electric's highly successful essay, "Why Study English," is being used as the introduction to a new Cardinal Pocket Book (35c) titled *Short Cuts to Effective English*. Ideas expressed in the essay have received wide acceptance in industrial and educational circles. Distribution of "Why Study English" is nearing the five-million mark, and it has been reprinted in many other publications. Chief value of the essay is in the support it gives the ideas being advanced by the instructors of America's youth.

**Flash Photo Guide:** The Photo Lamp Department has prepared a new booklet which covers "90 per cent of the questions concerning photography the department receives as inquiries." The 40-page "G-E Photolamp and Lighting Data Booklet" gives film speed ratings, guide numbers, flash and flood lamp data, and time-light curves. You can get the booklet at photo supply dealers or by writing: Inquiry Bureau, General Electric Company, Nela Park, Cleveland 12, Ohio.



August 1956

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

*Picture by Our Staff - and P. art.*

### THEME IS RESEARCH

**1956 Calendar:** "Research and new developments in our daily living, in our work, and in defense of our nation." is the theme of next year's calendar. The whole art approach was restudied, and a clean, modern design was adopted. The picture is larger, extending without borders to the edge of the frame, and gray bands above and below the picture help make the headline and days of the week stand out. The August 1956 illustration shown here as an example, depicts radar field testing in upper

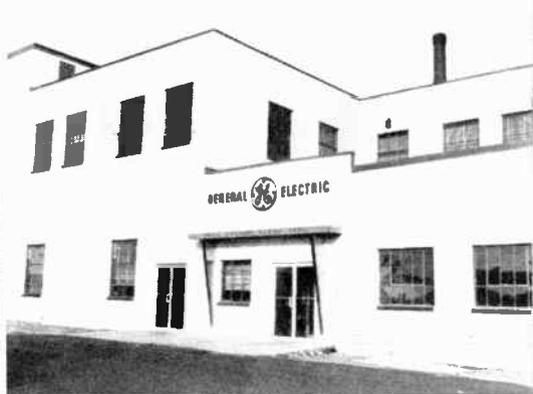
Alaskan coastal regions. Interesting statistics on the '56 calendar: 480,000 were printed, using a total of eight carloads (160 tons) of paper and 6,000 pounds of ink.

**Cans of spray-on touch-up paint** are now being sent out with all shipments of G-E power transformers and large voltage regulators. In addition to standard brush-applied paint, a 12-oz spray can of primer and one of Super Melaglyp finish enamel is supplied for quick repairing of any scratches or blemishes caused during shipping and installation.

**Rapid Strapper:** The Range and Water Heater Department at Appliance Park has just installed the nearest approach yet to automatic packing of large appliances. It's a machine which straps cardboard cartons around ranges at the rate of 180 per hour. The only unit of its kind in full-time use in the country, the new machine: (1) automatically positions cartons in the packaging line; (2) folds the carton's front and back bottom flaps; and (3) fastens a steel band around the carton—assuring a seal that will last until opened for the customer.

### PACKAGES THREE A MINUTE





FOR THIS IMPROVEMENT, A CHAMBER OF COMMERCE AWARD

## WHAT'S NEW . . . Cont'd

**In Good Voice:** Eastern Airlines, which operates a fleet of Martin 404 "Silver Falcons," has solved its troublesome failure of loudspeakers—used to give instructions to passengers. The speakers are installed in the ventilating ducts and must operate under the most adverse conditions of humidity. With conventional speakers, complete failures were common. However, after a year of tests on G-E speakers, especially adapted from the Company's standard drive-in theater models, there has been no "gravel-throat" and no noticeable deterioration. G-E speakers are being put in all the 404's and on Eastern's new DC7B "Golden Falcons."

**A Solid Hit:** Neither rain (as much as four inches in five hours), nor heat (usually 104 degrees indoors, 110 outdoors), nor driving dust (equally damaging to human throats and electric circuits) prevented G.E.'s House of Magic from scoring a triumph at the International Trade Fairs in Karachi, Pakistan. Wayfarer magicians Bill Gluesing and Paul Lucey report that, despite monsoon weather,

212,900 Pakistani attended 608 shows in person and 12,800 saw 11 performances on closed-circuit TV. This made House of Magic the biggest crowd-drawer among exhibits from numerous countries, including England, Russia, and China. The showmen have now moved on to India.

**"Vision and foresight"** were rewarded when the Lynn (Mass.) Chamber of Commerce presented its Modernization Award to the Small Aircraft Engine Department at the River Works. SAED acquired an empty rundown factory, and in a few months, transformed it into a modern efficient office building for its engineering, financial, and marketing staffs. See photos above.

