



GENERAL  ELECTRIC
Monogram
SEPTEMBER-OCTOBER 1977

**Reaching farther out in
GE space projects**

PLUS: Materials revolution; Rx for active life; Are solar homes practical?

The materials revolution

Security analysts following GE learn they can no longer concern themselves only with things electrical— not with materials and services producing 40% of earnings.

As this *Monogram* went to press, managers of General Electric's Components and Materials Group were readying for a major event: an all-day in-depth review with a large gathering of financial analysts—the specialists who guide

investors in buying or selling securities.

The review was scheduled for September 29, and the Group chose to give the analysts a close-up of one of its expanding production centers—Mt. Vernon, Indiana, where Lexan® and other



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Linn A. Weiss, *Editor*; Richard J. Knoph, *Associate Editor*; Donna R. Carpenter, *Editorial Assistant*; Ron V. Taylor Associates, *Design*.



On the cover: Voyager visiting one of Saturn's moons is portrayed by Space Division artist Peter A. Bertolino (above). Just launched, Voyager 1 and 2 represent the latest in a long series of GE-supported space projects, as highlighted on pages 14-17.

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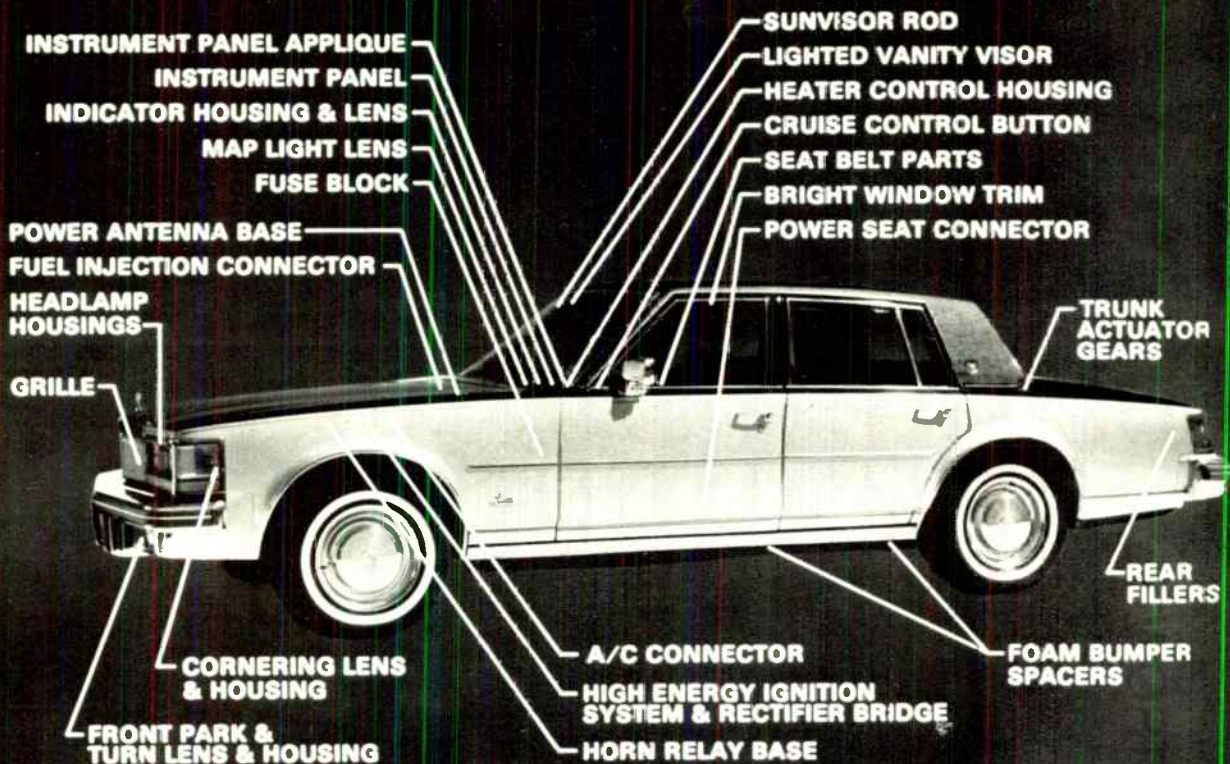
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The Monogram's purpose is to keep its readers informed on General Electric activities so that they may more effectively represent the Company in its relationships with the public. It is published bi-monthly by Corporate Public Relations Operation—Douglas S. Moore, Vice President. Editorial supervision is by David W. Burke, Manager, Corporate Communications, and J. Hervie Hauffer, Manager, Corporate Editorial Programs. Request permission to reprint articles from the Monogram Editor, Fairfield, Connecticut 06431. Copyright 1977, General Electric Company.



GE plastics for better gas mileage: to help 1978 models comply with tougher gas mileage requirements, Company plastics are helping cars shed pounds by replacing metals in such vehicles as the Cadillac Seville.

high-performance GE engineering plastic materials roll out.

Plans called for covering the whole range of the Group's activities—including appliance and electronic components and medical systems—but certainly GE's materials businesses were slated to stir some of the strongest interest among the visiting analysts.

From the time when GE first got into the business decades ago by researching for better materials for its own products, materials have become a big, fast-growing business for the Company.

How big? As GE Chairman Reg Jones has highlighted for several audiences: In 1971 19% of GE earnings came from materials and services. By 1976 the contribution had grown to 27%. And when you add in Utah International's raw materials businesses, a full 40% of GE earnings now come from this source.

Materials include some of the Company's better profit-makers and most promising growth businesses.

Growth rates three times faster than "the respectable rates of the markets we serve" have been achieved by the Group's materials businesses, Vice President and Group Executive John F. Welch, Jr. pointed out in a meeting preview. He outlined several major world trends that provide leverage for a high growth future in GE high-performance materials. "Whether it's plastics replacing metals, silicones replacing organic rubber, or carbides and diamonds replacing steel in machining operations, new materials of the types we supply are producing a quiet revolution in industry. The result is that we're on growth curves that exceed our served markets."

Welch's experts believe in helping this "natural" process along by innovative marketing. "Long ago we found that one of the barriers to growth in the use of our high-performance engineering plastics," he notes, "was simply that prospective customers didn't know how to apply them. So today the Plastics Business Division has twelve major technical centers spread across

(continued next page)

the world to create new applications and then to demonstrate to customers how they can put these to use."

What about the future? Division Vice Presidents Donald E. Debacher of Plastics Business Division and Charles R. Carson of Chemical and Metallurgical Division were set to present an attractive environmental outlook for GE's materials businesses.

Debacher cited rising energy costs as an example. "Rising energy costs call for weight reduction and that's why our plastics are replacing metals in cars," he says. "The Cadillac Seville story pictured is only a leading example of a trend that will accelerate," Debacher continues, "as the Congressionally mandated gasoline mileage requirements—27.5 miles per gallon by 1985—take effect."

Rising energy costs also are widening the gap

between the energy BTUs needed to produce plastics and those necessary to produce aluminum and zinc—the most common materials GE plastics replace in cars. The ratio is already two-to-one or better in plastics' favor.

Debacher was prepared to assure analysts that the technical innovations that have spurred the growth of these businesses will keep coming from General Electric. "As the materials businesses which now make GE a world market force mature and slow down," he comments, "we have new ventures positioned behind them to assure our continued leadership."

Coming along in the silicones business, Vice President Carson says, are fluorosilicones, for high-temperature applications. In the "metal cutting" field, aluminum oxide coatings are beginning to replace titanium coatings on GE's Carboly tooling products. "They will eventually yield metal removal rates of up to 200%



Parcourse— new use for Lexan® plastic

Physical fitness buffs abound everywhere (see pages 26-29), and one of the latest athletic crazes to reach these shores from Europe is Parcourse—usually a two-mile gymnastics track running through woods with a golf-style par assigned to each of 18 "fitness stations." GE Lexan plastic signs explain the specified exercises, and indicate three sets of par levels: starting, sporting and championship par.


Why Lexan plastic? "The signs are used out-of-doors in public places, so we need a material that is as indestructible

and vandalproof as possible," states San Francisco's Parcourse, Ltd. president Peter Stocker. "Clear Lexan plastic sheets take silk-screen images well, stand out well against all types of backgrounds and withstand abuse."

The idea of a calisthenics regimen conducted along a forested jogging and walking path was inaugurated as *Vita Parcours* in 1968 in Switzerland—"Vita" for the company supporting the project, and "parcours" for the French word meaning "circuit." In 1973, Stocker introduced the U.S.

higher than those of present materials.”

The message analysts will take away from their day at Mt. Vernon, Jack Welch expects, is that “General Electric sees a great future in the materials field. And it will be a profitable future—partly because the Company is supporting the big investments needed to insure profitability. At Mt. Vernon they will see examples of GE ‘vertical integration,’ adding the facilities to supply the basic chemicals we need. We’re just beginning the largest expansion in GE Plastics history, which will make us one of the world’s largest producers of phenol, a key material for our plastics.”

In short, after an intensive day of talks and hands-on experiences like September 29, analysts should have the information necessary to evaluate not only traditional business trends but the dimensions of an important new focus for GE’s future—materials. 



Blindness—or possibly death—was avoided because this worker was wearing GE plastic safety lenses when an accident shot a nail point-first at his eye.

version, Parcourse, which has two fewer exercise stations than *Vita Parcourse* and somewhat different exercises. Stocker supplies Lexan plastic signs and track-design instructions to such groups as park commissions and civic groups.

Parcourse requires no special equipment. All one does is jog or walk from one station to another and follow the instructions for chin-ups, jumping jacks, log hops and isometric squats. Primary emphasis is placed on developing the heart muscle rather than biceps or pectorals: “No one ever died of weak arms,” explains Stocker.

The Parcourse phenomenon already has reached 31 U.S. cities. Shown here: the Parcourse facility at The Rye Town Hilton Inn in Port Chester, New York.





