THE MONOGRAM

APRIL 1968

ROLLING OUT THE GE-POWERED C-5 GALAXY

PLUS: Virus Hunters...Public Safety...Suggestions

LETTERS

Whoppers

EDITOR: Mrs. Jeanette K. Yannie's letter in the February *Monogram* has introduced a new unit of length, the whopping mile. If we assume she works 5 days a week, then the 120 miles she travels per day is equal to 600 statute miles per week. Thus, a whopping mile is only ⅛ of a statute mile. This is a good unit for those who wish to boast about gas mileage.

Incidentally, Mr. Millard Meanea, a GE employee of the Idaho Test Station at the NRTS, lives in Carey, Idaho and travels 180 miles to and from work each day for a total of 7200 "whopping miles" each week.

GLEN J. BRISCOE
Nuclear Materials & Propulsion Operation
Idaho Falls, Idaho

In defense of Mrs. Yannie, her weekly total of 4800 "whopping miles" results from the daily 120 mile round trip covered by seven others in addition to her own mileage, or 120x8x5=4800. We must admit, however, that Mr. Meanea's travel to his GE job in Idaho Falls certainly qualifies as an undisputed "whopper."—Ed.

Pointing with Pride

EDITOR: I wish to commend those responsible for the Job Training Center being established in Cleveland through the assistance of General Electric (*Monogram*, February, 1968). I am also aware of the work being done in the Cincinnati Public Schools where General Electric Appliance Repair Courses are being instituted.

As an ex-teacher of Industrial Education I fully realize the value and necessity of these type of programs. This is a tremendous step forward in the field of Education and as a fairly new employee of General Electric, I'm happy to be part of the team.

BURT GRANT
Agency & Distributor Sales Operation
New York, New York

Phonetically Yours

EDITOR: When a *Monogram* story includes a name likely to be mispronounced, why not bracket the correct pronunciation alongside?

For instance, how should we pronounce the

(Continued on Inside Back Cover)

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

IN THIS ISSUE

Devere E. Logan, Editor

The *Monogram* is produced for office employees of the General Electric Company and its affiliates. It is published monthly at New York by the Employee Communication Operation of Personnel and Industrial Relations and printed in the U.S.A. by the Maqua Company.

GENERAL ELECTRIC

VOL. 17, NO. 4

THE GENERAL ELECTRIC
MONOGRAM

APRIL 1968

AVIATION

Rolling Out the Galaxy

The world's biggest airplane, the C-5 Galaxy, rolled off the production line for its official unveiling last month at Dobbins Air Force Base, Georgia.

President Johnson was among the 40,000 persons on hand to inspect the 383-ton, 246-foot-long aircraft that's powered by General Electric fanjet engines. A group of eleven General Electric employees from Evendale also was on hand.

The huge plane, built by the Lockheed-Georgia Corporation, is 18 yards less than the length of a football field and has a wing span of 223 feet. Its tail is as tall as a six-story building.

Powering the C-5 Galaxy are four General Electric TF39 engines providing 164,000 pounds of thrust. The TF39 turbofan engines will deliver up to 41,000 pounds of thrust each—twice as powerful as any commercial jet engine in service today.

Mr. Johnson told those at the ceremony that "We are observing a long leap forward in the effective military might of America.

"For the first time our fighting men will be able to travel with their equipment to any spot on the globe where we might be forced to stand—rapidly and more efficiently than ever."

THIS CROWD OF 40,000 WAS ON HAND FOR THE UNVEILING OF THE HUGE C-5 GALAXY.

CLOSE-UP VIEW OF THE POWERFUL GE TF39 ENGINES ON THE C-5 GALAXY.

Powerplant: The four GE jets powering the G-5 generate enough power to light a city of 50,000. Each TF39 measures 16 feet from intake to exhaust, and is eight feet in diameter at its widest point.

Yet, despite its size, the engine consumes fuel at a 25 percent lower rate per pound of thrust than any present-day fanjet engine.

The Galaxy will carry a maximum payload of 265,000 pounds for 3,000 nautical miles with the GE jets moving the aircraft along at a maximum cruise speed of 540 miles per hour. It has a ferry range of well over 7,000 miles, which gives the U.S. the capability of landing formidable land forces anywhere in the world within 24 hours.

Cargo Carrier: The huge plane, which makes its first flight in June, can be flown by a crew of five. A Lockheed executive said that if the Air Force had been able to use the plane during the Berlin Airlift, the entire operation could have been completed in 10 flights.

Lockheed also said that in a commercial version, the Galaxy would be capable of carrying 844 passengers. It hastened to add, however, that at the present time this wasn't practical.

Delegation: One of the most enthusiastic groups during the roll-out ceremony was from the Aircraft Engine Group's Evendale, Ohio, plant. The eleven employees, who had special reserved seats for the day, were representatives of the plant, having earned the honor through their outstanding contributions to the Target Zero Defects Program.

Also on hand were General Electric Vice Presidents Jack S. Parker and Gerhard Neumann.

Remarked one of the General Electric employees of the C-5 as the big hangar doors opened: "It's so big you just can't explain it."

At Deadline...

Transit Business: General Electric will furnish the electric propulsion and braking system for 150 rapid transit cars being built for the Chicago Transit Authority by The Budd Company. The equipment is part of an $80-million expansion program that will add rapid transit facilities to the median strip of the Dan Ryan and Kennedy expressways. The equipment will be supplied by the Transportation Systems Division's Transportation Equipment Business.

Fund Leader: Board Chairman Gerald L. Phillippe will head the Greater New York Fund's 1968 appeal next month. The drive's objective is to raise $79 million for the Fund's 425 hospitals, health and welfare agencies in the greater metropolitan New York area.

Rome Strikes: The judge of a Georgia state court has issued a temporary restraining order intended to stop a series of strikes by IUE Local 191 which have occurred one day a week since January 19th at the Medium Transformer Department plant in Rome, Ga. The order was still in effect at Monogram presstime, and was being observed by the union. The IUE says the issue is wages, although the Rome plant rates exceed community and state averages.

Elected: Dale E. Clark has been elected Managing Director of De La Rue Bull Machines Ltd., the Company's computer marketing affiliate in England. Mr. Clark succeeds Victor A. Casebolt, who has been appointed Deputy General Manager of Bull-General Electric, Paris, France.

At Shannon: The Irish Transport and General Workers Union is picketing the Company's wholly-owned subsidiary, EI Company, at Shannon, Ireland following an unsuccessful bid by the union to win representation rights at the plant. The strike is illegal under Irish law. Operations at the plant continue near normal.

BENEFITS

Vintage Year for Suggestions

It was a booming year for suggestions.

An all-time record of $1,332,459 in suggestion awards went on the books, topping by nearly 20 percent the million dollars paid in 1966 for good ideas.

One of the factors contributing to the large total was the Company-wide "Go For Improvement Program" and the fact that many components held special suggestion campaigns to urge employees to find ways "to do it better."

