



GENERAL ELECTRIC
Monogram
JULY - AUGUST 1978

**Trip report:
Three Far Eastern
Dynamos**

**PLUS:
GE's new look at technology,
the surge in cable TV,
and up with the Centennial spirit**

An in-depth look at GE technology

The Corporate Technology Study provides a host of 'action recommendations' for strengthening the Company's technical resources.

If you sense a new wave of excitement in the air these days about General Electric technology, chances are you're experiencing the forward thrust of the Company's recently completed Corporate Technology Study (CTS)—an analysis of GE technology that was announced in January 1977 by Board Chairman Reginald H. Jones in these words: "We have asked Charlie Reed to conduct an extensive review of GE's technology—where we stand, the adequacy of resources being applied, and

what we must do to preserve the rich heritage that has been given to the Company."

Dr. Charles E. Reed, Senior VP—Corporate Technology, emphasizes that the Study was not one of "technology for technology's sake," but rather was oriented to technology as an essential element of the business.

The objectives of the Study were to *appraise the present status* of technology throughout the Company . . . to *anticipate future directions*, needs and opportunities . . . to *devise incentives*



July/August 1978

Volume 55, Number 4

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

Contents

On the cover: Lee Pok Dong, the girl in the flowing peacock-decorated Korean gown called a "hanbok," was pleased to pose for photographs. "I will represent classical Korea," she said, "while the new buildings stand for modern Korea. Yes?" Yes, she was assured. Her presence beside a traditional pagoda amidst the soaring new buildings of Seoul symbolizes the contrasts between old and new in the Orient, as reviewed in the special "trip report" on pages 32-36.

THE COMPANY	2-13
GE's new look at technology / A kitchen for the handicapped / The Centennial spirit soars / John Wayne in Monographs	
THE BUSINESSES	14-16
Cable television's new technology	
CENTENNIAL	17-24
The age of electronics	
PEOPLE	25-31
Making 'extra time' productive / 'New faces' in GE export sales / Organization changes / Spit, polish and lipstick	
INTERNATIONAL	32-36
Three Far East dynamos	
PRODUCTS	37
Seeking the Atlantic's oil	
PERSPECTIVES	38-39
Who should manage our natural resources?	

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 1978, General Electric Company.



Chief architect of the Company's new in-depth technology assessment, Dr. Charles E. Reed: "The Corporate Technology Study indicates GE's commitment to technical excellence—both in its products and people."

that will motivate GE people to exploit the potential of technology . . . to *provide innovative ideas* for new directions (and alternatives) . . . and to *improve understanding* by GE people about the impact of technology on the success of their businesses.

Unlike some studies which, once completed, are placed on a library shelf and forgotten, the CTS is rich in "action recommendations." It has received top management support, and its recommendations were discussed in detail with the Company's Board of Directors, Corporate Policy Board and Corporate Executive Council. Management has stressed that the Study report should not be just "technologists talking to technologists," but rather indicate what should and will be done for the long-term good of the Company and all who share in its progress.

To assure this breadth, Dr. Reed assembled a task force of 15 outstanding people with broad Company experience in a variety of areas: technology and business management, planning, research, finance, product design and manufacturing, and law.

The Study—distilling the substance of a seven-foot shelf of interviews, surveys, studies, reports, data and appendices—worked down to specifics, looking on the one hand at technology in each business, on the other at the impact on the business of each technical area. It took an in-depth look at the technology strengths of 32

Company SBUs (Strategic Business Units), by evaluating each SBU against its strongest major competitor worldwide.

This look at the businesses showed that in terms of 1976 net sales billed, approximately 85% of the Company's sales were achieved through businesses that lead or equal their strongest major competitor in technology. Also, GE businesses ranking best in competitive technical strength have been the most profitable in each year since 1972.

The Study also made technology forecasts in 22 key technical areas of interest across the Company. This look at technologies gave special emphasis to electronics, computers and software, computer-assisted design, manufacturing and test, and special manufacturing technologies of broad interest to many Company businesses.

Lastly, the Study sought to resolve pervasive issues that surfaced, and made specific recommendations for improving GE's management of technology in all areas.

Already, many of the proposals growing out of the Study's Company-wide analysis are being implemented. Renewed attention is being directed to the complete integration of technology planning with strategic planning, and new financial reporting requirements are being issued to guide the Company's resource allocations for technology.

Attention also is being given to the Com-

(continued next page)

pany's growing interactions with the Government, in its role both as a regulator and as a sponsor of developments in technologies.

With many foreign countries now catching up with the U.S. in technology, the CTS pointed out the increasing need for a worldwide perspective.

"Technology transfer" was high on the list of the CTS Team's areas of analysis. As the Study progressed, it was evident that improved cross-fertilization of GE technologies could be a major source of business strength, and that bringing together key technical people from around the Company provided a "creative symbiosis" which improved GE's technological competence and tapped many new market opportunities.

Numerous mechanisms involving examples of technology transfer are underway, such as the Company's technology application operations, GE's GOSAM (Group on Solid-State Applications and Measurements)—a technology-based group that has effectively exchanged information on semiconductor technology—and The Advanced Development Council, jointly sponsored by Aerospace Business Group and Corporate Research and Development. More projects are planned.

Implementing specific recommendations of the CTS, a Corporate-level Computer Management Coordination Study has been completed under the leadership of Marion S. Kellogg, VP—Corporate Consulting Services. A result of this study is the establishment of a new Computer Management Operation in Corporate Production and Operating Services. This organization, along with a new Computer Aided Engineering and Manufacturing Council, with broadly-based membership from GE operations, is expected to promote widespread development of computer applications and usage in products and processes across the Company.

A strong "people orientation" is also evident throughout the Study. One noteworthy result is the Study's refutation of four recurring "myths" that have gained acceptance concerning General Electric's technical community:

- **Myth 1:** "Older engineers are obsolete."

Fact: Compared to the Company's younger engineers, the 25% of GE's engineering population over age 50 were found to be just as technically creative.

- **Myth 2:** "Salaries are not competitive."

Fact: The Study went to considerable lengths to examine this statement, surveying 72 Com-

pany alumni now working for 72 different employers. Only 16% contacted said salary was their principal reason for leaving. Some 80% of the 68 new GE technical employees surveyed said salaries were equal to or higher than those of other companies.

- **Myth 3:** "We lose our good young people."

Fact: GE's annual attrition rate among outstanding and above-average performers during the first five years of employment was found to be only 3% each, and among below-average performers, 9%.

- **Myth 4:** "We bring back the losers."

Fact: Throughout the Company, rehired GE alumni do just as well as the rest of the work force.

Putting the Corporate Technology



Pittsfield: Advanced Engineering Program participants listen to a General Electric instructor outline an engineering problem. Other Company locations will soon obtain this program, as well as a new entry-level Engineering Program to be introduced later this year.

Syracuse: "Technology transfer" of electronics manufacturing knowledge is underway between Syracuse's Heavy Military Equipment Department and Louisville's Manufacturing Electronics Operation. Louisville's Kerry Kenady (l) discusses work with Syracuse's Martin Maurer, Jon Canolesio and Robert York.



Additional GE technical-manpower development areas recommended by the Study can only be outlined in the *Monogram's* limited space.

Overall, the Study turned up some opportunities for improvement in the Company's recruiting and training programs. Now coordinating the Corporate Relations Staff's response to the Study's manpower recommendations is Corporate Employee Relations Operation's Dr. Lindon E. Saline, Manager—Professional Development Operation. The programs being developed:

1. **Recruiting.** General Electric on the average hires, annually, some 800 (2%) of this country's new Bachelor of Science engineering

graduates, 200 (1%) of its Master of Science engineering graduates, and 100 (3%) of its technically-oriented Ph.D.s.

Sectors are being encouraged to set definite annual hiring goals, so that at least 50% of each year's recruiting forecast can be released early enough to allow firm offers to be made early in the year to top graduates.

Plans call for continued use of GE technical people as college recruiters. These employees will continue to be urged to serve as guest speakers and adjunct faculty members on engineering campuses, and to develop working contacts with key college deans and department heads.

2. **Entry-level training.** A new entry-level GE Engineering Program is being designed. It will be pilot-tested starting in September, with 100 new engineers recruited from various college campuses.

Meanwhile, the companion GE Advanced Engineering Program—currently enjoying strong support at all 10 Company locations where offered—is being expanded this fall to Ft. Wayne, Louisville and Cleveland.

The Corporate Relations Staff is now contacting the various Sectors to develop additional engineering training assignments for both this year and next.

3. **New-manager training.** Each year, General Electric appoints some 700 new technical managers who have demonstrated technical skills, but have not yet had the opportunity to gain management experience. Now, a new 15-hour Professional Employee Management (PEM) survey course for these first-time managers has been designed to help them develop managerial skills—and to help position both the new managers and their professional associates so each "pursues a Company career of increasing contribution, achievement and personal satisfaction."

Pilot tests for the new PEM course were conducted at GE-Salem in June and GE-Erie in July. The PEM course will be offered to Company managers at component locations by course leaders, 80 of whom will be trained at Crotonville early this fall. Leaders will be trained on the basis of component interest and need.

Sectors are now being encouraged to have all their first-time managers participate in the course.

4. **Higher-level manager training.** Corporate Relations Staff members, together with participants from the Corporate Technology Staff, Corporate Research and Development and

(continued next page)

Study to work:



Salem: Pilot tests for GE's new Professional Employee Management course for first-time managers were conducted the week of June 12 for 17 Drive Systems and Industry Control employees (above). Crotonville's Dr. Stanley Duffendack, Nick Komanecky and DiAnne Leeds designed the course.

Evendale: Computer-aided design and manufacturing are now used by various GE components including Aircraft Engine Business Group, where 100 numerical control (NC) machine tools are being joined in a computer-controlled system to make jet engine parts. Shown: NC lathe operator Robert Elliott.



Corporate Consulting Services, are now reviewing existing courses and modules for higher-level managers, and exploring possibilities for new course and learning modules that would focus on the role and impact of technology on managing a business.

Educational opportunities are still available at GE expense to assist employees in increasing their expertise in given technologies. And open-promotion systems have improved technical employees' promotion opportunities.

Now that the Study is completed, what will its implementation mean to GE? Observes Dr. Walter L. Robb, VP and General Manager—Medical Systems Business Division, a key Study participant: "The importance of technological leadership to the Company's success is amply documented by the Study. It makes us all aware that continued commitment to investments in technology is essential if we are to maintain our leadership."

Adds Robert E. Fowler, Jr., VP and General Manager—Major Appliance Manufacturing Division, another Study Team participant: "The Study renews emphasis on the importance of manufacturing technologies as they relate to productivity. A strong push on these technologies thus brings major contributions to our long-term business success. It also is needed to keep up with some of our foreign competitors, such as Japan and West Germany, which are making impressive progress in manufacturing with the full backing of their national governments."

Observes Corporate's Arthur W. Robinson, Jr., Staff Executive—Technical Resources Staff: "The Corporate Policy Board has approved a plan for continuity in following through on the CTS findings. The Study Team was organized to be broadly representative of the Company's business, and the Team received help from literally hundreds of people around the Company. As a consequence, we have in place the machinery for a long-term implementation of the Study's recommendations."