Steinmetz Award winners named

Winners of the third biennial Steinmetz Awards, which honor scientists and engineers from the Company's operating Groups or Sector, will receive their medals at a banquet at Corporate Headquarters on October 11.

Created in 1973, the awards go to GE technical people whose contributions have had a significant impact on the Company as well as society. A \$5,000 donation will be made to the college of each winner's choice, for furthering engineering or science education.

This year's winners of the engraved silver medallions bearing the portrait of Steinmetz, who died 54 years ago, are:

- **Geraldo H. F. Campos**, International and Canadian Group, for his many product design achievements for the Brazilian market, and for his technical expertise, for which he is continually sought out by other affiliate operations.
- **Robert Godbarsen**, Components and Materials Group, for his contributions to medical diagnostic imaging, including the CT/T computerized tomographic scanner, Fluoricon 300 image intensification system, triple-field image tubes and 105mm spot-film camera.
- **William E. Good**, Consumer Products and Services Sector, for his principal role in developing a highly efficient optical system for video projectors, and for his innovations in TV sys-

tems standards and video-display technology.

- **F. William Gutzwiller**, Industrial and Power Delivery Group, for his key role in the development of the silicon-controlled rectifier, the basis of most electrical solid-state applications in industry today.
- **Dean B. Harrington**, Power Generation Group, for his design and development of large synchronous turbine-generators which have set a worldwide standard, and for his contributions as a Company generator instructor.
- **Martin C. Hemsworth**, Aircraft Engine Business Group, for the development of a high-bypass-ratio turbofan engine now in worldwide use, resulting in the present generation of clean, quiet, wide-bodied commercial aircraft.
- **Bohdan Hurko**, Consumer Products and Services Sector, for his contributions to the conception and design of the automatic self-cleaning oven system used throughout the major appliance industry.
- **J. Kirk Snell**, Special Systems and Products Group, for his leadership and innovative technical contributions to the creation and evolution of the TermiNet® family of computers and printers.
- **Kiyo Tomiyasu**, Aerospace Business Group, for his work in microwave sensors and devices, which has led to better satellite designs, and for his co-invention of the high-brightness disc laser.



Campos



Godbarsen



Good



Gutzwiller



Harrington



Hemsworth



Hurko



Snell



Tomiyasu



Helping students find jobs

To ease youths' transfer from school to work, GE believes in improving their teachers' understanding of industry. It's one of GE's successful career-education programs.

August national unemployment figures dramatize the problem. Rates for teenagers and young adults—17.5% and 11.1%, respectively—far exceed the 7.1% national average.

The irony: shortages of skilled craftspeople and technicians persist, though colleges continue to graduate surpluses of education, humanities and social science majors.

How can industry help? General Electric recognized this trend 20 years ago, and in an effort to offset this pattern—well before former U.S. Commissioner of Education Sidney Marland coined the term “career education” in 1971—began concentrating on the students' educators. Since the mid-1950s, thousands of secondary school educators have received course training including exposure to GE work practices

and opportunities. Millions of students have received GE career-education materials.

Observes Joseph M. Bertotti, Manager—Corporate Educational Relations: “Most educators have little knowledge or experience of industrial occupations. They need opportunities to attend world-of-work seminars to acquire firsthand industrial awareness.”

Two thousand educators since 1959 have graduated from the General Electric Foundation's summer career education and guidance programs, which were initiated to build industry occupational awareness among high school counselors and teachers in local school systems around the country. Twelve teams of counselors, teachers and administrators completed the course this summer.

Bertotti emphasizes that “the summer institutes provide industrial career education—not simply career guidance. Educators receive firsthand exposure to factories where they ‘shadow’ workers to learn their technical skills, motivations and wage scales.”

This program—set up under university aus-

(continued next page)

GE summer institutes: 2000 alumni thus far



University of South Carolina: work skills viewed.



Indiana University: educators tour GE plant.



Boston University: teachers 'shadow' workers.

pices as 5-to-6-week courses for graduate credit—was inaugurated at Syracuse University.

Through the years it has expanded to Boston University and the Universities of Louisville, South Carolina and Indiana.

Now called the “Career Education and Guidance Program,” the GE Foundation program requires teams (from 4 to 6 members) of educators from any given school system, to generate stronger program development once they return home.

Eleven GE plant components have since implemented an Educators-in-Industry program, which is a direct spinoff of the summer institutes.

Pioneered in Louisville in 1971, E-in-I programs have since spread to Lynn, Erie, Portsmouth, Milwaukee, San Jose, Bloomington, Cleveland, Schenectady and Philadelphia. Cincinnati is the newest participant, where the Eventdale plant this fall began working with Xavier University and the University of Cincinnati. Other E-in-I projects under consideration: at Bridgeport, Jonesboro, Daytona Beach and Charleston.

Most E-in-I programs also offer graduate credit to secondary school educators, and comprise 12-to-15-week classes which are held locally during the school year in GE plant cities. The curriculum includes in-plant “shadowing.”

Convincing academicians is only half the battle, however. Since these programs educate only educators, GE components also conduct follow-up projects with students.

Helping teachers and counselors convey their newly learned information to students is the mission of the Company’s Corporate Educational Communications Program.

Explains E. James Clark, Manager—Educational Communications Programs: “GE career-education ads in student magazines reach 15 million readers monthly during the school year. GE answers some 70 letters a day from career-minded students, and distributes more than 200,000 world-of-work booklets yearly to interested individuals. Poster-size versions of our ads go to thousands of educators as teaching aids.” Since 1969, GE has sponsored U.S. industry’s

largest career-education exhibit at the annual American Personnel & Guidance Association (APGA) convention. The U.S. Office of Career Education has endorsed the GE programs and various state departments of education have distributed GE educational literature—as have such companies as Whirlpool, General Motors and Bell & Howell.

Because of their past experience with such programs, Clark and Frank V. Donovan, Manager—Connecticut Public Affairs, now serve on Connecticut's Career Education Task Force.

“As a people-intensive company, General Electric needs qualified employees in extremely diverse fields,” states Joe Bertotti. **“Obviously, the Company endorses a broad concept of career**

education for individuals of all backgrounds.”

Still, present labor statistics are disquieting: since 1970, two-thirds of the humanities majors and three-fourths of the social science majors, nationwide, have taken jobs not directly related to their majors. Observes Bertotti: **“This adds up to a lot of frustration.”**

Fourteen of every 20 retiring people are blue-collar workers, while only 9 of every 20 young people entering the work force seek blue-collar work.

Comments Dr. Kenneth B. Hoyt, Director of Career Education for the U.S. Office of Education: **“General Electric continues to be a prime example for other large industries concerned about helping youth understand and capitalize on relationships between education and work.”**

AS



GE Educators-in-Industry programs are active in 11 GE plant cities. Shown: Bloomington class in session.

Stadium lighting: GE makes sports history

It was the night of Sept. 22, 1927. The largest crowd in boxing history up to that time—150,000 spectators—was thronged at Chicago's Soldiers' Field for "the fight of the century" between world heavy-weight champion Gene Tunney and ex-champ Jack Dempsey. In a ring ablaze with 142 GE 1000-watt National Mazda lamps, the intellectual tactician Tunney retained his title against the man he'd won it from the year before in Philadelphia. Once again, Jack Dempsey's brutal jungle fury had been checked.

Spectators at both the Chicago and Philadelphia prizefights participated in a relatively new American experiment—night sports under electric lights (in both cases, GE lamps). In the 1920s, a typical work day stretched to ten hours, with six work days a week. Since Sunday athletic activities often were frowned on, this left few daylight hours for sports. A potentially large crowd for night games existed.

It was a ripe opportunity for a technology GE had been nursing along for decades. GE historians maintain that the first U.S. night baseball game ever played was under 17 arc lights of one of GE's predecessor companies that produced six footcandles of light on the field at Ft. Wayne, Ind. on June 2, 1883. GE history buffs also report that the first regularly scheduled U.S. professional

night baseball game between two league teams took place on Lynn's Employees Athletic Association Field on June 23, 1927. Under 72 GE 1500-watt incandescent floodlights, the New England League's Lynn team played errorless baseball, defeating a Salem team, 7-2.

To be sure, the Lynn-Salem game was an exhibition match, with only seven innings. Cooperstown's Baseball Hall of Fame reserves official recognition of the first professional league night contest for a May 2, 1930 game at Des Moines, in which the Western League's Des Moines Demons trounced the Wichita Aviators, 13-6.

Whichever night game was "first," GE lighting was present: the Des Moines field was lit by 146 GE 1000-watt Novalux incandescent lamps.

The Des Moines "lighting gimmick" revolutionized minor league baseball. Formerly beleaguered by low gate attendance, the Des Moines night games began drawing three to four times the previous gate. Word spread rapidly. Less than 30 days after the first game, teams in Houston, Indianapolis, Lincoln, Decatur and Sacramento had converted to floodlighting and evening games.


Ironically, major league baseball officials continued to shun night games, many feeling that this would upset the glories of the wiry, tobacco-chewing, horse-faced men who faced off against umpires on hot after-

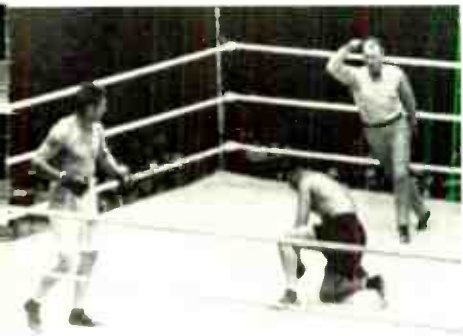
noons, got into bean-ball fights and fought for the pennant.

But electrical progress was not to be denied. On May 24, 1935, President Roosevelt, from the White House, flipped a switch that lighted Cincinnati's Crosley Field for the first major league night baseball game. Under GE Novalux lamps, the Cincinnati Reds outplayed the Philadelphia Phillies to a narrow 2-1 score.

