



**GENERAL  ELECTRIC**  
**Monogram**  
MARCH-APRIL 1974

**THINK WORLD:**  
how three GE operations do it

Plus: You can stop  
smoking, new go in  
electric trains, HQ as  
GE showcase

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, Public Relations Programs, and J. Hervie Haufler, Manager, Corporate Editorial Communications. Permission for reprinting articles should be obtained from the Monogram Editor, 570 Lexington Avenue, New York, N.Y. 10022. Copyright, 1974, General Electric Company.

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**Cover:** Prize-winning sculptures resulting from an art competition at GE's Locomotive Products Department (May-June 1973 Monogram) symbolize the enlargement of vision required to "Think World." Molded from discarded scrap metal are Robert S. Kellogg's "American Eagle" and "Sphere" by Carl A. Skrekla.

THE COMPANY

**HOW TO  
 'THINK WORLD'**

**It's a state of mind  
 that's a key to success for  
 some GE operations**

*"The Sun with one eye vieweth all the world."*  
 —William Shakespeare

So, too, do successful international businesses, a number of them within the General Electric Company.

Last year, the Company's international business was the largest in history, with sales rising some 53% to account for 18% of total GE sales and 22% of earnings—not including results from those nondiversified overseas affiliates that report directly back to U.S. operations.

Much of this growth stems from a new readiness on the part of managers of GE businesses to take a sun-like view of the needs of customers throughout the world.

In past years, there had been a strong tendency to regard international sales only as extra or incremental revenue by many managers who saw their market opportunities lying almost entirely between New York and San Francisco.

Today, many of the Company's strategic businesses see the world marketplace as an entity, of which the U.S. is a part. As one strategic planner put it in a piece of reverse English, "We consider the U.S. one of our prime markets."

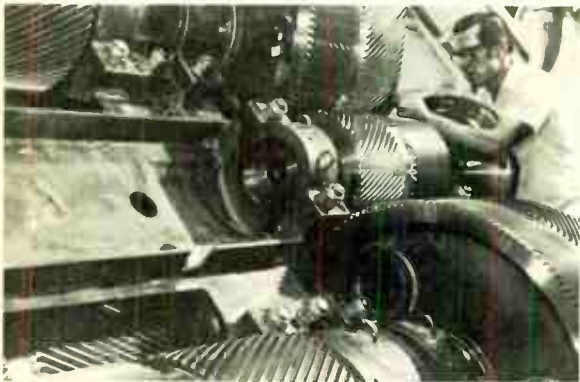
It's a switch in perspective, a different way of looking at business opportunities, that the *Monogram* has been exploring by singling out three different operations that are recognized among the GE leaders in adopting a true worldwide state of mind.

While these three businesses differ widely in their products, customers and strategies, several common denominators emerge:

- Technological leadership and product superiority must not only meet competition but be strong enough to overcome nationalistic barriers.
- Ability of these GE operations to compete on a world basis has meant that a U.S.-based



**GE Marine Turbine "thinks world": 21 of 31 GE-propelled ships entering service this year will come from international shipyards, keeping people busy at Lynn, Mass., and at seven associates.**



enterprise has won business that would otherwise have gone to non-U.S. producers operating on a trans-national scale.

- More jobs and greater employment opportunities have flowed to U.S. employees as the result of these operations' global outlook.

- GE share owners have been able to participate in markets whose rates of growth exceed those in the U.S.

- And above all, customers throughout the world, and their home countries, have benefited from GE technologies and products that might easily, applying a different cast of mind, have remained largely confined to the U.S.

Generalizations aside, the surest path to understanding what it means to "think world" can be gained by examining in some depth the case histories of GE operations that either have remained or become profitable by viewing all the world with one eye.

## **Marine Turbine: world view puts it neck-and-neck rather than also-ran**

General Electric is in a neck-and-neck race for number one position among the world's builders of merchant-ship steam propulsion systems. Yet were it not for a decision made 20 years ago to develop GE marine propulsion systems as a one-world business, GE would be an also-ran. Indeed, it is quite possible the Company would be out of the business altogether.

Case in point: In 1974, 31 GE-propelled merchant ships will enter service. Of these, 21 will come from non-U.S. shipyards. To look at it another way, GE will add a million-odd propulsion horsepower to the world's merchant fleets. More than 700,000 hp will be in the hulls of ships built outside the U.S.