Concludes Dr. Reed, the Study's chief architect: "In addition to the many specific implementation steps being taken, the Corporate Technology Study has already brought many intangible benefits to GE. It has brought top technical people and managers from all parts of the Company together. These people are gaining new insights about the Company, its diversity, its strengths, its problems, and its unlimited but often untapped opportunities to help itself through closer working relationships." ■

Special needs? A special kitchen

Today's Federal building code issued by the U.S. Department of Housing and Urban Development requires that 10% of all new Federally-funded housing units and remodeled apartment complexes containing 25 or more units be "handicapped-equipped." To meet specifications and stay within their budgets, many builders come to GE's Major Appliance Business Group for assistance—and Louisville's Kitchen/Laundry Design service responds.

At Atlanta's annual Apartment Builder/Developer Conference and Exposition this spring, GE displayed its new "model kitchen for the handicapped," which addresses the needs of the ambulatorily and visually handicapped. Notes William J. Ketcham, Certified Kitchen Designer and Manager—Kitchen/Laundry and Store Design: "Our GE kitchen emphasizes 'functionality'—meeting the needs of persons with birth-defect physical handicaps, crippling diseases such as multiple sclerosis, blindness, and disabilities caused by age."

The modern L-shaped kitchen includes eating space and is modified primarily in the sink and range areas. "It is essential to make a kitchen for the handicapped barrier-free," Ketcham observes. "By using standard appliances and cabinets in imaginative designs, we were able to keep the cost low."

For the ambulatorily handicapped, the removal of a drawer of the cabinet under the built-in oven brought the door and oven racks closer to a seated person. Cabinets and counters were lowered and a side-by-side refrigerator/freezer unit installed for easy reach to both compartments. A countertop range with front-mounted controls, and special shallow sink with plumbing and disposal situated at the rear, allow wheelchair access. Switches for food waste disposer, hood fan and undershelf lighting were installed at the front of the counters.

For the visually handicapped, special-order braille knobs from Product Service Operation were incorporated in the range, and a similar design is available for home laundry equipment.

The model kitchen for the handicapped is only one of some 2000 kitchen and laundry plans completed each year by MABG's Kitchen/Laundry Design service. ■



Designed with the needs of the physically and visually handicapped in mind, GE's "model kitchen for the handicapped" includes control switches at the front of the counters, extensive countertop lighting and kneeholes under the counters as needed. Range incorporates special-order braille knobs (r).



Centennial spirit soars

Rising to the occasion, people everywhere are sharing in the excitement of gala GE100 events.

'Up, up and away' in our Centennial balloon

A giant, high-flying Centennial tribute was launched June 16 at Schenectady's Research & Development Center. Christened "The Progress," the 100-foot-high balloon will tour GE locations around the U.S. in the on-the-ground company of a GE100 display van.

As approaching crowds crane their necks toward the royal-blue symbol of GE's "quest for excellence," visitors already at the van will be welcomed by "R&D 2," an animated, talking robot. Among the van's exhibits: Man-Made® industrial diamond, jet engines, coal gasification, lighting, an electric car, computerized tomography and plastics.



Evendale's GE100 celebration brings on 'Reds' fever

GE—in action 100 years. "Reds" baseball—in action 102 years. In Evendale, a Cincinnati suburb, that's something to celebrate! So, Aircraft Engine Business Group topped a series of Reds-related activities with back-to-back GE Nights at hometown Riverfront Stadium, where 18,700 GE family fans cheered their team to two come-from-behind victories over the Pittsburgh Pirates. At left: catcher Don Warner shares in the good times with friendly assists from GE hostesses Connie Whiles (l) and Pam Whitis.



Expo-Tech 'brightens up' with Edison and Latimer

By this Centennial year's end, 165,000 junior-high minority students will have seen Expo-Tech, a motivational exhibit sponsored by GE and equipped with 19 "hands-on" engineering projects. Purpose: to support the Program to Increase Minority Engineering Graduates (PIMEG).

As a GE100 tribute, stained-glass lighted portraits of Edison and his associate, black inventor Lewis H. Latimer (l)—with narrative about their pioneering work in electricity—have been added to the traveling exhibit.

Edison Energy Fair keynotes several GE100 Open Houses

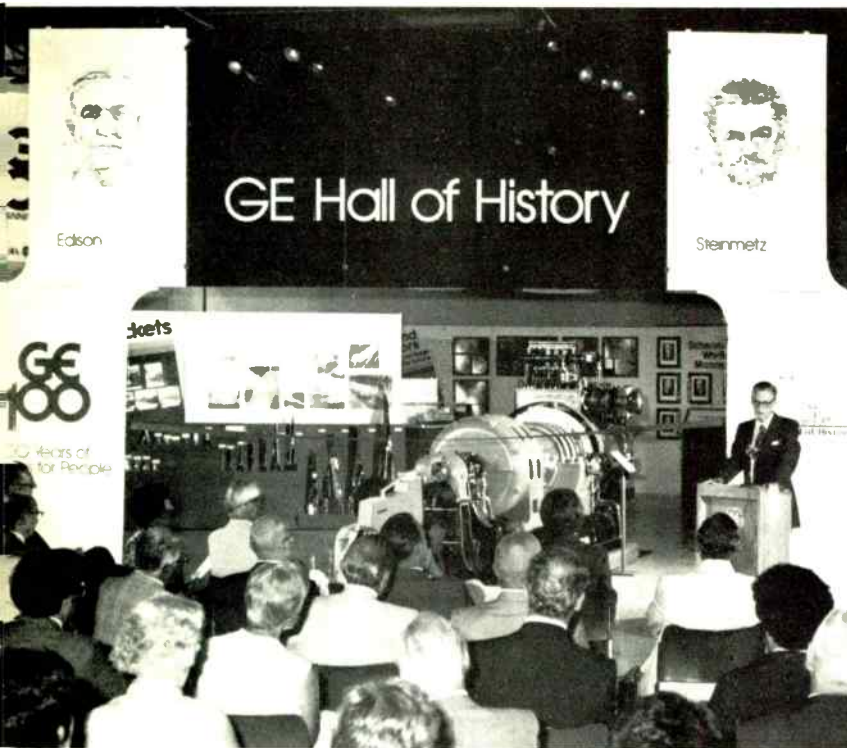
Power Systems Sector's Edison Energy Fair is on the move. Making a May debut with its prime mover, San Jose's Nuclear Energy Business Group, the fair now has gone on a six-month tour, bringing energy-education exhibits to 150,000 people at 11 GE locations. Fast becoming the centerpiece of several Centennial Open House celebrations, the fair's many attractions include an "Energy IQ" test (right) for visitors, and feature a multi-media "Energy Theater" that explores energy use today and energy challenges and choices of tomorrow.



Soccer star Pelé scores with GE-Brazil employees

The idol of every kid with a ball and a backyard, Edson Arantes do Nascimento—world renowned by his nickname, Pelé—kicked off a GE100 "Total Quality Program" at GE-Brazil's Campinas plant. Leading Brazil to consecutive quadrennial World Cup soccer championships in 1958 and 1962, Pelé this time led 2000 GE employees in joining hands and pledging themselves to goals of quality and teamwork. These, he said, were the secrets of his own international success.

(continued next page)



Chairman Jones opens Centennial Hall of History

“Unlike most other companies, General Electric has roots. We are a product of history, shaped and tempered by time.” So stated GE Chairman Reginald H. Jones (left) on June 19 during dedication of the Schenectady Museum’s GE Centennial Hall of History.

Sponsored by the Elfyn Society and covering 6000 sq. ft. in the museum’s Turnbull Gallery, the exhibition includes more than 25 exhibits ranging from Man-Made[®] industrial diamond to nuclear reactors, coal gasifiers, solar collectors, appliances and lighting. Highlights include Edison and Steinmetz artifacts and memorabilia as well as a look at what “today’s Edisons” are doing at the R&D Center. Following local showings, these displays will be made available to museums, educational organizations and GE components throughout the country.

The museum is open Tuesday through Friday from 10 to 4:30 and weekends from noon to 5.

Planning for GE’s Bicentennial, Burlington offers career-counseling

A company can’t look toward its next 100 years without considering the work force of the future. To help tomorrow’s wage earners better understand what the “world of work” is like, GE-Burlington in May sponsored a two-day Career Guidance Seminars program as a Centennial public service. The interested attendees: children of GE employees—190 of them—who participated in workshops that included apprentice training, engineering and opportunities for women.



Two birthdays at Walt Disney World—Mickey Mouse’s and GE’s

More than five million people are expected at Disney World’s GE Carousel of Progress this year—and the Centennial theme can be seen everywhere. A polished chrome GE100 logo dominates the VIP lounge, and a Centennial message has been added to the Carousel’s show, “100 Years of

Progress for People.” Hosts and hostesses all sport GE100 lapel badges, such as those worn by Philip R. Duyff (l), resident manager, and Kathleen M. Goddeau, operations lead. Disney World also features another 1978 celebration: a 50th birthday parade for Mickey Mouse, held twice daily.





Gas Turbine's 'Centurion' makes new friends for GE


Fascinating everyone from Beefeaters to international engineering VIPs and their children, Gas Turbine Division's "Centurion" robot took his first bows this spring in London. At the annual American Society of Mechanical Engineers show, he delighted 5000 customers and visitors with his animated performance on GE technology. And so intrigued were his British admirers that some even asked if GE would manufacture the robot as a handy homemaker's servant. GE ambassador Centurion symbolizes the Company's 100th year—and Gas Turbine's 30th year—of technological progress.

In Milwaukee, a conference center for Coolidge

As a commemorative salute to GE inventor Dr. William D. Coolidge, developer of the modern x-ray tube, the Milwaukee County Medical Complex recently accepted a new conference center dedicated by GE to the late scientist. The center is adjacent to the hospital's new GE Computerized Tomographic (CT) scanner. Shown are Radiology Department chairman James E. Youker (l) and GE-Milwaukee's Joseph N. Williams, General Manager—Diagnostic Imaging Programs Department, who holds a Coolidge portrait that will hang in the center.



Semiconductor's float: hot item in fire department parades

Don't bother to ask "Where's the fire?" if you see Semiconductor Products Department employees from Syracuse and Auburn, N.Y., rushing toward a crowd of fire-fighters. As GE100 gestures, employees designed a float for a summer-long series of fire department parades, and donated two dozen GE Home Sentry™ smoke alarms for local fire stations' fund-raising auctions. Lorraine Thompson (r) and Elaine Armstrong are aboard the float as Lester "Buddy" VanDyke (r) presents the first smoke alarm to Skaneateles, N.Y.'s assistant fire chief James Buff. 



Monographs

Philippine visitors. Philacor is the largest major appliance manufacturer in the Philippines, and since late 1976, General Electric has owned a 38% interest in this popular brand manufacturer. To celebrate another record year of growth, GE Board Chairman Reginald H. Jones invited Philacor's board of directors to "drop by for lunch" with him June 21 in Fairfield during the directors' annual visit to the U.S. for their board meeting.

Left to right are: Jones; Philacor's board chairman Justice Carmelino G. Alvendia; Philacor's Dante G. Santos, president and general manager; and Far East Area Division's James R. Birle, VP and



general manager.

Remarks Jim Birle: "Philacor is pioneering a new mode of GE international business operations by integrating our technical resources with a strong Filipino company on a full-partnership basis. Its

strong market share and excellent 'image' result from outstanding management."

Predicts Philacor's Santos: "Our phenomenal growth in recent years should continue into fiscal 1978 with record sales and earnings."