Among other early GE baseball lighting "firsts": in the first night game played at the Brooklyn Dodgers' famed Ebbets Field, June 15, 1938, Cincinnati's Johnny Vander Meer hurled his second no-hitter in a row to beat the Dodgers, 6-0. No other pitcher has ever duplicated his feat.

By mid-1939, GE advertised that it had installed stadium lighting in more than 100 ballparks. Moreover, boxers and the "boys of summer" were not the only ones benefiting from GE stadium lighting. During the 1920s and 30s, GE lighting also was adapted to trap and skeet shooting, tennis, swimming, hockey, horse racing and golf. And of course football.

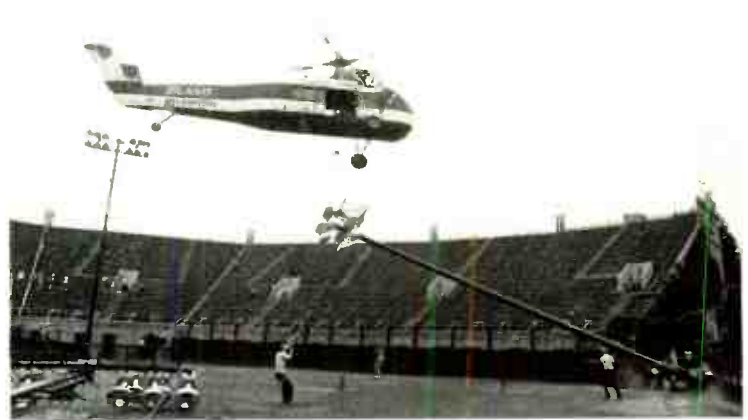
This country's newest GE-lighted baseball stadium, Detroit's Tiger Stadium, currently employs 550 GE 1500-watt Multi-Vapor® metal-halide lamps housed in Powr•Spot® luminaires. They produce *more than 100 times* the light employed in that very first night baseball game in 1883. 



1927. Tunney and Dempsey square off in "fight of century." Lynn's athletic field (right) was site of early pro baseball night game.



1938. Johnny Vander Meer pitched his second no-hitter in a row at Ebbets Field's first night game.



1975. First night match of Forest Hills' U.S. Open Tennis Championships took place under GE lights.



1977. Detroit's Tiger Stadium, the newest GE-lighted ballpark, hosts some 50 night games yearly.

Monographs



Helping in Hartford. Connecticut Governor Ella Grasso (center) recently formed a task force to help as part of a major effort to cope with increasing state costs—through an in-depth review of state agencies and an eventual state reorganization. Appointed to head the Task Force on Management of Human Resources: Crotonville's Dr. Lindon E. Saline (left), Manager—Professional Development Operation.

Why General Electric? "GE has a big reputation in the area of human resources," states E. Clayton Gengras (right), chairman of the Governor's Commission on Efficiency and Productivity. Gengras describes the Company's help as "the greatest contribution GE could make to Connecticut, and a lasting one."

Dr. Saline will recommend needed improvements in Connecticut's 40,000-employee personnel system—thus helping state employees perform more effectively by avoiding administrative "fire fighting" and the constraints of "real and imagined red tape."

Quicker quotes. Trading volume in the government securities market has skyrocketed the past two years, and New York's Merrill Lynch Government Securities Inc. recently saw the need for a new trading room. Whom did they call? General Electric.

Installation and Service Engineering Business Division (I&SE) performed a preliminary architectural and human-factors study, and under the Electrical and Electronic Service Department's coordination,



designed and installed all the new equipment—which includes GE monochrome TV projectors. Result: up-to-the-minute summaries of all issues traded, which appear on large TV screens located above the trading area.

I&SE's involvement will continue through a five-year maintenance contract on both the video-display and computer systems. Equipment leasing was handled by General Electric Credit Corporation.

50th anniversary. The year was 1927, and General Electric's



new hermetically sealed "monitor top" refrigerator made its debut with all the razzle-dazzle of the Roaring Twenties. Units were sandblasted, burned, dumped in the Erie Canal, checked for ruggedness on a North Pole trip, and tested as cigar humidors in moisture-ridden Java.

Was all the hullabaloo worth it? The monitor top—named for its distinctive single-cylinder compressor mounted atop the storage compartment—quickly revolutionized the American home by making the "ice box" obsolete. By 1930, demand for the then standard seven-cubic-foot GE unit had reduced the cost to \$250—less than half the 1927 price.

On June 20, 1931, the millionth GE monitor top was presented to Henry Ford's Edison Institute of Technology at Dearborn, Mich.

Bob's banjo. At the height of a party two years ago, Stamford banjoman Robert S. Whyte, General Electric Credit Corporation, brought in a washboard, gut bucket and tambourine from his car trunk and within seconds had enlisted several volunteers to play along with him. Then and there, the Whyte



Laundry Company was born.

Among the crowds the combo has entertained: a group of Whyte's co-workers, who stomp their feet to Bob's witty lyrics

and old chestnuts at a restaurant opposite GECC headquarters.

No one seems to have anything close to Bob's unusual repertoire of songs. Notes Bob: "Sometimes we get a whole roomful of grown-ups flapping their arms to a Lindbergh ditty, and one hostess even helped us out on a gold-plated kazoo."

Honors. Once again, General Electric has won the annual *Industrial Research* magazine contest which judges the "100 most significant technical products or processes of the year." GE garnered nine awards—four more than any other company or government agency. GE has won 111 such awards in the contest's 14-year existence.

- Alpha Phi Alpha, this country's oldest and largest black fraternity, presented its Equitable Employment Opportunities Award to the Company Aug. 9 "for perpetuating the principles of affirmative action." Thomas K. Edenfield, VP—Southeastern Regional Relations (with award), is flanked

manager of the R&D Center's Electronic Systems Programs Operation.

- Four additional Aerospace Business Group employees, Robert S. Murphy, Ansel J. Butterfield, J. Pieter de Vries and Max W. Saylor, have received NASA's Public Service Medal for exceptional contributions to the Viking Mars lander program.
- For 50 years of successful distributorship and service of Caterpillar products in Venezuela and Colombia, Caterpillar Tractor recently presented GE with two award plaques during ceremonies at its Peoria, Ill. headquarters.
- San Jose's Ram S. Vij, Manager—Plant Configuration Engineering, Boiling Water Reactor Systems Department, was recently elected a Fellow of the American Society of Civil Engineers.

- Dr. Martyn Adamson, Specialist—Reactor Core Chemistry at Sunnyvale's Fast Breeder Reactor Products Department, has been named a Vacation Associate by the chemistry division of Britain's Atomic Energy Research Establishment. He will work in England on nuclear fuel projects.
- The R&D Center's Dr. Philip M. Lewis, Manager—Mathematics and Software Design, and Dr. Ramani Mani, Manager—Engineering Mechanics Program, have been named 1977 Coolidge Fellows for their out-

standing scientific engineering achievements.



- Purdue University's Dr. H. Kurt Christensen (left) has received this year's General Electric Award for strategic planning research, presented by Corporate Strategy and Systems' VP Michael G. Allen (right) at the recent National Academy of Management Conference. Christensen's winning doctoral dissertation concerned the influence of business conditions on R&D effectiveness.
- Pennsylvania's GE Allentown Area Council achieved another "first" recently when it invited Allentown's Fred T. Domonkos, GE Credit Corporation, to join his father, Elmer A. Domonkos, Major Appliance Product Service Department, and sister, Karen G. Domonkos, GECC, as a member (see *Monogram*, Jan./Feb. 1977).



by (l to r): GE's Annette D. Long, fraternity general president James R. Williams and GE's Adron B. Butler.

- The nation's highest peacetime military award—the Distinguished Service Medal—was recently presented to Major General Laddie L. Stahl, U.S. Army Reserve, who also is

Diversity in space

Whether bringing TV to remote Japanese communities or seeking new answers to man's curiosity about Jupiter and Saturn, GE's space hardware has far outdistanced its military beginnings.

With the excitement of the nation's manned lunar-landing program shoved into the past, U.S. space projects receive only sporadic attention from press and public. But it's still a highly active and diverse field of endeavor, and General Electric is in the thick of it, as indicated by the examples illustrated in these pages.

Talks these days with experts such as Mark Morton, VP and Group Executive of the Aerospace Business Group, tap into a special enthusiasm: pride in the useful, constructive work done by satellites that spot hurricanes, forecast crop yields, explore for energy resources and link entire continents with communications networks.

It's all a far cry from the beginnings of General Electric's participation in space development.

That came in the waning days of World War II. Mindful of German successes with V-2 rockets, and knowing that the Soviets would move to capture every German space expert they could find, the U.S. poised its own teams to plunge into Germany and draft German scientists into its own space program. GE's Dr. Richard W. Porter, now retired, was in charge of one of these teams—the team, in fact, that drew the late Wernher von Braun into U.S. space work.

Meanwhile, back in the States, Porter's associate, Arthur W. Robinson, Jr., now Staff Executive—Technical Resources on the Corporate Technology Staff, was directing the building of a rocket-engine test facility where rocket development work could be started.

That was the beginning of GE's Hermes Project, named after the mythological Greek

god of science and cunning who was the messenger of the gods. As an element of the Hermes Project, GE and German scientists at the White Sands Proving Ground, New Mexico, first used captured V-2 rockets and space equipment to broaden the base of U.S. knowledge in the science of rocketry. But in the decade of Hermes' existence, the program quickly went beyond this base and developed the world's first multi-stage liquid-propellant rocket, which set new records for altitude and velocity. All told, 103 rockets and missiles were flight tested under the GE Hermes contract. Hermes liquid-fuel motors became the precursors of the U.S.'s later Atlas and Titan rockets, and solid-propellant rocket motors developed under Hermes led the way to the later Polaris and Minuteman.

