

# THE MONOGRAM

MARCH

1968



**PROJECT APOLLO: COUNTDOWN TO THE MOON**

**PLUS: Cablevision . . . VTR . . . HemisFair . . . Advertising**

# LETTERS

## Long Life Lamp

EDITOR: I work at our Large Jet Engine plant in Evendale, Ohio, and I have an item that may be of significance to you.

Enclosed are pictures of an Edison Electric bulb that was installed in my parent's home in Cincinnati, Ohio in March 1920. This same bulb has been in this socket ever since the light was installed and has been in daily use and is still burning today.

Perhaps this is worthy of note.



HARRY K. SCHMIDT  
Engine Sup. Opn.  
Evendale, Ohio

## Cable Quip

EDITOR: Relative to the article in the October-December '67 *Monogram* (page 5) on the installation of GE heating cable in Lambeau Field at Green Bay, I was asked by a loyal Green Bay Packers fan if I knew the reason why General Electric had been given the order for this installation.

It was because, he said, "Pro-*grass* is our most important product".

W. P. KOPPENAAL  
Industrial Sales Division  
Milwaukee, Wisconsin

## More Mileage

EDITOR: In the January issue of *Monogram*, you published an item about an Audio Products employee who "goes to great lengths to stay with a good General Electric job."

Many employees at the Avionic Controls Department go to even greater lengths to keep their good GE jobs. At least a dozen commute more than 120 miles a day from the Scranton, Pennsylvania, area to our Department at Binghamton, New York.

Our "champion" is Joe Zabielski, a Work Directing Specialist in Metal Parts Manufacturing. Joe drives from his home in Old Forge, Pa., to Scranton where he meets four other ACD employees who commute via car pool. The total distance for Joe is 74 miles one way, or 148 miles round trip!

C. A. WILLSEY  
Avionic Controls Department  
Binghamton, New York

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.

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Devere E. Logan, Editor

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GENERAL  ELECTRIC

## OPERATING RESULTS

### Sales and Earnings Up

Worldwide sales of the General Electric Company totaled \$7,741,233,479 in 1967, an increase of 8 percent over 1966, President Fred J. Borch announced last month.

Net earnings for 1967 were \$361,388,902, or \$4.01 a share, up 7 percent from the previous year's \$3.75 a share.

Mr. Borch noted that 1967 was the seventh consecutive year in which the Company's sales had increased, but that the business reflected the mixed trends of the U.S. economy.

Employee compensation, including benefits, totaled \$3,081,694,948, an increase from the previous year's \$2,930,317,936. Employment worldwide averaged over 375,000, with 296,000 employees in the United States.

**Operations:** Most Company components supplying heavy capital goods to utility and industrial customers operated at capacity against large order backlogs. Aerospace and defense sales were up throughout the year. However, an industry-wide inventory adjustment slowed sales of consumer products during the early months, with sales picking up as the year progressed.

Last year's increased earnings were due in part to a substantial improvement by established businesses in the fourth quarter as compared with the final quarter of

1966. Mr. Borch said that fourth quarter 1966 earnings were severely affected by events arising from that year's labor negotiations, including local strikes, deferred shipments and heavy inventories in anticipation of work stoppages.

Also, 1967's comparatively high fourth quarter earnings included a non-recurring \$10.8 million recovery of World War II losses.

President Borch said that start-up costs arising from the Company's increased modernization and expansion program reached their highest level in General Electric history last year. Plant and equipment expenditures amounted to \$561.7 million.

**Ahead:** Looking ahead to 1968, Mr. Borch said the Company's established businesses are expected "to maintain their profitable performance contingent upon developments in world economic and political conditions."

Mr. Borch also said "Government actions at home and abroad resulting from the uncertainties of the international situation may involve tax increases, tightening of the money supply and further controls and restraints affecting world trade. These will especially affect the profitable performance of all companies operating internationally."

The Company made provision for payment of \$390.1 million in direct income, franchise, and property taxes and renegotiation in addition to indirect taxes included in prices paid to suppliers.

## Dr. Paine Joins NASA

Dr. Thomas O. Paine, manager of TEMPO, the Company's Center for Advanced Studies, Santa Barbara, California, has been appointed Deputy Administrator of the National Aeronautics and Space Administration by President Johnson.

The appointment of Dr. Paine was confirmed by the Senate last month. Dr. Paine succeeds Dr. Robert C. Seamans, Jr., who resigned late last year after serving as Associate Administrator for five years and Deputy Administrator for two years.

Dr. Paine has been manager of TEMPO since 1963. He previously was affiliated with the Company's Research and Development Center and the Meter and Instrument Laboratory in Lynn, Mass.

### DR. THOMAS O. PAINE

*Turning his attention to space.*



## A Big Package

A total payout of \$123 million has been made to General Electric employees participating in the Stock Bonus Plan and the Savings and Security Program.

The payout, to 138,000 participants, began with a distribution of 1962 savings and Company payments under the Stock Bonus Plan, and wound up this month with the S&S Program payout.

The total of \$123 million reflects the market value of the GE stock being distributed—valued as of December 29, 1967—the end of the holding period. At that time each share was valued at \$96.00.

The package included over \$64 million in General Electric stock, \$58 million in U. S. Savings Bonds, plus about \$430,000 in accumulated cash income, according to E. S. Willis, manager of Employee Benefits for the Company.

The current payout is the sixth under the Savings and Security Program and the 15th under the Stock Bonus Plan. Mr. Willis pointed out that under the two plans, "Many employees—with substantial General Electric help—have been able to save toward realization of personal goals such as new homes, education for children, and extra income for emergency or retirement."

## NUCLEAR ENERGY

### Three for Carolina

The Carolina Power & Light Company has ordered three 800,000-kilowatt nuclear steam electric generating units from the General Electric Nuclear Energy Divi-

*(Continued on page four)*

# At Deadline . . .

Nuclear Order: Iowa Electric Light and Power Company will build a 550,000 kw nuclear power plant near Cedar Rapids and has selected General Electric Company to design and build the initial unit, a light water-cooled and moderated boiling water reactor. The new plant will be Iowa's first nuclear power facility and the largest single industrial project ever undertaken in the state.

Sports Special: A special one-hour television special "Jesse Owens Returns to Berlin," will be telecast coast-to-coast during the weekend of March 29th sponsored by the Large Lamp Department and Corporate Institutional Advertising. Memorable film of the Olympic's finest medal-winning performance will highlight the hour, with the inspiring story of the 1936 competition narrated by Jesse Owens as he returns to Berlin and the great Olympic Stadium. The telecast includes rare film rich in history and drama. The Sports Network will televise the program. Check local TV listings for broadcast time in your area.

Elected: The board of directors elected four new vice presidents last month: Robert V. Corning, general manager of the Lamp Division; Charles W. George, general manager of the Aircraft Equipment Division; Fred H. Holt, general manager of the Appliance Components Division; Robert B. Kurtz, general manager of the Contractor Equipment Division.