Celebrity TV extravaganza. Get ready for one of television's biggest star-studded guest line-ups—the "GE All-Star Anniversary Special," a two-hour celebrity-packed show to be presented on ABC-TV.

To help celebrate the Company's Centennial, host John Wayne will be sharing the screen with actress Suzanne

Somers and many other top entertainers. The giant GE100 special will be shown some time between September 1 and October 15. As this issue of the *Monogram* went to press, a firm airdate had not been set. Employees are urged to watch for more information at their GE components and to check local TV listings.

Job opportunities. All 26,000 General Electric managers now are receiving instruction in how to implement the conciliation agreement which GE reached June 15 with the Government's Equal Employment Opportunity Commission (EEOC). Key items in the agreement are programs to improve opportunities for minorities and women to compete for higher-rated jobs.

Shown here, Dothan, Ala.'s

John L. Crater, Manager—Employee and Community Relations for the local DC Motor and Generator Department plant, discusses with plant managers how the settlement is to be administered. A 31-minute slide-tape presentation, featuring comments by GE Board Chairman Reginald H. Jones on the importance of complying with the agreement, is being used at the managers' meetings.

The five-year EEOC agree-

ment is a forward-looking approach to equal employment opportunity which formalizes a number of current GE affirmative action programs, sets up new ones and continues others.



Returning empties. Homeward bound for New Orleans on a roundtrip to the Mediterranean in 1971, GE-Shelbyville retiree Norman B. Jones (r) borrowed an empty Scotch bottle, stuck an R.S.V.P. note inside, and tossed it from the ship 300 miles west of Gibraltar. Seven weeks later, the bottle was found 500 miles away in the Canary Islands and returned.

Jones now has dropped 48



nautical notes during frequent shipboard vacations with his wife, "Skip" (l). Eight have been returned from many parts of the globe—including one

that followed the journey of the famed *Kon Tiki*, traveling 6700 miles from Peru to the Fiji Islands. His distance record: from Peru to the New Hebrides Islands, 8000 miles in 553 days.

His message-bearers have included wine, vodka and whiskey bottles, glass fruit jars and 35mm film containers. "If you seal it tightly, it seems anything goes," he says.

Treasure-trove. Can a retired school custodian from Hatfield, Ark., find happiness in a Disney World treasure chest containing a \$25,000 diamond from Cartier? Are you kidding?

At right, with characters from the animated Disney film, "The Rescuers," Clifford Hamilton claims the treasure promised one of 10 finalists in the recent GE "Rescuers" Diamond Sweepstakes, a national contest conducted by Cleveland's Lamp Marketing Department. The finalists were picked at

random from entry blanks mailed with GE light-bulb package panels, and each received an all-expense-paid family vacation at Disney World.

Lamp's Lawrence F. Muehling recalls the prize ceremony: "An anxious moment occurred when the winner dropped his \$25,000 gem on the beach. I offered to hold it, then dropped it myself. Amazing how bright a 1.88-carat diamond looks under the Orlando sun—particularly when your job depends on finding it!"



Tomatoes at the Employee Store? Syracuse's Electronic Systems Division is selling the fruits of its high-technology labors to employees for \$1 a bag—at the Employee Store and GE snack bars. The product? "Ripe 'n Ready" Geniponics® tomatoes.

The crop is the result of Geniponics technology, which provides a continuous high

output of salad vegetables and healthy seedlings by controlling all light, heat, nutrient, atmosphere, humidity and organic interactions that affect plant life. While the Syracuse-GE tomato yield is a whopping 1½ tons a week, area grocers and restaurateurs participating in a test market program reportedly can't get enough of a good thing.

Honors. For the third time in five years, GE has won a CLIO award for "Best Corporate Commercial." CLIOs are given annually for excellence in TV, radio and print advertising. The commercial headlines outdoor lighting used for the 1927

Tunney-Dempsey "fight of the century," and features actor Pat Hingle as Thomas Edison. • Bruce O. Roberts, VP and General Manager—Large Transformer Business Division, was presented an honorary Doctor of Science degree by

Massachusetts' North Adams State College, where he was the May commencement speaker. • Corporate Employee Relations Operation's Joyce A. Lawson was named "Member of the Year" by the International Assn. for Personnel Women.

Cable television's new technology

CATV—cable television—has long been the U.S. television industry's stepchild. Since its birth in 1949, growth has been steady, with cable systems developing mainly in suburban areas where TV reception was poor.

But CATV now has a "new look." Space satellites are adding an out-of-this-world dimension to the industry and, used in conjunction with pay-TV as a signal-relay device, are ushering in a heyday for the cable business.

The parabolic communications dish atop the General Electric cable office in Anderson, Ind., symbolizes the impact of CATV's new technology. Pointed at a satellite, this rooftop earth-station receiver supplements Anderson's regular 12 channels of local and regional TV programming and 14 channels of FM radio, with TV programming from Atlanta and New York's Madison Square Garden. For viewers who add the pay-TV service, the earth station provides first-run movies, Las Vegas nightclub acts and world sports exclusives.

Already, some 3900 U.S. cable systems serve approximately 9400 communities. About 18% of all American TV households have cable, and last year alone, pay-TV subscribers increased by nearly 70%.

Thanks to its "salad" years spent in capital-intensive construction and acquisitions,

Since 1975, space satellites and pay-TV have revolutionized the cable industry—and GE Cablevision Corporation is adding hundreds of new subscribers weekly.

Schenectady's General Electric Cablevision Corporation (GECCO) is benefiting from CATV's new popularity. Presently the 17th largest U.S. cable television company, the GE subsidiary operates 13 systems in New York, California, Illinois, Indiana, Michigan and Mississippi.

Observes Reid L. Shaw, president of both GECCO and GEBCO (General Electric Broadcasting Company, Inc.): "American viewers are seeking greater diversity in both entertainment and information services. Cable's ability to provide a wider range of program choices and respond to personal needs makes it increasingly popular. Our sales have quadrupled in the past seven years, and we're now building additional earth stations, adding pay-TV services, expanding current franchises and examining possible new acquisitions."

As originally envisioned, CATV was simply to be a TV transmission technique to re-

place home antennas. Unlike over-the-air broadcasting, which passes through a narrow electromagnetic spectrum, the CATV signal darts from sender to home within a wired circuit. This improves picture quality and vastly increases the number of possible channels.

Inauguration of satellite transmission for pay cable programming in 1975 initiated the CATV industry's most spectacular growth rate to date, and it represents the "glamour" part of today's cable business. Overnight, pay channels became available to cable systems regardless of location. A surge of earth-station construction has resulted.

Further stimulus has come from the recent Federal Communications Commission action permitting use of 4½-meter parabolas, where previously only 9-meter dishes were allowed. This change lowers earth-station costs from \$100,000 to \$40,000, making pay service feasible for smaller systems.

"Pay-TV is a terrific entertainment bargain," maintains GECCO marketing manager Paul F. Schonewolf. "If a couple goes to a movie once or twice a month, they'll spend more than \$8 or \$9—the monthly cost of pay-TV." GE's pay-TV service is offered for a flat monthly fee on top of the \$7 basic monthly service charge. Installation fees average \$15 to \$20—although this

(continued on page 16)



Receiving pay-TV signals via satellite, the communications dish (above) began operation this May at GE Cablevision's Peoria, Ill., facility—largest of the GE cable systems. Peoria studio operator Jeff Loman (right) monitors the taping of a local community-involvement program, filmed by GE camerawoman Sandra Riddick (below).



“Pole climber” Suzie Balestra (left) hooks up GE Cablevision service for new Merced, Calif., subscribers, then installs the cable to the viewers’ TV sets (right). In October, GE’s Merced system will inaugurate pay-TV services via satellite.



charge is often reduced for promotional campaigns, as when GE television dealers offer half-price installations to encourage new TV sales.

What about X-rated, pornographic movies on pay-TV? "Not with us," Schonewolf stresses. "Our suppliers, Viacom's Showtime and Time-Life's Home Box Office, will never show an X movie. Yes, we do run R films, but we have a 'parental key' to control who sees them." If parents go out for the evening and don't want the babysitter and their children watching an R movie, they turn the key in a box and it locks off the pay-TV channel.

Of GECCO's current 165,000 cable subscribers, over 40,000 are also pay-TV users. However, where pay service has been available at least six months, an average of 29% of basic service subscribers take the extra-charge premium channel. Nine of GECCO's 13 cable systems now offer pay-TV, with three more planning to start this year.

Any problems with pay-TV? "Hollywood and other film centers simply can't produce enough premium programming fast enough," remarks Schonewolf. "Fortunately, cable industry leaders have been carrying this message to the film studios, and we're seeing increased interest in pay-TV's burgeoning market." Possibly in the wings: program series produced exclusively for pay-TV audiences, and national viewer ratings to find out what pay-TV audiences prefer.

Additional cable "spinoffs" besides pay-TV are generating new-found sources of GECCO income. In Decatur, Ill., bank tellers at branch offices of the Millikin National Bank and the First National Bank of Decatur compare customers' signatures



Bullish on new cable business, GECCO hooked up 21,000 new basic subscribers last year, and expects a 14% subscriber growth rate in 1978. "Service" is a GE watchword, and if an emergency occurs, technicians restore the system within 24 hours.

with the ones on file at the central offices, using pictures transmitted to TV monitors via a cablevision channel. Other innovations will surely follow—among them, household fire and intrusion alarm systems linked to central cablevision monitoring stations.

Significant new growth is expected in General Electric's cable systems. Since 1973, sales have grown at a compound rate of 30%, and expansion of current GE systems and franchises should ultimately add another 70,000 subscribers. Explains Schonewolf: "During the next 18 months, we plan to build another 700 miles of 'plant'—industry jargon for bringing cable to additional homes. Thus far, our home penetration—the percentage of customers versus the number of homes passed—is better than 55% and ahead of the industry average."


He continues: "Into the

1980s, our best cable markets will continue to be medium-sized cities and areas adjacent to major metropolitan centers. In these locations it's easier to obtain easement rights, installation is less costly, and the market potential for pay-TV and other ancillary services is the highest."

Uninterrupted service to GECCO's customers is paramount. Repair technicians are on call round-the-clock, to ensure that any service disruption is corrected immediately. When this winter's debilitating March ice storm struck Decatur, Ill., GECCO had its service lines repaired by the time electrical power service could be restored in the region. All GECCO service calls are free.

So financially attractive has the cable business become that Fairfield's Business Development Services, Inc., the wholly-owned GE venture-capital subsidiary, has made a \$2 million equity investment in an outside cable system, Arlington TeleCommunications Corporation (ARTEC) of Arlington, Va. Now in operation, ARTEC eventually plans to offer 36-channel cable service to Arlington homes, and also pay-TV.

"The era of cable television is here," concludes A. C. "Sam" Belanger, GECCO's VP and general manager: "We're showing steady growth in both volume and profitability, and we represent a good strategic business for General Electric, complementing the services of our broadcasting businesses."

He adds: "Stability is perhaps our greatest plus. It's ironic that 'bad times are good times' for us. When people have less spendable income, they tend to stay home and watch television." 