Aerospace Business Group's genesis was the Hermes Project. If today's rockets are grown-up versions of the Hermes motors, today's guidance systems also are descendants of Hermes guidance equipment. In addition, GE pioneered the "heat sink" and "ablation" methods of atmospheric re-entry heat protection, built this country's first nose cones, and in 1958 helped conduct the first nose-cone flights.

- A partial list of other early GE "firsts":
- First payload recovery from space (1958);
 - First vehicle recovery (1959);
 - First stabilized space platform (1959);
 - First black-and-white and color photos from space (1959);
 - Longest re-entry flight (1960);
 - First satellite recovery from orbit (1960);
 - First recovery from Van Allen Radiation Belt

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**NASA's Space Shuttle—bigger payloads
and new in-space exploration.**

For the nation's first reusable spacecraft, Shuttle Orbiter, GE built and now operates the craft's factory check-out station and the facility used to support the approach and landing testing. GE also has contracted for the shuttle's Waste Collector Subsystem, and will build an Atmospheric Cloud Physics Laboratory to study the earth's weather systems.

For NASA's follow-up space-processing effort, GE has proposed a furnace that would use "zero gravity" to better process metals and alloys, and a chemical and fluids processing unit that would produce more highly purified hormones and vaccines.



(1960); and

- First transmission during blackout period of re-entry (1961).

The Voyagers 1 and 2 that recently left Kennedy Space Center on a possible 12-year odyssey through the solar system and into interstellar space represent only one more GE-supported space project. The Company further enhanced its aerospace reputation during the 1960s and early 70s with contributions to NASA's Orbiting Astronomical Observatory and Biosatellite programs, and was a prime contractor for the successful Nimbus and Landsat earth-resources satellites.

In 1969, GE provided management and technical support for Helios, the joint U.S.-German program which sent a sun-probe satellite closer to that fiery orb than ever before.

As an important contributor to the Mercury, Gemini, Apollo and Skylab manned-space pro-

grams, GE has continually remained in the public eye. All manned flights through Apollo relied on GE radiocommand guidance equipment. For the Apollo mission, GE supplied overall quality control, overall systems engineering support, all the checkout equipment, all the Saturn launch vehicle tests, and the ship-to-satellite system that provided first live color TV pictures of splashdown and recovery.

GE's Apollo triumphs subsequently earned the Company an important berth aboard the U.S. Skylab mission, where GE supplied the metering systems that provided the first spaceborne radar for earth-surface studies.

Last year, a GE-equipped Viking spacecraft successfully landed its Mars Lander on the red planet on America's bicentennial birthday. The Company supplied engineering and management support during the project's development, and provided the attitude control, articulation control and computer command subsystems. **□**

Earth orbiters



Nimbus. A GE "weather bird" undergoes space environment simulation tests. GE has built six such craft, and a seventh will be launched next year. In 1969, Nimbus spotted Hurricane Camille and is credited with saving thousands of lives.



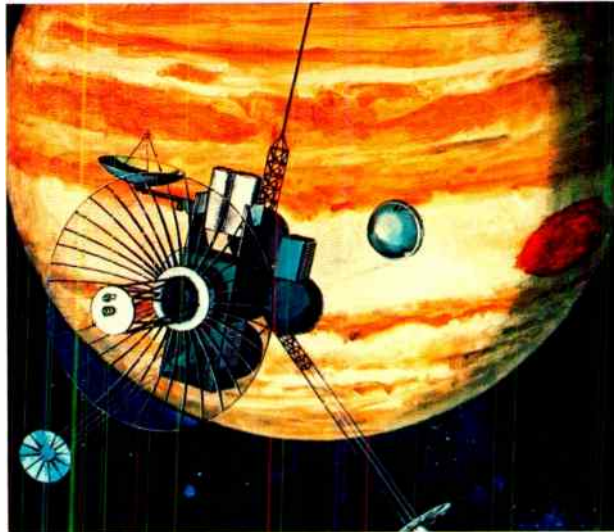
Landsat. The nation's first ecological satellites, General Electric's Landsat 1 and 2 predict crop yields, pinpoint pollution and locate natural resources.



Outer-space probes



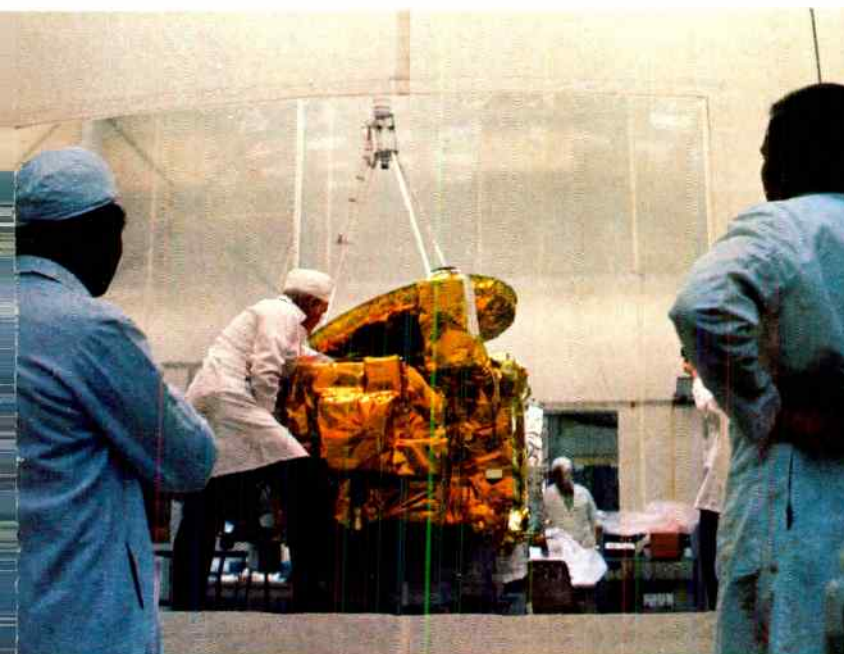
Voyager. Just starting their 12-year mission, NASA's two Voyager spacecraft are each carrying three GE Multi-Hundred Watt Radioisotope Thermoelectric Generators, which will power each craft's 10 scientific experiments.



Jupiter Orbiter. An atmospheric entry probe that would separate from its parent satellite and enter the Jovian atmosphere is now being designed by GE.

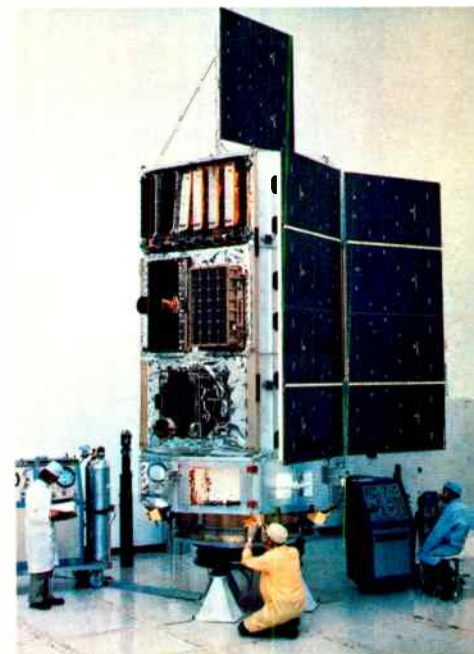


Pioneer Venus. When NASA's two Pioneer spacecraft approach Venus in late 1978, one craft will eject four GE deceleration module probes to collect information on the atmosphere.



◀ **DSCS (Defense Satellite Communications System).** Future links for a worldwide U.S. defense network. three GE communications satellites are under development.

Broadcast Satellite. Japan's 3000 islands lack unified color TV reception, so GE is building a satellite which will help link the 2000-mile archipelago.



HEAO (High Energy Astronomy Observatory). One of the three new HEAO research satellites will include a GE spectroheliograph for studying the sun.

Wedding a GE Weathertron® heat pump to GE solar collectors is helping Dallas P&L study the effectiveness of solar homes.



Aesthetically pleasing, DP&L's solar home is tested under normal living conditions. Texas Distributors, Inc. installed and maintains the equipment, and its workers required no prior solar training.



A spacious GE all-electric kitchen is included in both the solar and control homes, built by Dallas' Oxford Building Systems, Inc.

Are solar homes practical?

Dallas P&L and General Electric
have joined forces to check
their energy and cost effectiveness.



Should you build a solar-heated home? GE has teamed up with Dallas Power & Light Company to provide a detailed answer. This spring, two families

purchased identically constructed test homes with duplicated thermal energy requirements in Dallas' new Town Creek development.

The two homes' only difference? One uses a GE solar-assisted Weathertron® heat pump and domestic water heating system, the other a conventional electric heat pump and water heater.

For five years, computerized test equipment will monitor the homes' energy use and costs in a room adjacent to the solar home's garage, and data collected will be processed by Southern Methodist University's Institute of Technology. Differences in the living habits of the two families also will be recorded, and mathematical allowances made.

For this country's first controlled comparison of electric and solar equipment of this kind under normal home living conditions, DP&L is underwriting the solar equipment's \$12,000 cost. "Both houses use today's off-the-shelf products, which were installed and are maintained by workmen who required no special training in solar equipment," states DP&L VP W. W. Aston. "Also, the solar home is similar to other homes in the neighborhood, in that it's conventionally designed and aesthetically pleasing."

He adds that GE was chosen as DP&L's partner in the experiment "because GE solar equipment was ready to install as one package, and is comparatively simple to install and maintain. We picked the Weathertron heat pump because of its reputation as among the most dependable and efficient heating-cooling systems available."

"El Sol de Texas"—the quintessential ingredient for the ten GE solar collectors with Lexan® plastic covers that are installed atop the solar home's garage—is expected to supply 30% of the space heat and 65% of the water heat.