Twenty years ago, in 1954, three young sales engineers set out on a five-week tour of European shipyards, knocking on doors from Italy to Norway. Their mission: to find out as much as they could about sales opportunities for GE

*(continued next page)*



## THINK WORLD (*continued*)

steam propulsion systems, heretofore sold overseas on a hit-or-miss basis. The three were Hughes W. Ogilvie, now marketing manager for the Marine Turbine and Gear Products Department; Joseph P. Jurga, now manager of marine sales for the International Sales Division; and Robert O. Butcher, now manager of propulsion systems development for Marine Turbine and Gear.

They found, Ogilvie recalls, that some shipyards thought it was sheer effrontery for a U.S. propulsion-systems manufacturer to foresee any significant future in the European market.

They also came to some other significant conclusions:

- That while many builders and ship-owners were still wedded to diesel power plants, the trend toward increased size would open up opportunities for steam—where GE's rich experience would be a mighty asset.

*Hughes Ogilvie:  
"They called it 'sheer effrontery' to think that a U.S. firm could power European shipping."*



- That nationalistic considerations precluded exporting complete systems from the U.S. in large quantities.

- That in order to sell to major maritime nations, GE would need what they conceived of as a "national ally"—a concept that was a little hazy then, but which came into focus within a short time.

In 1958, GE marine turbine found its first national ally: Kvaerner Brug, a Norwegian manufacturer of water-wheel turbines. With its experience in handling large steel castings, Kvaerner Brug had the capability of building the stationary portion of the propulsion system. GE had the specialized tools and skills to build the "steam path"—the turbine rotor and buckets, the diaphragms and the gear rotors in which teeth are cut to extraordinarily fine tolerances.

Kvaerner Brug and GE entered into the first "manufacturing associate" agreement in Oslo,

where Joe Jurga signed the terse, six-page document for the Company.

The association has proved remarkably successful for both parties. Kvaerner Brug eventually entered the shipbuilding business, grew from a \$35-million-a-year company to a \$200-million-a-year company, and has become one of the leaders in the design of new liquefied-natural-gas carriers.

As Ogilvie describes it, "The GE system opens doors for Kvaerner Brug, and Kvaerner Brug opened doors for the GE system."

GE now has manufacturing-associate agreements with six other companies, most of them shipbuilders, in Germany, Italy, the Netherlands, France and Spain.

As Ogilvie, Jurga and Butcher had anticipated, the market for steam grew as ship size and horsepower ratings increased. At the outset, GE and its manufacturing associates were supplying equipment for ships in the 12,000-16,000 horsepower range—an area where diesels offered serious competition. One recent order, by contrast, is for a 60,000-hp single-shaft system.

"There's no way that a diesel can compete at that rating," Ogilvie points out.

As ship sizes grew, many shipyards which had been building their own propulsion systems found it was no longer economical for them to make the huge investments required to build a smaller number of larger systems. But a specialized propulsion builder such as GE could afford, for instance, a \$1.5 million gear hobber whose cost would be spread over many systems.

Hence, as shipyards have turned to the specialists, GE has been ready to compete aggressively for business that would otherwise have gone to other international suppliers.



*David Bennett:  
"International sales account for 60% of our merchant ship business."*

Today, reports David S. Bennett, the department's general manager, international sales represent more than 60% of GE's merchant

ship business and more than a third of the total business of the department, which is also the leading supplier to the U.S. military marine.

"The impact on employment at Lynn is almost a textbook illustration of how an aggressive overseas strategy can build jobs in the U.S.—even though much of the work on our GE systems is done overseas," says Bennett.

Employment in GE's marine operations at Lynn, Mass., is some 2,100 today, about double what it was a decade ago. Most of that growth, Bennett reports, is the result of the growth in international business.

Currently, Bennett, Ogilvie and Jurga are in the midst of a new market-development program. As befits a "think world" operation, the targets of the program are merchant shipbuilders in Japan, Korea, Poland, Yugoslavia, Taiwan and the Soviet Union.