Membership in the exclusive "400 Club" went to 20 components in which employees turned in useful suggestions at a rate of over 400 adopted suggestions per 1,000 employees for the year.

Leading the list of "400 Club" members was the Apollo Systems Department with 649 suggestions adopted per 1,000 employees. Industrial Heating with 607, and Specialty Transformer with 578.

IDEAMAN: Charles W. Vincent, left, a top 1967 suggestion winner at the Apollo Systems Department, describes an idea to General Manager Gerald T. Smiley.

Other Records: Savings resulting from the suggestions hit $11,489,700—another record. This was over $2 million more than 1966, and nearly a 25 percent increase in first-year net annual savings.

Employees came up with a total of 118,579 suggestions, or 18,680 more than in 1966. Of these, some 39,000 were adopted, as the number of adopted suggestions per 1,000 employees rose to 171 from the 1966 level of 151.

The average award was $34.17, compared with $32.07 in 1966.

CUSTOM POWER EQUIPMENT

Switching in a Big One

The world's largest a-c solid-state switch, from the Custom Power Equipment Department, Philadelphia, is being installed in a new continuous wide-slab casting facility at the McLouth Steel Corporation, Trenton, Michigan.

The General Electric switch, together with an induction heater from the Ajax Magnethermic Corporation, produces one of the decade's most significant steelmaking accomplishments: SCR (Silicon Controlled Rectifier) control of large tonnage induction heating.

McLouth Steel's new installation will allow it to heat a 30-ton slab (26 feet long, one foot thick and five feet high) to rolling temperature of about 2300 degrees Fahrenheit in less than an hour. This compares with four to six hours with a fossil fueled furnace — the current method. McLouth will have six of the new lines.

Upping Tonnage: Induction heating has been used successfully with small masses of metal, but applying the technique to large tonnage has long intrigued

A SUCCESSFUL HEATING TEST ON A 30-TON SLAB IN 2300° HEAT.

heating and electrical equipment manufacturers.

In 1965 the opportunity arose when McLouth Steel decided to use induction heating. Engineers at Ajax and General Electric met the challenge by designing a 210 megawatt system with unique features.

"Before the development of the switch," explains Charles H. Titus, manager of the Advanced Power Systems Operation, "no electrical device was capable of satisfactorily handling the high continuous current requirements and the repeated heavy duty switching operation required by high-tonnage induction slab heating."

To meet the requirements, General Electric employees developed a 10,000 ampere. 2700 volt a-c solid-state switch using a new high-power silicon controlled rectifier cell. In addition to providing a "soft start," or limiting inrush current to minimize disturbances the switch can operate in one-half cycle and is capable of interrupting at least 212,000 amperes peak current at 2,700 volts. The switch has no moving parts, and therefore can operate as long as necessary without wear.

Reliability: "The SCR has reached a point where perhaps it's not as reliable as a piece of bus-bar," observes Jack L. Fink, manager of marketing, Advanced Power Systems Operation, "but it's beginning to get into that league and it's certainly a reliable kind of component to put in real live industrial service."

The Ajax heater is providing the first practical approach to large tonnage heating by surrounding the slab with an induction coil (the heating element) from end-to-end. The slab is supported on edge and placed in the heater from below in a kind of "upside down toaster." The unique method eliminates many maintenance and wear problems encountered with conventional methods.

Return of the Volt-Liner

In 1965, the Voltage Regulator Business Section, Pittsfield, outfitted a Dodge Motor Home with its products, dubbed the van "Volt-Liner," and sent it out to help in the competitive selling effort.

Now, 100,000 miles and 48 states later, the General Electric Volt-Liner is coming back home.

The mobile display has visited every major city in the country, making stops at large utilities in urban centers and tiny rural cooperatives in remote areas. Almost everywhere it stopped, the reaction was enthusiastic, according to Donald A. Duclos, marketing manager.

"There's no question that the Volt-Liner has been a valuable tool in making customers fully aware of our products and how they work and perform," he said.

"One customer even increased his order as a result of seeing the mobile exhibit," he adds.

Road Show: Part of the success of the Volt-Liner was attributable to the advance work of General Electric sales engineers in the area. Before the Volt-Liner pulled in, employees lined up key customers from utility linemen to engineers and purchasing agents.

The Volt-Liner was driven by marketing trainees who spent three-month assignments with the traveling display. The experiences on the road were chalked up as rare insights into the customer and the products.

By plugging into a convenient a-c outlet, the Volt-Liner could carry working models and operating equipment. It included a major display of the Section's ML-32 utility regulator, plus equipment from the Distribution Protective Equipment Department.

Now that the Volt-Liner is back home in Pittsfield, it'll undergo a bit of rest and rehabilitation before being outfitted for a new role: a mobile maintenance school.

This fall, the unit will hit the road again.

A GROUP OF UTILITY MAINTENANCE MEN VISIT THE VOLT-LINER

but this time visiting customers to provide instructional information on regulator maintenance.

MEDICAL ELECTRONICS

Bacteria Hunters

Many of the serious bacterial and virus infections that strike man go undetected until after the ominous signs of their presence appear.

Now, however, there's hope that it will be possible to detect and identify infectious diseases, including those caused by viruses, days before fever or other symptoms appear.

The announcement of the new technique came last month from John R. Gould, manager of biological techniques at the Company's Electronics Laboratory in Syracuse, N.Y. He told an Air Force meeting in Washington, D.C., that the technique may prove useful in early detection of leukemia, cancer, radiation damage and birth defects. It may also help determine the sensitivity of harmful bacteria to antibiotics.

Mr. Gould explained that the technique is an extension of previous work in which it was found that bacteria could be detected and identified (*The Monogram*, June '66).

He also said that new developments in this work point strongly to the possibility of early detection and identification of infectious diseases caused either by bacteria or viruses.

Micro-Sleuths: Essentially, the technique is a means of detecting the presence of viruses through the chemical products arising from their interaction with living cells. Earlier work established that it was possible to identify bacteria by the waste products they produce.

VIRUS HUNTER GOULD
A key to early cancer detection?

The Electronics Laboratory is conducting its experiments under contract to the Air Force Office of Scientific Research, and in association with Cornell and Syracuse Universities.

In studies at Cornell, dogs and horses were used in experiments which successfully detected canine infectious hepatitis and equine infectious anemia before the appearance of conventional symptoms.

On the basis of preliminary studies at Syracuse University with influenza and other viruses, it's hoped that the method may be useful in identifying viruses. In contrast to bacteria identification, virus identification is still in its early stages.

Possible applications of the technique included the early identification of diseases, rapid identification of disease-producing substances in food, water, or the atmosphere, and shortening of the time now needed for the classification of microorganisms, principally strains of bacteria.

PUBLIC SAFETY

WITH THE NATION'S LAW ENFORCEMENT AGENCIES ATTEMPTING TO CUT THE RAPID GROWTH IN CRIME HAS COME THE CHALLENGE TO GENERAL ELECTRIC TO APPLY ITS RESOURCES TO DEVELOP MODERN TECHNOLOGY THAT WILL HELP IN THE EFFORT.

