GENERAL ELECTRIC

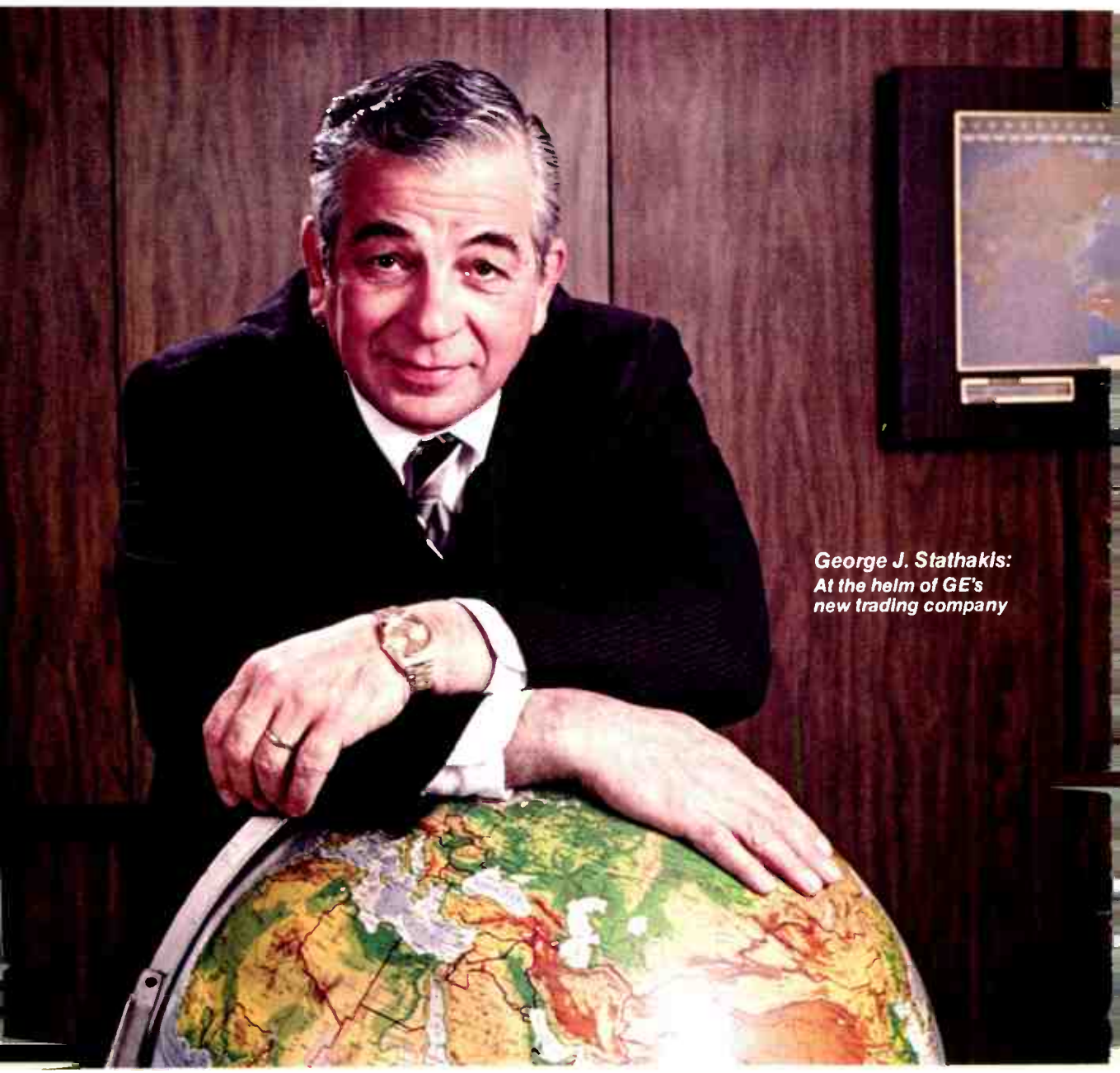
Monogram

May-June 1982

En route to world markets

New GE Trading Company

Charting a bold course



George J. Stathakis:
At the helm of GE's new trading company

to world markets

AMERICA is losing ground in the world marketplace.

For the past five years, the U.S. trade deficit has averaged close to $30 billion a year. And that trend is not about to change. More and more foreign multinational companies, with backing from their governments, are driving hard to capture markets here in America and around the globe.

Compounding this problem is the lamentable fact that of the 20,000 American companies which have attractive export potential, only one percent now account for four-fifths of all U.S. exports.

But help is on the way, and in the forefront is General Electric — a company that's been in the trading business since the turn of the century and is, today, America's largest diversified exporter.

GE has formed a new business venture — the General Electric Trading Company (GETC). Its mission is to market manufactured products for GE components and for other U.S. companies.

How will this help America? Or General Electric? And what kind of impact can GETC have in balancing trade?

Answers come from Executive Vice President Robert R. Frederick, who runs the Company's International Sector, and Vice President George J. Stathakis, who heads the new trading firm.

Frederick points out that while a decline in exports has been the trend in America since the mid-1970s, the opposite has taken place at GE. As Company business strategies have become more global, GE has boosted its exports dramatically — from $1.9 billion in 1976 to about $4 billion last year.

He also notes that President Reagan, in a proclamation in May on World Trade Week, indicated that a billion dollars of U.S. exports account for 32,000 jobs. General Electric exports alone supported 128,000 jobs in the United States in 1981, Frederick explains.

"Strengthening the U.S. economy and creating more and better jobs are obviously critical and immediate national objectives," he says. "Increasing exports is our best response, simply because markets suitable for U.S. products are growing faster internationally than here at home."

It is expected that the new trading company will help more American companies to become active and successful exporters.

As Frederick states: "Now, and in the years ahead, we face fierce competition in international markets. The flexibility of a trading company — and the fact that it can offer the world a full market-basket of top-quality U.S. products as well as GE's own sophisticated products and services — will be a real advantage. Our new enterprise is a perfect example of GE's new world view."

What are the advantages of a trading company? And how will GETC work?

Comments Stathakis, who is the President and Chief Executive Officer of GETC: "The atmosphere is clearly right for a trading company that can tap U.S. export strengths and help brighten the nation's economic picture. We bring unique skills to the trading company concept, such as our extensive in-place international sales and distribution network, our unmatched product diver-

What's a trading company?

■ *A trading company is a mechanism for facilitating the flow of goods and services across international boundaries. Seen from the domestic perspective, it's an exporter. It purchases products from manufacturers and markets them globally. And, since it takes title to the products, it bears the full risk of selling them in many countries. The trading company imports to the U.S. market. In addition to being a marketing organization, a trading company can function as a broker. It can conduct third-country transactions: it might buy German products and sell them to Mexico.*

sity and our well-established export services organization."

What Stathakis envisions is a "one-stop export service" which draws upon GE's present international marketing structure.

"There will be two main benefits to GE from GETC," he says. "Profit is one. The other is to provide GE SBUs with a more efficient export marketing vehicle. That means the ability to package GE products with products of other companies to create a more effective and attractive marketbasket. And we think that extending GETC services to external clients will provide us with a stronger presence on a worldwide basis."

An idea whose time has come. —Stathakis

Areas with high export growth potential will be the target of the new GETC organization.

"Selected countries in each region are likely to achieve growth rates of as much as 15% in the next decade," says Stathakis. "Many small-to-medium-size U.S. exporters and potential exporters face difficulty in tapping these dynamic markets because they have no marketing structure capable of reaching these customers. We do."

As for the contents of the GETC marketbasket, Stathakis says that among GE candidates will be motors, switchgear, transformers, contractor equipment, batteries and lighting systems—"the shorter-cycle flow goods types of products."

As for non-GE products, potential clients include some 2,500 domestic manufacturers of such items as hand tools, engines, compressors, blowers and fans, controls and instruments.

"The total market for U.S.-manufactured products that complement GE products is about $32 billion. We expect the export opportunity for these products to grow some 15% to 16% a year in many parts of the world," Stathakis says.