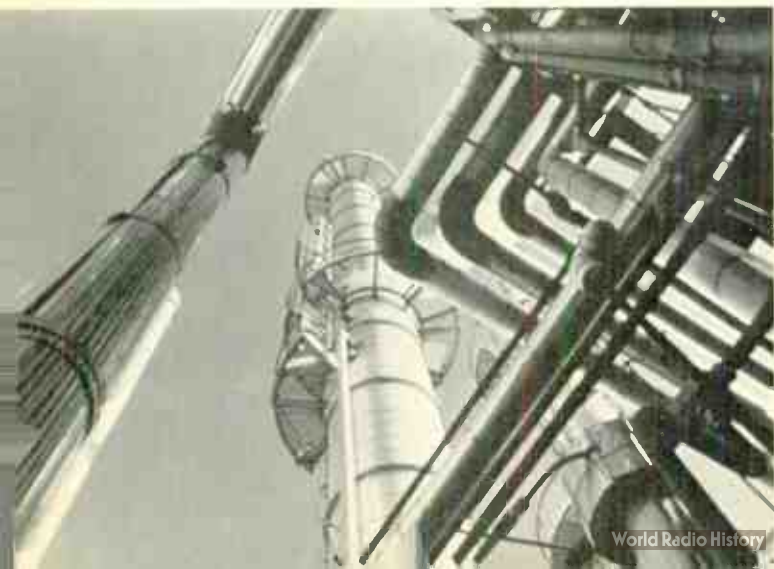
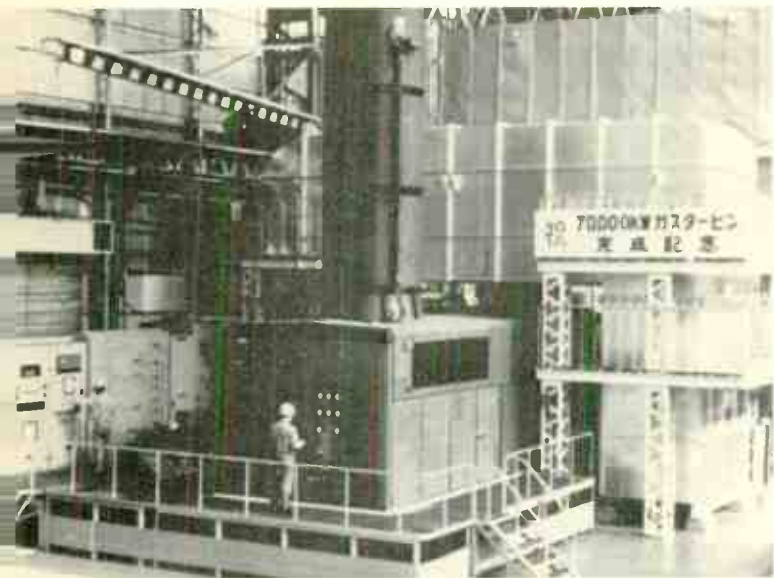
## In GE Plastics: "No over there and no over here"

Initial customer contact for the new, supertough automobile tail-light lens was made through General Electric Plastics GmbH in Frankfurt, West Germany. The customer, Volkswagen, sent its designers to study GE's Lexan® polycarbonate at the Customer Application Development Center operated by General Electric Plastics B. V. at Bergen Op Zoom in the Netherlands. The order was placed on the GE Plastics Business Division headquarters in Pittsfield, Mass., and supplied out of the Mount Vernon, Indiana, plant. Shipments went to Brazil, where new Volkswagens incorporating Lexan tail-light lenses are now in production.

This kind of international razzle-dazzle might leave some people a little dizzy. But it raises no

*(continued next page)*

**GE Plastics' world series: Japanese joint venture, U.S. production at Selkirk, N.Y., and European center in the Netherlands.**



## THINK WORLD (*continued*)

eyebrows among the men who manage GE's worldwide engineering plastics business.

"There is no over there and no over here in our plastics business anymore," emphasizes Dr. John F. Welch, Vice President and Group Executive for the Components and Materials Group.

"It took years to break down artificial barriers between our off-shore operations and our domestic operations," Welch recalls. "Now everyone in the business talks the same business language—product performance, cost control, competition, customer service. There are national differences, of course, many of them very subtle, but basically there is one business."

General Electric's creation of a unified one-world plastics business revolves around products and people.

In terms of products, Noryl® led the way in 1966 by being the first General Electric plastic produced overseas.

Today, the Plastics Business Division has, under Robert T. Daily, the Division's general manager, a handsome facility at Bergen Op Zoom to serve Europe. A joint venture with Nagase, a Japanese company, centers in a compounding facility in Moka. And General Electric plastics are produced at Melbourne, Australia, compounded there from materials sourced from the U.S.