Here's how the system works. The sun's rays heat an antifreeze-type liquid inside the collectors. Through a series of pumps and enclosed pipe systems, this heat is transferred to water held in a 1200-gallon storage tank, raising it to a temperature of up to 200° F. This tank becomes a shared heat source for both the home's space and water heating.

Using this system, the sun should supply all space-heating and most water-heating needs until the outside temperature drops below 50° F. Below that temperature, the Weathertron heat pump becomes the primary space-heating source, with solar assisting the heat pump on severely cold days.

The domestic water is preheated year round by the storage tank water when it is above 140° F. A heat exchanger preheats the domestic water before it enters the water heater. A backup electric heating element inside the domestic water heater automatically flips on whenever water in the water heater drops below 140° F.

How close is solar technology to probably being economical for homeowners? Responds Aston: "Capital costs of a solar home system will take maybe 30 years to recover at today's energy price. But fuel prices are rising, and future product standardization may cut solar equipment costs. President Carter's energy plan, if adopted, also includes tax credits for solar homeowners, which may get it down to about a 20-year payout."

He concludes: "If our experiment does prove successful, the information gained from this Dallas project could well affect the design of future solar homes." ▲

One down, several new ups

Offsetting the B-1 cancellation, other orders are flowing in to GE jet engine operations.

Favorable word-of-mouth advertising is known to be a big factor in spurring the success of a new movie, a detergent, an electrical housewares innovation. But can it sell jet engines?

GE's top aircraft engine managers today reply in the affirmative. "The word is getting around among members of the airline fraternity," says Robert H. Goldsmith, VP—Commercial Engine Projects Division of the Aircraft Engine Business Group, "that GE engines are superior and are backed by better product support—two main elements that add up to higher profits for the airlines. It's a message that has been bringing about major shifts in our direction."

These pass-along reports aren't just hearsay, Goldsmith points out. "There have been some very careful studies of comparative engine performance. Results from those studies are the real source of the reports favorable to GE engines."

One such study was conducted within KSSU, the European consortium that handles engine maintenance for KLM, Swissair, SAS and UTA. Service on GE CF6 engines used on Boeing 747 wide-bodied aircraft is supplied for all partners by KLM, while SAS provides such service for Pratt & Whitney engines used in other KSSU 747s. "These unbiased, in-house analyses showed," Goldsmith says, "that there were sufficient savings in cost to justify changing their engine selection on all new 747 Combi aircraft to

the CF6. KLM received the first GE-powered commercial 747 in October '75."

Another powerful influence comes from Atlas, the consortium of five other European airlines that similarly cooperates on maintenance. The German partner, Lufthansa, is responsible for servicing P&W engines. Yet, swayed by Atlas comparisons of GE and P&W engine performance, the German carrier has in its own recent decisions opted for GE power plants.

James E. Worsham, VP—Airline Programs Division, says: "Lufthansa is on its way to having an all-GE-powered wide-body fleet, using McDonnell Douglas DC-10s and Airbus Industrie A300s as well as GE-equipped Boeing 747s. They now have 16 GE-powered wide-body aircraft (ten DC-10s, four A-300s and two 747s) and will have four more by year end. The airline's recent order, largest in its history, included commitments for five additional GE-powered 747s and options for four more 747s which will replace all of their P&W-powered 747s. It added up to a very powerful vote of confidence in GE engines.

"All in all, of 83 wide-bodied commercial aircraft selected thus far in 1977, 59 will be powered by GE's CF6 engines.

"In addition, these same airlines placed options on another 33 aircraft powered by the CF6.

"The new orders have come from all over the world—All Nippon Airways, Singapore Airlines, Air Gabon, even Jugoslovenski Aerotransport of Yugoslavia—the first sale of GE engines in Eastern Europe," Worsham reports.

As the result of these gains, Goldsmith expects that CF6 engine production in 1978 will be significantly higher than in 1977.

These successes, moving AEG toward near-future delivery of its 5000th commercial engine—including engines for business jets—have eased the sting of a substantial recent setback on the military engine front: President Carter's decision

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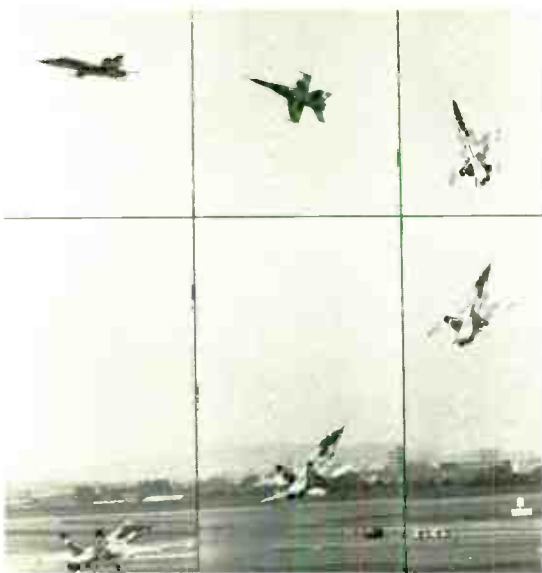


AEG's Gerhard Neumann: helping to offset the B-1 cancellation, several "spectacular marketing successes" add up to a powerful vote of confidence in GE jet engines' performance and savings.



GE engines, once shut out of 747 wide-bodied craft, are now making big inroads. Lufthansa, as an

example, will now have its entire 717 fleet powered by GE CF6-50 engines.



Helping to fill the B-1 gap are other programs using GE engines. Shown: F-18 plane scheduled for U.S. Navy and land-based use in other countries.

This sleek new Spruance-class destroyer derives its strength from four compact GE LM2500 marine gas turbines which provide power of more than 30 knots at 25 per cent greater fuel efficiency.



to terminate the production program for the B-1 strategic aircraft and its GE-supplied F101 engines.

In a recent report to employees of the Aircraft Engine Business Group, Gerhard Neumann, VP and Group Executive, was able to note: "Though these developments do not offset the loss of F101 production, they help."

VP Neumann took pains to reassure GE people engaged in the B-1 project: "Those of you associated with the F101 can be proud of your work. You have done an outstanding job! You designed and developed one of the finest powerplants ever built for the defense of our country."

He added that AEG marketing people are working to find another application for the engine, or perhaps a derivative, "so that your fine work and the half-a-billion dollars already expended by our government on the F101 are not totally wasted."

With GE commercial engine advances filling some of the gap left by the B-1 cancellation, AEG's military engine specialists are, themselves, scoring gains in other projects.

Louis V. Tomasetti, General Manager—Military Engine Projects Division, was able to report that the F-18 fighter aircraft with GE's F404 engines is making good progress "and it appears that this program is 'go'." F404 production is expected to provide substantial new work at GE in Lynn, Mass., with Evendale and other AEG plants making selected components. Tomasetti noted that "the government has ok'd efforts to try for sales with a land-based version of the F-18 to several overseas countries."

Tomasetti noted a similar favorable outlook for another important project: "Funding for the Black Hawk and AAH Army helicopters, which use our T700 engines, also seems to be going through Congress okay."

In a further recent newsbreak, the U.S. Navy selected GE engines to power 200 new helicopters as part of its sophisticated submarine detection and attack program called "LAMPS"—for Light Airborne Multi-Purpose System.

In addition, the TF34 in the A-10 close-attack anti-tank aircraft is providing good, solid base work load for the Lynn plant today and for the next five years.

Looking further into the future, Tomasetti sees prospects emerging in additional U.S. defense programs. "The Defense Department and Congress may soon be announcing support for a lower cost penetrator bomber to replace the B-1 and which will use GE F101 engines. In addition, we

see the need for large tankers and transport aircraft to deploy troops and equipment rapidly. These are possibilities for serving national security that fit our capabilities."

A final generator of good business news visited by the *Monogram* was the Marine and Industrial Projects Department. "We are doing very well in this part of our business," says VP Neumann. The Department's General Manager, O. R. (Bud) Bonner, adds details:

"The M&I charter is to derive marine and industrial powerplants from GE aircraft engine designs. We now offer two products.

"Our original engine, the LM2500, is in widespread use, powering both civilian and military marine vessels, oil and gas pipelines, and industrial processing plants. This year we became the world leader in delivered marine gas-turbine horsepower.

"The Aircraft Engine and Power Generation Groups have formed a joint enterprise within Power Generation to serve up gas turbine products which best suit customer needs. Called the Industrial Gas Turbine Programs Department, it markets complete packages for industrial use, which are powered by the LM2500 or by Gas Turbine Division products.

"Our new engine, the LM5000, develops more than twice the horsepower and is also some 10% more efficient. It was given its development go-ahead in November 1975, with a scheduled date to test on August 15 of this year. We made it—ten minutes before midnight! We already have an order for 15 units of the LM5000 and are expecting further orders."

The navies of the world, Bonner observes, are going toward fast, lightweight craft. Eleven countries have chosen GE's LM2500 units. "We've beaten out competing engines on two important recent contracts—the powerplants for West German frigates and the first of a potential eight Fast Ships for South Korea."

A talk with Bud Bonner quickly runs through a worldwide array of other opportunities: ice-breakers so oil tankers can reach Alaska's North Slope, hydrofoils, liquefied natural gas tankers that can use the LNG "boil off" as fuel, electrical generating plants in Iran, mobile power stations for offshore oil drilling. "Also, we're gearing up for the merchant marine market. Of the 900 ships launched worldwide during an average year, at least 6% are ideally suited for gas turbine propulsion. It's an opportunity we're going after."



Another source of strength for GE: powerplants for helicopters. Shown: Army's new Black Hawk chopper.



Light, fast ships for today's navies rely on GE's marine and industrial gas turbines derived from aircraft engines. Above: Patrol Hydrofoil Missile Ship powered by GE LM2500 marine gas turbine.