Among the major competitors that GETC will face are, predictably, the Japanese. The top six *Sogososha*—or Japanese general trading firms—rang up sales in 1981 of $290 billion, with about 30% involving third-world customers.

Notes Stathakis: "The *Sogososha* are practically synonymous with the term trading company. They have strong financial capabilities, economies of scale, experience and a strong entrepreneurial mentality. But they are vulnerable. Much of their experience is in commodities rather than manufactured goods. They aren't adept at dealing with small-to-medium-size U.S. manufacturers—the type GETC will serve. And, most importantly, their success in attracting U.S. suppliers has been minimal because of language and culture barriers. Our potential clients have repeatedly told us that they want to deal with a U.S. trader. They see the *Sogososha* as primarily a channel into Japan."

When GETC opens for business on July 1, it will consist of about 200 people drawn from the Company's International Trading Operations and field sales. More than half of them will be located offshore, says Stathakis. The majority of the staff will be sales-and-marketing-oriented, with a small support staff in finance.

GETC will also include the International Trade Development Operation, which will continue to be primarily responsible for the development and fulfillment of General Electric's counter-trade obligations (see next story).

GETC will operate on a "pay for performance" mode. Over time, most of its transactions will be on a buy/sell basis.

Stathakis explains: "GETC will buy standard products from clients and sell them on a competitive basis through local distributors and our local sales team. These transactions are expected to account for about 70% of our revenues by the mid-1980s. The balance will come from commission transactions, in which GETC will act as a broker."

When asked what qualities are necessary for success as an international trader, he listed marketing, promotional and entrepreneurial skills. "The individual must be comfortable in a total

transaction cycle—identifying the opportunity, moving quickly and then closing the deal. The entrepreneurial quality is most important."

During the second half of this year, GETC expects to book about $100 million in export orders. By 1985, expectations are for $1 billion in orders. By 1987, the figure is $2 billion.

"Our 1982 orders will be largely from GE apparatus and component businesses," says Stathakis. "But in the years ahead, we expect clients outside GE to account for an increasing share, so that by 1987 they will be about 55% of the total."

Stathakis says the reality of world trade, the need to boost U.S. exports and provide jobs at home, and the vast experience and resources of GE lead to one inescapable conclusion: "The General Electric Trading Company is an idea whose time has come."

The business of countertrade

THERE'S MORE to the intricate rules of the international trade game than just product and price.

Take the following case, for example, when General Electric's Aircraft Engine Business Group won a hard-fought competition to supply 300 F404 engines to the Canadian government. The package stipulated more than mere price and performance. It had to "industrially benefit" Canada's economy. This key requirement was met, in part, when GE placed a compressor blade and vane plant in Canada and agreed to generate substantial exports of other Canadian products.

And so it goes in today's complicated game of world trade. Gone are the days when it was enough to simply have good products, prices and sales personnel. Deals are complex. The rules are changing.

It is in this world that P. A. "Takis" Argentinis feels at home. He is GETC's Vice President and manager of International Trade Development (ITD).

"Trading," he explains, "is a critical skill these days, because so many governments now impose trading requirements on companies that want to sell in their countries. These may be for countertrade, which means a commitment to purchase products from the country to which an export is made; or for an 'offset' arrangement, as it is called in the context of military procurement."

Since 1976, when countertrade and offsets involved about 2% of world trade, the practice has grown to 30% of the nearly $2 trillion in global trade conducted in 1981. This growth also has been reflected in General Electric's export business. GE's desire to retain its top ranking as a diversified exporter mandated its participation in this significant world market segment.

"Most of the early requirements were associated with military sales," recalls Argentinis, "notably aircraft engines, which still represent the largest segment. But now, demands are being made in connection with the sale of many GE products, ranging from power generation equipment to materials such as plastics."

As a result, selling GE products overseas will frequently involve ITD in deals covering buybacks of various imported products. Typical of these are hardware, transformers, metal parts, molds, compressors, mopeds, chemicals, electronic components, and steel pipe. Argentinis and his associates seek buyers for such products both within and outside General Electric, in the U.S. and abroad.

"Some of the products involved in our deals are hard to sell," he says, "since the driving force behind many of them is a foreign government's use of its purchasing power as leverage for the forced sale of its products. Also, there may be no established market for these items, and they

P. A. Argentinis: "Traders must know how far to push and when to pull back. They must not be bluffed."

may not be the most technologically advanced. So, in order to minimize risks, we deal in medium-technology items where we can achieve good trade margins."

Failure to discharge GE's countertrade or offset obligation can lead to penalties, not to mention the commercial consequences resulting from damage to GE's reputation. ITD, therefore, will often transact on a break-even basis in order to dispose of the liability at minimum cost.

"Our charter in ITD is to manage and integrate countertrade and offset programs so that we can maximize export sales opportunities for the Company while minimizing our risks," explains Argentinis. "This means accurately evaluating the level of countertrade and offset needed to win the sale, identifying the products offered in order to avoid a glut of hard-to-sell items, establishing alternate means of fulfillment, such as through selected transfer of technology, and determining the amount of any potential risk brought about by non-fulfillment."

Within ITD's trading operation are GE traders, who are responsible for all the buy/sell activity from countries in which General Electric has undertaken trade obligations. They also put together complex and sophisticated multiparty arrangements, such as the purchase and financing of ships or the retrofitting of foreign-made oil drilling rigs with GE equipment in order to penetrate new markets. Working closely with purchasing specialists in domestic and international GE operations and with buyers of other companies, they seek products to buy. They can take title if necessary, and then sell to GE buyers or to other companies.

Traders work with many GE customers, suppliers, and third parties worldwide, for whom they act as finders, brokers, or sellers of goods.

It is the trader who is the critical figure in these complex negotiations.

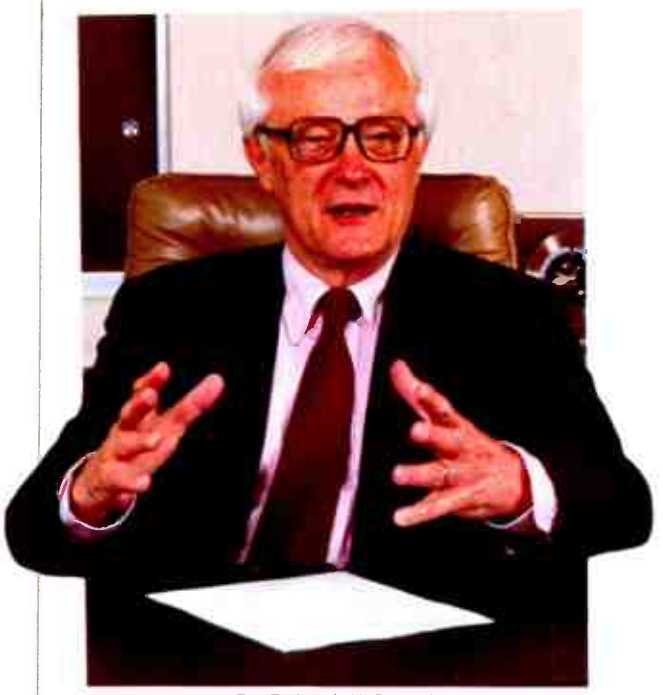
"The trader brings buyer and seller together and helps them bridge monetary chasms that may amount to millions of dollars," Argentinis notes.

Argentinis sees traders as very special people:

- They should be multilingual and at home in a variety of cultures. (ITD business deals can be conducted in 20 different languages, ranging from Swahili and Mandarin to Portuguese and Greek.)
- They deal in high-tech products, so they should have an engineering degree. Some also may need an MBA.
- Trade deals can be quite complex, involving not only the buying and selling of industrial goods, but also financing, marketing, barter, and clearing arrangements by several parties. Traders operate with very narrow 'opportunity windows.' They must be fast and totally prepared. The homework for preparing these agreements is awesome.
- At the bargaining table, mental agility is a must. During negotiations, they may be called upon to adjust a cash flow analysis on the spot. They have to be good listeners—grasping subtle nuances, cultural cues, and even body language signs.
- They must know how far to push and when to pull back. And, as professional negotiators, they must not be bluffed.