At Charleston: Groundbreaking ceremonies have been held near Charleston, S.C., marking the start of construction on a new \$40 million plant for the manufacture of low-pressure hoods for steam turbine generators. The plant is scheduled for opening early next year.

(Continued from page two)

sion. It's the largest single order for equipment ever placed by CP&L.

According to Paul Colby, vice president, operating and engineering for Carolina Power, by the time the three units are installed, fueled, and in operation, they will represent an investment approaching \$500 million. Plans are to install the first unit for operation in 1973, and the second for operation in 1974. Installation date for the third is still open.

The combined capacity of the three nuclear units—2,400,000 kilowatts—will be equivalent to the total capacity of Carolina Power's present generating plants.

## AEC Okay

Meanwhile, the Atomic Energy Commission licensing and safety board has approved a permit for the Company to build a \$15 million reactor fuel reprocessing plant near Morris, Illinois (*The Monogram*, Oct. '66).

The plant will recover uranium, plutonium and other radioactive materials

**PLANT MODEL** of the Morris, Ill. Midwest Fuel Recovery Plant is checked by Paul Reinker, left, general manager of the Fuel Recovery Operation, and Stan Smolen, manager of the Morris plant.



from nuclear fuel elements previously used by nuclear power plants. Morris, Illinois, is also the site of Commonwealth Edison Company's 1,828,000-kilowatt Dresden Nuclear Power Station and its three GE boiling water reactors. The GE facility will be operated by the Nuclear Energy Division's Fuel Recovery Operation.

## GE CABLEVISION

### San Antonio Sign-up

The city council of San Antonio, Texas, has awarded a franchise to General Electric Cablevision Corporation allowing the Company to construct a CATV system serving some 215,000 homes in the city.

The multi-million-dollar franchise is "the largest of any received to date," and the 34th to be awarded to Cablevision Corporation in its 39 months of operation. The Company presently operates CATV systems in Alpena, Mich.; Hattiesburg, Miss.; Logan, W.Va.; Walnut Creek, Calif.; Biloxi, Miss.; Merced, Calif.; and Watertown, N.Y. A total of 28,494 subscribers are presently served by GE Cablevision.

CATV is a rapidly-growing service for "piping" up to 20 television channels into any city "on the cable", including those where TV reception isn't otherwise available. Subscribers to the service pay a small installation charge plus a monthly service fee of \$4 to \$5.

Before work can begin in San Antonio, GE Cablevision Corporation must receive FCC approval or a waiver of Commission rules. It could take two years, but, adds James T. Ragan, manager of marketing for the Corporation, "We'll try to get FCC action as quickly as possible." Mr. Ragan





CABLE PLANS for San Antonio are checked by, from left, San Antonio attorney Robert Sawtelle; Vice President and General Manager of GE Cablevision Corporation Reid L. Shaw; Regional Manager William C. Cunningham, and Manager of Marketing James T. Ragan.

reports that a favorable vote by the San Antonio city council came after intense competition from two rival bidders and stubborn opposition from local interests.

In addition to television programming, cable TV can provide additional services not available through standard programming such as financial reports, 24-hour news and weather.

Mr. Ragan feels that the potential of CATV services is yet to be explored. For example, future extended services could include municipal government programming, special educational features and shopping services. San Antonio could be the city for such additional CATV services.

## AEROSPACE ELECTRICAL

### Waynesboro's SST Order

The giant U.S. supersonic transport currently being built by the Boeing Company includes General Electric turbojet engines, but it will also be equipped with a GE electrical system.

The order for the system was received recently by the Company's Aerospace Electrical Equipment Department, Waynesboro, Va., and was secured in competitive bidding extending back to 1966. It could be worth \$9 million if current plans to build 200 supersonic transports materialize.

Waynesboro has been developing the VSCF (for Variable Speed Constant Frequency) system over the past ten years. Generators used in the VSCF package will come from Erie.

The contract calls for 22 channels of 60 KVA a-c generating equipment. A channel includes a generator, a converter, and a control-protective panel. Each SST jet engine has one channel. The two prototype aircraft being built will use eight channels of VSCF equipment.

Waynesboro's electrical system is giving the customer greater reliability and less maintenance than constant speed drive electrical systems now in use. The GE system is light weight and has a built-in malfunction analyzer.

SST PROTOTYPE of the GE electrical system is inspected by, from left, James Neet, manager of marketing; H. Ernest, Boeing engineer; Dave Plette, manager of engineering for AEED.



## INFORMATION SYSTEMS

### Aiding Internal Revenue

While collective head-scratching over income tax forms presently occupies many General Electric employees, the Internal Revenue Service is turning to the Company for assistance in processing future returns.

Pleased with the performance of a GE pilot operation in Atlanta (*The Monogram*, Sept. '66), the IRS is launching plans to add additional GE information systems to seven Internal Revenue Service centers. The result will be greatly increased efficiency at those centers.

The Atlanta pilot installation allowed the IRS to transfer tax data directly from returns to magnetic tape for computer processing, eliminating punch cards. Some 600 million punch cards had been made each year by the Internal Revenue Service in processing tax returns.

**Equipment:** The letter contract was secured by the Company's Federal Systems Operation, Bethesda, Md., and includes 14 GE/PAC 4020 process computers, magnetic tape handlers, tape controllers, disc storage units, and some 3,087 key station terminals (similar to Datanet 760s).

Suppliers of the equipment and software are Process Computer Department, Information Devices Department, Processor Equipment Department, and Special Systems Department.

The first units will be delivered this summer, with additional deliveries through the remainder of 1968 and early 1969.

**Savings:** The use of information systems and computer technology is credited with saving some \$94 million in refunds last year for American taxpayers who over-

paid federal income taxes through mistakes in arithmetic.

Commissioner of Internal Revenue Sheldon S. Cohen, who made this observation in the current GE public affairs quarterly *The Forum*, also notes that computers are keeping records of unpaid refunds due taxpayers who moved last year and left no forwarding address. When this year's form is filed with the new address, a refund can then be made.

In addition, Mr. Cohen said IRS is still improving computer techniques to include visual displays to enable remote field offices to answer taxpayers' questions promptly.

### HEMISFAIR '68

#### The Play's the Thing

On April 6th, in the GE Theaterama at HemisFair '68 in San Antonio, Texas, the curtain goes up on the premiere performance of "The Wonderful World of Progress."

General Electric's HemisFair show will be an original two-act musical presentation. According to David W. Burke, manager of Public Relations Programs Operation, it contains the same creativity and ingenuity of the Company's highly-acclaimed presentations at the New York World's Fair, Seattle's Century 21 and Disneyland. The show will present the story of progress in electrical living since the first electric lights were turned on at the old San Antonio Opera House in 1882.

Starring in the show will be 16 hostesses and a filmed "Genie" with a zesty mixture of "op art," film-optical techniques and magic effects incorporated.