The Division has maintained its U.S. ties—and job opportunities—with its Pittsfield headquarters and major production facilities at Selkirk and Mount Vernon.

Other General Electric plastics are following in the Noryl pattern. Lexan has been produced overseas since 1971. Lexan sheet is now being exported from Mount Vernon, but will eventually be produced overseas from US-sourced materials. The newest star in the GE plastics galaxy, a thermoplastic polyester called Valox® that is resistant to corrosion, solvents and heat, is just now emerging from pilot-plant production at Pittsfield.

Daily sees engineering plastics as a natural one-world product. Customer service needs, for example, are similar worldwide. Except for sheet products, General Electric engineering plastics are sold in large packages of small pellets, mostly to molders who shape the material for end users. General Electric works closely with molders and end users on applications.

"In Pittsfield and in Los Angeles," Daily notes, "we have a Customer Application Development Center, where we can solve customer product design problems on a comprehensive

array of molding equipment. The same sort of center has been equally useful in Bergen Op Zoom. Now we've built another in Russelsheim, near Frankfurt, and are building others in England and France."

While there are some differences in applications worldwide, Thomas H. Fitzgerald, general manager of the Engineering Polymers Products Department, finds that users of GE engineering plastics around the world have more similarities than differences. Fitzgerald reports, for instance, that Lexan is now used to some extent by virtually every major automobile manufacturer. "It's become a universal product," he says.

If the creation of universal products is important to Plastics' one-world approach, so too is the "people" phase of the business.

"Enthusiasm isn't just a desirable attribute in our business, it's an important strategic asset," declares Bob Daily. "We've deliberately built a management team that is young, aggressive and capable of growing with the business."

Alongside this restless growth spirit, Welch and Fitzgerald are nurturing the one-world approach that their products demand. For example, at last year's international business conference in Hawaii, half the participants were



*Bob Daily:  
"When GE  
plastics people  
get to one-upping  
each other, they  
forget whether  
they're from the  
U.S., Europe or  
Japan."*

from the U.S. and the other half from Europe, Japan and Australia. "But when they started one-upping each other on their cost-control experiences or their ability to penetrate the pleasure-boat business, you could scarcely tell the difference between the American or the Japanese or the European," says Daily.

What about the impact of the shortage of petroleum products on General Electric's plastics? Fitzgerald is cheerful: "It's been difficult, but we've been able to get the feedstocks to meet customer needs. Long run, there will be upward pressure on plastics prices. But our



world metals competitors are boosting prices even faster. Zinc castings, to take an extreme, are projected to go up more than 60% in the next five years. "Relative to metals, engineering plastics will remain the customers' best value."

## Gas Turbines: New routes to world business

This year Jacob B. Gatzemeyer, manager of the Gas Turbine International Department, expects GE's international gas-turbine sales to be about twice what they were in 1972.

In 1972, gas-turbine sales to the international market were twice what they were in 1970.

Behind these cheery data is a business that has developed a dual approach to international markets.