CRIME IN AMERICA is on the rise. Last year, major crimes increased 16 percent over 1966. In cities of 500,000 to one million population it was up 23 percent.

Suburbia, which once symbolized an idyllic escape from urban crime to many Americans, was infected with a 16 percent increase in crime during 1967.

Such disquieting figures, released last month by the Federal Bureau of Investigation, suggest the growing problem that confronts both law enforcement agencies and the American public.

"Crime threatens our lives and property, our character and institutions, our hopes for ourselves and our children; the American Dream itself," said Attorney General Ramsey Clark in an address to the International Association of Chiefs of Police recently.

Technology: To deal with the growing crime in our society, many law enforcement agencies have turned to modern science and technology. The result has generally yielded new, efficient, and sometimes revolutionary ways of fighting crime.

The wisdom of applying technology was suggested in the recent findings of the Presidential Commission on Law Enforcement and Administration of Justice. It's also high on the list of FBI Director J. Edgar Hoover:

"Today's technology should be exploited to its fullest degree in meeting the issues presently facing law enforcement," he says. "The total result will be more efficient management and more effective operations."

Asking GE: Coming up with the technological approach to modern law enforcement has involved General Electric along with other leading companies. The work runs from the utilitarian product, such as the two-way mobile radios, to sophisticated laser holography fingerprint identification systems.

One of the earliest applications of General Electric products to public safety was in 1929 when GE leased a 5kw radio transmitter at South Schenectady to the New York State Police. Since then, radio communication has been a basic Company contribution.

"Effective communication," points out Glenn R. Petersen, manager of the Mobile Radio Business Section at Lynchburg, Va.,

POLICEMAN AND POCKET MATE RADIO

Communication is a key to police mobility.

"is the keystone of police mobility both in the area of civic emergencies and crime detection."

The uniform of today's policeman reflects this emphasis, with the small walkie-talkie as commonplace on his hip as a pistol.

In Touch: One recent General Electric communication system installed by Lynchburg is at Newark, N.J., which purchased nearly 300 GE MASTR Progress Line mobile radio and motorcycle units to upgrade its police communications network.

A new technique developed by Lynchburg to help move police messages faster and with privacy is "Digital Overlay." It uses mobile radio channels to convey teleprinted information from headquarters to a patrol car. The coded information uses only a portion of the voice channel, and allows the simultaneous transmission of voice messages.

The "Digital Overlay" technique was being discussed this month by three Lynchburg engineers at a Chicago symposium on law enforcement and technology. They're outlining how the system could be used for fast identification of suspects, stolen property information, and auto license checking.

Computer Network: For the past two years, a computer-controlled Teletype network, including a GE Datanet 30 communications processor, has been used by the Pennsylvania State Police. The automated system was developed in conjunction with the Company's computer specialists in Phoenix, and is among the nation's fastest and most accurate police communication systems.

The system operates around the clock, counting and switching automatically all messages moved over the statewide Teletype network. It handles general alerts and station alarms 30 percent faster, and with better accuracy, than manual systems. As a sideline, the computer has memorized statistics on some 2,500 stolen cars. When asked, it can tell police if a car is "hot."

The electronic system has paid for itself and given the Pennsylvania State Police

DATANET 30 AT WORK

a bonus: it released 10 men for other general police work.

Narcotics Sleuths: To stop the rising tide of narcotics traffic, several law enforcement agencies are using General Electric X-ray diffraction equipment as a quick method of identifying drugs.

"Although principally used for drug analysis, it also is used to analyze paints, soils and various poisonous solid materials," says William S. Best, a senior chemist at the North Carolina Bureau of Investigation, one of the organizations using the equipment.

The technique allows positive identification of drugs within minutes, compared with other testing methods that normally would take hours. This rapid method has permitted law enforcement officials to book suspects who might otherwise have had to be released for lack of sufficient or timely evidence.

A marijuana detector, meanwhile may grow out of work being done by employees at the Company's Electronics Laboratory, Syracuse, N.Y.

The idea is to apply techniques used to detect chemicals in the atmosphere to the task of detecting marijuana smoke. If an instrument is developed, police officers will be able to literally sniff out a suspect before actually presenting themselves to make an arrest.

Intoxograph: A portable alcohol detector, only a little larger than a shoe box, is also being investigated by the Electronics Laboratory. The battery-operated unit can be carried in a patrol car, allowing an officer to test a suspected drunken driver at the point of arrest rather than at a police station or hospital.

There are obvious advantages in using the Intoxograph instead of more conventional blood, breath or urine analysis. One

INTOXOGRAPH: A balloon, containing a suspect's breath, empties into the alcohol detector, which records the tell-tale evidence on graph paper. Demonstrating the unit are D. F. Moore, left, and R. L. Sharman.

of them is that most techniques can't distinuish between ethanol—the type of alcohol common to most alcoholic beverages—and acetone, which is a chemical produced in the body of a diabetic person prior to a coma. The Intoxograph detects only ethanol, and therefore can't confuse a diabetic with an intoxicated person.

But the big plus for the Intoxograph is in time saved. On the average, an officer spends three hours or more from the time of initial pick-up until a suspect is booked or released. Discussions with law enforcement agencies suggest that this time could be cut to 45 minutes.

Videotape: Closed circuit television systems have been in wide use by security-minded agencies for some time, but now videotape recording is in the picture.

The Los Angeles County Sheriff's Department is bringing a new dimension to law enforcement through the use of small, portable General Electric videotape recording system. Several bureaus of the department—homicide, vice, narcotics and

aero—have been working with the new VTR system, introduced recently by the Closed Circuit Television Business Section, Syracuse, N.Y.

Traffic patterns have been studied via VTR carried aloft via helicopter during patrol flights over the city of Lakewood, with "excellent results."

Videotape is also bringing a new perspective to crime investigation and in checking details of an accident. "The camera has recorded details we've been able to spot in playback," says Sheriff Peter Pitchess, "but failed to take note of during our first response to an incident."

He said that the VTR system "Is simply helping us do a better job."

Fingerprints: Sometime in the near future it may be possible to identify automatically the fingerprints left at the scene of a crime before the criminal has had time to leave town.

Such a suggestion has grown out of experiments in scientific fingerprint identification conducted at the Electronics Laboratory and the Research and Development Center. Both have used the three-dimensional laser images called holograms in their experiments.

POLICE VIDEOCOPTER IN L.A.

A special application of holography, called spatial filtering, has the capability of comparing two patterns and producing a signal which relates to the similarity of the patterns. Fingerprints are ideal subjects for the spatial filtering method of recognition.

In theory, it's possible to recognize patterns at the speed of light. Also, the technique is precise. Even near-duplicate prints don't fool the spatial filter, and partial latent prints can be checked with recorded reference prints.