Performances of the 20-minute show will be held between 10 a.m. and 10 p.m.





### GE'S GENIE OF THE SOUTHWEST

*An upbeat show with successful elements.*

in the circular, cantilever-roofed GE Theaterama overlooking the northwest corner of the HemisFair lake area and adjacent to the fair's minirail line.

**Showtime:** The curtain rises with the audience filing in to the tune "We're Headin' for a Wonderful Tomorrow." The setting is an ultra-modern, all-electric kitchen, and on stage is a hostess who introduces the "Genie of the Great Southwest."

Included in the program are original tunes written for the GE HemisFair show by the Broadway team of Fred Tobias and Stan Lebowsky. In the first act, there's an Indian-flavored song, "What Does A Genie Do When Everyone Can Do What A Genie Does?" and followed by a modern beat melody, "A Hundred Years of Happenings."

Act two is played in an ultramodern family room appropriately furnished with General Electric home entertainment products. The cast bounces the bossa nova in

two more tunes, "The World Outside," and "There's Nothing We Won't Try."

The climax is "a surprise finish designed to send GE guests off with an optimistic view of the future."

## MEDICINE

### TV in the Operating Room

Physicians at the Barney Children's Medical Center in Dayton, Ohio, recently performed a rare operation on a four-month-old child born with an inside-out bladder.

According to Dr. Alan D. Shafer, director of surgery for the hospital, the chances of a child being born with such a condition are about 50,000 to one. Dr. Shafer is among those who have demonstrated success in the complicated bladder "turn-in" operation.

Because of the rarity of the operation, Dr. Shafer secured a portable General Electric Video Tape Recorder system and recorded the entire operation. He estimated that it would be one or two years before he performed the extremely involved and complicated operation again.

The video tape system is expected to be a stepping stone toward establishment of a training library to be used to instruct interns and residents at the center.

"I wanted to tape an operation that would not be routine," Dr. Shafer said. "However, my future plans for videotaping include operations that are not quite so rare. Every operation is an important one, and the more training techniques we utilize to help our young surgeons, the less risk is involved for the future."

**Easy-On:** The portable GE VTR system used to record Dr. Shafer's surgical procedure was supplied by Alfred M. Sinder,



### RECORDING SURGERY IN DAYTON

*From rare operations: a visual record.*

a local closed circuit television dealer. The system included a video tape recorder, closed circuit TV camera and 12-inch monitor—all enclosed in a roll-around cabinet.

Operation of the system is simple: plug it in, connect the cables, and aim the camera. The Dayton set-up was handled by the hospital's medical photographer, who took charge of the video taping after scanning the instruction manual.

According to Harry E. Smith, manager of the Closed Circuit TV Business Section, Syracuse, which makes the VTR system, the medical market for such equipment is both a significant and growing one.

"Video tape recording is an excellent educational technique for physicians who wish to play back the tape for self-appraisal and to improve technique," says Mr. Smith. "It's also a help to young interns or residents who perhaps can't witness certain operations. They can re-play tapes of certain complex surgical procedures and get much more than they might from observing just once in the operating room. VTR is also a fine visual aid in orthopedic and neurological studies, and for speech therapy."

Mr. Smith points out that while the current GE VTR system is a black-and-white one, the Company is working on a practical color video tape system. At present, color taping of operations must be done with relatively expensive professional studio cameras.

"The addition of color will add still another dimension to the VTR picture," says Mr. Smith, "that will make recordings of such operations as heart transplants exceptional aids to the physician."

## INDUSTRY CONTROL

### Controls Down Under

Australia's newest bulk ore-carrying ships bear the rather distinctive names of *Darling River*, *Iron Hunter* and *Bogong*; yet they have something in common: modern General Electric automated power plant control systems from the Industry Control Department, Salem, Va.

To make the ships as economical as possible to operate, the shipyard installed the General Electric Central Operations System that's in use on over 30 ships steaming through the world's oceans.

The Aussie ships have GE package engine rooms, MST-13 main propulsion steam turbines, boilers, condensers and pumps.

Sea trials on the *Darling River* reported that she achieved the most economical fuel rate recorded for vessels of its type and verified the high mechanical efficiency of the installation.

**Humble Tankers:** Meanwhile, Industry Control Department installed three similar Central Operations System Controls for the main power plants of three new tankers being built for Humble Oil.



*This NASA photo shows the moon as it looked to astronauts in the Gemini VII spacecraft.*

## PROJECT APOLLO: COUNTDOWN TO THE MOON

The moon. It hangs in the sky waiting for man. The trip will cover some 500,000 miles of space. Project Apollo is what the U.S. has called the great adventure, and the clock is running. Over 6,000 General Electric employees—in the Apollo Systems Department and the Mississippi Test Support Department—share the challenge. They must help engineer the dream into reality.

LAST JANUARY, scientists watched in satisfaction as the orbiting lunar landing craft successfully went through a series of 100 mile-high maneuvers essential to landing American astronauts on the moon and bringing them back.

The maiden flight, plus the perfect November flight of the Saturn V space vehicle, gave space officials reason to feel confident that the Apollo program was moving again.

The momentum was also evident to the 5,000-plus employees of the Company's Apollo Systems Department which is headquartered at Daytona Beach, up the coast from Cape Kennedy. The Department, under contract to NASA, works quietly behind the scenes and provides equipment

to check out the Apollo spacecraft, lunar module, Saturn launch vehicle and the Cape Kennedy launch site itself. The Department also provides engineering brainpower to help NASA assess the reliability of the Apollo vehicle and to support the integration of Apollo systems. In addition to Daytona Beach, the Department includes employees stationed at Cape Kennedy; Houston, Texas; Huntsville, Ala.; Bethpage, L.I.; Downey, Calif. and Washington, D.C.

**An ACE:** To pave the way for a successful Apollo mission, GE engineers and scientists have had to develop new technology, procedures and techniques to meet the needs of the complex Apollo system. The Company consequently designed and

built checkout equipment as advanced and sophisticated as the space vehicles it was to test.

The monitoring job is a big one. GE monitors systems involving thousands of parts and millions of components, and NASA can allow none of them to fail.

To check out the Apollo spacecraft's command, service, and lunar modules, the Company has handed NASA an ACE. In this instance, ACE stands for Acceptance Checkout Equipment-Spacecraft. ACE is a kind of computerized robot "inspector" that keeps a critical eye on spacecraft from the factories where they're built to the launch pad. General Electric has provided 12 ACE stations—each consisting of three rooms of electronic equipment but designed to allow a relatively small staff of engineers to monitor and control the spacecraft checkout task.

ACE tests such key Apollo systems as communications, instrumentation, fuel cell and cryogenics, environmental control, biomedical, guidance and navigation.

**Electrical Support:** Before the 7.5 million-pound-thrust Saturn V rumbles on its way to the moon, it'll need a clean bill of health from another system, ESE.