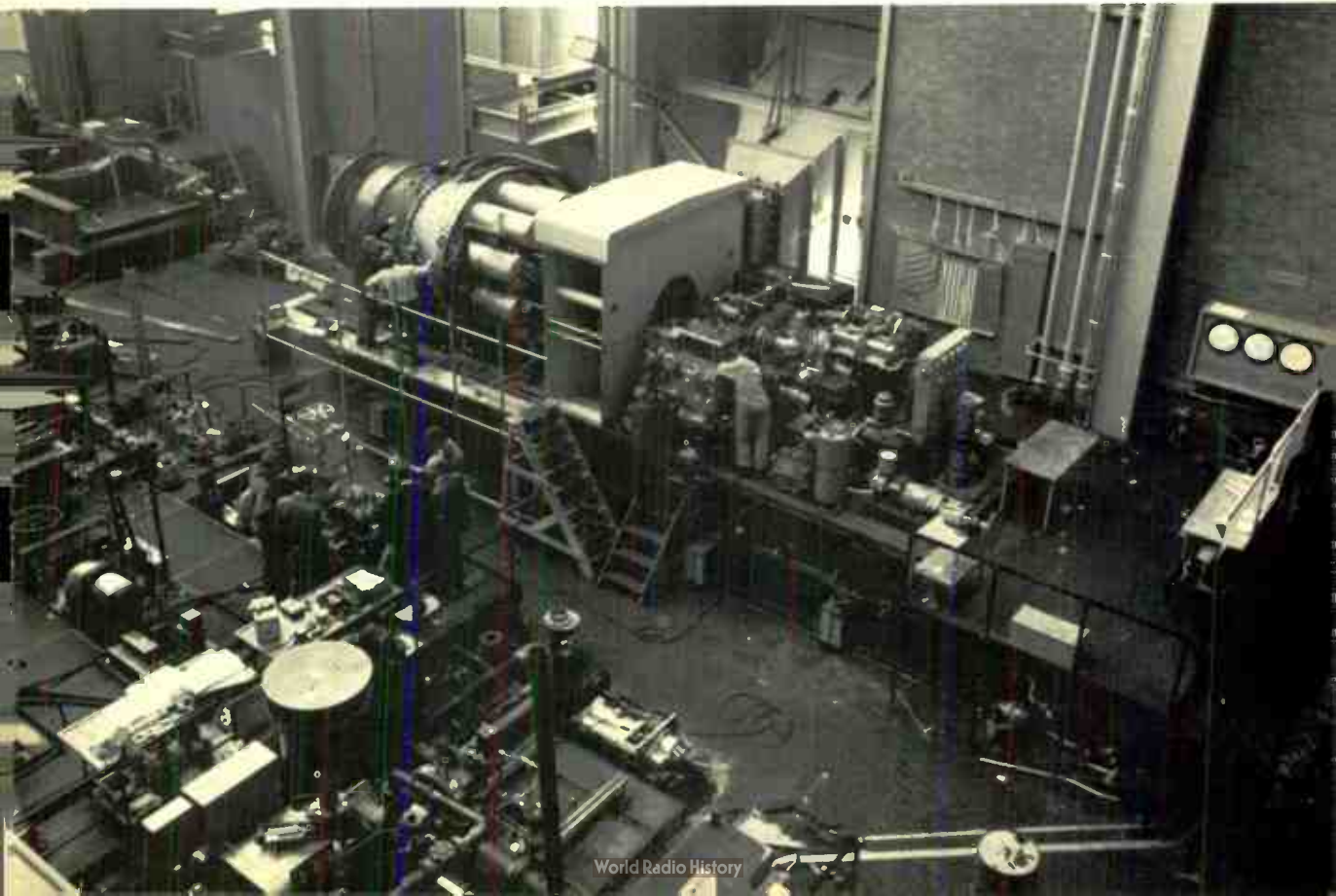
Gas Turbine has gone the direct-sales route, selling complete GE heavy-duty gas turbines direct to international users.

At the same time, it has gone the manufacturing-associate route, selling rotating parts, to nine

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**GE Gas Turbine strategy: be ready to supply direct from the U.S. (shown: Greenville, S.C. unit en route to test chamber) or with local content through international manufacturing associates. Below: Assembly of a GE gas turbine at NV Motorenfabriek Thomassen, De Steeg, Holland.**



## THINK WORLD (continued)

manufacturing associates that build the stationary parts, assemble, test and sell complete units.

This dual approach has been effective. Almost half of Gas Turbine's income today is derived from international business.

Jack Gatzemeyer divides his one-world view into three main sectors.

Sector number 1: the industrialized nations of Western Europe plus Japan. Economic growth rates are similar to the U.S., but fuel costs are high. Thus, there is a heavy need for highly economical power-generation equipment. For the future, Gatzemeyer sees these nations as important users of GE's STAG (steam and gas) combined-cycle systems for power generation.

Much of GE's manufacturing associate business comes from this sector. Most industrialized nations want local content in their generating



*Jack Gatzemeyer: "We're solid in the markets of industrialized nations and are looking for new business among developing countries, the USSR and China."*

facilities, and GE's manufacturing associates, in Germany, France, the United Kingdom, Norway, Holland, Italy and Japan are able to supply this requirement.

Sector number 2: nations that are beginning to develop rich new sources of materials.

The nations of North Africa, the Middle East and Latin America are stepping up their production of mineral wealth. Many are on the threshold of major industrial growth. They are buying gas turbines for power generation and for petrochemical and pipeline applications.

Because these nations generally do not have power-plant manufacturing capability, they are major customers for direct sales.