The age of electronics



CHAPTER 5

An amazing sound appeared in the earphones of ship wireless operators on Christmas Eve of 1906. Instead of the familiar dots and dashes of Morse Code, there were human voices on the air! Radio operators quickly summoned ship's officers to wireless rooms to verify these unusual transmissions originating at a Brant Rock, Massachusetts, station. There was a woman's voice bursting into song, then a poem, a violin solo, a man making a speech, and finally a request to send reception reports to Professor Reginald A. Fessenden.

Radio had developed its voice. Yet, it couldn't have happened without help from General Electric and its talented young Swedish engineer, Ernst F. W. Alexanderson, whose high-frequency alternator had made the historic broadcast possible.

GE was no stranger to wireless technology. The Company's co-founder, Elihu Thomson, had sent wireless signals 100 feet in 1875, and the young General Electric Company had made wireless sets. So it was understandable that radio pioneer Fessenden came to GE in 1904 seeking an alternator that would expand the range of wireless into higher frequencies. He had tried to build such a device and failed. Could Alexanderson help?

For two years, the inventor worked devotedly at his designs, ignoring the skeptical opinions of some who thought the task to be impossible. The alternator rising from the factory floor was ponderous. Its huge spinning disc reached 700 miles per hour, and technicians were understandably apprehensive as the machine reached top speed. Yet, it was precisely built to close tolerances, with its speed constant to within a fraction of a revolution. First models generated two kilowatts of alternating current at 60,000 cycles per second, and they soon reached 100,000.

Alexanderson's success changed radio. Instead of sputtering, snapping spark sets that transmitted short distances, the alternator created electromagnetic waves that leaped oceans. But the inventor was

not content with less than a complete radiotelephone transmitting system. He devised a magnetic modulator for the purpose, which he used with a micro-

phone and connected to the alternator. His tests showed the system's signals to be weak, however, and he searched for a way to amplify them. His trail led naturally to Dr. Irving Langmuir in the General Electric Research Laboratory.

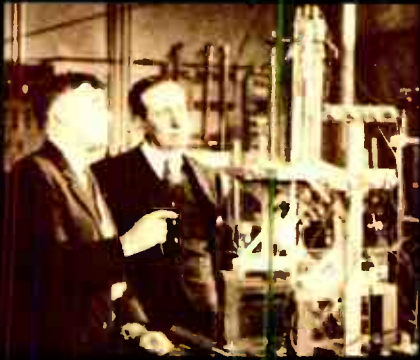
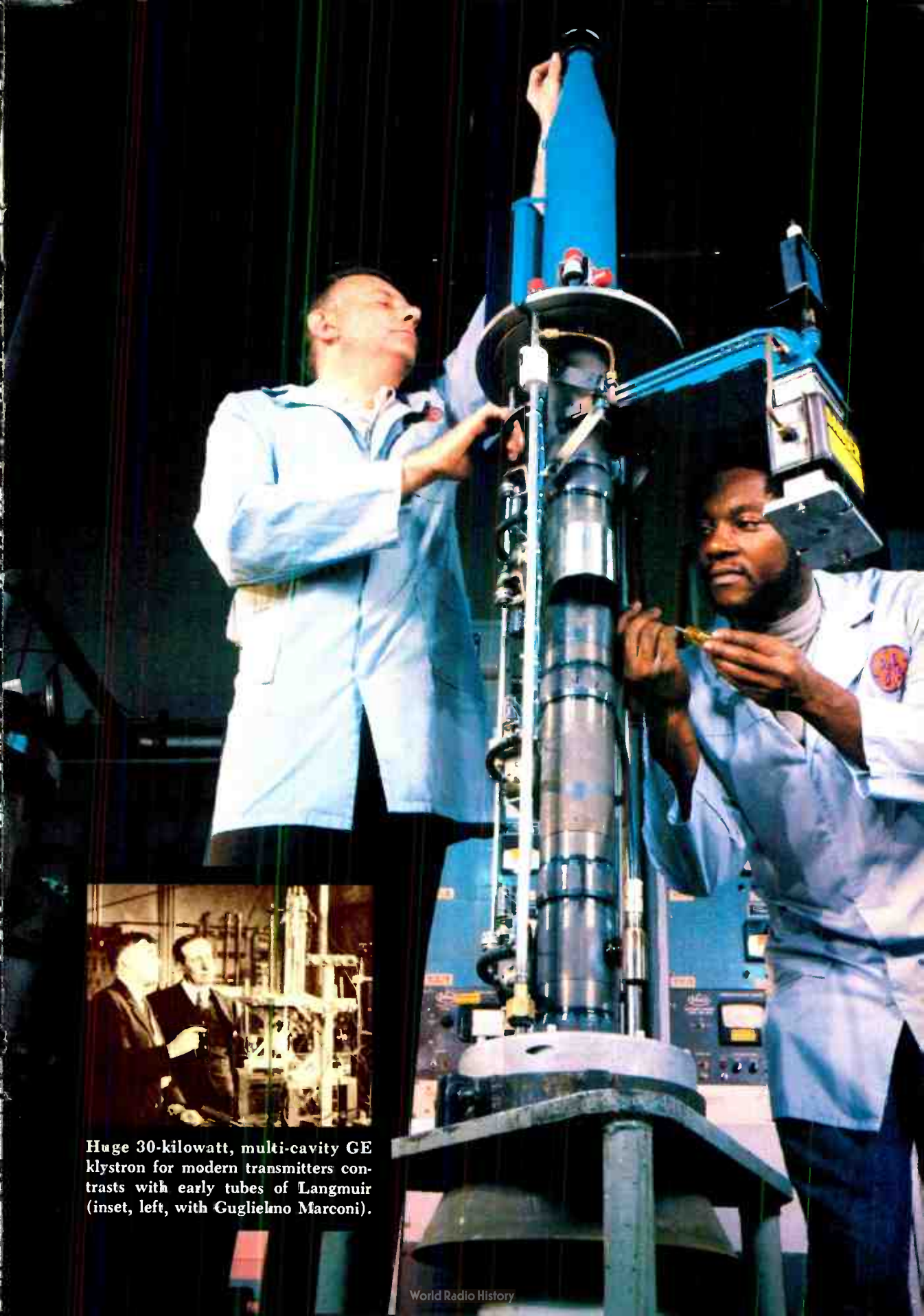
By 1913, Langmuir had made a major contribution to the parent science of electronics by explaining the electron tube space-charge phenomena. He applied for a patent on a new tube, the plotron, that was characterized by its constant vacuum, freedom from gaseous effects and steady,

reliable operation. Unlike previous flea-power types, the plotron could operate at up to 50,000 volts and handle kilowatts of power. The tube was exactly what Alexanderson needed: it could amplify the microphone's tiny voltages to make his magnetic amplifier efficient and pave the way for a high-power transmitting unit. Langmuir continued his prolific contributions to electronics and allied fields. His related studies in surface chemistry led to his receipt of a Nobel Prize in 1932—the first to a scientist employed by an industrial laboratory.

In succeeding years, further electronics innovations were developed by Langmuir, Alexanderson, Whitney and Coolidge, working with associates including Dr. Saul Dushman, William White and Dr. Albert Hull. These included the use of tubes in a radiotelephone transmitter operated from a-c (1915), thoriated filament power tubes (1921), the photoelectric relay principle (1923), thoriated filament receiving tubes (1923), the magnetron (1924), first rectifier tubes to eliminate batteries in home receivers (1925), the glow-discharge regulator tube and screen-grid tube (1925), the cathode ray tube (1926), the thyatron (1928), the Alexanderson radio altimeter (1928), glass-to-metal seals for vacuum tubes (1932), and the steel envelope radio tube (1935).



Alexanderson alternator circa 1912



Huge 30-kilowatt, multi-cavity GE klystron for modern transmitters contrasts with early tubes of Langmuir (inset, left, with Guglielmo Marconi).

These early developments supplied many needed building blocks for radio broadcasting. Another was the development of the first practical loudspeaker in 1925 by GE engineers Chester Rice and Edward Kellogg, allowing radio fans to remove their ear-phones and fill the parlor with sound. And it was GE's Charles A. Hoxie, working on a high-speed recorder for transatlantic radio signals in 1919, who devised a means of recording complex sound on motion picture film. He called it the "pallphotophone." The Hoxie method of making talking movies is the one used virtually everywhere today.

GE begins broadcasting

"This is station WGY . . . W, the first letter in wireless, G, the first letter in General Electric, and Y, the last letter in Schenectady."

Those words introduced General Electric's first broadcasting station at 7:47 p.m., February 20, 1922. The audience consisted of only 300 amateur radio fans, but they were treated to a 63-minute program of live music and song. WGY was soon joined by sister stations KGO, Oakland, in January of 1924, and KOA, Denver, in December of 1924.

As technical developments emerged from the GE laboratories, they were conveniently tested at WGY and the Company's two experimental shortwave stations, 2XAF and 2XAG, that began operation in July of 1925 and provided global coverage from a 54-acre plot in South Schenectady. The voice of General Electric was heard clearly in Australia and Europe and by the Byrd Antarctic expeditions.

While WGY achieved many firsts, one of the most notable occurred August 3, 1922, when it

broadcast the first radio drama, "The Wolf." The event expanded radio's dimensions by proving that a play could be presented solely via the medium of sound.

Meanwhile, the dream of adding sight to radio was realized by Dr. Alexanderson. In 1926 he developed a mechanical scanning disc system of transmission and gave a public demonstration in January of 1928. WGY, recognizing the potential of video, again made history by producing the first dramatic program on television September 11, 1928. It was a blood-and-thunder, 40-minute play entitled "The Queen's Messenger," with but two characters performing before three simple cameras.

Frequency modulation and radar

In 1928, GE put radio on wheels by demonstrating a 50-watt radio-telephone used on board a New York Central train. By 1934, the Boston police were using a new two-way mobile radio system—GE's first such installation and the base for the present GE business in mobile radio. In September 1939, the Company convincingly demonstrated the advantages of noise and static-free FM (Frequency Modulation) for mobile communications in a side-by-side test with AM for the Federal Communications Commission. GE Broadcasting officially inaugurated FM on November 20, 1940, at Proctor's Theater in Schenectady and, in 1961, GE pioneered a stereophonic FM broadcasting system that was adopted as the nation's standard.

With the outbreak of World War II, GE dropped its commercial radio development and converted its electronic technology to wartime needs. No device



First TV drama, WGY 1928.

GE's Key Dates in History

1959—Lucalox®—a new light source is announced. 1961—GE opens Space Center at Valley Forge, Pennsylvania. 1964—Fred J. Borch becomes president and chief executive officer and Gerald L. Phillippe is board chairman with retirement of Ralph J. Cordiner. 1969—Project Apollo lands man on the moon, with 37 GE operations and 6000 employees involved in the project. 1970—Synthesis of gem-quality diamonds announced.





A forerunner of today's missile and satellite detecting radar was this high-power radar laboratory built, installed and operated by GE-Syracuse in the late 1950s on Trinidad Island down range from NASA's Cape Canaveral, Florida, space facility.



50 years after Alexanderson's first TV receiver (above), GE remains a leading U.S. supplier of radio sets and an innovator in TV, offering new developments such as VIR and Widescreen 1000.

GE Broadcasting operations include TV station WRGB, left, three AM, three TV and five FM outlets, plus 12 cablevision systems.

contributed more to the success of the war effort than radar, and at its heart were GE electron tubes, including Hull's magnetron. From the Spring of 1941, when the Navy ordered 400 sets of early-warning radar, through the war years, the Company participated in the design and manufacture of over 50 types of radar for the armed forces. Postwar radar developments have included high-power acquisition radar produced between 1957-71, long-range surveillance units in operation since 1960 and new, over-the-horizon designs for the 1980s.