The Electrical Support Equipment

(ESE) designed and built by Apollo Systems Department is the largest array of electrical equipment in the Apollo program. ESE contains some 10,000 panels, cabinets and racks bulging with electrical checkout equipment. The 25,000 cables it uses contain enough wire to string a fence around the world.

**ESE**, with twice the volume of equipment as the ACE system, is a vast array of ground support equipment that checks out the launch vehicle and support systems. It can simulate the various conditions to which the circuits will be subjected during actual Apollo missions. Test conductors send commands through ESE to exercise or control each of the critical components of the booster stages. ESE then reports the information from each of the thousands of test points to the engineers conducting the test so they know at all times, in detail, if the launch stages are operating properly.

There is a check on the check-out, too. The ESE is checked by OATS, which is used for simulation purposes. It can, if necessary, provide the normal delays experienced between the time a command is received and the time it's actually carried out by the astronaut.

#### GE ACCEPTANCE CHECKOUT EQUIPMENT FOR APOLLO SPACECRAFT & LUNAR MODULE.





**MOONSCAPE:** Clear view of the moon's surface is made by Lunar Orbiter III from altitude of 32.7 miles. The crater in the center of this NASA photo is Kepler; about 20 miles in diameter.

As the Kennedy Space Center makes ready for actual flight, booster preparation checkout equipment monitors shake-down tests. Stage simulators are included in this equipment, and can take the place of the S-IC, S-II or S-IVB stages of a Saturn V. It can simulate the correct checkout responses of a stage if a part of the booster has to be isolated for some reason. Engineers can therefore be working on one of the booster stages and yet a complete checkout of all three stages can be completed.

**At the Cape:** Another area in which the Company provides hardware is the Kennedy Space Center. The launch area equipment is functionally similar to ACE and ESE, but is used to check out and control the launch area and facilities.

The Cape installation includes Electrical Launch Support Equipment (ELSE) and Space Vehicle Measurements Checkout Equipment.

The ELSE is associated primarily with the control of propellants, gases and mobile launcher equipment; water control, for fire protection and cooling; telemetry

and radio frequency checkout systems, and used during the pre-launch checkout of on-board systems.

The Space Vehicle Measurements Checkout Equipment includes ground support equipment used during checkout of the booster stages before transfer to the launch pad, and a measuring station using analog computers for real-time evaluation during checkout and countdown and for providing a permanent record of critical booster data for post-flight analysis.

**Flurry of Flights:** Apollo Systems engineers have "flown" the entire Apollo mission on computers, from start to finish, up to 10,000 times a day. These simulated flights have identified the most critical equipment and mission events and have given NASA and the Apollo astronauts a basis for deciding what to do if a problem should occur during a flight.

## Testing in Mississippi

With a roar that shakes the ground, the giant 7.5-million-pound thrust rocket engine of the Saturn V first stage spits fire and smoke, straining at its test stand moorings.

The big blast is a test firing, and it's the main business of NASA's Mississippi Test Facility deep in the pine forests 50 miles northeast of New Orleans. The site is a component of NASA's Marshall Space Flight Center at Huntsville, Ala.

For the 1200 employees of the General Electric Mississippi Test Support Department, the job is operating and maintaining the 25-square-mile site for NASA and in providing management, engineering, technical and administrative services, range, site and special support functions.

Current mission of the installation is preflight acceptance testing of the first two stages of the Saturn V launch vehicle



—the powerful rocket that will lift U.S. astronauts to the moon and beyond.

From a large area of bogs, cypress trees and swarming mosquitoes has grown a \$315-million space proving ground. It has three mammoth test stands, over seven miles of man-made canals, underground tunnels carrying thousands of miles of wire, blockhouses, control centers, data centers, and a 26-mile railroad system.

**Ahoy:** The site is also home for a small, GE-operated "Navy," which handles the barges that bring in rocket stages via the East Pearl River and the site canal system. The 81-foot S-II stage reaches the site via the Panama Canal from Seal Beach, Calif. After acceptance testing, the rocket stages are transported to Cape Kennedy via the Gulf of Mexico.

General Electric crews help prepare the facility for the rocket stage tests, record and process the test data and turn the results over to NASA for evaluation. When a stage passes all tests, NASA issues a "flight-worthiness certificate." The stage is then refurbished and shipped to the Kennedy Space Center for mating with other stages and the spacecraft before launch.

**Supertest:** Test firings at the Mississippi

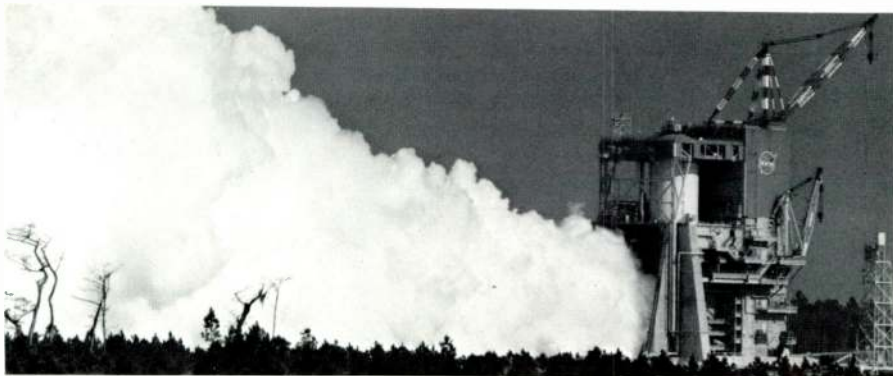
Test Site allow the liquid-fueled stages to develop the same thrust and to function essentially as they will during launch and flight. The five engines of the S-IC stage gulp 15 tons of kerosene and liquid oxygen each second to produce 7.5 million pounds of thrust, or 160 million horsepower. The smaller S-II second stage engines burn liquid hydrogen and oxygen to produce about one million pounds of thrust—over 21 million horsepower.

The Company's employees at the Site measure the performance of the engines and all stage systems, simultaneously recording vibration, temperature, thrust, fuel flow, pressures, strain and other vital information.

An okay is a big one, since the S-IC is vital to the success of the lunar mission; it must boost the 3,164-ton Saturn V vehicle and Apollo spacecraft from a launch pad standstill to an altitude of 40 miles and a velocity of 6,000 miles an hour. It takes but two-and-a-half minutes. Once done, the exhausted first stage drops away and second stage engines boost the vehicle higher and faster.

**Other Role:** General Electric also provides NASA with a variety of range services, including central control, transport

#### HYDROGEN-FUELED ROCKET ENGINES OF APOLLO/SATURN V UNDER TEST.







**TEST TEAM:** The Saturn V test complex, with from left, John R. Picard, manager, range operations; Paul W. Soge, general manager of the Department; Thamos S. Teague, manager, logistics.

and storage of propellents and gases, maintenance, and operation of laboratories.

Base services are also provided by General Electric. Food, transportation, mail, health, security and fire protection plus utilities, roads and grounds are handled—all sufficient for a city of 5,000.