AEG's Group Advanced Engineering staff is at work on engines of the future with less environmental impact, improved noise control and greater energy conservation. Shown: Evendale's new anechoic chamber for testing new engine concepts.





IntSD's Judith Yesorsky (l), VP Kris Christiansen (c) and Marinella Constantino tour N.Y. Foundling Hospital, supported by GE through United Way.



IntSD hosted a career orientation for 40 youths this July, at which Barbara Goodman discussed GE technical positions. GE has hired two students part-time.



Offering students a chance to survey the worldwide career opportunities in the Company, Marvin H. Stuart explains GE overseas opportunities.

New York's Internationalists

Responding to the City's job and educational deficiencies, GE money and people are tackling a throng of urban ills.

As General Electric's largest representative in the Big Apple, the International Sales Division is determined to acquit itself honorably in terms of financial assistance and community service to help solve the City's urban ills.

But in a metropolitan area the size of New York, money alone cannot begin to cover urban needs. What can be done?

The Division's response has been given an extra non-financial dimension by the "Internationalists"—individual employees who are contributing their efforts to some 13 community groups wrestling with job and education deficiencies in all five boroughs. To help, many area GE employees are lending a hand on various community help projects.

Remarks Arthur Sears, Jr., the Division's Manager of Public Affairs: "Many more worthy organizations exist than the Company has financial resources committed to them. Our response has three goals. First, we pledge strong financial support to key organizations in need of help. Second, we try to target the Division's discretionary funds for maximum effect in support of worthy

one-time contributions. And third, we encourage GE professionals to make themselves available as counselors, planners, speakers and organizers."

Division financial support now goes to local branches of various organizations which have heavy youth-directed goals: the New York Urban League, the Police Athletic League, the National Puerto Rican Forum and the United Negro College Fund. The New York Public Library and its Harlem-based Schomburg Center—the latter undergoing new building construction to house and preserve valuable documents on black heritage—are also GE recipients.

Helping the handicapped has been a major project the past two years for the Division's Barbara Goodman, Specialist—Salaried Personnel Relations and Practices, who has helped numbers of individuals obtain GE jobs. As a member of the Projects for Industry Council of the Long Island Human Resources Center for the handicapped, Barbara helped the center establish industry guidelines for handicapped hiring and was instrumental in setting up a GE recruitment program.

Barbara also has served six years as a member of the technical advisory committee of the Opportunities Industrialization Centers, an international organization designed to provide career-education counseling for the economically disadvantaged, unemployed and underemployed. She has helped restructure and plan OIC curricula to meet business' changing needs, and partly as a result of her efforts, the Division has hired several persons through OIC who are making constructive contributions to the Division in computer operations and secretarial and finance positions.

Selected high school students this summer were invited to Division headquarters to receive career orientation, as well as discuss such topics as the free enterprise system and international trade.

Under Barbara's direction, this GE-conducted Vocational Exploration Program—sponsored by the National Alliance of Businessmen—afforded 40 students a chance to receive first-hand exposure to what goes on in an international sales office, and to chat informally with an international executive, IntSD VP Kristian H. Christiansen.

During their week-long, overall orientation to the world of work, the students toured not only the Manhattan office, but also a GE product service center and repair shop and warehouse.

Another Internationalist who has shown a special interest in New York's young people is Karen Fairey, Specialist—Salaried Personnel Development & Community Programs.

She has served as a GE executive-on-loan for one year as program manager of the Economic Development Council of New York City. In her position, she assisted in the development, implementation and evaluation of on-going EDC programs. For three months in 1976, Karen also devoted one work day per week as an executive-on-loan for the United Negro College Fund.

A former Westchester County schoolteacher, Karen now is active in adult "career fairs" for persons—particularly women—who wish to return to work. She also participates in numerous "career days" for the city's students, and conducts career-education seminars for business education teachers and guidance counselors.

As for the Division's Art Sears, he too is active—serving on the communications committee of a child-abuse prevention program of New York's Odyssey Institute, a largely self-supporting service organization that figures prominently in the Division's contributions budget. Art also serves on the N.Y. Foundling Hospital's child-adoption committee which seeks to find homes for hard-to-place youngsters.



Organization Changes

AEROSPACE BUSINESS GROUP

William J. Cimonetti, General Manager—Armament Systems Department
Lee L. Farnham, General Manager—Space Systems Operations

AIRCRAFT ENGINE BUSINESS GROUP

M. Robert Rowe, General Manager—Special Airline Programs, Commercial Engine Projects Division
Walter E. Van Duyne, General Manager—Commercial Engine Parts Support Department
George H. Ward, General Manager—Marketing Department, Military Engine Division

CONSUMER PRODUCTS AND SERVICES SECTOR

Donald S. Beilman elected a Vice President
Robert E. Fowler, Jr. elected a Vice President
William B. Clemmens, Vice President—Customer and Industry Relations Operation
Philip J. Drieci, General Manager—Retail Sales Division
Wilford R. Hecox, General Manager—Range Marketing Department
H. Gary Carlson, General Manager—Quartz and Chemical Products Department, Lamp Components Division

INTERNATIONAL AND CANADIAN GROUP

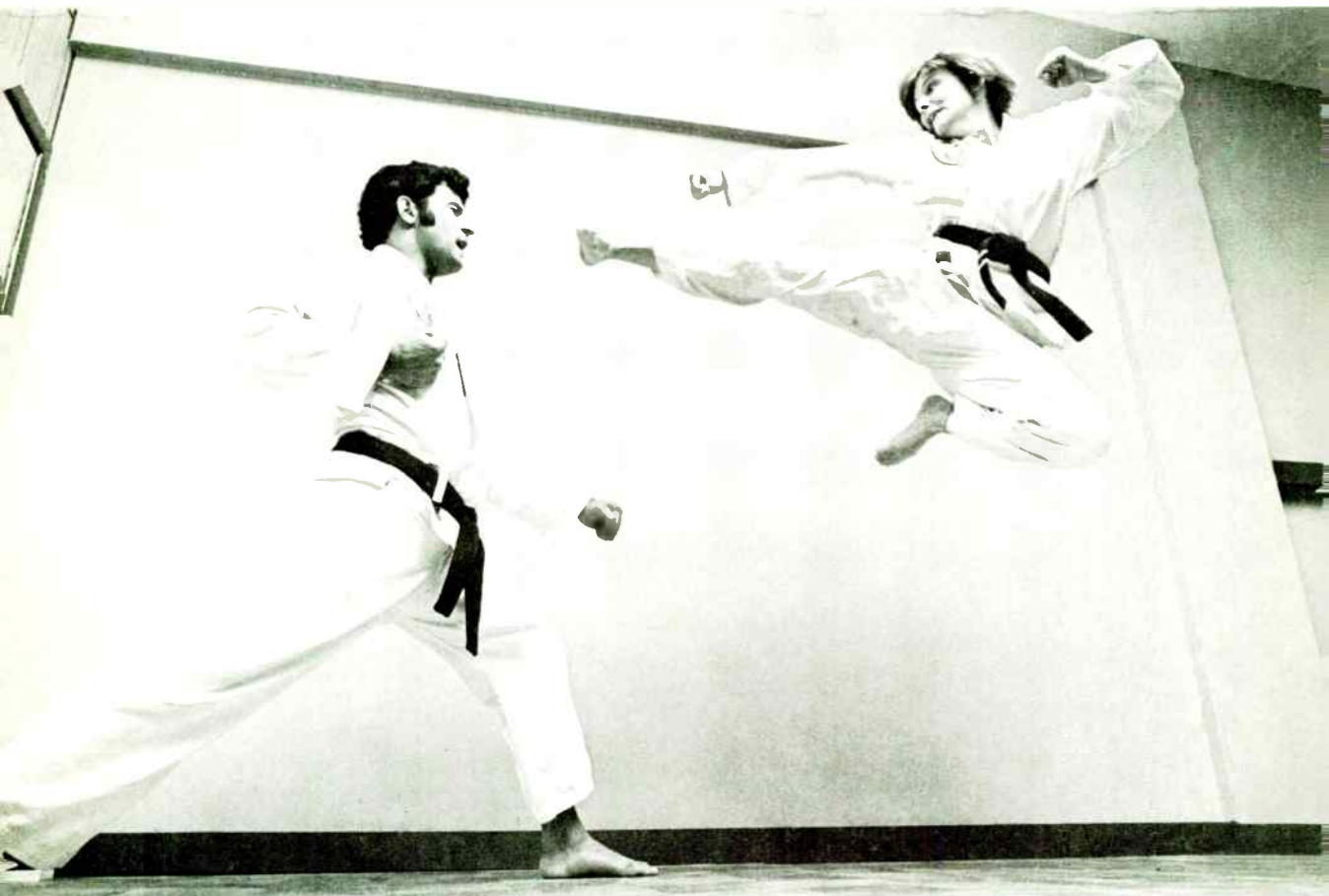
James R. Birle elected a Vice President
Paolo Fresco elected a Vice President
Frederic G. Drake, President, General Electric—Germany
Piero Boschi, Managing Director—COGENEL (Italian Operations)

SPECIAL SYSTEMS AND PRODUCTS GROUP

Donald S. Bates, General Manager—Information Services Business Division
Gerald F. Gould, General Manager—Transit Products Department

Rx for the active life

'Proper exercise can reduce stress, improve health and make one more alert at work,' notes Corporate Medical Operation's VP Tom Casey.



Qualified as a black-belt holder in Korean karate (Tae Kwon Do), Burlington's Beverly Hayden, Armament Systems Products Department, notes that karate builds coordination, timing, muscle tone and quick reflexes. "I began studying the martial art 10 years ago, and since then have doubled my self-confidence."

The bad news first. No solid scientific proof exists that exercise prolongs life.