Sector number 3: the Soviet Union and the nations of Eastern Europe, and the People's Republic of China.

Gatzemeyer believes that the potential here is as large as either of the other two sectors. His department is seeking this business aggressively. GE reps have engaged in technical discussions with the Russians since 1969, and Gatzemeyer himself has made four trips to the USSR.

He says, "It's well known that the Russians have great resources of natural gas that they wish to transport through new pipelines—including a pipeline from the USSR to Western Europe. Consequently, they're very interested in gas turbines for pipeline pumping, and we're in serious negotiations for this business."

He sees GE's prime opportunity in China in terms of small, rapidly installed gas-turbine power-generating stations—probably produced in cooperation with what would be developed as new manufacturing associates. He points out that China is essentially decentralized in its power production, with individual communes responsible for their own power generation. The gas turbine, he believes, is ideally suited to Chinese needs.

Gas Turbine's participation in the overseas gas turbine business goes back to the 1950's, when floating gas turbines were used on Venezuela's Lake Maracaibo to drive natural gas back into the bottom of the lake to maintain pressure for crude oil production.

Relying first on exports direct to customers, the component then developed its manufacturing-associate approach in response to requirements for local content by many countries. "We could have gone the licensing route, which is conventional in this business," says Gatzemeyer, "but we felt that we had the technological leadership to make a larger contribution."

To bring this 'think world' story full circle, one of the promising international aspects of Gas Turbine's business is in ship propulsion, which makes it a competitor in the same markets served by Marine Turbine. "Our main competitive thrust, though," says Marine Sales Manager August A. Travaly, "is at the top end of the marine diesel market." All of Gas Turbine's marine sales have been between 10,000 and 25,000 horsepower. Diesels, Travaly points out, still power most of the world's smaller merchant ships.

Typically, of 15 marine orders for GE gas turbines, nine have come from overseas shipyards. ■





## A rebirth for GE's Association Island?

**Proposed as U.S. National Sailing Center, old GE site is scheduled to take part in 1976 Olympics.**

The scenes above are etched in the memory of many a longer-service GE employee: the crammed boats streaking out of Henderson Harbor, GE brass on hand to welcome each new group of "campers," finding one's "tentmate" in the rows of permanent two-man cabins, attending morning-long business reviews at Town Hall, devoting afternoons to a round of sports that included everything from shuffleboard to highly competitive softball to fishing in Lake Ontario, swapping shoptalk over evening drinks at the Black Catte, and joining in firelight ceremonies under the historic elm on the lake's shore.

The scenes are from Association Island which, for some 50 years, was the site of summer-long sessions attended by successive waves of GE people. As many as ten three-day camps would be held, each attended by up to 300 employees. Current concerns and interests of the Company would be aired in morning reviews, spiced with skits and dramatic routines. Afternoons and evenings would be given over to fun and games.

But corporate styles change. The sheer burden of the undertakings and the tradition of

whoopla were less attractive to new ranks of managers. Association Island was deeded over to the YMCAs of New York as a GE gift in 1959. The "Y" used it as a conference and recreation center, but eventually had to close its operations down for lack of capital to maintain them.

Enter U.S. sailing enthusiasts. Last summer the island was given a trial run when both the Thistle and Lark classes voted to hold their 1973 national competitions on eastern Lake Ontario, using Association Island as their base. On November 14 the North American Yacht Racing Union's Executive Committee voted conditionally to establish its National Sailing Center at the island. Moreover, the U.S. Olympic Committee has recommended that all yachting Olympic trials be held there in June 1976 and NAYRU is now allotting time at the island for major championships in both Olympic and non-Olympic classes.

Sailing was one of the afternoon activities offered to GE campers. Now the currents are moving swiftly toward making it a whole new way of life for Association Island. ■

# UNDERSTANDING THE ECONOMY

CPRO's Doug Moore:

**"1974's poor 'attitude climate' calls for extraordinary efforts to gain support for sound economics"**



**“W**e in General Electric, as in all business today, recognize that we are dealing with a public mood that is highly suspicious of and skeptical toward its institutions—including its business organizations. As Irving Kristol put it recently in *The Wall Street Journal*, ‘tis the season for scapegoating, and the large corporation is once again everyone’s favorite candidate for ritual slaughter.’ It adds up to an exceedingly unpromising ‘attitude climate’ in which business must operate. Our response in General Electric has to be to make 1974 a year of extraordinary efforts directed toward re-explaining and interpreting the fundamentals on which the nation’s economic system is based and on which our economic welfare depends.”