Sums up Argentinis: "All our agreements rest upon one simple business cornerstone: mutual trust. When our traders enter into negotiations, their ability to consummate a deal requires credibility. In this business, you operate on the basis of credibility, or you don't operate at all."

Selling GE products overseas, such as this large steam turbine being loaded aboard ship, will play an important part in countertrade.



Dr. Roland W. Schmitt

What R&D can do

It should be called the "can do" lab.

Situated on a bluff overlooking the Mohawk River, the Company's Research and Development Center in Schenectady, N.Y., has produced a steady stream of innovations. The modern x-ray tube, Lucalox® ceramic, the first reproducible process for making diamonds, the fan-beam CT scanner, and a host of other developments have poured out of this lab to create, or improve, General Electric businesses.

Since the Center was established in 1900, more than 10,000 patents have been awarded in its employees' names.

But what is Corporate R&D doing today? Where are its strengths? How can it help GE businesses be market leaders in the 1980s?

"We are exploring and developing the technologies vital to GE's business thrusts," answers Dr. Roland W. Schmitt, Senior VP—Corporate Research and Development. "We're a highly creative place, and we work very closely with GE businesses to get products into the marketplace."

This interaction between R&D and the Company's businesses is reflected by the increasing number of general managers and other GE executives visiting the lab: from 69 in 1980 to 93 last year to 81 during the first four months of 1982.

"Those general managers who haven't been here, or who haven't been here in years, are being urged by top management to come up and find out what we do well, how we can help them, and how we can interact with their businesses," adds Schmitt. "There's nothing like a general manager's perspective to sort out what's significant to the business, what should be emphasized or de-emphasized."

Schmitt notes that Corporate R&D tries to have 60% of its programs aligned with what the businesses will need in order to become, or remain, market leaders. The other 40% consists of basic research in the relevant sciences, with 10% of that in the "wild blue yonder"—high-risk, highly speculative research.

"Among our major efforts today," continues Schmitt, "are factory automation and materials development."

The Center is deeply involved in many facets of factory automation. Three examples:

• Industrial cameras. The Center is working with the Optoelectronics Systems Operation to further

improve the quality and capability of the Company's solid-state TV cameras, which have been used to measure and control industrial processes for several years. These "factory eyes" are based on an R&D invention: the CID (charge injection device) imager. It's a very large scale integrated chip the size of a fingernail.

• Computer-aided design. Current R&D programs in solid modeling will give Calma and other GE components more productive CAD tools. Using solid modeling techniques, designers and engineers are able to see—on their computer terminals—a three-dimensional picture of the part they are designing or analyzing. There are several benefits. Internal structures and external shapes can be seen clearly. Complex parts can be analyzed and changed without building prototypes. Tool paths can be generated directly and precisely from the three-dimensional model. Even test and inspection planning of finished parts can be integrated into the system. Another R&D program has brought computer-aided design and computer-aided manufacturing (CAD/CAM) to the art of mold-making. Center scientists developed a software package that eliminates the need for the traditional cut-and-try method for making molds, lowering production costs and drastically cutting product introduction time.

• Industrial controls. A recent development by Corporate R&D and the Industrial Electronics Development Laboratory is opening a new product opportunity for GE. It's the single axis controller (SAC), an electronic device that simplifies the control of such complex factory automation systems as advanced assembly and material-transfer lines. Instead of controlling the entire system from one central processor, the SAC concept localizes the control at each critical axis. This improves accuracy while freeing the central processor for other tasks.

In materials development, Schmitt cited ULTEM® polyetherimide resin and vacuum plasma spray technology (see pages 10-11).

Other key R&D efforts involve medical diagnostics and microelectronics. Corporate R&D and the Medical Systems Business Operations have a joint research project under way to develop nuclear magnetic resonance (NMR) into a commercial product. Medical NMR uses powerful magnets and radio waves, instead of x-rays, to produce images and obtain chemical and biological information about the body.

Meanwhile, a new electronics laboratory, to be dedicated in October, will increase the Center's research into very large scale integrated (VLSI) circuits. "As VLSI technology becomes proved, the applications will come pouring out of here," predicts Schmitt.

One of the Center's real strengths, says Schmitt, is its versatility. It has a staff of 1,050 scientists, engineers and technicians (including 425 PhDs) who represent every major scientific discipline. "If a chemist has a question about physics or mathematics, he can walk down the hall and get an answer," notes Schmitt. "That kind of resource helps us help the Company's businesses."

What follows on pages 10-13 are more examples of what GE businesses have been doing with the "can do" lab, a lab which GE Chairman John F. Welch says "never lets you down."

R&D engineer Allen W. Case, Jr., installs GE solid-state TV camera on an experimental assembler.

ULTEM resin: inventing new plastics

More than a decade of discovery and dedication came to a climax in February when General Electric introduced ULTEM® polyetherimide resin.

Hailed as the plastics industry's first new polymer in years, ULTEM resin is a perfect example of the continuing cooperation between Corporate Research and Development and GE businesses—in this case, the Plastics Business Operations (PBO).

"It's been a group accomplishment," says Dr. Joseph G. Wirth, general manager of PBO's Technology Department. "After the initial discovery, a lot of people made outstanding contributions that put all the pieces together."

Wirth contributed to the initial discovery—of a new polymer class, polyetherimides—while working at the R&D Center in 1971. Further development work, led by Dr. Howard Relles and the Chemical Synthesis Branch at Schenectady, produced a number of chemistry breakthroughs that simplified the process.

PBO, meanwhile, identified the market requirements for a new plastic and established a venture group in 1978 to develop polyetherimide chemistry into a new business. More process breakthroughs came from PBO's Technology Department, working with R&D Center scientists. Finally, an ULTEM resin plant was constructed in Mt. Vernon, Ind.

"ULTEM resin gives GE a material with the performance of specialty plastics, and the processability of engineering plastics," says Dr. Eugene F. Apple, VP and general manager—Specialty Plastics Division. "It provides PBO with a significant competitive edge."

It also expands the GE marketbasket of engineering plastics, which includes LEXAN® polycarbonate resin, NORYL® thermoplastic resin, and VALOX® thermoplastic resin.

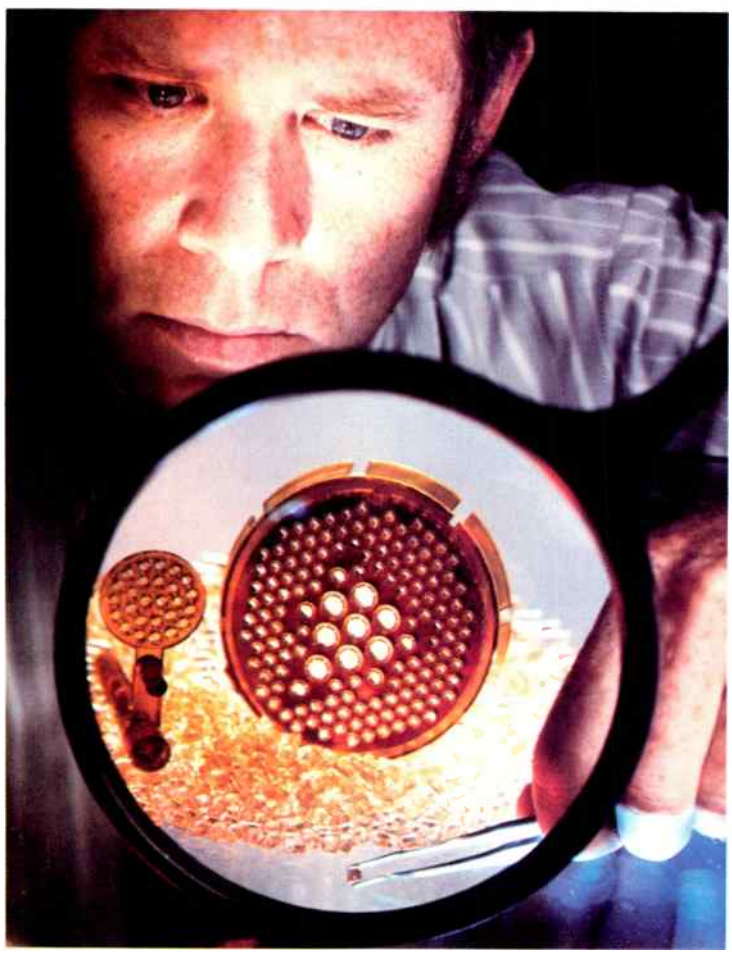
ULTEM resin has several key features. It has outstanding heat and flame resistance—it's designed to perform at temperatures up to 400° F, nearly 100° higher than any other GE thermoplastic can tolerate. It's easy to process. And the material has outstanding mechanical and electrical properties.