The Electronics Laboratory has taken a systems application approach by converting the optical fingerprint into a digital code describing the characteristics of each print and feeding it into a central computer. Such electronic investigation of stored fingerprint codes can produce a positive identification in seconds.

Automatic fingerprint recognition is extremely complex, and considerable development is still needed. But it offers a state-of-the-art alternative to the traditional method of manually examining prints, and as crime grows in the nation, the need for fast, automatic fingerprint identification will grow more urgent.

Night Lights: Crime and darkness go hand-in-hand. Of the seven major crimes tabulated by the FBI, four generally peak during darkness: robbery, burglary, major larceny and automobile theft. These comprise about 90 percent of the serious crimes in the country.

Improving night lighting has been of prime concern to such cities as Chicago, Indianapolis, Gary, and New York City. These cities have documented the decline of crime in areas where relighting programs have been conducted.

Chicago, which has purchased General Electric luminaires from the Outdoor Lighting Department in two major orders of 51,000 and 77,500 units, found that in

an alley lighting project, crime was significantly reduced even before the entire lighting job was finished.

Vandals: Windows smashed by rock-throwing vandals cost thousands each year and divert investigating officers from other policework. The problem is severe in some school systems, and a growing number are substituting tougher LEXAN® polycarbonate for window glass. The change is saving taxpayers money and frustrating vandals.

Among recent LEXAN installations is Bridgeport's Father Panik Village, a low-rent housing project that was losing windows to vandals at the rate of 1,000 panes a month. A test installation of LEXAN was arranged last August, and installations now total some 1,200 panes.

Systems: With the growing application of technology to law enforcement and public safety has come the next logical step: pulling things together in an overall systems analysis.

The Syracuse Police Department, for example, has been working with the Company's Electronics Laboratory in the application of science and technology to community needs.

Studies have included such projects as "Random Patrol," and "The Concept of an Offensively-Deployed Police Force."

Effects: For the most part, little is known about the effects of certain technology on crime. Until field evaluation and statistical evidence mounts, effects will remain speculative.

But as the Presidential Crime Commission points out, not all technological innovations can be postponed until these evaluations are completed. Judgment must identify where technology appears to offer greatest promise. While this may involve some wasted effort, the urgency of crime control warrants the risk.

ADVERTISING

TV Tee-Off

General Electric will undoubtedly delight duffers with its television sponsorship of six PGA golf tournaments this year. This is the third year in a row that the Company will be a major sponsor of televised golf.

The decision to renew sponsorship was based on the proven ability of televised golf to attract business and professional viewers according to Roy O. Stratton, manager of institutional advertising. The Company will be a one-third sponsor.

"Golf is an excellent buy for corporate advertising purposes," he says. "Attendance at golf tournaments as well as golf's TV ratings has been increasing."

The televised matches include the New Orleans Open, May 11-12; Atlanta Classic, June 1-2; Western Open, August 3-4; Westchester Classic, August 16-18; and the Philadelphia Open, August 24-25. The Los Angeles Open was televised January 27-28.

General Electric time-sharing computers will be used during the telecasts to analyze and project players' scores.

The Company pioneered the use of computer projections during the U.S. Open in San Francisco in 1966.

LAMP

Turn on a Tuffy

For years the thin, fragile skin of the incandescent light bulb could prove rather shattering at times, but a new GE "Tuff-Skin" lamp promises to change all that.

Lamp Division has announced a new line of "Tuffy" lamps that have a trans-

lucent coating which protects the bulbs against breakage, and users against harm from glass fragments in case accidental breakage does occur.

The coating is silicone rubber from the Company's Silicone Products Department, and is so tough and resilient that it makes lighted GE bulbs virtually impervious to damage by liquids, snow, ice, rain, sparks and other common sources of thermal shock. They're also up to 70 percent more resistant to damage by physical impact than conventional uncoated bulbs.

A major feature of the "Tuffy" lamp is that it usually keeps glass splinters safely enclosed if the bulb is broken.

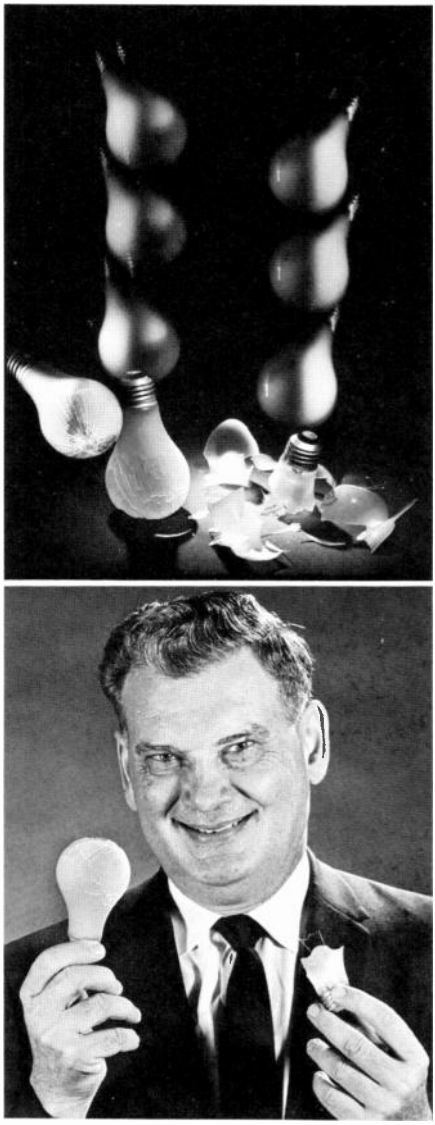
Tuffskin: Applied to the surface of standard or "rough service" inside-frosted bulbs, the coating also provides excellent diffusion of the light, transmitting over 95 percent.

The Tuff-Skin lamps are expected to find wide use in outdoor and indoor installations where bulbs normally are exposed to the weather, rough service, and thermal shock.

One application is the bare-bulb stringer commonly used by parking lots, amusement areas, car lots, or construction sites. The silicone coating is so effective as an insulator against rain and snow that it permits using stringers of up to 200-watt bulbs without the likelihood of breakage due to thermal shock.

This same insulating quality curtails damage from hot sources like sparks, molten solder or weld spatter. The feature, together with increased resistance to mechanical shock, could be important in machine or automobile shops, service stations, construction sites and foundries.

GE Tuff-Skin bulbs are available in standard and "rough service" types. Standard wattage lamps come in 25, 40, 60, 100, 150 and 200-watt sizes.



SHATTERING? As the stop-motion photograph shows, the new GE Tuff-Skin lamp survives what turns out to be a shattering experience for a conventional incandescent lamp on the right. C. M. Chrysler, incandescent lamp product planner, shows the aftereffects.

NEUTROGRAPHY*

A rather penetrating new way of looking at things.

A new technique that's more "revealing" than X-rays has been developed by the Company's Irradiation Processing Operation, Pleasanton, Calif. It's called neutron radiography, and it makes Superman's X-ray vision seem myopic in comparison.