The speaker is Douglas S. Moore, VP—Corporate Public Relations. His point to *Monogram* readers: “This is a task and a responsibility that calls for all the help we can get—not just at headquarters nor in Corporate Public Relations Operation but throughout the Company.”

Concern on this front, he notes, begins at the top. “One of the five special committees organized by the Board of Directors is the Public Issues Committee, whose stated purpose is that of ‘concentrating on major public issues and assessing management’s response to them.’ And an important element in that assessment is certain to be our resourcefulness in gaining public support for sound economic policies.”

One significant step taken by Corporate PR itself is the establishment of a Public Issues Council, formed both of PR professionals and of representatives from the Corporate Executive Staff, Corporate Employee Relations and Advertising and Sales Promotion Operation. The

Council’s purpose: to identify those public issues with the greatest impact on the Company and to coordinate a broad-scale response to them.

Comments Moore: “Taking a leaf from the strategic planners, the Council has recognized the need to allocate the Company’s communications resources selectively by identifying seven Key Public Issues for special emphasis in 1974. Concern for economic policy and the enterprise system is one of these. The others include: energy and the environment, foreign trade and investment policy, equal opportunity for minorities and women, consumer interests, technology and society, and special interest issues such as the pressures for increased financial disclosures. In addition, picking up an idea first advanced by Senior VP Robert M. Estes, the Council recognizes a number of ‘anticipated issues’ whose main impact can be expected to come beyond 1974.”

One tangible result of these new approaches: a closer coordination between top GE spokesmen and corporate communications programs. “Executives’ public-speaking engagements, Congressional committee testimonies and the like used to be considerably more random, determined largely by the nature of the requests,” Moore explains. “Today, with a priority list of issues and the strong support of our top officers, it’s possible for executive spokespersonship to build toward recognized objectives.”

Efforts to build economic understanding of the economy and the enterprise system currently lead the list. Examples cited by Moore:

- **Inflation**—“The economy is locked so tightly in its inflationary spiral today that we tend to forget that inflation is a man-made phenomenon. Control of it is, consequently, a test of human will and restraint. The Government must lead through responsible fiscal and monetary policies, but ultimate control also requires public understanding and support.”

A General Electric contribution to the evolving debate on this subject, Moore feels, was the carefully reasoned talk that Chairman Reginald H. Jones gave recently to the Traffic Club of Pittsburgh. “Reg made the important point that there needs to be a turnaround in U.S. priorities—with more attention to the neglected *production* side of our economy rather than to the *wealth-distributing* side, which was the main thrust of social concern in the decade of the 1960’s. As Reg observed, it’s a special U.S. problem, because the U.S., in directing only 15% of its GNP to capital investment, is at the bottom



Speaking out for economic understanding: CEO members Dance (left), Parker, Jones, Weiss.

of the list of industrialized nations—comparing to 34% for Japan, at the top.”

• **The role of profits** is being stressed in talks both by Vice Chairman Jack S. Parker and Vice Chairman Herman L. Weiss. “Both have made statements on this subject that merit close study,” Moore notes.

“Jack Parker’s talk to the Executives Club of Chicago provides a needed antidote to those press accounts of industry’s ‘soaring’ profits. Jack termed these press stories ‘the \$100 billion misunderstanding’—that’s the level of *reported* profits before taxes for the non-financial sector, while the reality — after deducting taxes and eliminating inventory profits resulting from inflation—was more like a \$30-billion annual rate and was actually below the preceding year’s level. This type of analysis is essential if we are to correct the gross overestimation of profit levels that exists in the public mind. Also, Jack hit hard on the fact that profit must be considered as an element of cost in any going business, just as certainly as labor and materials are costs. This, too, is a vital point that tends to get lost and must constantly be reinforced.”

The important service that Herm Weiss has been rendering in his addresses, Moore says, “is to tackle head-on the false idea that there’s an inevitable conflict between profit-making and social responsibility. He makes it clear that for business you can’t have one without the other. Profits are the prime ingredient that permits General Electric and every other company to help improve or move forward the quality of life. He sees that ‘no contradiction exists between serving the public and seeking a profit.’ Profit is the incentive that guides business to social needs. It offers the carrot of persuasion

rather than the stick of compulsion.”