These characteristics make ULTEM resin ideal for electrical connectors, printed circuit boards, automotive components, appliances, and the interiors of aircraft and mass-transit vehicles.

"The possibilities of this material have challenged the imagination," adds Apple.

The material is evolving, too. GE has received almost 100 patents relating to the product, giving the company a very strong proprietary position.

"The same fundamental chemistry that led to ULTEM resin will lead to more value-added materials, ones with greater temperature capabilities and other improved performance characteristics," notes Relles. "We're looking at what we can do past ULTEM resin."



Dr. Howard Relles inspects pellets of a new GE plastic, ULTEM resin.

A technician at Aircraft Engine Business Group prepares the vacuum chamber for plasma spraying (inset).

Plasma spray: adapting a hot technology

Take a high-energy spray gun. Produce a stream of ionized gases, or plasma, that can reach 20,000° Fahrenheit. Inject a metallic powder. Then spray that molten metal, at 2,000 feet per second, against a form sitting inside a vacuum chamber.

Voilà: a new metalworking process.

The technique, known as rapid solidification plasma deposition, is being used to put protective coatings on buckets for heavy-duty gas turbines and on turbine shrouds for jet aircraft engines.

"The vacuum plasma spray produces superalloy coatings that are extremely strong and can resist corrosion and thermal fatigue," says the R & D Center's Dr. Paul A. Siemers, manager—Structural Plasma Program.

The process was refined by Corporate R & D in a three-way effort with the Company's Gas Turbine Division (GTD) and Aircraft Engine Business Group (AEBG). A key is the vacuum chamber. In it, molten particles solidify instantly upon impact. Densities approach 100%. There's no contamination. And the low pressure (1/20th of an atmosphere) creates a broader—and more useful—spray area than conventional plasma spray systems.

GTD, which first identified the process as a solution to a bucket corrosion problem that has plagued the gas turbine industry for 25 years, estimates that the new technology could double the life expectancy of its turbine buckets. AEBG also sees it extending the life, and reducing the cost, of shrouds that are rubbed by the tips of turbine blades.

The next step? Whole structures, instead of coatings. "Using this process," adds Siemers, "you can make more intricate shapes than you could by casting or powder metallurgy. Vacuum plasma spraying could become much bigger in the future, and we're at the forefront of this technology."

Coffeematic: a quick fix

Not all Center projects are long and involved or require massive infusions of money. The Coffeematic® drip coffeemaker is a case in point.

"The early Coffeematic had a tendency to emit a lot of steam and, like all drip coffeemakers, it was prone to clogging with hard-water minerals if not cleaned properly," explains Al DeMott, manager—Design Engineering for Beverage Products in the Housewares and Audio Business Division.

To minimize these nuisances in time to meet a production deadline, Housewares turned to Corporate R&D. After two intensive weeks, mechanical engineers Dr. Bahram Keramati and Dr. Ralph Wood emerged from their labs with an enhancement to the water-pumping system that would do the trick.

This fast turnaround was no small feat in light of the very complex flow phenomena involved in heating and pumping water inside the Coffeematic unit.

"What made the quick fix possible was our experience with much larger equipment, such as power plant steam reheaters," says Wood. "The two systems, despite size differences, have similar two-phase fluid flow characteristics," adds Keramati.

They proposed adding a low-cost plenum—a chamber where steam could condense and create a partial vacuum to increase the velocity of hot water going through the pipes to the coffee. "This significantly reduced steaming," notes Keramati, "and created a scrubbing action that helps reduce mineral buildup in the pipes." Housewares engineer Frank Miklas added a check valve to the plenum to further reduce mineral buildup by preventing hot water from flowing back into the heater.

Housewares, which began installing the combination condenser/check valve last June, forecasts a reduction of in-warranty clogging complaints from 2.5% to .5% because of these improvements.

Dr. Bahram Keramati pours a cup of coffee from the improved Coffeematic® for Al DeMott.

Dr. Wayne Nelson discusses STATPAC formulas with Carolyn Morgan (left) and Pat Caporal.

STATPAC: making the numbers work

Data, data, data. In this Age of Information, everyone—it sometimes seems—is analyzing data. How much of this, and how many of that? What are these numbers telling us? Which information is more important?

To make heads or tails out of the data they collect, many GE businesses have relied on STATPAC. A computer package for data analysis, it was developed by Corporate R & D in 1971. It's been enhanced periodically.

"We needed a versatile, easy-to-use system for making sense out of lots of data," says Dr. Wayne B. Nelson, leader of the GE team that developed STATPAC. "It was the first large package for data analysis that could be used by nonstatisticians."

Since its inception, STATPAC has been used more than 25,000 times. Virtually every GE component has accessed the program. And it has solved a myriad of business problems, from improving product performance to predicting sales to increasing yield.

For example, the Lexan Products Division in Mt. Vernon, Ind., used STATPAC to determine the optimum pressure, temperature and mixture of ingredients for improving its monomer yield. The Audio Electronics Products Department analyzed its warranty data and inventory with STATPAC to predict future sales. Statistical analysis of bird impacts on jet engine fan blades helped the Aircraft Engine Business Group select the toughest blade design.

STATPAC provides a variety of graphic displays and numerical analyses, so business managers, engineers and others can make better decisions from the available data.

"One of STATPAC's main advantages," adds Nelson, "is its ability to analyze product life data. That not only allows you to estimate warranty costs, but also helps you catch problems from test data and improve product life."

Currently, Corporate R & D is planning to develop a version of STATPAC that will run on minicomputers.

Dr. Ralph Alpher points to photo of Great Nebula in Orion, called "the birthplace of stars."

DR. RALPH ALPHER

Pioneer of the Big Bang

HIS NAME IS PHONETICALLY CLOSE to the Greek letter α (alpha), which means "the beginning." And appropriately enough, Ralph Alpher, a physicist at Schenectady's R&D Center, has devoted much of his life to trying to understand a true beginning—the origin of the universe.

"What could be more interesting than the problem of genesis?" he asks. "Imagine being able to say what the universe was like in the first moments after creation..."

Alpher and his George Washington University mentor, George Gamow, did just that in the late 1940s when they proposed a theory that the universe began with a gigantic explosion, the by-products of which were the chemical elements embedded in a sea of radiation. From these building blocks, the galaxies, stars and planets were formed.

Alpher, who was doing aerodynamic research for the Navy at The Johns Hopkins University, offered support for the theory in his doctoral thesis, "On the Origin and Relative Abundance of the Elements." He and Gamow then wrote a letter to the *Physical Review* describing the theory developed in Alpher's thesis.

Within days of the letter's publication, newspapers, wire services and magazines carried articles on Alpher's thesis. "For a week or two, I was interviewed almost daily," he recalls.

One conclusion that caught people's imagination was that the important part of creation occurred within the first five minutes. During the oral examination in defense of his thesis, Alpher found himself addressing an audience of more than 200.

Detractors earnestly attacked the theory. Some astronomers argued that their own observations indicated the universe had existed forever in a basically unchanged state, giving rise to the Steady State theory. British astronomer Fred Hoyle

insisted that elements were formed inside stars, and referred to Alpher and Gamow's theory derisively as the "Big Bang." The name stuck.

In his spare time, Alpher teamed up with another Johns Hopkins physicist, Robert Herman, to rework and extend the Big Bang calculations. The pair found that at least two elements — helium and deuterium — could not be made inside stars. And, in 1948, with new data available, they predicted that the Big Bang must have left behind a radiation background that would still exist. At that time, there appeared to be no way to prove that the radiation was there, so the Steady State/Big Bang controversy continued.