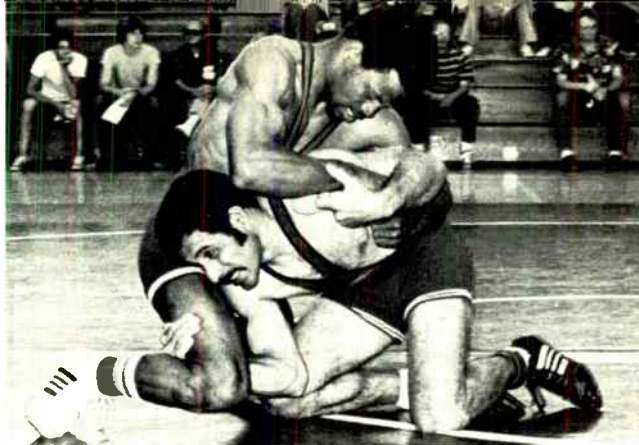
Now the good news. "Proper exercise improves the *quality* of one's life—by increasing stamina, reducing tension, aiding sleep and promoting digestion. By avoiding shortness of breath and early fatigue, an individual is simply better able to

enjoy the active life."

So states Dr. Thomas R. Casey, VP and Company Medical Director, Corporate Medical Operation, who recently asked top U.S. health experts to address the Annual General Electric Health Conference Sept. 26-28 in Atlanta. GE physicians, nurses, industrial hygienists and key safety admin-



As a scuba diver and marine cinematographer, R&D Center scientist Dr. Marcus P. Borom—co-inventor of a “wrist computer” designed to help divers avoid the bends—stresses regular aerobic exercise: “I was once caught in a rip tide while snorkeling off the Caribbean’s Grand Cayman Island, and aerobics insured a safe but exhausting swim to shore.”



Deaf since age three because of a serious bout with pneumonia, Philadelphia’s Angelo D. Rivera (bottom), Re-entry and Environmental Systems Division, is a champion wrestler who in 1973 placed fifth in the World Games for the Deaf at Malmö, Sweden. “Keeping in shape for wrestling requires a strict regimen of jogging and calisthenics.”



“I’m convinced jogging helps my work performance,” states Major Appliance Business Group’s Leo W. Bush, 48. He began jogging three years ago, has run in five marathons, and recently won his division of the Master’s Mile at Louisville’s Mason-Dixon Games.

istrators attended the meeting.

Observes Casey: “The President’s Council on Physical Fitness has compiled some revealing statistics. Industry spends more than \$25 billion per year in expenses related to premature deaths. Heart disease alone costs industry about 52 million work-days per year. Needless to say, GE employees’ health is of immense importance to the Company.”

Chief villain in most deaths from heart disease and stroke is atherosclerosis (clogged arteries)—caused by the excess deposit of fatty-cholesterol substances in the arteries of the heart. Exercise may not prevent heart attacks, but it can lessen their probability, improve chances of survival and reduce the length of convalescence.

Atlanta conference speaker Dr. Albert A. Kattus, a medical professor at UCLA’s Center for the Health Sciences, notes that atherosclerosis “kills and cripples more people than all other disease entities combined. What an irony of our time that this

scourge of the human race is self-inflicted.”

It needn’t be. Exercise can strengthen the heart muscle and its ability to pump blood throughout the body. At the same time, it can reduce the heart rate and often the blood pressure. “Aerobic” exercises—such as walking, jogging, swimming and cycling—are commonly recommended by health experts for cardiovascular fitness since they increase the flow of oxygen-bearing blood.

The American Heart Association says flatly that fitness requires *at least 20 minutes of*

Attempting to become national roller skating champions, Marge and Andy Demyan since 1969 have performed competitive dance routines in at least one tournament a month. States wife Marge, with Ravenna’s High Intensity and Quartz Lamp Department: “Championship skating is a rough grind. Sometimes you feel you’re going to die, but you have to make it look easy for the judges.”

(continued next page)





A modern-day Icarus, Binghamton's Robert A. Zimmerman, Aerospace Controls and Electrical Systems Products Department, insists that hang gliding is safe. His preparation? Proper training and a steady diet of handball to keep his muscles in shape.



For America's Bicentennial, racing cyclist Alan W. Fanning combated 105-degree desert heat, a Kansas hailstorm and a Missouri tornado to complete a 4200-mile tour from Oregon to Virginia. He is with San Jose's Boiling Water Reactor Systems Department.

exercise a day at a conditioning level. States Dr. Lenore R. Zohman, Director of Cardiopulmonary Rehabilitation at New York's Montefiore Hospital and Medical Center, who also addressed the GE Atlanta meeting: "Five to ten minutes of slow warming up should precede the 20 minutes and another five to ten minutes of cooling down should follow it.

"During the 20 minutes, the person should keep his heart rate in a 'target zone' of 70 to

85% of its maximum capacity—which can be roughly estimated for the average individual as the number 220 minus his age. Thus, the average 40-year-old man has a maximum heart rate of about 180 beats per minute and his target zone would be from 126 to 153."

Complete physical exams are "musts" for persons embarking on any exercise program, cautions GE's Dr. Casey. Because 10 to 15% of Americans have some form of heart or blood-vessel disease, "everyone should get a pre-exercise checkup, and if over age 35, that checkup should include an ECG stress test [an electrocardiogram taken while one is pedaling a stationary bike or walking vigorously on a treadmill]. Certain types of exercise are dangerous for some people, so exercise must be prescribed as carefully as any drug."

Dr. Casey emphasizes that the would-be athlete must get oriented to physical fitness first, and then set up an individualized exercise routine that slowly increases with endurance: "It's best to exercise before eating, as the heart doesn't have to do

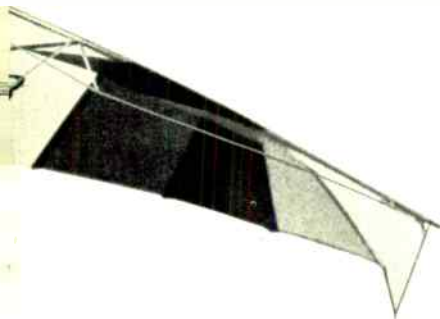
double duty in pumping blood to both the digestive organs and other parts of the body. Also, avoid cold beverages after exercise, as they may set off powerful reflexes that cause spasms of the coronary arteries."

Of course, follow a proper diet and avoid smoking.

Today's sedentary way of life has millions of Americans fighting back to stay in shape. In researching this *Monogram* article, the staff turned up literally dozens of GE part-time athletes: white-water buffs on the Colorado River, noontime hikers in the Mojave Desert, and secretaries in San Francisco who refuse to ride elevators to their 11th-floor offices.

They all evangelize exercise as the way to beat inactivity's stress, sluggishness and irritability. Jogging seems to be a preferred mode of after-hours exercise.

Remarks Dr. Casey: "Brisk walking and jogging—not running—are generally good exercises for most people. Jogging, for example, is an aerobic exercise that demands oxygen but does not produce an intolerable



Each winter, GE components in Burlington and Rutland host a "GE Winter Olympics" and invite other area GE facilities to send

their top skiers to compete. The latest women's winner? Deborah Stein, Worthington's Specialty Materials Business Department.

oxygen debt, so it can be continued for a relatively long time."

Length of exercise is the key, he maintains. "The body's caloric expenditure is related to distance covered rather than speed. Controlling one's weight so the heart is not overtaxed involves slow, steady workouts—seven to ten minutes per mile. Pushing yourself is dangerous. It's consistency that counts."

Is all the sacrifice in time and effort really worth it? Veteran GE enthusiasts insist that exercise has cured their ills, made them more alert in the office and given them a new self-confidence. Concludes Dr. Casey: "Health fitness pays dividends for the individual as well as the Company. But if you *do* decide to get in better shape, obtain a physical first. Don't take to the cinder tracks, clay courts and tumbling mats without knowing what your body can stand." ❧

Competitive canoeist Jack D. Wright, Evendale Engineering Operations, built his own 18½-foot cedar-strip canoe, which he races on Ohio's Little Miami River. "To win, one has to push to the limit, so I've dumped several times and broke a canoe in half on a rock."



The Englishman's game of cricket has a disciple in Lynn's Henderson L. Maynard, Medium Steam Turbine Department. From Barbados, he has organized the Lynn West Indian American Sports Club.



"Swords have fascinated me as long as I can remember," remarks fencer Bernard C. Desautels, Burlington's Armament Systems Products Department. He recently won the Kentucky foil championship.



Physical fitness begins early in the morning for more than 25 Pittsfield GE employees, who meet at 6 a.m. three days a week at the local Y.M.C.A. They complete 60 minutes of running, stretching and bending exercises, and then swim or play basketball.

Elfun at 50

‘Unlike most other companies, we have roots—legendary people, places and events,’ Jones notes.



Elfun national president Lewis E. Foster (center) and Lamp VP Robert V. Corning (left) presented original mold for Elfun’s anniversary commemorative paperweight to GE Chairman Reg Jones.



It was miles away from Association Island, but the happily raised voices of 576 Elfuns filling the large tent at Nela Park September 6 had a familiar ring as they sang “Underneath the Elm.”

It was the fiftieth anniversary party of the Elfun Society, and in an upbeat mood of celebration, the Cleveland chapter together with representatives from throughout the Company listened to GE Chairman Reg Jones share some observations on the occasion.

“The past, the present, and the future of General Electric are bound up in the unbroken line of leadership, generation after generation, that flows through the ranks of the Elfun Society,” he said. “To me, the first duty of Elfun is to teach and sustain the distinctive spirit of General Electric.”

The Elfun Society began on July 15, 1928, on Association Island in the St. Lawrence River. The 65-acre site had been used by the Company since 1907 when it was purchased by the National Electric Lamp Association (NELA), who used it for meetings of the Society of NELA, the first generation of Elfun’s ancestors. The Island remained in use until 1956, and in 1959

was deeded over to the YMCAs of New York as a GE gift. While the stately elm that was the Island’s trademark is gone, it remains the symbol of the Society today.