The testing of Apollo's Saturn rockets is only a beginning for the Facility, since the testing laboratory was built with an eye to the future. Expansion is possible, so when NASA decides to raise the next generation of launch vehicles, the Site will be ready.

## INTERNATIONAL

### Time-Sharing Francais

The arrival of time-sharing in France last month added another dose of excitement to a country already busily hosting the winter Olympics.

The French minister of industry seemed more interested in the Bull-General Electric action than that of Grenoble, and telephoned the symbolic formal announcement of France's first commercial computer time-sharing service during a press conference on February 8th.

Ready availability of computer time-sharing on a broad scale arrives at a critical point when France and the rest of Europe are sharply aware of the need for increased efficiency and productivity.

**Milestone:** Meanwhile, back in the United States, a milestone in time-sharing was reached on the Dartmouth College campus. Over 100 persons successfully used a General Electric 625 computer simultaneously.

## NUMERICAL CONTROL

### Training Under Control

Industry's growing application of numerical control, which totaled \$254 million last year, has stimulated a parallel need for trained personnel who understand the design and operation of the control systems.

General Electric, as a leading supplier of numerical controls (the Mark Century line), has created a special little red schoolhouse bulging with electronic and teaching aids to meet the need. The training school, operated by the Numerical Equipment Control Department, Waynesboro, Va., has graduated over 3,000 students—representing 850 customers—since it was begun in 1962.

The school reflects the "total service" approach by the Department. "We are not just selling numerical controls," says General Manager Paul D. Ross, "We are selling hardware, software, service and training; the total numerical control package."

**School Bells:** The school has expanded

from its one-teacher, single room origins of 1962, a year in which it graduated 244. Last year, over 1,000 completed the school, the staff had grown to three, with the addition of closed circuit television, video tape recorder, visual aids and the usual numerical positioning and contouring demonstration equipment.

About 70 percent of the enrollees are from users of Mark Century controls. Another 15 percent come from the machine tool manufacturers, while the rest are in-Company participants—primarily Installation and Service engineers.

While most of the instruction takes place in Waynesboro, classes have been held in customers' plants. The use of Mark Century controls around the world also has led to training schools being held in England and Germany.

**Innovations:** Because many changes have occurred in the short life of numerical control, the Company's training school has been continually revised and updated. Its effectiveness is increasing via the use of such teaching tools as programmed instruction (*The Monogram*, Feb. '68), high speed classroom demonstrator units and videotape. Feedback from the field and evaluation of service reports helps to match coursework to needs.

Instructors in the school are R. D. Spalding, G. S. Lyda, and J. P. Tipton. Lutz Kutcher of GETSCO handles the European sessions.

How do customers feel about the school? Hugh Kellenberger, manager of manufacturing maintenance for Aerojet General Corporation, has attended the classes along with 18 other representatives from Aerojet and is pleased with the school.

"It's very rare that we ever have to call in a GE serviceman," he points out. "Without the schools and the training we just couldn't maintain our numerical control equipment."

## COMPUTERS

### The GE-115: Getting Around

Last year the Distribution Protective Equipment, Department, Pittsfield, Mass., saved \$50,000 in production and administration costs and cut the time needed to process customer orders from 15 days to eight. The Department did it with a GE-115 computer.

The Gas Turbine Department, Schenectady, handles reports on inventory, engineering scheduling, quality control, purchase order status, accounting, and sales by computer. The computer is a GE-115.

Large Generator and Motor Department, Schenectady, is installing a computer that will process labor-input vouchers, prepare factory paperwork, handle accounts payable, function as a remote input unit for a GE-635 computer, and eliminate punch cards via use of magnetic tape. The computer being installed is the GE-115.

In addition, that computer will replace a Univac card processor, two IBM 407 accounting machines, one IBM 604 calculator, and two IBM 083 card sorters.

The pattern is being repeated throughout the Company, as the GE-115 goes to work for some 26 components in over 34 installations.

The GE-115 is a general purpose computer. Its major use is as a business data and processing computer. While it's smaller than most GE 405 and 415 units, the comparative cost and "throughput" is considered a good buy.

The product responsibility for the 115 is that of Olivetti-General Electric, although the computer uses components from various departments in the Information Systems Group. Marketing of the 115 is done by the Small Computer Marketing

Operation, Bridgeport, with sales handled by the Information Systems Sales and Service Deputy Division, Phoenix, and the Industrial Sales Division in the primary metals industry.

## ADVERTISING

### The Corporate Message

"This boy's heart runs on batteries," declares the advertising headline in *Time* magazine. The copy describes the eight-year-old boy pictured as having a surgically-implanted General Electric Cardiac Pacemaker that raises his heartbeat to a consistent 69 beats per minute.

Another ad in *Business Week* pictures a tiny pellet in a thimble with the headline: "This tiny pellet packs the energy to light your home for three years." The copy identifies the pellet as nuclear fuel,

**NEW AD:** Ford C. Sloter, left, and Roy O. Stratton of corporate advertising with new GE od.



and makes the point that General Electric is helping utilities produce electricity economically via nuclear power plants.

Both advertisements are part of a new series of General Electric institutional messages appearing in major magazines and on broadcasts. They're designed to interpret the Company as a leader in research and development, in the introduction of new product innovations, and as a contributor to the solution of important social problems.

**Rationale:** "There is a lot of evidence to suggest that a favorable public attitude toward a company can pay off," comments Roy O. Stratton, manager of institutional advertising.

"We're trying to build a favorable attitude toward General Electric with this new ad program by depicting our very real strengths—specifically, our ability to develop new product concepts and ideas that meet the needs of society and its individual citizens."

Mr. Stratton says that the new program "is getting through to people," as indicated from early responses from inside and outside the Company.

The ads will continue to appear in news weeklies, general business publications and intellectual magazines with a combined circulation of about 10.5 million. Versions of the ads will also appear on General Electric College Bowl (pitcher Bob Gibson throwing at unbreakable Lexan® polycarbonate windows) and on GE-sponsored radio programs in Washington and New York.

This month, two new ads will appear. One shows photos from the GE-built Nimbus II satellite tracing the path of a hurricane. A second ad (see photo) "The 21st century is here 32 years ahead of time" points out that GE has much of the technology needed to build the dream city of tomorrow today.

## Clipping the Leads

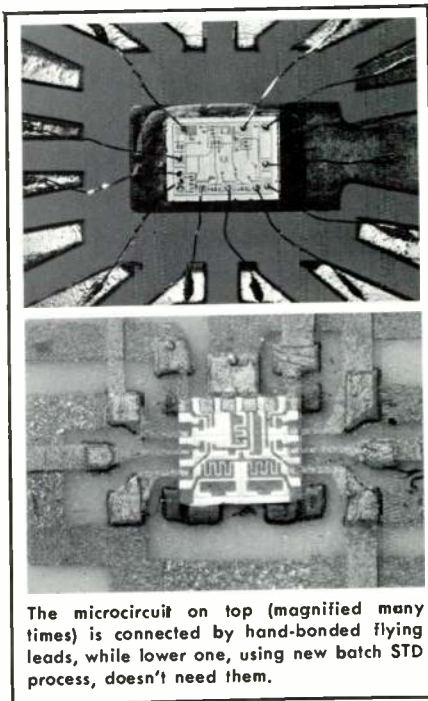
Compressing electronic circuits into tiny chips a fraction of an inch square was a boon to an industry looking for high reliability in a small package. But it was still necessary to connect the microcircuit with hair-thin wires or "flying leads" that were bonded under a microscope.