The radiation was there, as it turned out, but nobody was looking for it. During the next 17 years, astronomers discovered such exotica as pulsars, galaxies and quasars. The work of Alpher and his colleagues was largely forgotten.

Then, in 1964, a group of researchers at Princeton University was looking into the possibility that the universe might be cyclic — expanding, contracting and collapsing on a time scale of billions of years only to re-emerge in a new Big Bang.

As the Princeton group proceeded, it realized — as had Alpher, Gamow and Herman — that energy from the Big Bang (an echo, so to speak) should pervade the universe today whether the universe had gone through one Big Bang or was cyclic. As it prepared to look for this leftover radiation, the group learned that two Bell Labs researchers (who later received the Nobel Prize for their observations) had detected background radiation while developing an earth station for satellite communications. The Princeton group immediately interpreted it as the leftover Big Bang radiation. The Steady State theory was discredited; the Big Bang theory became the accepted model for the origin of the universe.

The published results of the Princeton/Bell Labs work made no mention of the theories of Alpher, Gamow and Herman, who had predicted the presence of the radiation 17 years earlier.

Alpher, meanwhile, had left Johns Hopkins and had come to General Electric. While his GE work has included research on shock waves, high-velocity gas flows and magnetohydrodynamics, as well as lengthy stints in strategic planning and technology forecasting, Alpher has continued to pursue cosmology as an avocation. He has co-authored papers on galaxy formation, the fundamental constants of nature, and the constant of gravitation.

It wasn't until 1975 that he and his frequent collaborator, Robert Herman, received the first credit for their work on the Big Bang theory. That year, they garnered America's oldest award for scientific research, the Magellanic Premium of the American Philosophical Society. More honors followed: the Georges Vanderlinden Prize of the Belgian Royal Academy of Sciences, Letters and Fine Arts in 1975; the John Price Wetherill Medal of the Franklin Institute in 1980; and the 1981 New York Academy of Sciences Award in Physical and Mathematical Sciences.

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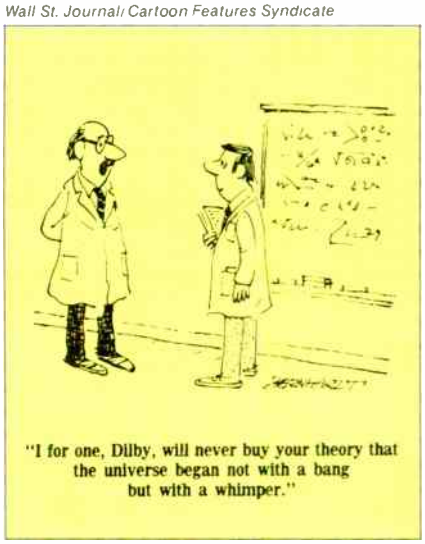


"I for one, Dilby, will never buy your theory that the universe began not with a bang but with a whimper."

Which award meant the most? "The first one," Alpher replies immediately. "Our contribution was finally being recognized, and we could enjoy fully the thrill that was ours when the radiation we knew was out there had been found."

After their 1975 award, Alpher and Herman found themselves being interviewed on their work once again, notably for two 1977 books on the early universe, Steven Weinberg's *The First Three Minutes* and Timothy Ferris' *The Red Limit*. They are currently working on their own volume, a personalized account of the development of Big Bang cosmology that Alpher says "will also address the issue of ethics in science."

And what lies ahead for cosmologists? "There is a good deal of excitement," he answers, "about experiments now underway in many countries to find out whether the proton is radioactive. If the answer is yes, it will lend credence to a new theory of forces in nature, which will clarify the behavior of the universe during its first seconds. Finally, astronomers are trying to ascertain whether they have correctly accounted for all the material in the universe. Better observations will indicate whether the universe will expand indefinitely — as it now appears to be doing — or whether it will slow down, halt, reverse to a Big Crunch and be re-born through a new Big Bang many billions of years in the future." ▬

Though even the nearest galaxies are millions of light-years away, powerful telescopes and computer-aided devices can record images of objects near the fringes of the known universe—objects such as quasars whose light has taken 10 billion years to reach us. The photos on these pages were taken by Arizona's Kitt Peak National Observatory (KPNO) and its sister facility, Chile's Cerro Tololo Inter-American Observatory. Kitt Peak's Mayall telescope, the world's fourth largest, is, in effect, a colossal camera. Its huge quartz primary mirror was made by GE's Quartz and Chemicals Department in Cleveland, and was ground and polished at Kitt Peak's optical shop over a three-year period (above). KPNO's McMath solar telescope is used in conjunction with a charge injection device supplied by GE Optoelectronics Systems Operation in Syracuse. The computer-aided images which result are used in solar and planetary research and to study phenomena like the Eagle Nebula in Serpens (background).

Galaxy in Centaurus, the nearest known violent galaxy.

Ring nebula in Lyra: glowing gas surrounds a hot star.

Eta Carinae nebula obscures peculiar, variable

STAR TREK

Great Nebula in Orion, called "the birthplace of stars."

tar.

Computer-enhanced image of the giant star Betelgeuse.

Up With People for the World's Fair

There'll be singin' and dancin' in Knoxville, Tenn., this summer when General Electric sponsors Up With People at the 1982 World's Fair.

An internationally acclaimed music troupe, Up With People is composed entirely of students from throughout the world. They have performed in palaces and prisons, in Carnegie Hall and high school gyms. In January, they were the halftime entertainment at Super Bowl XVI in Pontiac, Mich.

GE previously sponsored Up With People on a 1978 tour celebrating the Company's centennial and at the 1974 World's Fair in Spokane, Wash., the last one held in the United States.

At Knoxville, the Up With People cast will perform daily from June 19 to Sept. 12. Their schedule includes daytime shows in the State of Tennessee Amphitheater and weekday evening performances in the America's Electric Energy Exhibit (AEEE) pavilion.

GE's Power Systems Sector provided resources for the AEEE pavilion and its displays, which illustrate the benefits of electricity to individuals and companies; while the Gas Turbine Division loaned its model of Riyadh 7, a huge combined-cycle power plant, to the Saudi Arabia pavilion.

World's Fair entertainment sponsored by GE.

Sledder Chris Leach "smells the ice."

Skeleton sledding rattles the bones

"I don't think I'm crazy," says Chris Leach. "Really, it's a lot worse to watch than to do it."

The "it" is skeleton sledding, a sport Leach is helping to revive. After watching a few runs, spectators may think the sledders will

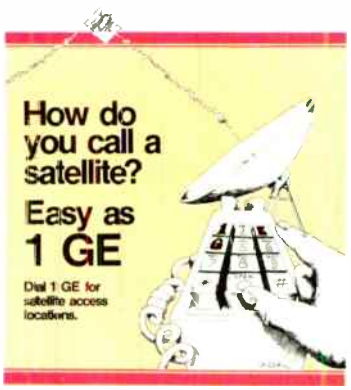
have to be revived, too.

For the uninitiated, skeleton sledding resembles those sled rides you took as a youngster. Only you go down a bobsled run. At 70 miles per hour. With your hands tucked at your sides. And your chin an inch off the ice.

"You steer by moving your head and shoulders," explains Leach, who recently competed in the world championships in St. Moritz, Switzerland. A technical specialist at GE's Armament and Electrical Systems Department in Burlington, Vt., he was on the first official U.S. Skeleton Sled team.

"The run takes about 75 seconds, but it seems a lot longer," continues Leach. "Everything goes by in slow motion. You forget everything but the run and what you have to do. It's refreshing. You can even smell the ice."

Maurine Vaughan cooks up a winner.



Cooking up a winner in Louisville

Ready for a Reuben roll meat loaf? How about some Mexican zucchini lasagna? Or a peanut-butterscotch meringue pie?

Those were among the 10 tasty finalists—out of 2,000 entries—in the recent General Electric Microwave Cooking Contest. Held in Monogram Hall at Louisville's Appliance Park, the on-stage judging by three nationally prominent food editors was based on taste and appearance, originality, ease of preparation, and availability of ingredients.