The charter Elfun members included 841 members who were participating in the Company’s Electric Fund—thus the name Elfun Society. Over the past 50 years, Elfun has grown to a membership of 16,834 regular members and 3,426 senior members in 61 chapters.

“General Electric and the Elfun Society are at important transition points,” noted Jones in his remarks. “General Electric is changing fast from the old-line electrical manufacturing company to one that now derives nearly half of its earnings from materials and service businesses, as well as a great diversity of manufactured products that were spun off from our original core businesses.

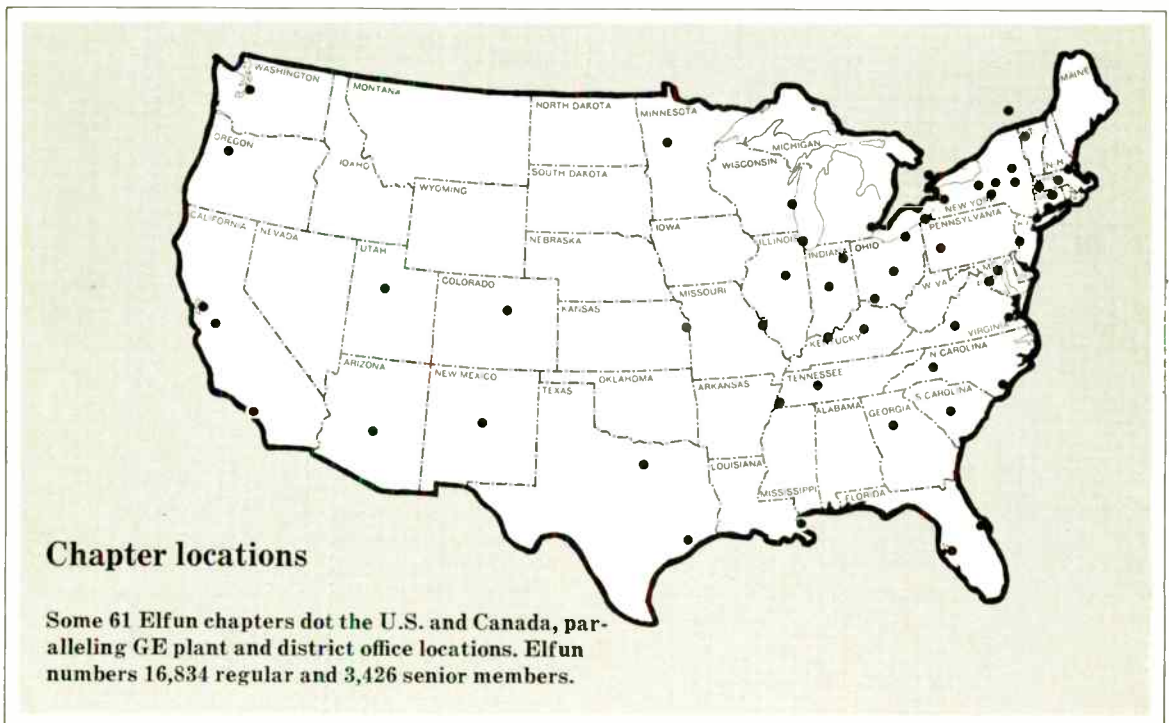
“Elfun too is in a period of transition. What began as an almost secret society dominated by the Company’s officers has become a large and substantially independent organization—closely related to General Electric, of course, but determining its own policies and programs. Elfun membership, once a tight little fraternity of electrical-industry people, now encompasses a range of industries, disciplines and professions that may not be matched anywhere in its diversity.”

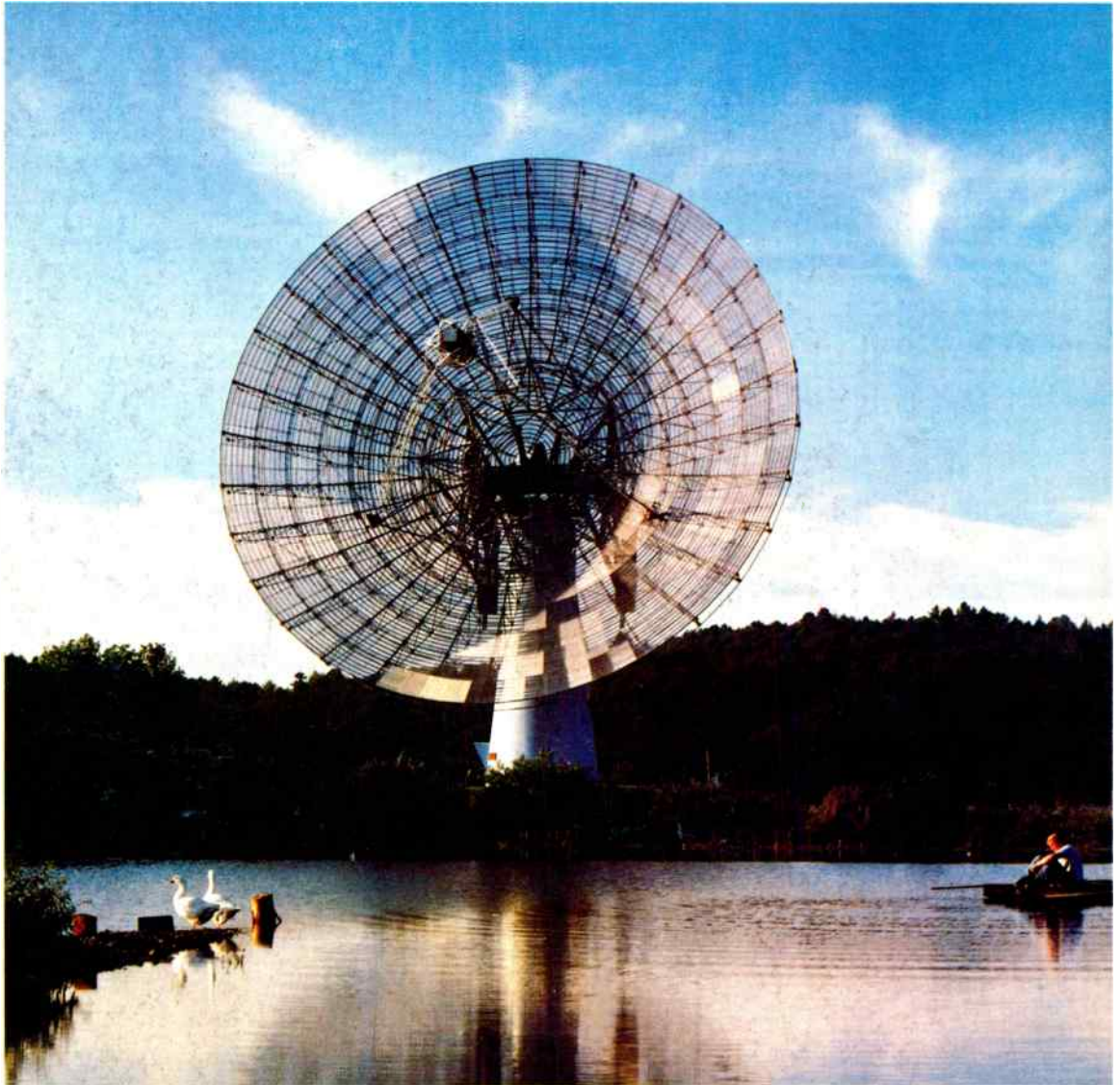
Elfun members can sustain the spirit of General Electric, observed Jones, in several ways:

- **Through fellowship** that creates unity and through personal contact that overcomes the barriers of geography, component and profession.
- **Community services:** The General Electric tradition of involvement in civic affairs can bring honor to the Company as well as satisfaction to the individuals involved.
- **Spokesmanship:** The charge to go out and “make friends for General Electric” has expanded in recent years as the economy has been politicized, and public policy has become a decisive factor in the climate for business.
- **Our heritage:** While the Company has been so busy making history that it hasn’t taken the time to record it, “something very precious is going to be lost if we don’t begin to take our past more seriously.” The Chairman charged Elfuns to “preserve our proud heritage and make it meaningful to the future.

“Unlike most other companies, we have roots. We are not merely ‘a bundle of assets hastily thrown together in a feverish search for profits,’ as somebody once said about one of our competitors. Rather, we are a product of history, shaped and tempered by time. We have our legendary people, places and events—our Nela Parks and Association Islands, our Charlie Wilsons and Charlie Steinmetz’s, our famous firsts and—let’s admit it—our famous failures. Out of all these and many other nameless, long-forgotten events we have forged a distinctive set of traditions, values and beliefs that we call ‘the spirit of General Electric.’ It inspires great loyalty, it encourages moral integrity, and it honors innovation. In my view it is one of our most valuable assets. But it is also an endangered asset because it feeds on history, and much of our history is disappearing as the people involved in it pass on.”

Jones concluded his remarks by saying, “You are the keepers of the General Electric spirit—the one shining thread that holds past and future together. I charge you to guard it, and teach it, and sustain it in the adventurous years ahead.”





SMARTER LOOK INTO SPACE. Radio emissions far beyond our galaxy are now being better interpreted at the Dudley Observatory's Frank I. Fullam Radio Telescope at Bolton Landing, N.Y.—thanks to a General Electric Fast Fourier Transform (FFT) Spectrometer.

GE researchers at Syracuse's Electronics Lab, along with scientists from Syracuse University and

the observatory, are taking a closer star gaze at pulsars, supernovae and other phenomena using the parabolic dish's breadbox-sized FFT spectrometer.

The GE instrument enables astronomers for the first time to record unexpected short-duration coherent radio pulses over a wide frequency range. Pulsars—the remains of burnt-out stars—were discovered through such data processing techniques.