The high reliability combined with such microminiaturization seemed too good to be true. It was. The industry discovered that the fragile flying leads could be a source of failures that nullified the circuit reliability.

One solution attempted was to design microcircuits with a series of "feet" that replaced the fragile leads making connections with other parts of an electronic unit. This "flip chip" system proved less than ideal. Reliability went down, visual inspection was difficult, registration was tough because the feet were under the chip, and temperature changes between the chip and the ceramic substrate caused additional failures.

**The Answer:** Last month, the Company's Electronics Laboratory announced that it had developed a new batch process that eliminated the flying lead and flip-chip approach through a new process using thermoplastic film as a bonding agent between the microcircuit and the substrate upon which it is mounted. The process is called STD, for Semi-conductor on Thermoplastic or Dielectric. It also allows interconnection of many microcircuits in what is called "Large Scale Integration."

According to Jerry J. Suran, manager of the electronic applications and devices section at the Electronics Laboratory in



The microcircuit on top (magnified many times) is connected by hand-bonded flying leads, while lower one, using new batch STD process, doesn't need them.

Syracuse, every step of the process is done in a batch manner that produces complete STD circuits in a solid structure. A photolithographic and chemical technique is used, with resistors, capacitors, and transistors arranged in a series of layers that involve the use of such materials as gold, chromium, copper and plastic.

Mr. Suran says that some development remains to be done, but that the principles of STD are proven. Plans have been made for a pilot production line, and the Laboratory will work with product departments in the Company to apply the technique to electronic equipment built by General Electric. The process may prove useful for computer applications, microwave circuits, consumer or industrial electronics, and opto-electronics.

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## PRODUCTS

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**Instant Replay:** The Eastman School of Music, Rochester, N.Y., is using the familiar "instant replay" technique used on TV sportscasts in teaching pre-school youngsters to play the violin. Using a small, classroom-size video tape recorder by General Electric, 100 children have been taught to play the music of Bach, Mozart and Vivaldi within a few months' time . . . The University of Rochester, meanwhile, is using a GE VTR to teach languages to pre-schoolers. Among the students is a 15-month-old U.S.-born boy who is learning Swedish.

**Deskon:** A new line of low-cost wall type and desk-top remote control consoles for FM two-way radio systems called "Deskon" is introduced by the Communication Products Department, Lynchburg, Va. The solid-state units control remotely-placed two-way radio base stations over a telephone line. The units also feature in-

### UNDER CONTROL WITH DESKON

*Secretary Mary Adams demonstrates.*



### SUB-ZERO FLUORESCENT

tercoms, which can be used like an office intercom system without tying up the air frequency.

**Fluorecents:** A construction improvement now permits the GE T10-J fluorescent lamp to operate at peak performance even when exposed to sub-zero temperatures and air circulation. The change involves the addition of a metal cap to create an insulating air space around the lamp's bases . . . Lamp Division has also introduced two new fluorescent lamps in "the Chroma Line" for use in color-critical industrial, agricultural and institutional lighting applications.

**New U:** Large Lamp Department has turned out a fine new shape in lighting: a slender "U" shaped 40-watt fluorescent lamp. The 22.5-inch-long lamps will fit into two-foot-square ceiling fixtures to brighten the lot of stores, offices and commercial buildings. The lamps were intro-



duced to meet the needs of architects, engineers and designers for small symmetrical fixtures.

**Dishwashers:** The General Electric dishwasher line for '68 provides several unique features. Top-of-the-line models provide "Selecta-Level" racks that enable the homemaker to adjust, raise, lower or remove the two upper racks in her dishwasher. Another unique feature is "Mini-Wash," a new short cycle designed for slightly soiled dishes. It uses less water, detergent and time (14 minutes) and supplements four other cycles in top line models. Another feature is the soft food disposer that liquefies soft foods and washes them away.

**Quartzline:** A new 1000-watt Quartzline\* lamp housed in an elliptically shaped

#### DISHWASHER & SELECTA-LEVEL RACKS



#### NEW QUARTZLINE LAMP

*It's watts inside that counts.*

outer bulb has been announced by the Large Lamp Department. Over its lifetime, the new unit produces about three-and-a-half times as much light, measured in terms of lumen hours, as a conventional general-lighting incandescent lamp of the same wattage. It is intended for outdoor and indoor floodlighting uses and for general illumination in industrial applications.

**Charging:** National distribution of a General Electric PERMA-CELL battery system has been announced by the Battery Business Section, Gainesville, Fla. The system includes nickel cadmium batteries in types AA, C, or D and automatic battery charger. The battery charger was first introduced to General Electric employees last summer (*The Monogram*, August-September, 1967).

\*Registered Trademark of General Electric Co.



# AROUND THE COMPANY

**Honored Process:** Three top awards have recently been presented to the Process Computer Department, Phoenix, Arizona. The Department received the "Arizona Employer of the Year" award for 1967 from the President's Committee on Employment of the Handicapped. Prior to receipt of the honor, the Department had received the Phoenix Mayor's award for hiring the handicapped as well as the Equal Opportunity Citation of the Phoenix American Legion for leadership in the field of minority employment. Commented Department General Manager Louis E. Bret, "We take a great deal of pride in the recognition we earned in the employment field in the Phoenix area and throughout the state, and we know that these policies have provided us with qualified, dedicated people whose skills will help us immeasurably in reaching our business goals this year."

**Hot Stuff:** A license to manufacture and sell "fluid bed" furnaces for removing insulation from electrical equipment has been given to FECCO, a division of Bangor

Punta Operations, Inc. of Cleveland, Ohio. The rapid and inexpensive removal technique, which burns off modern electrical insulation materials without damage to the metal underneath, is currently in wide use by General Electric Service Shops. The technique allows speedy removal of phenolics, polyesters, silicones and epoxies from armatures, field coils, stators and transformer windings.

**Prime Movers:** It takes big transportation planning to move big GE turbine-generators, as witnessed by two recent ticklish transit problems. In Tehran, a 16-axle, 64-wheel trailer was needed to move a 150-ton GE turbine-generator from a seaport on the Persian Gulf 1,200 kilometers over the Zagros Mountains. And, in Schenectady, a railroad flatcar over 45 yards long was rolled in to handle the transportation of the world's highest rated single-shaft steam turbine-generator to the Pennsylvania Power and Light Company's plant in York Haven, Pa. The railroad car is the heaviest capacity depressed center car in the world.