And the Grand Prize winner? An apricot-glazed graham cake by Maurine Vaughan of Richmond, Va. In addition to a $10,000 cash prize, Vaughan received an all-expense-paid trip to the Pillsbury Bake-Off® and a new GE Microwave Cooking Center.

"The contest helps us understand how people use the product," notes Diana Hansen, manager—Cooking Performance Development for the Major Appliance Business Group.

Is this the satellite to whom I'm speaking?

GE employees at nine locations are taking part in a pilot program involving satellite transmission of some coast-to-coast DIAL COMM calls. The program began March 1.

"If this test is successful, we hope to install enough earth stations over the next few years to give every major GE location access to the satellite," notes William B. Pomeroy, manager—Corporate Telecommunications Operation.

For the pilot program, earth stations were installed in New York (serving Schenectady, Albany and Waterford), Connecticut (serving Bridgeport, Fairfield and Stamford) and California (serving San Jose, San Francisco and Sunnyvale). Coast-to-coast calls from those locations are sent, via the earth stations, to a satellite parked 22,000 miles above the equator, then transmitted back to earth.

"We anticipate that a satellite network will cut our DIAL COMM costs by 25%," adds Pomeroy. The satellite service is provided by Satellite Business Systems.

Fink named to NASA post

Daniel J. Fink, Senior VP—Corporate Planning and Development for GE, has been named chairman of the NASA Advisory Council. Composed of leading scientists, industry executives and public figures, the Council serves as NASA's top advisory group on aerospace policy and program planning.

Miracle at Mebane

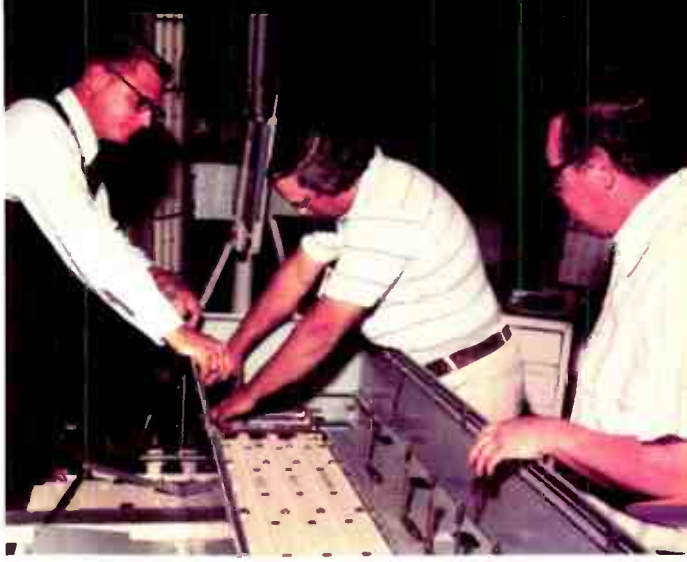
IN THE LATE 1970s, the General Purpose Control Department's Mebane Operation in North Carolina needed help.

The plant there, a low, brick building alongside Interstate 85, was turning out industrial motor starters and control equipment for a worldwide market. Yet, profitability was declining.

The design of Mebane's main product, the motor control center, had not been significantly changed in years. Its quality, as well as the quality of customer service, had fallen. And the sales force was having a tough time in the marketplace.

Then, starting in February of 1981, Jesse Lawrence, plant manager, with the help of fellow workers, brought pride and profitability back to Mebane. What follows is that story—the miracle

In less than 18 months, Jesse Lawrence (in vest, left, above and below) and his staff turned the General Purpose Control Department's Mebane Operation around by running that business as if they owned it.



of Mebane, which exemplifies a GE team putting "ownership" into its business, running that business as if they owned it.

In his office at Mebane, Jesse Lawrence fidgets while he talks about ownership and what it means to him and his team. He tosses his feet onto his desk, pulls at his tie, swings his feet to the floor, unbuttons his vest, nurses a cup of coffee, shoves his chair away, lights a cigar, and paces. He has too much energy to sit behind a desk.

"Ownership is a two-way street," he says. "You've got to have a gutsy manager at the top who will give ownership to operations, who will delegate the responsibility so you can run your business. Accepting responsibility is not the hardest thing to do—delegating it is!"

Lawrence circles his desk. "You can never have ownership without management trust. And that doesn't happen overnight."

One person who agrees with Lawrence is his boss.

"Ownership," says General Manager Gary L. Rogers, who manages the General Purpose Control Department in Bloomington, Ill., "means that you know your market, know your customers, your people, that you organize yourself to run your business successfully."

In Lawrence, Rogers has that kind of manager.

"Jesse is a strong and independent manager," notes Rogers. "And he's very aggressive in formulating action plans. He knows his market, and he

knows his customers. He's quick to forge ahead. At Mebane, he took over a problem situation and, with his team, turned it around."

The Mebane Operation, which opened for business in 1972, has been part of the Contractor Equipment Business Group of the Industrial Products Sector since 1979. Inside the 190,000-square-foot plant, some 1,200 employees turn out a variety of motor starters — electrical equipment used to start, stop, control and protect an electrical motor.

They're low- and medium-voltage control centers able to handle up to 5,000 horsepower and 7,200 volts. And these products are used at power generating stations, steel and paper and rubber mills, chemical plants and oil refineries.

As competition began to cut into GE's market share, morale dropped at the North Carolina plant. The steps taken to turn the business around weren't working. The outlook was not good.

And nobody knew what to expect when Lawrence was brought in to manage the plant.

Lawrence kept his mouth shut and listened to his employees.

"If I thought Mebane was an old business on the way out," Lawrence points out, "I wouldn't have taken the job. I was convinced that was not true. Mebane had excellent people and products with great potential, and I believed it could recapture its market share."

Lawrence brought to his new venture the type of experience that cannot be gleaned from textbooks. He grew up in the electrical construction business. His father was a contractor. Among Lawrence's first jobs at GE was that of second-shift foreman.

"I knew what a wire was and where to put it," he says. "I had a feel for equipment and how to use it."

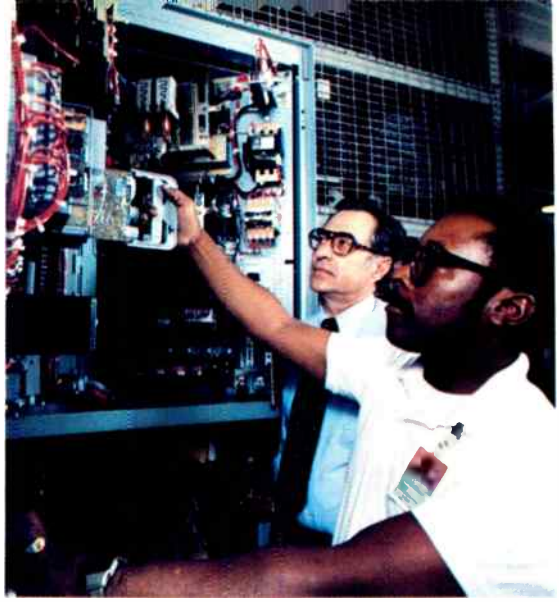
He also spent five years with GE do Brasil, where he learned the importance and power of good communication.

"The language there was a barrier," he recalls. "You never know how important it is to communicate until you can't."

On his own, Lawrence learned Portuguese.

At Mebane, talking to his employees was no problem. Lawrence is a North Carolinian himself, and to break the ice and gain their confidence, he told them that he, too, was raised on "hog chitlins and cornbread."

Lawrence made quality the overriding theme in everything his people did. "Quality had to be more important than output," he remarks. "We had to convince our front-line managers that it was the key to our success. We would not tolerate poor quality in anything."



William Zint (left) examines a motor control center with Larry Gunn.

Lawrence opened up communication channels, too, inaugurating a "speak-up program" so he could hear from the people in the shop as well as his managers in the front offices. He showed up at 7 a.m. and stayed late and encouraged his managers to do the same. "Get out in the shop," he told them.

He attacked such problems as productivity, shop flow, quality of product, quality of engineering, competitive pricing and people.