The new technique is useful in nondestructive testing or as a supplement to industrial X-rays. While the neutron radiographs are made in much the same way as conventional X-rays, their unique penetration properties produce film images showing contrasts between materials quite different from those made by an X-ray. The difference results because neutrons and X-rays are absorbed by target materials in different ways.

With a neutron radiograph, it's possible to show a piece of string shielded by lead or the wick and fuel within a metal cigarette lighter. As the three-image comparison below shows, the train's insides are an open book to the neutron radiograph.

The Company's Neutrography Service has been particularly valuable to industrial and governmental groups—such as Apollo scientists—requiring visual inspection of hardware internals that can't be X-rayed effectively.

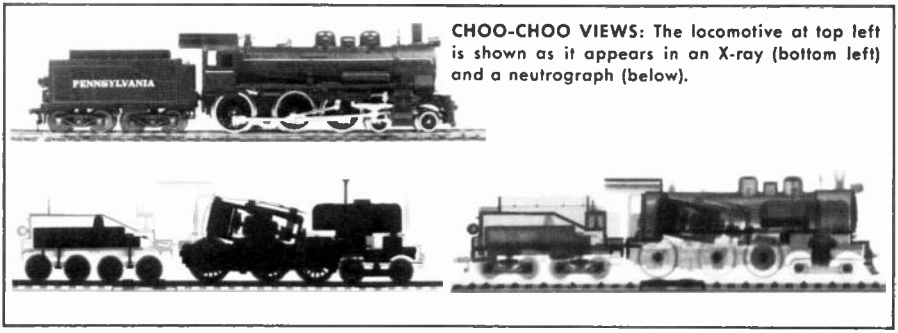
For example, the hydrogenous explosive materials and epoxies encased in metallic shells of critical aerospace ordnance devices are readily imaged with a neutron radiograph.

Neutrography Service is the result of an intensive three-year development program. According to C. Dan Wilkinson, manager of the nuclear test reactor, the technique uses a neutron beam from a nuclear reactor which passes through the object to a photographic plate. Contrasts in the resulting film negative vary according to the rate at which neutrons are absorbed as they pass through the object being neutrographed.

To date, points out James I. Sweeney, manager of marketing, Neutrography has been used to inspect explosive components such as cable cutters, explosive bolts, rocket igniters, as well as inspection of titanium weld joints and radioactive fuel elements.

Presently the neutron radiography technique is confined to the existing radiation sources such as the Vallecitos reactor, but

** Service mark of General Electric Company*



CHOO-CHOO VIEWS: The locomotive at top left is shown as it appears in an X-ray (bottom left) and a neutrograph (below).

Mr. Sweeney says that the development of portable neutron sources will greatly expand the potential market for Neutrography as a non-destructive testing standard in industry. Such development is presently under way at the Vallecitos Nuclear Center.

RETAILING

The Marketing Merchants

There's a strong swing toward retail management that's dominated by "administrative merchants" so preoccupied with tight inventory, turnover, and gross margins that they ignore many opportunities to give consumers "what they want, when they want it."

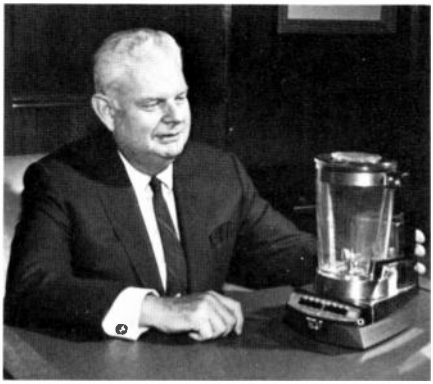
The administrative merchants are practicing retailing as it should *not* be, in the opinion of Willard H. Sahloff, Vice President and General Manager of the Housewares Division.

"Just as changing consumer wants and needs forced the manufacturer to redirect his thinking, to develop a modern marketing concept, so today's modern retailer must change his thinking," he told the Southern Retail Executives Institute in New Orleans recently.

"If you're complacent, change will hit you so fast it will blow you right out of your offices."

Customers First: While satisfying consumers is much more complex than ever, it's still the very reason for the retailer's existence, Mr. Sahloff pointed out. The administrative merchant must give way to the merchant who's concerned with customer satisfaction.

"What I'm calling for is a Marketing Merchant," he said.



HOUSEWARES MARKETER SAHLOFF
A call to give consumers what they want.

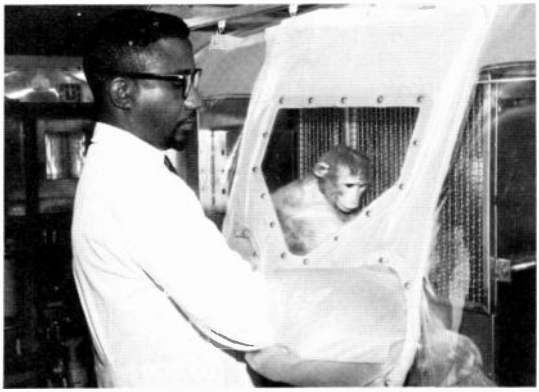
According to Mr. Sahloff, he must know how to satisfy consumer wants and needs: "A leader in his marketplace. A man who's not afraid to take risks, nor be mesmerized by numbers, but uses statistics effectively to service his customers. A truly understanding merchandiser. He doesn't react to the environment, but rather shapes and influences it. In short, an entrepreneur."

He observed that there are some marketing merchants today, but their numbers "are far too few."

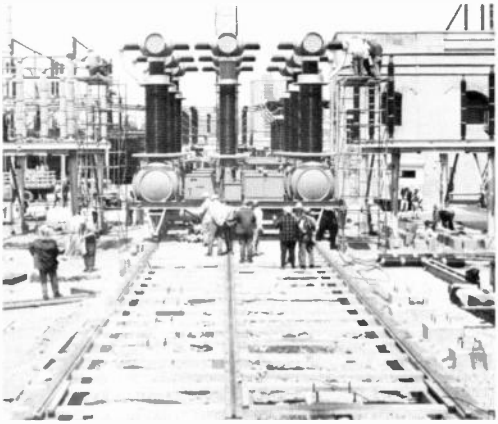
Marketing Gap: The movement of retail stores away from the consumer is creating what Mr. Sahloff calls a "marketing gap." This includes shortcomings in a knowledge of local consumer needs, the ability to open markets for new products, a better use of retail advertising and a need for improved purchasing to insure inventories adequate to give consumers what they want.

"You can—you must—end the marketing gap and start marketing to give consumers what *they* want and need," added Mr. Sahloff, "nothing less will satisfy them."

ON CAMERA



MONKEY BIZ: A Rhesus monkey gets a meal of sterilized food from a laboratory technician at the Valley Forge Space Technology Center. The monkey is one of six simian associates happily living in bacteria-free cages that simulate space capsules. Studies are determining effects of long confinement in a sterile environment.