Electronics Park

In 1945, the Company began construction of Electronics Park in order to consolidate its scattered electronics operations. The 155-acre complex near Syracuse, New York, was completed in 1948. The Electronics Laboratory was soon announcing significant achievements, including the Company's first magnetic drum memory digital computer, OARAC; the uni-junction transistor; the first all-transistor radio; and the first double sideband anti-jamming (Costas loop) receiver. Electronics Park also became a significant semiconductor center, helping GE emerge as the leading germanium diode supplier.

GE scientists continued to make significant discoveries in solid-state physics. In 1950, Dr. Robert N. Hall found that indium and germanium could be used to make alloyed P-N junctions—the basic elements of power rectifiers and some transistors. In 1960, Ivar Giaever's discovery of super-conductive tunneling opened the possibility of a new class of electronic devices and led to his award, in 1973, of a Nobel Prize. Other GE firsts

included the commercial plastic signal transistor (1961); commercial plastic SCR (1965); and tape-automated semiconductor packaging providing a means of manufacturing integrated circuits in high volume and at low cost (1970).

Electronics for industry

Since 1901, when GE developed mercury-arc rectifier tubes for street lighting, electronics have been increasingly applied to industrial uses. Variable controls of motors were most common, and photoelectric tubes were made in quantity by the Company starting in 1930. GE ignitrons were used in electronic welding controls beginning in 1934 and expanded to include motor drives. In 1963, ignitrons yielded to the silicon-controlled rectifier (SCR) with the application of a SILCO-MATIC® SCR power supply converting a-c power to drive 12,000-horsepower d-c motors in the rolling of steel plate—thus establishing a major trend in the industry by replacing motor-generator sets.

In addition to components, the Company developed electronic systems for improved industrial productivity. Typical was the introduction in 1959 of GE's solid-state DIRECTO-MATIC® Electric Control System, a sophisticated approach to controlling the numerous manufacturing processes in metal rolling mills. In the early 1960s, programmable controllers were developed for use in steel, power generation and petrochemical industries.

One of the most dramatic applications of electronic technology has been in computer timesharing, a concept launched by the Company in 1963. The idea of several users sharing the same computer



GE researchers Hull and Dushman.

1972—Reginald H. Jones becomes board chairman as Fred J. Borch retires. 1973—Nobel prize for physics awarded to Dr. Ivar Giaever of the GE R&D Center. 1976—Utah International Inc. merges with General Electric. VIR television receiver introduced. World's largest hydroelectric turbine—from Canadian GE—installed at Grand Coulee Dam. 1977—The world's first all-solid-state, long-distance HVDC transmission project is completed.





New microprocessor used to improve existing systems is checked on an "emulator" (above) in General Electric's Electronics Laboratory.



New GE-MOV® varistors, above, protect sensitive solid-state components against voltage surges. Integrated General Electric communications system (left) provides electronic efficiency for modern police and fire operations.

at the same time was developed by General Electric and Dartmouth College, utilizing a simple computer language dubbed "BASIC." By 1965, GE introduced a commercial timesharing service that grew to a network of 42 U.S. cities by 1969, via satellite into Europe by 1971, and subsequently to Japan and Australia by 1973. In 1976, General Electric cut the ribbon opening its first overseas computer "supercenter" near Amsterdam, the Netherlands, adding to those already in operation at Cleveland, Ohio, and Rockville, Maryland.

The GE MARK III® Service computer network today provides computational capabilities to over 600 cities in 21 countries in 21 time zones. The network supports a variety of terminals and handles a peak load of approximately 1,800 simultaneous users daily. This is accomplished by integrating over 200 electronic minicomputers, which concentrate and route traffic over 300,000 miles of telephone lines.

Teleprinters

An integral part of the growth of computer time-sharing has been the parallel development of high-speed teleprinter technology. GE entered the field in 1969 with its TermiNet® 300 printer, a device that utilized large-scale, solid-state integrated circuitry. The printer provided an operating speed of 30 characters-per-second, which was three times faster than conventional printers of the day. Today, General Electric offers a wide variety of teleprinters ranging in speeds from 30 characters-per-second to 340 lines per minute.

The future of electronics

"Solid-state electronics is rapidly permeating all phases of the Company's businesses," comments Dr. James M. Lafferty, manager of the Research and Development Center's Electronic Power Conditioning and Control Laboratory. He sees more integrated circuits, power devices and microcomputers at work in the years ahead.

How will an increased use of minicomputers affect products? Dr. Jerome J. Suran, manager of the Company's Electronics Laboratory, predicts that many products will have computer circuitry built in. "For example, to accomplish energy management in the home," he says, "our refrigerator and washing machine may 'talk' to each other and automatically stagger their duty cycles to minimize energy use and balance the electrical load."

Dr. Suran explains that trends clearly show that the increasing complexity of computers is rapidly approaching that of the human brain. "Based upon this increasing sophistication of computer functions, we can project that in about 20 years, for the price you'd pay for a color television set, you could be able to buy your own robot. This household servant will be trainable, will be able to recognize people, do household chores, maintain records such as family medical histories and so on. All this is due to packing more complex electronics into less volume."

The consensus is that electronics has come of age in the years since Edison and that GE's first century marks but the end of the beginning.



New GE high-speed teleprinter.



Modern electronics at work includes GE Information Services Mark III® network (above) serving over 5000 customers worldwide and, right, GE Mark Century® machine control.



Making 'extra time' productive

These three GE people use it to help others.

Fighting illiteracy. More than 21 million Americans, 16 years of age and older, have serious reading deficiencies. These functionally illiterate individuals are commonly the jobless, poor and alienated. They often lack the skills to cope successfully as workers, citizens and parents.

In New York's Onondaga County, home of GE-Syracuse, more than 8000 adults are classified as "nonliterate." Helping curb this illiteracy problem is Semiconductor Products Department's Idella B. (Dell) Ford (left), an employee relations program clerk: "Lifesaving directions on a medicine bottle are meaningless to people who can't read. Access to driver's licenses, Social Security cards, cooking recipes and newspapers are all denied the nonliterate individual."

Now in her seventh year with Literacy Volunteers of Greater Syracuse, Ford devotes 20 hours per month to helping nonliterate adults improve their reading, writing and speaking skills. She also serves as a workshop leader in training others to aid illiterates.



Overcoming earthquakes. The temblor that struck Managua, Nicaragua on Dec. 23, 1972 destroyed the Evangelical Temple Mission School in the city's poorer section. Responding to a delayed distress call, General Purpose Control Department's George A. Lowery, a tool grinder, journeyed to Nicaragua last year with two other church members to rebuild it—paying part of his own way for the 10-day working vacation.

"A person must live through the daily discomfort, see the people's houses put up with just boards and corrugated steel roofs, to understand the feeling one gets in finishing this kind of job," says Lowery. His work party added two rooms to the school, which made space for 50 more students. He is shown here placing timbers on top of the school's steel-roof trusses.

Lowery went on a similar working vacation in 1973, that time to Kendleton, Tex., where he helped install a heating system in the boys' dormitory at Bay Ridge Christian College.



Teaching English. Last fall, four General Electric de Mexico, S.A. (GESAMEX) employees approached their Mexican manager, Consumer Products Operation's Salvador Rojas (left), and asked him to teach them English. Rojas, who taught himself English and speaks it fluently, agreed to teach them before work three days per week from 7 to 8 a.m.

Word spread rapidly. More GESAMEX employees asked to join Rojas' class. Presently, his class enrollment stands at 17 students from Finance, Manufacturing, Marketing and Relations. He provides the course material and does not charge his students for his time and effort.

What does Rojas do when he finally gets home at night? "I attend the University of Mexico four evenings per week," he notes. "I'm working toward a bachelor's degree in economics."



India's Shirish Tanna:
via Malawi, Bombay and London

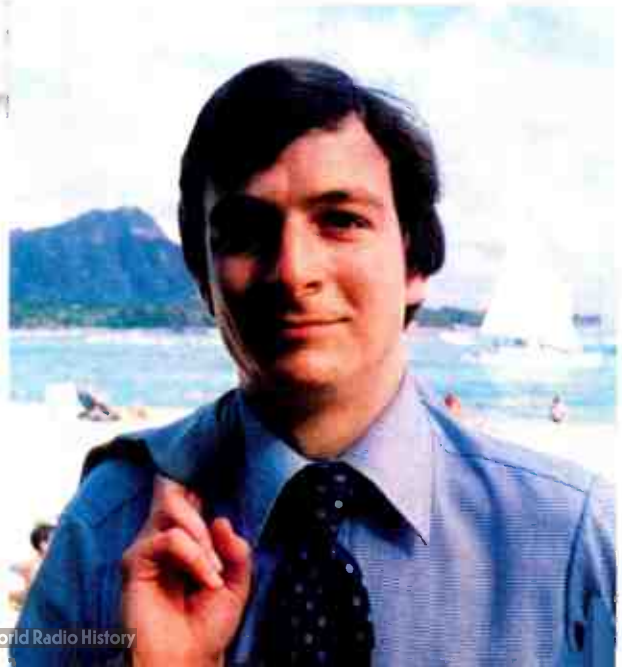
Shirish Tanna came to GE's International Marketing Program with a varied international background already behind him. A native of India, he moved with his family to Malawi in Africa when he was five. Then he went back to India and received his electrical engineering degree from the University of Bombay. Next, he spent four years in London with another firm, before joining the IMP there eight months ago.

"I was attracted by the opportunity to join a large international company that had a 'customized' training program."



◀ **Muhammad Al-Lamadani:**
a Saudi in Schenectady

"Working with many GE people has given me a 'pluralistic' view of GE business," notes Saudi Arabia's Muhammad Al-Lamadani, now with Schenectady's Gas Turbine Division. He holds a B.S. in mechanical engineering from the University of Petroleum and Minerals in Saudi Arabia, and an M.S. in engineering management from the University of Kansas. "I joined GE's Technical Marketing Program before enrolling in the IMP."



America's Jim Gosart draws
Honolulu 'dream' assignment

After three IMP assignments in the continental U.S., Stratford, Conn.'s James M. Gosart has drawn a "plum": in ESSD's Far East Sales Operation office in Honolulu. States the Cornell electrical engineering graduate: "For me, the meaning of the IMP is that it's a fast and sure way to get to know the Company. I've worked in Medium Transformer operations in Rome, Ga., in Gas Turbine in Schenectady, and at International headquarters in New York."

An ardent rugby player, Gosart has found rugby buffs wherever he's gone. His present team: the Honolulu Harlequins.

International Marketing Program enables engineers from many nations to accelerate their development.

'New faces' in GE export sales

In business, having the right person in the right place at the right time often spells the difference between a black-ink ledger entry and a red-faced rationalization about why the "Big One" got away. Headquartered in New York City, General Electric's Export Sales and Services Division is out to land a maximum number of new international orders, by being more attentive to the "people" factor.

As of this summer, 18 graduate engineers—comprising 10 nationalities and representing 13 nations plus the U.S.—are enrolled in ESSD's International Marketing Program, a recruiting/training plan that includes GE's Technical Marketing Program and that is designed to enhance GE export sales. Among the benefits already realized: increases both in productivity and in the interpersonal effectiveness of ESSD's export sales force.