"We couldn't sit around working on the perfect plan and do nothing," he recalls.

Lawrence and his staff took action.

They had the shop redesigned so materials would flow naturally from one end to the other — with the finished product coming off the assembly line in record time.

They also repainted it and had it relit.

They resurrected jobs that earlier had been eliminated — jobs in manufacturing engineering, quality control and design engineering.

They worked more closely with suppliers — telling them what materials Mebane needed to survive and demanding that they supply quality and service.

They switched people around — letting them know what kind of work, what kind of problems, pressures and responsibilities others had to face. Lawrence is a believer in moving people around because it broadens them, gives them perceptions of what others do.

William Zint is one of those people who found

himself on the move.

An engineering manager, he spent nearly a decade in the front offices, unaware of the problems and frustrations in the back shop. Lawrence made him a manufacturing manager with shop responsibilities.

"I discovered why there's a sense of urgency back here," he yells over the roar of machinery. "When I tell people I need an answer now—I mean now! I can't have my people standing around doing nothing while we wait for an answer. That certainly is no way to beat this productivity problem we face in America."

And they went after a new product design.

Explains Ivy Davis, Mebane's marketing manager: "We had to re-establish credibility with our customers."

The Mebane people went into the field, surveyed GE customers—asking them what they wanted in a product. Then a prototype was put together and brought back to the customers. It was what they wanted.

The new product was the GE 8000-Line Motor Control Center, a blend of needed innovation and standard features that were proven to be reliable over the years.

Mebane was rolling again. There was a new sense of urgency and pride; morale was on the rise.

In celebration of the plant's 10th anniversary in Mebane, a local radio station wrote a song, and it reached Number 1 on the charts there. A line from one of the verses captured the new spirit of the employees.

We're in this life together/We're here through thick and thin. We're good and gettin' better—we're GE Perfect Tens!

An open house was scheduled, the first in years, and hundreds of residents in the Mebane area toured the plant.

"You can't imagine the feeling we had when we first learned we had made money," recalls a jubilant Bob Jones, employee relations manager at Mebane. "We were all happily stunned."

Adds Lawrence: "Our market share has improved as a result of our emphasis on quality, service and cost. We're designing a new line of products to give us a competitive edge in the future, and we're investing heavily in automation tools to insure that we stay competitive.

"We've still got a long way to go," muses Lawrence. "We've just begun to fight."

Says Lawrence: "We've just begun to fight."

County leader: Frank J. Smith. A maintenance worker in Louisville's Room Air Conditioner Department, Smith (left) is in his third term as a representative in the Kentucky state legislature. He's also served the citizens of Bullitt County as Jaycee founder and president, County Fair director, and Red Cross chairman.

Health care planner: Anita van de Erve. Supervisor of the medical clinic at Charleston's Large Steam Turbine-Generator Department, she's on a statewide council aimed at bringing health care to South Carolina's rural areas. During the past three years, she's also formed, chaired and served on various committees for controlling health care costs.

Five receive 1982 Phillippe Awards

Social stewards

County leader. Health care planner. Inner-city crusader. Crime fighter. Village organizer.

Five definitions of social stewardship. And fitting descriptions of the five General Electric employees pictured on these pages.

Winners of the 1982 Phillippe Awards, they exemplify the public service performed by former GE board chairman Gerald L. Phillippe. As winners, they receive a medallion and the right to designate a charity or educational institution for a $1,000 grant from the GE Foundation.

Inner-city crusader: Eaustria Sabir. Setting up a Guardian Angels chapter is just one way Sabir (center) has served his Southside neighborhood in Youngstown, Ohio. The Apparatus Service Shop operator has also organized medical screening clinics, a food cooperative, voter registration drives, and housing programs.

Crime fighter: Alexander Sledge. A manager in GE Information Services Co. at Rockville, Md., Sledge (center) formed the Montgomery County Crime Solvers Unit that, since 1978, has led to the arrest of more than 130 felons and the recovery of more than $500,000 in stolen property.

Village organizer: Helen W. Dudley. A collector in the Mobile Communications Business Division at Lynchburg, Va., Dudley (holding baby) is a legend in the rural village of Evington. She helped organize and build its medical clinic and fire department, in addition to assisting the bedridden and needy.

Organization Changes

Corporate

Mark J. D'Arcangelo, Staff Executive—Relations Issues Integration

Consumer Products Sector

Arthur P. Byrne, General Manager—High Intensity and Quartz Lamp Department

Ronald W. Mathewson, General Manager—Fluorescent Systems Department

Harry T. Rein, General Manager—Specialty Lamp Department

James F. Sarver, General Manager—Lamp Glass and Components Department

Industrial Products Sector

John C. Dwyer elected a Vice President

David M. Engelman elected a Vice President

Marion S. Richardson elected a Vice President

International

George J. Stathakis, President and Chief Executive Officer—General Electric Trading Company

Edward C. Dietz, Staff Executive—International Strategic Planning and Development Operation

Power Systems Sector

George W. Sarney elected a Vice President

Leonard P. Roberts, General Manager—Medium Transformer Department

Services and Materials Sector

Philip M. Gross, General Manager—Noryl Products Division

Martin J. Kelly, President—General Electric Credit Auto Lease, Inc.

Donald W. Shirey, General Manager—Plastics International Ventures Department

Uwe S. Wascher, General Manager—Valox Products Department

Edward R. Koscher, General Manager—Composite Polymers Ventures

Michael D. Lockhart, Staff Executive—Services and Materials Strategic Planning and Development Operation

Technical Systems Sector

Donald S. Beilman, VP—Electronics Technology Planning

Donald J. Meyers, VP—Special Assignment

Francis J. Schilling elected a Vice President

Robert L. Stocking elected a Vice President

James E. Dykes, VP and General Manager—Semiconductor Division

David O. Gifford, VP and General Manager—Electronic Components Division

Mark B. Barron, General Manager—General Electric Microelectronics Center

Walter E. Weyler, General Manager—Mobile Communications Business Division

Jack Gifford, President—Intersil, Inc.

Karl J. Whitaker, General Manager—Mobile Communications Engineering Department

Aircraft Engine Business Group

Robert J. Smuland elected a Vice President

Does the light stay on when I close my refrigerator door?

REMEMBER WHEN YOU were a kid and you wondered if the light in your refrigerator stayed on after you shut the door? You'd close the door very slowly, seeing if you might catch that moment when the light went out. But you never did. Or you'd snap open the door with a sudden jerk, hoping to get a jump on the light and see it pop on. But you never did. Well, maybe the light never did go out. And you pondered, does the light stay on when I close my refrigerator door?

Kids today can get an answer to that question, and so can you, by dialing the Consumer Products Sector's new GE Answer Center™, the largest and most technically sophisticated operation of its kind in the United States.

You call this toll-free number—800-626-2000—and you can get an answer to any question you may have about a consumer product. And you can get that answer at any time, day or night, weekends or holidays.

The Answer Center went on line last year in four test cities—Denver, New Orleans, Baltimore and Portland, Ore. It was a hit, handling some 2,000 calls a week. In July, it goes nationwide with an expectation of up to 6,000 calls a day—and more than a million a year.

Why this expectation? Richard A. Costello, manager of Consumer Marketing Programs for the Consumer Products Sector, explains: "In the flood of new products, it's easy for consumers to feel helpless about making the right choices. So they are asking more questions, demanding more than ever before. We must have service that is prompt and efficient—especially here at General Electric where we make more than 100 different consumer product lines, where we sell more than 250 million consumer items a year. Given this pervasive presence, we have to be able to respond to this more demanding, questioning consumer."

Located in Louisville, home of the Company's Major Appliance Business Group, the Center is staffed with carefully screened, thoroughly trained consumer representatives and technicians who can field questions dealing with GE's vast array of consumer products. A significant percentage of the questions relate to prepurchase information—what product to buy, for example, or where to buy it. Other questions concern how to use a product or how to fix it.

In the test cities, results showed that 84% of the questions were answered on the spot.

A "neighborhood store" is how N. Powell Taylor hopes consumers will view the Center.