ON THE TRACK: The problem was to move a pair of three-story-high 345KV GE Air Blast circuit breakers quickly into place at Consolidated Edison's substation in Brooklyn with no weekday outage. Collective head-scratching by Installation and Service Engineering Department and the Power Circuit Breaker Department resulted in the unique railroad track and roll-in feature shown. The circuit breakers were assembled on site, then rolled in for quick on-line service.

MILK CARTONS? Nope. They're new shipping cartons for General Electric LEAP-FROG distribution transformers from Pittsfield. The new containers are an innovation to protect the underground transformers during shipment. As clerk-typist Alaine Harrington points out, the peaked tops prevent shippers from stacking anything on top of the transformers.

AROUND THE COMPANY

Ever on Sunday: If you need emergency motor service, Sunday isn't the best day in the week to pick, but such a choice was forced upon the Youngstown Sheet & Tube Company recently. A voltage overload caused a stator to flash over, damaging 250 brush holders made by the Large Generator and Motor Department, Schenectady, and putting an important motor out of action. The Youngstown Service Shop got on the phone and called LG&M's renewal partsman Ed LaBahn at his home in Amsterdam, N.Y. Mr. LaBahn contacted four other employees, who headed for the plant to get the parts ready for shipment. By mid-afternoon the parts were packed, and Mr. LaBahn drove to the Albany Airport and got the parts on a plane heading for Cleveland. The disabled motor had its new brush holders and was back on line by 10 p.m. Sunday night.

Here's to Honduras: The Honduras National Railroad, while the oldest in Central America, is staying up-to-date with the addition of six model U10B diesel electric locomotives from General Electric. The units complete a two-year dieselization program. Also rolling the rails in Honduras are 14 GE U10B locos owned by the United Fruit Company and 13 similar units operated by the Standard Fruit Company. The locomotives are used to transport passengers and such freight as bananas and lumber. The U10B diesel electrics are built by the Locomotive and Parts Department, Erie, with sales via IGE Export Division.

OIC: General Electric's support of the Opportunities Industrialization Center (OIC) was cited during a first anniversary celebration of the Erie branch of the organization. Rev. Leon H. Sullivan, founder of the OIC, was main speaker at the dinner, attended by 500 community leaders. Vice President Bryce W. Wyman noted that 340 people are now enrolled in the Erie OIC to fill Erie jobs in the future. . . . Meanwhile, in Milwaukee, General Electric donated $1,000 worth of lighting fixtures for the new local OIC center.

Costmanship: Service Shops Department is aiming for a 20 percent boost in cost improvements over 1967 through a new program dubbed "Score for Profit." General Manager Peter C. Van Dyck and Leon N. Bress, cost improvement chair-

ILLUMINATION: With new GE fluorescents for the Milwaukee OIC are James W. Milsap, executive director of the center, R. J. Marcus, manager of employee and community relations at the X-Ray Department, and J. W. Nelson, Jr., general manager of the Department.

man and manager of the Department's manufacturing section, talked up the program on a 13-presentation tour across the country to bring the message to the Department. In kicking off the program at Rice Hall in Schenectady, Mr. Van Dyck pointed out that all business today is faced with "a squeeze between the rising costs of labor and material," and the "pressure on prices that will allow it to remain in competition for the customer's order." As a result, he said, "the Service Shops, like every other business, must give consideration to all opportunities for cost control and cost improvement." High on his list of things to do: finding new and more effective ways to perform daily work in the shop, and maintaining quality while cutting costs.

Slice is Right: "You can have your cake and eat it too," suggested General Purpose Control Department, Bloomington, Ill., as it sent out 6,000 individually boxed cakes to introduce a "Cut Yourself a Slice of Living" merchandising effort. The program was launched for franchised control distributors and implemented by Agency and Distributor Sales Organization nationwide. The idea was so "finger-lickin' good," that A&DSO awarded the Department a Golden Bell Award for the best merchandising program conducted by an A&DSO-served product department.

Tour Talk: The Nuclear Energy Division, San Jose, Calif., recently played host to 35 junior high school students from various minority groups with a plant tour and panel discussion on job opportunities in industry and business. "We want to hire people who can be promoted," said L. Richard Jones, employment manager. "People who have the capacity, skills, and drive to move ahead. Without an education, you will not be qualified for promotion." The students received employment applications, and invited to fill them out, returning them to GE for analysis and an inventory of students' strengths and weaknesses and potential as job candidates. The students also heard a number of GE employees straight-talk about the importance of staying in school and how an education was helping them move ahead on the job. Points out employee Robert Lopez: "The purpose of these tours is to motivate students to continue their education and prepare themselves for jobs in industry and business. In four years we have already seen a definite increase in college enrollment among minority group high school students as a result of this effort."

IN PARIS: Among the crowds thronging to the Fifth Annual International Agriculture Exhibit in Paris last month was French President Charles de Gaulle (above). Among the exhibits attracting his attention was the Bull-GE time-sharing terminal, which was set up to furnish instant information on farming and general subjects, including trains to take and changes to make when traveling the Paris Metro. The show attracted a half-million persons.

PRODUCTS

Picture-Pack: A battery-operated video tape recording system with a closed circuit TV camera not much larger than a home movie camera was introduced recently by the Company's Closed Circuit Television Business Section, Syracuse, N.Y. The hand-held camera weighs under five pounds and has a small microphone mounted on top. The video tape recorder is about the size of a woman's purse, is worn over the shoulder and weighs about ten pounds. The "Porta-Pack" system is designed for use by lawmen, firemen, coaches or investigators. The system sells for $1,295, and is compatible with any GE half-inch VTR recorder deck.

"SHOOTING" A BASKET

Shoulderstrap videotape tells the score.

Color it New: A new studio television color camera, the PE-350, is being demonstrated this month at the National Association of Broadcasters convention in Chicago. The new separate luminance live color TV camera uses "chroma enhancement" for maximum color fidelity and new optical system for improved sensitivity. The camera is from the Visual Communication Products Department, Syracuse.

Ballasts: Specialty Transformer Department, Fort Wayne, Ind., has unwrapped a new line of mercury lamp ballasts that provide added application versatility for conversion of incandescent installations to mercury lighting. The new ballasts can be used in a variety of locations, since the existing lamp receptacle mounts on the ballast, which is positioned directly on the existing conduit box.

Component Caravan: A new low-cost one-watt monolithic integrated circuit audio amplifier requiring fewer external components for operation than previous IC's has been announced by the Semiconductor Products Department, Syracuse. The new PA234 will deliver audio to either a 16 or 22 ohm speaker, operates from 9 to 25 volts and has a frequency response of 30 to 100 KHz. . . . A low-cost line of hermetically sealed thermistors for temperature measurement and compensation applications in appliance, heating systems, motor, fan and textile controls is announced by the Magnetic Materials Business Section.