States the program's chief supporter, ESSD's Kristian H. Christiansen, VP and general manager: "The Company's international business represents an increasingly large part of its annual revenues, totaling about one-third of all revenues for 1977. Our people's continued sales success abroad is of prime importance. The conduct of today's foreign business is complex, and we need individuals who can bring us that 'extra ingredient.'"

Exactly what is that ingredient? "Call it cultural affinity—a close identity or empathy with the customers with whom you're in contact," explains Christiansen. "An understanding of the culture and protocol of the country in which you work can provide a helpful entrée to certain customers—and makes you more useful to your product-department 'clients,' the GE folks for whom you sell everything from gas turbines to switchgear."



VP Kris Christiansen

IMP's "international look" derives from careful recruiting in three primary areas:

- Offshore university and college systems, through Area Divisions' local sales offices.
- GE's Technical Marketing Program.
- American universities and colleges.

The intent, of course, is to provide a worldwide balance between cultures, languages, and technical and sales abilities. IMP graduates have the opportunity to return to their areas of origin so that they can

best utilize their *total* background.

Four types of potential GE engineers are sought:

- "Local nationals"—foreigners who, once they complete their IMP training, will return to their native country as GE export sales representatives.
- "Third country nationals"—foreigners who eventually will be assigned by GE to a country other than their own or the U.S.
- "Ethnic" U.S. citizens—persons who enjoy close cultural ties with another country, whether they were born there or not, and who wish to relocate overseas.
- Other U.S. citizens—persons who wish to enroll in GE's Technical Marketing Program, but who also desire international experience either in ESSD domestically or abroad.

Notes Christiansen: "We insist on hiring *engineers* even though they will work in a marketing capacity. Technical competence is the key to selling sophisticated products—and selling products is the bottom line."

The IMP member's first assignment is normally the ESSD office from which he or she was originally contacted—in some cases, the New York headquarters. In other cases, where the IMP member is recruited through the Area Division sales office, the first assignment normally would be in that local office.

(continued next page)

Following the first GE "exposure," IMP members are then scheduled for several other assignments, ranging in time from three to six months, in product businesses and ESSD headquarters. Each assignment is tailored to acquaint them with another Company business that they will need to know.

Formal GE career-development courses complement the individual's preparation.

"Off-program" placements from the International Marketing Program now total 10 people. ESSD initiated the program in 1976, and plans call for 20 to 30 engineers to "matriculate" through the IMP each year. Because of the many fast-developing nations in the Middle East, Far East and Latin America, heaviest emphasis is being placed on training "local nationals" and "third country nationals" to service these regions.

"An additional benefit of having IMP-member participation offshore is the contribution these employees make toward the vital 'missionary work' that is critical to the development of new markets overseas," notes Christiansen. "That's why ESSD, with 20 IMP training assignments now opened up worldwide, is uniquely positioned to provide the technical sales people required."

He concludes: "Training of people is the most important activity any company can do. In the years ahead, General Electric's export sales will depend largely on its having trained vigorous, culturally-attuned, technically-competent employees to become effective international representatives for the Company."



Miami's Dan Traxler calls on GE customers in Bahamas

"The IMP curriculum offers a chance to 'see the other side of the mountain' in the Company," remarks Wisconsin-born Daniel R. Traxler (l), with Latin America Business Development Division. Traxler has trained with Detroit's Apparatus Distribution Sales, Fitchburg's Mechanical Drive Turbine, Schenectady's Gas Turbine and Middle East Sales in Bahrain. His B.S. from the University of Wisconsin is in industrial engineering.

"The highpoint of my IMP career was demonstrating GE street lamps and luminaires to Abu Dhabi's ruling sheiks. We installed 12 units along the highway leading to the airport, and new orders resulted!"



◀ **Taiwan-born David Ho:**
hosts Commerce's Juanita Kreps


Assigned last year to GE's liaison office in Seoul, Korea, IMP member David Ho (second from left) helped tour U.S. Commerce Secretary Kreps (right) through the GE exhibit at the annual U.S./Korea Electronic Show. "My IMP 'exposures' have taught me how countries' financing patterns and engineering standards affect export sales."

A Taiwan native, Ho immigrated to the U.S. in 1966 and received his B.S. in industrial engineering from Columbia. His GE assignments have included Lynn's Medium Steam Turbine, Schenectady's Gas Turbine and New York's ESSD.



◀ **Puerto Rico's Jose Montes:**
picking up skills in Plainville

San Juan's Jose A. Montes already has completed IMP assignments with DC Motor and Generator in Erie, Pa., Medium Transformer in Rome, Ga., and ESSD in New York. His present position: with Plainville, Conn.'s Distribution Assemblies Department. "I think I'm a 'broader-gauge' employee for having experienced such a large number of technical and commercial situations in various General Electric businesses."

Montes received his B.S. in electrical engineering from the University of Puerto Rico. 

Organization Changes

CORPORATE

Frank P. Doyle elected VP—Corporate Employee Relations

Gerhard Neumann, VP—Special Projects, reporting to Vice Chairman Jack S. Parker

CONSUMER PRODUCTS AND SERVICES SECTOR

James W. Cherol, General Manager—Refrigerator Manufacturing Department

William G. Gingrich, General Manager—Room Air Conditioner Department

John B. Hagerty, General Manager—Home Laundry Marketing Department

James F. West, General Manager—Home Laundry Product Management Department

INDUSTRIAL PRODUCTS AND COMPONENTS SECTOR

Paul H. Way, General Manager—Industrial Heating Business Department

INTERNATIONAL SECTOR

Alastair C. Gowan elected a Vice President

POWER SYSTEMS SECTOR

William A. Anders elected a Vice President

A. Philip Bray elected a Vice President

Henry E. Stone elected a Vice President

Bertram Wolfe elected a Vice President

Spiridon N. Suciu, General Manager—Neutron Devices Department

TECHNICAL SYSTEMS AND MATERIALS SECTOR

Fred O. MacFee, Jr., VP, appointed Group Executive—Aircraft Engine Business Group

Robert H. Goldsmith, VP—Aircraft Engine Strategic Planning and Development Operation

Louis V. Tomasetti, VP and General Manager—Airline Programs Division

Edward Woll, VP—Project and Technology Assessment, Aircraft Engine Business Group

James E. Worsham, VP and General Manager—Commercial Engine Programs Division

James N. Krebs, General Manager—Military Engine Projects Division

James C. Castle, General Manager—Ground Systems Department

Leroy E. Foster, General Manager—Valley Forge Support Department



Spit, polish and lipstick

More than just weekend warriors, these employees are 'gung ho' about their military commitments.



Esprit de corps among Lynn's Naval Reservists

Four Lynn employees spent their last two weeks in June on a beach at Kittery Point, Maine. Vacation? Their field uniforms, mobile radios and sonar gear told observers otherwise. Taking advantage of GE military pay benefits, Naval Reservists (l to r) Commander Edward N. Morris, Chief Warrant Officer Lewis C. Restuccia, Yeoman William J. Dore, Jr., and Chief Petty Officer Anthony Morano were on maneuvers as part of a Mobile Inshore Undersea Warfare unit—a combat-ready band of 72 individuals trained in coastal surveillance and harbor control.

S.CPO Morano, oldest member and thus “plank-owner” of the unit, sums up Reserve duty neatly: “It gives a person the opportunity to participate in something worthwhile—his country.”



Col. Wilda Weinman: a lineage of military involvement

In World War II, Wilda M. Weinman was an Army nurse at Ft. Jackson, S.C. During the Korean conflict, she was called to active duty on Guam. Today, Col. Weinman is Chief Nurse of an Army Reserve 1,000-bed hospital in Ohio. And at nearby GE-Euclid, she attends to lamp plant employees' needs as head nurse.

“If career-long military service to one’s country is another way of saying ‘patriotism,’ I accept the definition proudly,” she says. Col. Weinman is the 12th cousin of U.S. history’s greatest patriot: Gen. George Washington. Her choice of profession also branches from a family tree of special note: “My father was a country doctor, and my mother and oldest sister became nurses. It was only natural that I try to uphold a tradition of caring for others.”



Capt. Russell Gorman: from Oakland to the Pentagon

“This country’s Sunday punch” is how Capt. Russell W. Gorman describes the Naval Reserve. As a civilian, he is operations planning superintendent for Utah Transport, Inc., the marine subsidiary of Utah International Inc. He has been allied with the service since 1949, and his commitment is strong. “Russian sea power is increasing and our Navy is reducing its numbers. The Reserve’s ability to respond is vital.”

At Oakland, Calif., Capt. Gorman heads a Military Sealift Command Headquarters unit to augment the area command staff in an emergency. Four of his last five “two-weeks active” billets have been in the nation’s capital. Last duty: the Pentagon. He calls it “fun” and adds: “It all depends on what motivates you. For me, it’s a sense of accomplishment.”



Col. James Anslow: tank-training for Marine Reserve

“Leatherneck” Commanding Officer James W. Anslow, Syracuse-GE mechanical engineer, is getting his fellow U.S. Marine Reservists off their feet—and into tanks. He explains: “Traditionally, Marines have been called into combat as light infantry units. But their image is changing. Projected use of Marines in support of NATO will require their familiarity with armored heavy equipment.”

For the past two years, Col. Anslow has headed “Operation Drumbeat” at Ft. Drum, N.Y., to employ Marine Reserve units for mechanized-warfare training. Since first serving as an artillery officer on Okinawa in 1954, the “bird colonel” notes: “Over nearly a quarter-century with the Corps, I’ve been everything from a platoon leader to a tank battalion commander.”



**Spec. 5 Beverly Smith:
Army Reservist behind the wheel**

When Beverly I. Smith leaves the forklift truck she operates at GE in Columbia, Md., and reports to her Army Reserve base as a Specialist Five—she climbs into another forklift truck. Why? “I enjoy the work. It’s as simple as that.” Reservist training has provided her with a mastery of rough-terrain-class giant forklift truck operation. Recently fulfilling a two-week summer camp obligation, she now has added to her military driving skills by practicing for a two-and-a-half-ton truck operator’s license.

“What once was labeled ‘women’s work’ has always been boring to me. I like a job where I can move around a little.” What does she do when she’s not driving trucks? “I play first-base position in a GE softball league. I’m just one of the gang.”



**PO1.C. Richard Atkinson:
Coast Guard Reserve rescue**

Six years in the Coast Guard Reserve have led to a sea of experiences for Petty Officer 1st Class Richard H. Atkinson, GE-Somersworth, N.H., general foreman. He once skippered his 44-foot craft around 20-foot storm waves in what turned out to be a false-alarm rescue mission. He also was “discovered” at a Coast Guard children’s picnic and chosen for a character role as a Russian judge in a TV drama, “The Defection of Simus Kadurka.” He was named 1977 Portland District “Reservist of the Year.”

Weekend patrols of New Hampshire/Maine coastal waters as a coxswain and diver mean 24-hour duty for the Reservist. Whetting his Coast Guard interest: “I love the ocean and I love boats. It’s a healthy, constructive break from what I do at work.”



**Col. Robert Lynn:
directing state Air Guard operations**

On recommendation of the President, full-colonel rank in the Massachusetts Air National Guard recently was awarded to GE-Pittsfield technical marketing manager Robert O. L. Lynn. His duty: Director of Operations for all Air Guard mission-related activities in the state.