**Service Plus:** The Specialty Component Motor Department gave an ample demonstration of manufacturing skill and speed recently. They were contacted at 2 p.m. concerning an urgent request for 1,500 motors for a Chicago company. The Jonesboro plant was notified and an immediate conversion was started on the machinings, winding, and assembly for the required model. The necessary changes were made, and the motors built and shipped in nine hours. The excellent service led to an additional large order.

**Hotpoint Expansion:** A story of past and future growth has been outlined by Hotpoint's president, John C. Sharp, who reports that some of Hotpoint's individual product departments now have a larger volume than Hotpoint's total business in 1940. Since World War II, Hotpoint has erected a new electric range plant, a new refrigeration facility, a new home laundry factory, and a dishwasher-water heater plant. Though these modern installations were planned in anticipation of predicted industry growth and have rated capacities among the highest in the industry, Hotpoint is already studying plans for possible additional facilities.

**Nothing small** about the Small Aircraft Engine Department employees. They recently gave the Red Cross 335 pints of blood in one day, setting a record among G-E departments at Lynn. Total River Works contribution during this Blood-mobile visit came to 1,074 pints. Total contributions since drives began are a phenomenal 6,903 pints.

**G-E automatic washers** are being packed in new corrugated cartons, which save an estimated 40% in packaging operations and weigh 10 lbs. less than the wooden crates formerly used. The cartons have reinforced tops for storage and are designed for handling with fork-lift trucks.

**G-E high fidelity** equipment will soon include a versatile 20-watt amplifier. A dual chassis permits installation of power amplifier and preamplifier units in a single cabinet or in separate components. There are nine independent panel-mounted controls and provisions for five inputs and three outputs. These make it adaptable for use with several combinations of radio, phonograph, recorder, and television sound reproduction.

**Atomic Electricity:** Samuel Undermyer II, reactor designer, Atomic Power Equipment Department, told the National Industrial Conference Board recently that in 25 years, 23 per cent of the installed power generating capacity will be atomic.

**One million square feet** of "Thru-Con" printed wiring boards is the 1956 production goal of G.E.'s Electronic Components Department at Auburn, N. Y. Now being used in several G-E table model radios, in the transistorized portable radios, and in the 11-inch portable TV sets, the boards will roll off what is perhaps the world's most completely mechanized printed wiring board production line at the rate of several hundred thousand per month.

**Electric "trolley trucks"**—operating on current from overhead lines and powered by railroad-type traction motors—will soon be hauling more than a thousand tons of limestone out of California mines each day. Big advantage of the new trucks is that they are equipped with a cable reel so they can move away from the overhead wire zone and operate as easily as conventional self-propelled units. The 30-ton electric trucks are expected to save an estimated \$15,000 a year over diesel-powered vehicles. All the electric equipment will be built by the Locomotive and Car Equipment Department for the Kenworth Motor Truck Company of Seattle, which is building the four units for the Riverside (Calif.) Cement Company.

## ORGANIZATION

### Electronics Division

Color System Technical Project established; Ira J. Kaar appointed manager.

## *Monogram Personality*

**When a professional society** honors one of its members by electing him its president, it's a sure sign the man is recognized as a leader in his field. This is the honor just given G.E.'s Arthur N. BecVar, manager of Appearance Design, Major Appliance Division, by the American Society of Industrial Designers, the leading U.S. association of designers for industry.

The honor comes as no surprise to BecVar's colleagues in General Electric. The kitchen center, built-in appliances, wall refrigerator, mix-or-match colors — all are G-E design concepts developed under BecVar's aegis. Moreover, his stated views on design trends make him a logical successor to earlier ASID presidents like Raymond Loewy, Walter Darwin Teague, and Henry Dreyfuss.

With his eye always on those ever-changing social standards which translate themselves into the type of product consumers buy, BecVar's task is to design appliances that are feasible from the engineering and manufacturing viewpoints, favorable from the cost-profit viewpoint, and fashionable from the viewpoint of current standards of good design. As BecVar has pointed out: "For years we got along with things that worked, with little care given to design, color, or appearance. Now, the American consumer not only desires but feels the need for good design."