Jet Record: A standard production Lear Jet 25 established a new world "time to climb" record for business jet aircraft earlier this year by reaching 40,000 feet in six minutes and 19 seconds, thus bettering by one minute and two seconds the previous record. The Lear Jet is powered by two General Electric CJ-610-6 engines.

Talking Points

Computer in the Cast

Central Casting Corporation, the main source of "extras" for motion pictures and television, has ordered a GE-405 computer system.

The role of the GE-405 will be a bit off stage, but definitely not a bit part. It'll calculate both gross and net daily earnings of about 3,000 extras. Also, it'll be used in processing the requirements of the Motion Picture Industry Pension Plan, the industry's health and welfare fund, and the screen actors and producers pension and health and welfare plan, all of which cover approximately 30,000 employees in the motion picture and television industry.

No word yet as to whether or not the GE-405 gets top billing.

Nashville's New Sound

WSIX, which is the GE Broadcasting outlet in Nashville, Tenn., realized that most FM stations covering the city were programming about the same type of middle-of-the-road music, so it started looking for something that would "create a different image," and boost the listening audience.

Nashville, which is a major country and western music center, was buzzing with talk of its music going "uptown." The change was in growing sophistication of the country music. (A less sophisticated explanation given was an absence of the "gut-bucket guitar and blue grass type of music".)

MARY JANE LOWER

For cost-cutting, she rings the bell.

According to WSIX radio manager Paul Ruhle, the new FM stereo sound adopted was dubbed "Metropolitan Country," and performed by such recording stars as Chet Atkins, Dean Martin, Roger Miller, Margaret Whiting and others. Last June, the new sound was announced to the industry (including jumbo postcards bearing GE flashbulbs and a reference to the "bright" new trend in Music City, U.S.A.) and WSIX began programming the new sound 18 hours a day.

Did Nashville take to the new sound? Mr. Ruhle reports that indeed it did, with "strong acceptance" along music row. In the all-important audience surveys, the station has scored an impressive increase: its listening audience has doubled in ten months.

Really Lower

The Syracuse, N.Y. *GE News* recently looked around for a way to call attention to the continuing need for lower telephone

costs. Pretty secretaries at the phone are usually attention getters, so the paper looked for a candidate.

Gadzooks! In the Heavy Military Electronics Department they found an ideal person to dramatize lower telephone costs (see photo).

Her name is Mary Jane Lower.

Diamonds Sí, English No

A major linguistics problem hit the Specialty Materials Department in Detroit with the arrival of two customers from Argentina.

One spoke but Spanish and Italian, the other spoke only Spanish and Russian. Neither spoke English. Both wanted to talk about GE Man-Made® diamond.

No one in the diamond application laboratory visited by the men spoke their language, so Manager Ernest Ratterman sent for marketingman P. R. "Fabs" Kaldobsky.

Fabs is fluent in Russian. He also knows the field of diamond abrasives.

Mr. Kaldobsky translated into Russian, which was readily understood by one of the customers, who gladly re-translated into Spanish for his associate.

Hip at Hotpoint

In a recent "Your Opinion Please" column, the *Hotpoint News* asked employee Derrick Whitehead what he considered the most important electrical appliances in his home.

"Our refrigerator would be number one," he answered; "our range would be number two, and our stereo would be number three.

"In that order we cool it, heat it, and swing it!"

Merit Badge

Some 600 Cincinnati Boy Scouts are learning requirements for an Atomic Energy Merit Badge in a cooperative program in which GE is participating. The Company initiated the badge in 1964.

Mobile Phone-In

Things were going along smoothly at the Communications Products Department plant in Lynchburg, Va., recently. That is, they were until a telephone cable was damaged and left the plant without any telephone service.

And can a communications business afford to be left incommunicado? Not for a minute!

Resourceful employees jumped into a car equipped with a General Electric Improved Mobile Telephone System and wheeled it up to the plant. By strolling to the car's mobile telephone, vital calls could go through and communications were maintained despite the cut cable.

MOBILE PHONE AT LYNCHBURG

Fred Ward, sales manager, in touch.

PEOPLE

PROGRAMMER SISTER CLARICE
Telling her students how it really is.

GE's Nun: There's one programmer at the Nuclear Energy Division's computation and data processing section you're bound to notice: SISTER CLARICE SPARKMAN. The Dominican Sister says that she "Gets lots of turned heads and second glances, but that she likes it here very much." Sister Clarice is also a second year mathematics lecturer at the University of Santa Clara where she teaches three evening classes. Why did she come to work for GE? "Students who do not want to teach math come to me and ask what math careers are open in business and industry," she says. "I honestly don't know what to tell them, and that's what I'm here to find out." Adds Sister Clarice, "I want to prove that teachers can make their idea work in practice as well as theory."

Honored: WARREN SPOFFORD, of the Air Conditioning Department's evaluation engineering section, has been named a Fellow of the American Society of Heating, Refrigeration and Air Conditioning. . . . DR. BERNARD R. COOPER, a physicist at the Research and Development Center, has been elected a Fellow of the American Physical Society. . . . Among recent selections for the 1968 edition of "Outstanding Young Men of America" are BRIAN BUSHEY, field service representative for Armament Department and DR. MARK G. BENZ, a metallurgist at the R&D Center. The award honors the young men in the country who are "working toward excellence in their careers and community service."

Teamwork: Vice President WILLARD H. SAHLOFF is one former Rutgers basketball player who continues to score points with his support of the team. This year, six varsity basketball players at Rutgers University are recipients of grants from the Willard H. Sahloff Scholarship Fund. The Housewares Division General Manager is also a charter trustee of Rutgers. 15 Sahloff scholarships have been awarded to date, with contributions matched by the Corporate Alumnus Program of the General Electric Foundation.

Ideamen: The biggest suggestion award in the history of the Carbon Products Section of Small AC Motor and Generator Department, Schenectady, has been presented to EDMUND ADAMKIEWICZ. The check for $1,675 was a fine going-away present for the 43-year employee, who retired recently . . . And, at the Mississippi Test Support Department, Bay St. Louis, Miss., GERALD KUKOWSKY, a technician in range operations, collected $1,200 for

his good suggestion. . . . And FRANK BAUMGARTNER of the Generator Department, Schenectady, came up with another big idea that netted him $1,450, to bring his total suggestion winnings to $3,300.

Edisonia: Among those who watched Thomas Edison swing a golden hammer to begin the 1928 dismantling of his first lamp plant in Harrison, N.J., was ALSTON RODGERS. Mr. Rodgers, manager of the Lamp Division's Lighting Institute, recently returned to New Jersey, but this time in his capacity as a member of the Edison Birthplace Association's Board of Trustees. An amateur historian of the lamp industry, Mr. Rodgers called his new association "an honor and a very pleasant duty."