Col. Lynn joined the U.S. Air Force in 1951 as a fighter-interceptor pilot. “Flying got into my blood,” he recalls. And so in 1956 he signed on with the Air Guard Tactical Fighter Squadron. In the early 1960s, his unit was activated and sent to France for a year to be near the Cold War’s potentially explosive controversy at the Berlin Wall. Today? “While my military paper work has increased, I still fly supersonic aircraft in ‘red-flag’ maneuvers that realistically simulate actual battle conditions.”

Trip report:

Japan

What can we of General Electric learn from the people, the economies, the business systems of other lands? That was a key question threading through a *Monogram* reporter's recent visits to three of the "economic miracle" countries of the Orient—Japan, Korea and Taiwan.

A pre-trip overview was provided in New York by James R. Birle, VP—Far East Area Division.

Each of these countries has its own national identity and culture, Birle observed, but there are also common denominators.

Each of the three has come, in a relatively short time, from economic obscurity, even poverty, into the front ranks of the world's trading nations. "And they've done it despite great limitations in both fuels and raw materials," Birle noted.

How, overall, have they done it? "They've developed effective 'value-added' economies,



importing natural resources and then converting them into finished products for export at highly competitive prices. To manage this neat economic trick, each draws upon a literate, educated people with

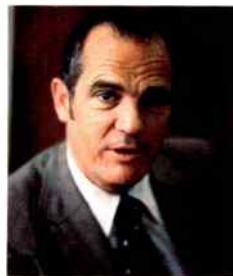
keen entrepreneurial and managerial skills. Also, the people have a strongly developed 'work ethic.' And all three nations plow back high percentages of their incomes as investments in advanced technologies."

There's another common denominator that Jim Birle hopes is not being lost on the developing nations of the world: "Each of these three countries, in varying degrees, demonstrates the vitality of private enterprise and individual initiative. There is, in each instance, more centralized control than we're used to, or believe in, but underneath this top shell of governmental direction they leave ample room for the innovator and the entrepreneur, and it's been a powerful factor in their economic successes."



In Tokyo, delivering U.S. exports

A primary lesson in how to build exports



"We in the U.S. could learn a great deal from the Japanese about how to compete more effectively for exports. The fact is, as Reg Jones has pointed out, that U.S. export trade has been losing ground, accounting for a declining share of the world's manufactured exports. Twenty years ago the U.S. share was 28%. Ten years ago it was 24%. Last year it was 20%. And behind those downtrending figures is the human angle—eight million U.S. jobs are tied directly to exports."

The speaker: R. Howard Annin, Jr., who, for the past five years, served as President and General Manager of General Electric Japan, Ltd., and as GE's National Executive for Japan. Annin has been elected a Vice President of General Electric and will, later this year, become VP—Northeastern Regional Relations in New York. But before leaving his Tokyo office, he met with the *Monogram* to wrap up some of the main impressions of his years in Japan.

In the period when the U.S. was becoming

continued on page 34

three Far Eastern dynamos

Korea



In Kunsan, GE STAG® plant

Up from poverty to one of today's most booming economies



South Korea is a country that is very proud of, and very excited by, its economic success and growth. That's the dominant impression left by a hurried, jam-packed visit to this peninsula appended to the great bulk of Asia.

J. Thomson Snedeker, manager of the Company's Korea Liaison Office and GE's Country Manager, agrees: "Current headlines about Korea don't tell the real story here," he told a visitor to his Seoul office. "Much more important, over the longer run, is the rise of Korea from near-destruction 20 years ago to one of the world's fastest-growing economies, with a solid GNP of \$25 billion in 1977, and with a steadily growing middle class. Two decades ago, people were eating the bark off trees to keep from starving. Many of these skyscraper-lined Seoul streets were mud lanes. Today, Korea's 10-to-11% annual real growth rate is the envy of other countries. And its success in winning export business is carrying Korea into the front ranks of the world's trading nations."

continued on page 35

Taiwan



Near Taipei, twin GE nuclear plants

Major economic projects open up markets for advanced technologies



"Buy American"—it's a familiar slogan in the domestic U.S., but could anyone expect it to be official government policy elsewhere in the world?

On the island of Taiwan, the answer is yes. The Government of the

Republic of China, under the leadership of President Chiang Ching-kuo, has used its "Buy American" policy to express the country's appreciation for past American aid.

And a great deal of buying Taiwan is doing. The Government is pushing toward completion of what it terms Taiwan's Ten Major Construction Projects and has already set the nation's sights on Twelve New Projects for the 1980s.

In their buying, the Taiwanese want to invest only in leading technologies. K. F. Yau, the affable young manager of General Electric's Taiwan Liaison Office and the Country Manager for GE, underscores the necessity of technical leadership in winning export orders for GE. "Taiwan favors American products. But at the same time they can't afford to invest in

continued on page 36

Japan (continued)

less of a factor in world trade, Annin said, the Japanese came zooming up, using exports as the base for their 10% annual growth rate until slowed by the recession of the past two years.

"A major factor is that in Japan there's a profound understanding of the importance of exports and of companies that operate on a worldwide scale," Annin pointed out. "While the U.S. Government has tended to discourage the growth of U.S. companies that operate worldwide, Japan's Government has done just the reverse. There's a cooperative approach between government and business. This relationship isn't the sort of monolithic single entity that's often been called 'Japan Inc.'—that's too harsh a term. But there is more of a team effort. Instead of being an adversary of its trading companies, the Japanese Government practices what they call 'administrative guidance,' providing business with direction as well as support in their mutual effort to win export orders."

While pursuing this aggressive export policy, the Japanese remain sensitive to their relations with other countries. "They penetrate other markets as far as they can," Annin said. "Then, when they meet opposition, they search for an accommodation to other people's objectives as well as their own."

This is happening now in Japan's relations with the U.S. "There is concern on both sides of the Pacific with the size of the trade imbalance that exists between Japan and the U.S. As a result, the Japanese are opening more opportunities for U.S. business to import into Japan."

Annin himself has served as GE's representative on a trade study committee focusing on

specific product areas where there are barriers inhibiting U.S. companies from competing in Japanese markets. "In major appliances, as a leading example, we're pressing the Japanese to apply the same standards for products entering Japan that are applied to Japanese products entering the U.S. And we've received indications of a favorable response. Gradually, American firms are finding it easier to do business in Japan."

One other point emphasized by Annin was the need for greater understanding of the true role of the overseas operations of U.S. firms. "So often in the U.S. these offshore affiliates are pictured as the agents for 'exporting jobs' and for manufacturing products at low labor rates to sell in the U.S." The more accurate view, in his estimation, is that most often an overseas affiliate is the ally of domestic operations, helping to increase U.S. business and U.S. jobs.

"By being on the scene," he said, "GE-Japan has most certainly helped U.S. operations to win export orders. And these have been substantial. A total of 15 GE-type boiling water reactors are operating or on order, and other types of GE generating equipment are in service. GE jet engines recently cracked the Japanese airline market. Over 30 GE Computerized Tomographic scanners are operating or on order. The list could go on and on."

The point is made particularly clear, in Annin's view, by the example of General Aircon, Ltd., the joint venture linking GE's Air Conditioning Business Division with the Toyota Group and Mitsui and Co. "This has been a very successful venture, supplying air conditioners to the Japanese market. Now, as the result of new agreements, GE major appliances from the U.S. will also be marketed through the extensive distribution channels of General Aircon, which includes Toyota Motor Sales domestic outlets."



Three interrelated phases of General Electric business in Japan: production of GE 'Skinny' air conditioners designed to fit Japanese sliding windows; Tokyo hospital installation of General Electric CT scanner; and display of U.S. exports of GE major appliances in Toyota auto showroom.



The GE affiliate has aided in the development of other joint ventures—in engineering plastics, silicone materials, electronics, information systems, nuclear fuel and drive systems.

Howard Annin summed up: “The Japanese firmly comprehend the benefits provided by their own international companies. We can only hope that eventually the U.S. public and U.S. Congress will come to similar positive attitudes.”

Korea (continued)

How have the Koreans done it? “They’ve developed a ‘value-added’ economy,” Snedeker said, “but they have done it in their own distinctive way. They emulate what they admire but are seeking to avoid what they consider mistakes in planning by other countries.”

Take the matter of age-career relationships. “In Japan the individual businessman usually can’t hope to reach a position of authority until he’s in his fifties. The Koreans, on the other hand, are quick to point out examples of young men who are running billion-dollar operations.”

Similarly, the Koreans make a point of not losing time on formalities. “They don’t stand on ceremony in business relationships. They pride themselves on being direct and candid.”

Here, again, an observer sees the results of close government-business cooperation in building export business. “Korea’s Government and industry are working together very successfully in such areas as applying great selectivity to their capital investments. They restrict new capital additions to those in which they can see a clear and continuing benefit to the value-added economy. If they succeed in their objectives, Korea won’t experience great amounts of

idle capacity such as that now existing elsewhere—in CB radio production, for example.”

The Koreans are also providing a model for adjusting to economic change. An example cited by Snedeker: Korea’s experience in textiles. “For a time, textile production was a big factor in Korean growth. But then, as Korean living standards improved, their industry began to lose the advantage of low labor costs. Today they’re managing a massive shift out of textiles and into more advanced technologies—electronics, heavy industry, petrochemicals.”

Korea’s growth is opening big new opportunities for General Electric to contribute to the nation’s progress. “Our biggest projects now,” Snedeker said, “are two GE STAG® plants—steam and gas turbine combined-cycle plants—going in at Kunsan and Yongwol. In another big energy project, we have a Large Steam Turbine-Generator licensing program with Korea’s Hyundai International Co. Also, Korean Airlines uses many GE-powered aircraft. Good experience with GE drive motors and control centers has led to orders to equip a new Ilssin Steel cold rolling mill. All in all, the products and services of more than a dozen GE operations are serving Korea’s growth.”

Snedeker sees several shifts in emphasis that are improving the Korean business climate. “The shift toward more sophisticated technologies is one change that offers greater potential for GE. Another is the Government’s move to reduce import restrictions—to make sure that Korea’s all-important export markets are not closed off through retaliatory actions.”

As a result of these and other changes, Tom Snedeker sees Korea as more receptive to foreign investment and the related imports needed to develop Korea’s domestic and export industries. “It’s a climate,” he concluded, “that spells increased opportunity for GE participation.”

General Electric’s participation in Korea’s booming economy includes controls and drive motors for new steel mill, as well as GE CF6 engines supplied to, and maintained for, Korean Airlines.



Taiwan (continued)

second-best technologies. China Steel is an example. In planning the huge integrated steel mill being built in stages, China Steel's managers studied the technologies of six different countries. They're delighted, and so are we, that GE drive motors and controls got the nod for their new cold plate mill."

From his office in Taipei, Yau keeps tabs on a variety of other GE involvements:

- Four nuclear plants of the Taiwan Power Company are being equipped with GE boiling water reactors, and two other nuclear plants will utilize GE steam turbine-generators.
- 74 GE electric locomotives have been ordered by the Taiwan Railway Administration.
- GE Lucalox® lighting is being used the full length of the new North-South Freeway.