**WORLD'S HEAVIEST DEPRESSED-CENTER FLATCAR & HUSKY SCHENECTADY CARGO.**



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# Talking Points

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**Hotpoint Expands:** Plans for a \$3.5-million investment in Hotpoint's home laundry dryer facilities that will create 150 new jobs have been announced by the Home Laundry Business Section. The expansion will allow the addition of new equipment, tooling, and for rearrangement of the present dryer manufacturing area. The move will make it possible for Hotpoint to meet the needs of a rapidly growing dryer market.

**Admirable:** After reviewing 16,000 television commercials, *Advertising Age* magazine selected the 100 best for the year. Among them: the General Electric series of recruiting commercials appearing on GE College Bowl. The ads are part of the Company's mass audience recruiting campaign telling students that General Electric is trying to solve social problems and that we need energetic young people to help us.

**Contracts:** Ordnance Department has received a \$7.2 million cost plus incentive fee contract for design, development and installation of training facilities for the Navy's new Poseidon weapon system. The Navy contract assigns to General Electric the project management responsibilities for Fleet Ballistic Missile training facilities under development for the Poseidon program . . . NASA's Marshall Space Flight Center has awarded the Spacecraft Department a study contract on the feasibility of applying a gravity gradient technology (*The Monogram*, July-Aug. '66) to vehicles in the Apollo Applications Program. Involved will be the S-IVB Orbiting Workshop and a Lunar Module.

**BARTD Order:** General Electric was the successful bidder on a contract to supply all track side rectifier substations and associated d-c switchgear to the Bay Area Rapid Transit District (BARTD) of San Francisco.

## *Perfect Record*

Mrs. Rita Curran, cashier at the Everett, Mass. Plant of the Aircraft Engine Group, qualified for a special valentine last month. On February 14th she completed 26 years with the Company without having missed a single day of work.

Mrs. Curran's record is extraordinary in itself, but also, since her work station is behind bars (see photo), testifies to her positive psychological outlook.

## *Pressing Problem*

No news was bad news for Quincy, Illinois' newspaper the *Herald-Whig* when its printing press control unit was knocked out, threatening to impose an involuntary news blackout.

Electricians needed some 16 tons of con-

### CASHIER RITA CURRAN

*Not barred from a perfect record.*





### THE SNORKEL SELL

*Subtle selling from happy khaki.*

trol equipment in a big hurry to keep the presses rolling. A check of the General Electric Industry Control Department in Salem, Virginia, located the equipment needed, and the suggestion that a charter plane be used to speed delivery.

The equipment was airlifted and installed, with Quincy readers getting their news just a few hours behind schedule. Wrote the *Herald-Whig's* business manager: "I can't tell you how much we appreciate the very fine service we received from you. We expected many problems and much delay, and received just the opposite."

### Beetle Meters

Beetle Bailey, Sergeant Snorkel and other happy characters of Mort Walker's popular comic strip "Beetle Bailey" have volunteered to serve in a General Electric advertising campaign to sell meters.

The campaign, by the Instrument Department, West Lynn, Mass., will feature the comic strip to point out the "army"

of sales and service personnel that stands behind GE panel meters. The cartoons will appear in ads in electronic trade magazines, in direct mail, on counter cards and banners.

Ralph E. Goodwin (see photo), advertising and sales promotion manager for the Department, says, "The cartoon is a natural tie-in to our message of a sales and service army behind every GE panel meter." The campaign is being developed by the Company's Advertising and Sales Promotion Department.

### Scouting Computers

Explorer scouts in Mountainside, N.J., are entering a new dimension in scouting thanks to the Company's Information Systems Sales and Service office there.

A new Explorer Troop (415) devoted exclusively to computer sciences is being sponsored by the Company. It meets at the GE Data Processing Center to become familiar with computer operations, programming, and electronics, as well as the world of business.

Attendance at the troop's first meeting brought three times the number of boys that could be accommodated, and plans are underway to form three classes in the post to handle the group. All scouts will get "hands on" training on a GE-415 computer system.

### General Electric College Bowl

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

Participants: March 17—Pre-empted; March 24—Syracuse University (N.Y.); March 31—Dartmouth College (Hanover, N.H.); April 7—Lake Erie College (Painesville, Ohio); April 14—University of Chicago (Ill.).

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# PEOPLE

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**Appointments:** J. PAUL AUSTIN, member of the Company's Board of Directors, has been appointed vice-chairman of the National Alliance of Businessmen, a group picked by President Johnson to spur the drive to land jobs in industry for the hard-core unemployed . . . HERSHNER CROSS, vice president and group executive, has been elected to the board of directors of the National Association of Manufacturers . . . DONALD E. IRWIN, acting manager of Engineering Recruiting Service, has been named Chairman of the Engineering Manpower Commission of the Engineers Joint Council . . . J. MOREAU BROWN, administrator of educational support programs of the General Electric Foundation, has been elected to the board of directors of the Citizen's Scholarship Foundation of America . . . ROYCE HUBIN, specialist, education and community relations at the Nuclear Energy Division's San Jose Plant, has been appointed a member of the Adult Advisory Committee of the California State Board of Education . . . DR. ROGER P. KAMBOUR, a physical chemist at the R&D Center, has been appointed to the editorial advisory board of the technical journal, *Polymer Engineering and Science*.

**On Loan:** FREDERIC H. BLACK, systems engineer with the Re-Entry Systems Department, Philadelphia, is serving as an economic development specialist with the United Planning Organization of Washington, D.C. Mr. Black says that he will "formulate an economic development posture for the organization and make recommendations to the city government and related Federal agencies to institute pro-

grams to achieve neighborhood stabilization, provide jobs, training and retraining, new careers and an incentive to the minority groups within Metropolitan Washington, D.C."

**Hall of Fame:** CLIFF BATTLES, who collaborated with Sammy Baugh in bringing the Washington Redskins their first championship, has been elected to the National Professional Football Hall of Fame. Mr. Battles, now a General Electric employee with the Defense Programs Division in Washington, was elected with other

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**In Crotonville:** The eighth General Management course is underway at Crotonville, with the following participants: Aircraft Engine Operating Division: *E. J. Kovarik*

Aircraft Equipment Division: *W. C. Polkow; B. A. Shaw; G. F. Woodward*

Appliance & Television Sales Division: *E. B. Cardwell; D. I. Peterson*

Appliance Components Division: *D. G. Cochran*

Area Division—Far East: *W. A. Powers*

Area Division—Latin America: *P. R. Woolery*

Canadian General Electric Company: *R. E. Jonasson; E. M. Johnson*

Construction Materials Division: *J. W. Thurlow*

Consumer Electronics Division: *G. K. Mason; J. S. Chamberlin; N. R. Huey; E. G. Schatz*

Contractor Equipment Division: *E. J. Hurson*

Corporate Staff: *W. W. Kuyper; J. W. Blake; H. Stern*

Defense Programs Division: *D. T. Atkinson; H. Asher*

football greats including Otto Graham, Elroy "Crazy Legs" Hirsch, Charley Trippi and Art Donovan. His reaction to the honor: "I'm tickled to death."