Pacemaker: X-Ray Department's BILL DUEHREN, eastern zone application engineer for pacemakers and biomedical products, was glad he had experience explaining things to his ten-year-old son. He could apply his technique to the fifth grade class at the Loch Raven Elementary School in Baltimore, which had written to General Electric after seeing an advertisement featuring a boy and his cardiac pacemaker. They had inquired at the suggestion of their teacher, who couldn't quite satisfy the students' persistent questions about the pacemaker. X-Ray Department's Advertising Manager, BOB MOLITER, received their letters and promised that a GE biomedical expert would stop by to "show and tell." Mr. Duehren explained such things as "what happens when the batteries run down?" (new generator implanted), and "what the wires are made of" (stainless steel and silver) while holding the class spellbound. Commented the teacher after the presentation "The class has never before stayed so attentive for so long on any subject."

LAMP'S ALSTON RODGERS

Historic memories of Edison in New Jersey.

X-RAY'S DUEHREN IN CLASS

Spellbinding show and tell.

Color Finish: When ROBERT N. BECK, a design draftsman with the DC Motor and Generator Department in Erie, received a suggestion check for $1,622, he remarked:

"Well, I know we're going to buy a color television set." But Mr. Beck, who could claim the largest suggestion award in the Department's history, never got a chance to buy that set. As a bonus award, Alton S. Cartwright, general manager of the Department, presented him with a General Electric Porta-Color television set. Mr. Beck is a 21-year employee, and won his award for his timely suggestion for saving copper used in the manufacture of field coils.

Honorables: Effective management of test data collection, reduction, and processing and concern for personnel development have earned a "One-in-a-Thousand" award for WILLIAM M. BARRENTINE, manager of test data operations at the Mississippi Test Support Department.

Progress: MEL J. BORDELON, educational relations specialist at the Mississippi Test Support Department, has been appointed to the staff of the national Plans for Progress agency. Mr. Bordelon will be on loan for 13 months, serving as liaison between the agency and the 417 member companies that support its work. Plans for Progress seeks to achieve more stable community conditions through improved communications, vocational guidance, employment practices, education and training.

ORGANIZATION

Advanced Development and Resources Planning

The organization of this Division includes the Advanced Development Project Office; Advanced Systems and Technology Operation; Business Planning Operation; Engineering and Manufacturing Integration Operation; Marketing and Product Planning Operation; Communication and Manpower Programs Integration Operation; Finance and Economic Modeling Operation; Legal Operation.

Aerospace

The personnel, facilities and functions of the Nuclear Materials and Propulsion Operation, and the Nuclear Thermionic Power Operation are transferred to the Missile and Space Division and assigned to the General Manager-Nuclear Systems Programs.

The responsibility for the Malta Test Site is transferred to the Ordnance Department.

Aircraft Engine

The General Manager of the Aircraft Engine Support and Service Division is assigned responsibility for the General Electric Technical Services Company, Inc.

Robert L. Miles is appointed General Manager of the Marine and Industrial Department.

ROBERT L. MILES

Appliance and Television Sales

Responsibility for International General Electric Puerto Rico, Inc. is transferred to this Division.

International Information Systems

This Division includes the Small Computer Marketing Operation with the Division General Manager assigned to represent, and act on behalf of, the General Electric Company with respect to the Company's interest in, and relations with, the following subsidiaries: Compagnie Bull General Electric, Societe Industrielle Bull General Electric, Olivetti-General Electric, S.p.A., and De La Rue Bull Ma-

chines Limited.

Manufacturing

A Manufacturing Management and Personnel component is established in Manufacturing and H. Ford Dickie is appointed Manager.

A Quality Control component is established, and Alfred P. Taylor is appointed Manager.

Marketing and Public Relations

The personnel, facilities and functions of the Marketing Consulting component and the Urban Affairs component are combined to form Marketing Consulting and Urban Affairs and W. Blake Miller is appointed Manager.

President's Office

Review Boards covering the following areas have been established: Community Systems Development, Information Systems Businesses, Industrial Automation and Process Computer Business, International Business, and Nuclear Energy.

Television

The organization of this Division includes the Major Color Television Department, Portable Color Television Department, Television Components Department, Monochrome Television Business Section, Business and Marketing Planning Operation, Organization and Manpower Planning Operation, Legal Operation.

General Electric College Bowl

(NBC-TV, Sundays, 6:00 p.m. EST)

Participants: April 7—Lake Erie College (Painesville, Ohio); April 14—University of Chicago (Ill.); April 21—Loyola University of Los Angeles (Calif.); April 28—Brandeis University (Waltham, Mass.).

LETTERS

(Continued from inside front cover)

name of our recently elected Vice President, Harry P. Gough?

"Gow" as in "bough?" "Goff" as in "cough?" "Guff" as in "rough?" "Go" as in "though?" "Goo" as in "through?" "Gup" as in "hiccough?"

J. Cecil Rowe
Large Lamp Department
Cleveland, Ohio

Try goff as in cough.—Ed.

Tape Talk

Editor: Your article on tape recorders (February, 1968 issue) shows that GE has a tape recorder for almost everyone's needs.

GE has even broader tape recorder coverage than your story indicated, however, for in Oklahoma City, the Tape Memory Business Section of the Information Devices Department builds tape equipment for computers.

The newest addition to the product line is a 150 inch per second high performance single capstan tape handler with a USA sale price of $39,500 each.

W. T. Bayer
Tape Memory Business Section
Oklahoma City, Oklahoma

Your unit is a bit bigger than we had in mind.
—Ed.

Lunar Modulation

Editor: I have just read, with interest, the article on Project Apollo in the March, 1968, issue of *The Monogram*.

The Mobile Radio Business section of the Communication Products Department is also working with NASA at Merritt Island Launch Area. We, at CPD, designed and supplied all of the mobile radio systems for use by the ground support agencies of NASA, such as fire, launch control, etc.

These systems have been installed and operating since 1965 and have been used in some of the most recent launchings. We too are proud of our participation with this important customer.

Ralph D. Abrams
Communication Products Dept.
Lynchburg, Virginia

EDITORIAL

The Human Potential

TODAY'S all-too-familiar protest scenes appearing in our newspapers and on television represent a variety of social problems. One involves the realization that even the great military strength and vast economic powers of our nation have their limits. Some problems in the world are too big for any one nation to solve. Some domestic problems here at home are likewise too big for the government to solve alone.

"The youth of America seem to be the first to sense this massive discrepancy between the collective institutions of our society and the still unmet needs of the people," observed Vice President John B. McKitterick in a recent talk to the Schenectady Elfun Society. Their youthful disillusionment is directed at hollow claims of progress in Washington and they're equally cynical, he said, over the "protestations of good intentions on the part of the business establishment and the labor unions alike."

These young people will soon constitute a majority of our population, and will be running the country, said Mr. McKitterick, and in the competition for their approval, "accomplishments in the conventional manifestations of success simply are not going to count.

"If we and the other great corporations can find the way to make a business out of development, if we can learn to measure profits in human progress as well as dollars," he concluded, "we will not only win the enthusiastic support of our young people, but the last third of our century can bring mankind a long way toward realization of the human potential."