Overall, the Taiwan story offers a dramatic example of how a country can, through good management and hard work, lift itself out of economic difficulties. "World War II left Taiwan in a state of ruin and disorganization," Yau explained. "But by investing their capital in economic and industrial expansion the people have moved their economy up in stages. First they strengthened their agriculture. Earnings from agricultural exports enabled them to develop light industries. Success with these, particularly in textiles, set the stage for the 1970s, when the country moved to develop its basic industries while also upgrading its economic infrastructure. Now the economy is gaining at a strong annual rate of more than 8% in real terms. And the country is self-sufficient—the U.S. aid program was terminated in 1965."

GE exports helping to advance Taiwan's ambitious multi-phase program to strengthen its economy include Erie-built electric locomotives and GE steel mill automation equipment.



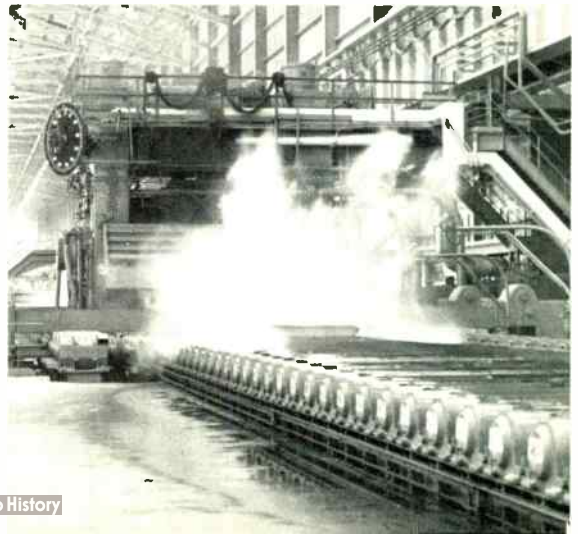
It's a phenomenon to behold: here on the world's 37th largest island, the eastern half of which is dominated by rugged mountains, the industrious Taiwanese have developed the "biggest little economy" anywhere. K. F. Yau is busily planning GE's further participation.

And in retrospect . . .

Making the trip's final lift-off, from Taipei's airport, a visitor feels that there's no such thing as an "economic miracle." These three countries *deserve* to have gotten where they are. Their people have made the hard decisions; they've taken the more rigorous and demanding road. Rising from chaos with U.S. aid, they have become independent, self-supporting nations.

Essentially, they've applied basic economics on a worldwide scale. They've sought out and invested in the most advanced technologies—both in products and in the processes for manufacturing them. They've forgone many of the West's social services and huge governmental complexes in order to give priority to capital formation and reinvestment in industrial and economic expansion. They have encouraged and forwarded their international companies rather than putting roadblocks in the way.

Their people are tough competitors. They're what one observer called "results-oriented"—that is, they concentrate with great diligence and self-sacrificing industriousness in getting the job done. At the same time they're far from being economic automatons. Certainly one American visitor found them unstinting in the time given to good-humored conversation, interesting bits of ceremony and moments of grace—exchanges that provided the most memorable aspects of a highly memorable trip. ▲



Seeking the Atlantic's oil



Energy hope in the Atlantic is Exxon's *Glomar Pacific* (above), crammed with electronic equipment and literally tons of GE products.

GE products—from diesel engines to solid-state rectifiers—are helping Exxon's new drill ship explore for energy off New Jersey's coast.

If success crowns Exxon Corporation's efforts to locate oil and gas in the Baltimore Canyon section of the sea floor stretching from Long Island to Maryland, a lot of General Electric people will have had a hand in it.

Exxon's drill ship, the *Glomar Pacific*, owned and operated by Global Marine Corporation, started the quest March 29 when it began to sink a 14,000-foot test well about 95 miles off New Jersey, with products aboard built by seven GE components.

Four GE 16-cylinder diesel-electric power modules, built by Erie's Locomotive Operations, are powering the *Glomar Pacific*, providing power for propulsion, ship's service and drilling. Six 1600-hp motors built by Erie's DC Motor and Generator Department are supplying propulsion for the ship's twin-screw drive. In addition, DCMG employees built the five 1675-hp thruster motors—three forward and two astern—which drive propellers used for dynamically positioning the ship during drilling operations.

Erie's Transportation Equipment Products Department enters the picture with 10 drilling motors used in the drill rig operation. Three of these motors are driving the drawworks, one drives the rotary table, four drive mud pumps and two drive cement pump units.

Besides GE-Erie, other Company plants also have their products aboard, making the *Glomar Pacific* virtually a "GE ship."

Other products include:

- four marine a-c generators from Schenectady's Large Motor and Generator Department;
- nine silicon-controlled-rectifier (SCR) solid-state units that provide drilling and propulsion d-c power, from Salem's Drive Systems Department;
- motor controls from Salem's Industrial Control Department; and
- low-voltage switchgear from Plainville's Distribution Assemblies Department.

Application engineering and field sales were provided by Marine and Defense Facilities Sales Operation, and equipment installation was supervised by Installation and Service Engineering Business Division.

The high-stake gambling by the oil industry for Atlantic hydrocarbons involves a "billion-dollar risk"—with possibly no return on investment. Thirty-seven companies have paid the Federal Government \$1.1 billion simply for the right to drill on 93 tracts covering 529,466 acres in the area. To operate the *Glomar Pacific*—idle or not—costs Exxon \$110,000 a day.

Success is not certain by any means. Chances of finding oil at the first of Exxon's six initial exploratory drill sites are no better than one in five. But it's a calculated risk, and if it pays off it can go a long way toward helping straighten out the nation's balance-of-payments deficit.

Imported oil last year cost the U.S. \$45 billion, compared to \$5 billion in 1972. The U.S. 1977 trade deficit was \$29 billion—about three times higher than any previously experienced.

A sister ship to the *Pacific*, the *Glomar Atlantic*, with a similar amassment of GE products aboard, is now under construction. Delivery is expected later this summer. ▲

Government or private enterprise:

who should manage our natural resources?



By
Alexander M. Wilson
President and
Chief Executive Officer
Utah International Inc.



Government and private enterprise share awesome responsibilities for the economic well-being of nations. One of the major differences of opinion between government and industry today is over who should play the role of manager of our natural resources.

Mining and its relation to the prosperity of nations is almost as old as recorded history. Copper was being mined and extractive metallurgy practiced at Timna in Israel's southern desert as far back as 4000 B.C.

The rich mines of Laurium not only saved the Greeks from Persian domination 2500 years ago, but also provided Athens with a monopoly of silver in the Mediterranean world. This bolstered the economic power of Athens and helped lead to the golden age of Greek commerce and culture.

Today, mining and the extraction of natural resources remain a dominant force in the development of nations, and the role of government is obviously vital. But that role should be carefully appraised and

thoroughly understood.

The role of government in a democracy is to promote the general welfare. The role of private enterprise—and the social justification for its existence—is to provide the economic basis for the material well-being of the community.

I believe strongly that resource *management*, as distinguished from *policy setting*, is best left to the private sector—and that the market forces of supply and demand, and the contributions of private enterprise, provide optimum benefits. This does not in any way lessen the vital role that government must play.

Part of that role is to set the rules under which natural resource companies operate. Those rules, in turn, are influenced by government-established priorities that determine the rate of growth of sectors of their economies.

If it is determined that the stimulation of natural resource industries is a high social priority, then government initiatives in such areas as tax policies, regulations, royalties and price manipulation must be carefully examined and balanced against the higher-priority purposes.

Unfortunately, many governments today throughout the world are deeply involved in direct resource management as a consequence of expropriation or government agency development—as well as indirectly through the application of exploration and mining codes, domestic development policies, fiscal and monetary constraints, international trade policies, and foreign investment regulations.

Over the years the trend has been toward more and more government participation in resource management. In most instances, *this has been counterproductive.*

Roots of the U.S. energy problem lie in the Government's attempt to manage both the resources *and* the market system.

Since 1959, the price of domestic crude oil has been influenced by the Mandatory Oil Import Program, which was implemented to *limit* the flow of *cheap* foreign oil into the United States. The program was intended to encourage U.S. production by protecting domestic producers from foreign oil which could be delivered at a fraction of the domestic cost. But its intent was frustrated when, in the 1960s, some countries were granted exceptions, and restrictions on residual fuel oil imports were eliminated. So domestic producers were not really protected by an erratic quota system.

Oil companies increased their investments in other nations. U.S. exploration and drilling became increasingly unattractive.

By 1973, when OPEC increased world oil prices four-fold, the result was this: there was no longer any significant excess capacity. Domestic oil prices continued to be held at levels well below replacement cost. And the U.S. energy crisis was finally recognized.

So, the U.S. consumer is now paying far more than the modest market increases that might have occurred *if the unrepeatable law of supply and demand had been respected by government.*

The U.S. Government controls 125 thousand million tons of coal reserves in the western U.S. Yet it is virtually impossible to open a new coal mine in the West today, despite the President's assertion that our national objective is to double coal production by 1985. Why? Because those who oppose resource development have succeeded in having a massive and comprehensive environmental impact statement mandated.

It's hardly likely that this will be ready until 1980 and, until it's ready, no Federal coal leases will be granted.

Resource management solutions, as well as investment and balance-of-payment remedies, are bound to be more technical and managerial in nature than political. Hence they are best left to market forces.

To insure a climate reasonably attractive to mineral investment, natural resource industries require certain favorable preconditions:


- A safe political environment.
- Security of tenure to the explorer with the risk capital.

- A skilled workforce.
- Infrastructure and support services.

It is a basic economic truism that investment capital will flow toward the most attractive opportunities. The investor must receive some assurance of an acceptable return.

Let me conclude with some basic precepts:

- Governments should avoid *management* of resource industries, concentrating instead on the policies, rules and tax treatments that stimulate the investments of those who should and can manage most ably.
- Governments should maintain *stable policies* over a long enough period of time to establish an international reputation as a favorable investment climate. Rapid change, even in the right direction, has unsettling effects on investment. Confidence sinks quickly, but returns slowly.
- Governments must realize that it is futile to seek investment capital if they do not create conditions offering some assurance of an acceptable economic return. How acceptable a return may be is directly related to the perceived dimensions of *risk*.
- In formulating broad social policies and actions, governments should avoid social welfare initiatives that outrun the ability of the economy to support. Such initiatives, in fact, create the need for foreign capital in the first place, by diverting needed money away from investment.

Governments which observe the simple realities of the market system can expect to resolve their problems of foreign exchange, balance of trade, unemployment and inflation and will continue to move forward both economically and culturally. 



LIGHTING OZ. When Dorothy and her dog Toto followed the Yellow Brick Road in the 1939 film classic, "The Wizard of Oz," they had to brave a dark forest. In Universal Studios' 1978 adaptation, "The Wiz," that isn't necessary. More than 53,000 GE lamps brighten the sets and help carry off the trick of turning New York City into Oz.

At a replica of the New York Public Library, where Dorothy finds the Cowardly Lion, 240 five- and ten-thousand-watt GE quartz lamps illuminate their meeting. In a sequence featuring the destruc-



tion of Evillene, Wicked Witch of the West, hundreds of GE flood lamps herald the freedom of Evillene's sweatshop workers. In the movie's most spectacular scene, 41,000 GE incandescent bulbs transform New York's World Trade Center complex into the Emerald City (above).

"The Wiz" will have its world movie premiere in New York on October 24, and stars Diana Ross as Dorothy, Michael Jackson as the Scarecrow, Nipsey Russell as the Tin Man, and Ted Ross as the Cowardly Lion.