Since coming to G.E. in 1916, BecVar has seen design emphasis develop to the point where G.E. now pays as much attention to product contour and color as it does to new features of performance and utility. He has seen the industrial designer become such an integral part of the management team that he is in on all phases of product planning and sales and marketing discussion. All this is especially satisfying to a man for whom



**ARTHUR N. BEC VAR**

design has been foremost through student days at Notre Dame, in graduate work at Purdue and at Czechoslovakia's Charles University, and during his entire professional life. Even at home, BecVar, his wife Jayne, and the two oldest of his four children spend many leisure hours dabbling in designs with water colors and clay.

Because G.E.'s emphasis on progress has such an important bearing on product design, BecVar's thoughts are constantly on the future and on the industrial designers who will further the Company's reputation as a pace setter in modern design. He is pleased that the nation's universities now realize an industrial designer must be trained in engineering, manufacturing, and marketing, as well as in the arts. He sees, as a logical follow-up, G.E.'s manpower development program as an ideal sphere in which talented young designers can receive the training to enable them to become industrial design experts.

## PEOPLE

**G-E parents** who are concerned about the handwriting of their school-age children will be interested in the experience of William F. Mattes, Jr. of the Large Lamp Department's New York office. A recent *Saturday Evening Post* article on handwriting training in the schools told of Mattes' shock at discovering that his son Bill was being taught to print but not to write long-hand, with the result that the boy was unable to read cursive writing. Mattes touched off a controversy which brought him correspondence from many parts of the country. Briardliff school officials claim that the printing method improves legibility, speed, and neatness. Mattes says he could understand postponing the teaching of cursive writing for the first two or three years, but thinks it should then be taught thoroughly. He explains, "I don't want my son to be cut off from the outside world because he can't read letters from his grandparents or friends in other cities." As a partial solution, Mattes gave his son some private tutoring.



Photo courtesy *Saturday Evening Post*

**BILL MATTES AND SON**



**SECOND ONLY TO NORTH AMERICA**

**South African Visitor:** P. M. Van Der Merwe, production and manufacturing manager of the South African G.E. Company (Pty) Ltd., is returning to Johannesburg with a lot of know-how gained in visits to ten Company plants in the U.S. and Canada. (He was especially impressed with a value-analysis seminar he attended in Schenectady.) The standard of living in South Africa is second only to that of North America, according to Van Der Merwe, who added that his country has a tremendous future. The Johannesburg plant with between 350 and 400 employees makes washing machines, irons, heaters, toasters, space heaters and Calrod® industrial heat-

ing equipment. In photo, Van Der Merwe points out the African plant location to Harry E. Douth of IGE in Schenectady.

**Bradley University** in Peoria, Ill., has awarded an honorary doctor of science degree to Maynard M. Boring, G.E.'s consultant on engineering manpower.

## EDITORIAL

# Mr. Reed Defines American Capitalism

The six points listed below represent one of the clearest definitions ever given of the American economic system. They were presented by General Electric's Chairman of the Board, Philip D. Reed, opening speaker at the National Foreign Trade Council Convention in New York, November 14. Mr. Reed, the Council's convention committee chairman, put forth a credo which so well expresses, explains, and extols the vigor of American capitalism, that the *Monogram* is proud to be the first to carry it in printed form—Ed.

• • •

"... What are the distinguishing features of our American capitalism? They can be simply described because each component is aimed and oriented toward one thing—vigorous growth. Let me mention the principal elements.

"1. We in America believe in large volume and small margins—not small volume and large margins.

"2. We in America believe in high wages, high productivity and high purchasing power. They must occur together. One without the other defeats its own ends, but together they spell dynamic growth.

"3. We in America believe in scrapping the obsolete, regardless of its remaining useful life. A new tool, a new technique, or a new machine which can do the job better and faster and which, by resulting savings, will pay for itself in a reasonable time, is a good investment even though it replaces equipment in first-class condition.

"4. We in America believe in consumer credit, and have developed and used installment sales techniques to

a degree unparalleled elsewhere in the world. Without it our economic indices would be at a fraction of their present level, and new industries like television, for example, would still be in their infancy.

"5. We in America believe in more leisure for our people through a short and highly productive work week. And the very fact of extensive leisure has produced great new industries which provide means for entertainment, for cultural pursuits, for sports of all kinds and for the do-it-yourself enthusiasts.

"6. And finally and most importantly, we in America believe deeply in competition versus the cartel. Competition is the spark plug of our economy. It keeps us endlessly, urgently searching and researching for new and better products, more efficient methods of production, and surer marketing techniques. It is both the 'carrot' and the 'stick', at once pulling and pushing us along the road to better things. Human nature being what it is, I submit there is no substitute for competition."