Manager of the Center, Taylor is a 26-year GE veteran. He believes that the Center adds a new

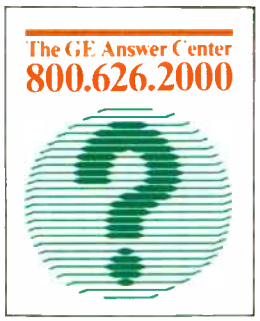

MILK

dimension to the Company.

"It gives GE some of the advantages of a small company," he says. "It gives consumers a feeling that there is someone who really cares about them, about their concerns and their needs."

Obviously, to be effective, the Center had to be specially designed, equipped and staffed.

First of all, it has the latest telephone technology available to handle the multitude of calls that come in daily. Its information system consists of twin Honeywell Level 6 minicomputers connected to a large GE computer communication network. Planning and designing the Center's computer program took four months, while another three months (11,000 man-hours) were needed to enter facts into the system that could provide the right answer to nearly every question.



Queries that can't be answered immediately are transferred to technicians with intimate knowledge of the product in question.

The Center works this way: A person calls and asks: Can I connect my radio to my tape recorder so it records clearly? Taking the call is a consumer specialist with 148 hours of extensive training, including computer technology and communication skills and a more-than-casual familiarity with GE products.

Points out Taylor: "Our specialists are much more than just telephone operators. We conduct weekly training classes with all of them. They keep abreast of changes and new features and, of course, learn about new products and services as they are introduced."

For the person wanting to know about the tape recorder, the specialist taps out the question on the computer keyboard and instantly the answer flashes across the video screen. It's a yes.

"The data base in the Center's computer system is extremely comprehensive, the largest of its kind," Taylor says. "And the data base grows daily as new information is programmed into it." He also notes that the Center has a 1,500-volume reference library.

Among the unusual questions fielded so far:

- The music for your recent GE lighting commercial was beautiful. What's the name of the melody and who composed it?
- I'm an undertaker, and I use silicone glue to stick letters onto tombstones. How can I get the excess glue off?
- Can I convert my black-and-white television to color?
- Can I drink water from my dehumidifier?

Of course, not all questions wind up being humorous. Most, like the one Joseph Belson asked recently about a GE refrigerator, are more serious.

A scientist for U.S. Pharmacopeia in Rockville, Md., and a retired director at the U.S. Food and Drug Administration, Belson was in the market for a new refrigerator. He had never owned a GE appliance before, and he was curious about the TFF24RB model. Because he is a scientist, Belson wants to know more about the products he buys than the average shopper. Sometimes sales clerks can't answer his questions. When he couldn't get the answer he was looking for about the TFF24RB's ice maker, he called the Answer Center.

His question was beyond the realm of the computer, and he was immediately switched to Technician Terry Darnell, who spent 15 years in Louisville as a serviceman before joining the Answer Center.

"Suppose something happens to the icemaker," asked a skeptical Belson. "Suppose it doesn't work once the refrigerator's installed?"

Darnell listened intently. "If the refrigerator is not properly installed," he answered, "then you might have some problems. If a self-piercing water valve is used instead of a saddle-valve, then the line could become constricted. And make sure the refrigerator hasn't been accidently set on top of the tubing, cutting off the water supply. A lot of times people don't check how it's been installed."

Belson and Darnell continued their chat, weighing the pros and cons about various models. Darnell enjoyed this because, as he later put it, "Although I'm not out in the service truck anymore, I'm still helping people. Instead of just the folks in Louisville, I've now got the whole United States as my territory."

When their conversation was over, *Belson purchased the TFF24RB—and four other GE products, too*—and wrote to Taylor.

"Your GE Answer Center," he said, "is like having a good friend."

GE radios reach new high

This story ends at the top of the world.

It's a tale of triumph and tragedy, of mountain climbers against the Himalayas, and of the role General Electric personal radios have played in five recent American assaults on the world's tallest peaks.

"Communication with all members of a team is a vital part to staying alive on a big Himalayan peak," states one member of a 1981 expedition that tried, unsuccessfully, to scale the unclimbed Kangshung (East) Face of Mt. Everest.

Chris Kopczynski, who did reach the 29,028-foot summit of Everest with another group, reports from an earlier expedition that "a man would be dead if not for these radios."

But that's climbing ahead of our story, which begins in Lynchburg, Va.

(continued on page 31)

"Wherever a radio goes, it must be reliable. In many ways, it's a life-saving device."

Himalayan climbers who have relied on the quality of GE personal radios are Chris Kopczynski (above) on Makalu I and Dr. Christopher Pizzo (below) on top of Mt. Everest. At right, Sherpas bridge an ice fall on Everest.

Nestled in the James River Valley at the foot of Virginia's Blue Ridge Mountains, Lynchburg is home to GE's Mobile Communications Business Division. It's an idyllic setting, an ice age removed from the roaring avalanches and numbing temperatures awaiting those who challenge the Himalayas.

"These expeditions provide a tough test for our radios," says Mahlon Hutchison, manager of the Timberlake plant that manufactures the Division's hand-held, two-way radios. "They're exposed to a lot of abuse. If they work on Everest, they should work in Minneapolis."

GE personal radios, used mainly by police and fire departments, security services, and construction crews, are also exposed to a battery of tests before leaving the plant. All semiconductor components go through 72 hours of stress tests, then 24 hours of thermal shocks. Each module is tested before advancing to the next stage. Finally, the completed radios pass through a test pipeline—a series of six separate quality inspections.

"Quality is critical with a product like ours," adds Donald Prillaman, manager—Quality Control for Personal Radios. "Wherever a radio goes, it must be reliable. In many ways, it's a life-saving device."

Which brings us back to the Himalayas and Chris Kopczynski. A Spokane, Wash., contractor and expert climber, he was part of the 1980 expedition that scaled Makalu I, No. 5 on the top-of-the-world chart.

Recalls Kopczynski: "Another expedition, trying to climb Makalu II, had one of its members fall ill with cerebral edema at 21,000 feet. They had no radios. They sent a member of their expedition back down to our base camp to see if we could help evacuate the man.

Lynchburg's Frances Thomas checks quality of GE radio component.

"We loaned them one hand-held radio. In a three-way conversation with the Makalu II team, a Sherpa rescue team and our doctor—who was located at 21,500 feet on Makalu I—we were able to describe how to administer oxygen properly, and how to get liquids into the man's body. A three-day rescue, with our doctor constantly on the radio, kept the man alive. It's a miracle he's alive today."

GE personal radios also provided vital communications during an ill-fated 1980 women's expedition to Dhaulagiri I, the sixth-highest peak in the world. An avalanche at 19,000 feet buried the camosite, pushing one tent and five women into a crevasse and onto a snowbridge 40 feet below. Four women were rescued; but Lyn Griffith, leader of the support and research group, was never found.

"They (the radios) were invaluable during the avalanche, as it was necessary for people at higher camps to descend with supplies," relates climber Shari Kearney.

Another women's expedition, also outfitted with GE radios, succeeded in climbing 22,494-foot Ama Dablam this spring. Located in the Everest region of Nepal's Solu Khumba valley, it's considered by many to be the world's most beautiful mountain.

And then there's Everest. King of the mountains. Majestic. alluring. dangerous.

The Kangshung Face, in remote Tibet, proved insurmountable. Severe storms, illness, and the threat of avalanche beat back one 1981 expedition.

But another group, attacking Everest from the Nepal side, had better luck. This was the American Medical Research Expedition, which used miniaturized scientific instruments and GE radios to monitor the climbers' heart rate, blood pressure and oxygen consumption at altitudes between 24,000 and 29,000 feet.

"Your fine hand-held radios made our venture successful," notes Dr. Karl Maret. "In spite of occasional poor weather and transmission conditions, we were able to maintain daily radio contacts with all camps on the mountain."

Finally, in late October, Kopczynski and Drs. Christopher Pizzo and Peter Hackett stood on the summit. For the first time ever, GE radios had made it to the top of the world.

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Stephen L. Harris, Editor
Raymond K. Andresen, Associate Editor
Donna R. Carpenter, Editorial Assistant
Ron V. Taylor Associates, Design

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