**Goddard Award:** The American Institute of Aeronautics and Astronautics has presented the annual Goddard Award to three men—including two General Electric employees—whose engineering skills made possible the development of the jet engines for the giant C-5A transport. The winners are DONALD C. BERKEY, General Manager, TF39 Department, and JAMES



DONALD C. BERKEY      JAMES E. WORSHAM

E. WORSHAM, General Manager, Military Advanced Engines Department, both of the Company's Aircraft Engine Group in Evendale, Ohio. Also named was Ernest C. Simpson, chief of the turbine engine division of the Air Force Aero Propulsion Laboratory, Wright Patterson AFB, Ohio. The award is named for the late rocket pioneer Robert H. Goddard, and is presented each year to those who have made "a brilliant discovery or series of outstanding contributions over a period of time in the engineering science of propulsion or energy conversion."

**Lawmen:** Two General Electric employees have been recognized for their "exceptional bravery and initiative" by the San Francisco Police Department. JAMES A. WHITE and RONALD E. ANDERSON, both in the electrical and electronics service organization of the Installation and Service Engineering Department, reacted quickly when they heard a woman's screams while in a downtown parking lot. They sped to her aid, discovering that she was being stabbed by a man (later identified as her husband). They subdued the man, holding him until police arrived. The work of the GE employees went unnoticed until a letter arrived at I&SE addressed to W. E. "Pete" Plummer, district manager. Commented Mr. Anderson, "It's sickening to see people who won't do anything when someone is in trouble."

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Electronic Components Division: *R. B. Byrn, Jr.; L. T. Bowles*

Electronic Systems Division: *H. J. Kindl*  
General Electric Supply Company Limited: *R. B. Lewis*

Housewares Division: *R. R. Foster; A. P. Lehnerd*

IGE Export Division: *V. J. McCabe; J. L. Schaffner; W. M. Luper; M. Kalikow; A. F. Knauer*

Industrial Drives Division: *A. Hernandez; E. N. DeVault; A. J. Forti*

Lamp Division: *C. A. Brown; E. F. Apple; W. E. Tragert*

Missile and Space Division: *E. Ray*

Power Generation Sales Division: *W. H. Prentice; W. B. Reed; C. U. Osburn*

Power Distribution Division: *F. F. Collyer; G. M. Boyd*

Power Transmission Division: *R. T. Morris; K. G. Adack*

Power Transmission and Distribution Sales Division: *J. C. Brennan*

Refrigeration and Air Conditioning Division: *W. G. Spiegelhalter; E. J. Zirkle*

Transportation Systems Division: *L. A. Shore; J. H. Kathman*



## ORGANIZATION

### **Aircraft Equipment**

H. Brainard Fancher is appointed General Manager of the Aerospace Electrical Equipment Department.

### **Chemical and Medical**

Reuben Guttoff is appointed General Manager of the Division, which includes the following components: Silicone Products Department, Chemical Materials Department, X-Ray Department, Insulating Materials Department, Polymer Products Operation, and Chemical Development Operation.

### **Consumer Electronics**

This Division now includes: Audio Products Department, Radio Receiver Department, Visual Communications Products Department, General Electric Broadcasting Co., Inc., General Electric Cablevision Corp., Electronics Sales Operations, Advanced Marketing Operation, Business Planning Operation, Legal Operation.

### **Industrial Process Control**

This Division organization includes: Process Measurement and Control Deputy Division, Instrument Department, Process Computer Department, Overseas Operation, Process Measurement and Control Systems Operation, Communication Products Department, Specialty Control Department Joseph F. Ponzillo, General Manager, Nu-



REUBEN GUTTOFF



JOSEPH F. PONZILLO

merical Equipment Control Department, Process Systems Operation, Business Development Operation, Legal Operation.

### **Industry Components and Metallurgical**

A Specialty Materials Department is established, succeeding the Diamond Business Section.

### **Information Systems Equipment**

This Division includes: Information Systems Sales and Service Deputy Division; Sales Programs Operation; Information Systems Field Sales Operation; Information Management Operations; Field Engineering Department; Finance Operation; Employee Relations Operation; Large Systems Department, John F. Burlingame General Manager; Medium Systems Department, Richard E. Roberts General Manager; Special Systems Department, Jack Katzen General Manager; Processor Equipment Department, Information De-

H. BRAINARD FANCHER    JOHN F. BURLINGAME    RICHARD E. ROBERTS







JACK KATZEN



MORRIS A. ZIPKIN



LEON L. FARNHAM



OTTO J. KLIMA

vices Department; Division Finance Operation; Division Employee and Community Relations Operation; Division Legal Operation.

### Missile and Space

This Division includes: Space Systems-Nuclear Systems Programs, Morris A. Zipkin General Manager; MOL Program; Spacecraft Programs, Leon L. Farnham General Manager; Research and Engineering; Mission Requirements and Advanced Programs; Re-entry Systems, Otto J. Klima, Jr., General Manager-Operational Systems Programs; Ballistic Systems Programs; Space Re-entry Systems Programs, Howard M. Wittner General Manager; Research and Engineering; Mission Requirements and Advanced Programs; Apollo Systems Department; Mississippi Test Support Department, Paul W. Sage General Manager.

HOWARD M. WITTNER

PAUL W. SAGE



RAYMOND L. DICKEMAN

WILLIAM F. SURETTE



### Nuclear Energy

The Domestic Turnkey Projects component is designated to report to the Division Vice President, and Raymond L. Dickeman is appointed General Manager.

### Power Distribution

The former Distribution Transformer Department has been divided into two new operating components: the Commercial Distribution Transformer Department and the Residential Distribution Department.

### Power Protection and Conversion

William F. Surette has been appointed General Manager of the Medium Voltage Switchgear Department.

### Research and Development

A Specialty Materials Handling Products Operation is established and Walter E. Gray is appointed Manager.

## EDITORIAL

### Decade of the Moon

**M**OOON-WATCHING takes on new meaning in the space age's second decade. The greatest adventure in man's history is just around the corner, with some 6,000 General Electric employees working with NASA to make it happen (see story, page 9).

It was slightly over ten years ago that Sputnik I signaled the start of the space age. While some employees may not realize it, General Electric has had more aerospace achievements honored by the Smithsonian Institution in that decade than any other aerospace contractor. It's a record of which we can be proud.

But an accelerating timetable allows little time for reflection. Progress in the air and in space is offering General Electric tremendous opportunities to demonstrate its competence and leadership. Many of the new technologies unfolding will make man's life better on the ground as in the air. And that's what General Electric traditionally emphasizes.

So, consider the moon. It symbolizes the real "futures" business.