• **The electrical economy**—This was the theme Vice Chairman Walter D. Dance emphasized at the January Press Conference. “In the great public confusion brought on by the energy crisis, Dave Dance has seen the need to counter the kind of wishful thinking that has been indulged in with regard to the more exotic energy sources such as fusion, fuel cells and solar energy. Dave has made clear that use of these more exotic sources on a commercially viable basis ‘will be in the next century, not in this one’ and that our main reliance in this century has got to be on coal and light-water reactors. It’s up to us all to keep pounding away on the theme that the best route to energy independence is via the electrical economy.”

So it goes with other key issues. “Reg Jones has recently reaffirmed the Company’s determination to be a leader in improving opportunities for minorities and women in such ways as accepting the Chairmanship of the National Advisory Council on Minorities in Engineering. On international trade policies, Jack Parker has carried the ball in a series of Washington meetings with Senators to register GE’s support of the Trade Bill now under consideration. On the ‘consumerism’ front, Stan Gault is spearheading an industry campaign against exaggerated charges about appliances’ energy consumption. And Tom Paine and Art Bueche are tireless as spokesmen for social progress through technology.”

Doug Moore is convinced that, as these and similar thrusts by GE officers are supplemented and multiplied by GE people throughout the Company, an appreciable effect can be realized on the public mind and on public decision-making. “But I should also point out that by reporting these top officers’ perspectives to *Monogram* readers, I’m not implying a ‘party line’ to be followed. Rather, the whole approach of the Public Issues Council is to organize source material which GE people can use as they see fit in their external contacts with the public. Employees in operating Groups, for example, can probably contribute best by concentrating on those issues that are having the most direct impact on the health and future potential of their businesses. Participation on this scale, and with the more careful targeting of objectives I’ve described, is one of the surest ways we know to change the attitude climate for the better.”

*Note: copies of talks referred to in this interview will be supplied on request to the Monogram editor. ☐*



# MONOGRAPHS

## First quarter preview: improved results

**New York**—As a prelude to an energy press conference presented here March 21 by the Major Appliance and Consumer Products Groups, Vice Chairman Dave Dance announced: "Based upon our most recent estimates, General Electric's 1974 first-quarter earnings will be higher than the 63 cents per share earned in the same period last year."

He added: "One of General Electric's great strengths is in its wide market basket of products—covering the whole spectrum of consumer, aerospace, industrial power equipment and industrial components and systems, as well as our international business and the wholly-owned General Electric Credit Corporation. Most of our businesses are experiencing very strong demand for their products, achieving record order rates and still building backlogs."

The purpose of the conference, he noted, was "to bring perspective to some of the issues being raised as part of the current, serious energy situation," particularly "the perspective as viewed from the familiar appliances and consumer products used around the home—the impact of the energy they consume and how we can make them serve us more efficiently."

●

**A Fellow of the Academy**—that's the title recently bestowed on GE Marketing Management Development consultant Marion S. Kellogg by the International Academy of Management. Headquartered in Geneva, Switzerland, the Academy is widely known as CIOS, from its



original French name: Conseil International pour l'Organisation Scientifique. It grew out of the first International Management Confer-

ence, held in Prague in 1924 and sponsored by Thomas Masaryk, President of the Czechoslovak Republic, and Herbert Hoover, prior to his becoming President of the U.S. Today it is a force helping to advance scientific and professional management throughout the world. Shown welcoming her into CIOS ranks: fellow Fellows Reginald H. Jones, GE's Chairman, and Harold F. Smiddy, former GE VP who is now Honorary Counsellor of CIOS.

●

**Progress in opportunities for minorities** has also occupied GE's Board Chairman in recent weeks.

He convened the first meeting of the National Advisory Council on Minorities in Engineering (NACME), a new arm of the National Academy of Engineering in Washington in February. The new Council will be steering a national drive to achieve a ten-fold increase in minority engineering graduates over the next decade. GE is the pioneer corporation in organizing the Council, composed of heads of major corporations, universities and cabinet-level government officials.

●

**A tenth anniversary dinner for OIC** (Opportunities Industrialization Centers of America, Inc.) held recently in Minneapolis turned into a warm personal tribute to Reverend Leon Sullivan, founder, led by GE's Chairman.

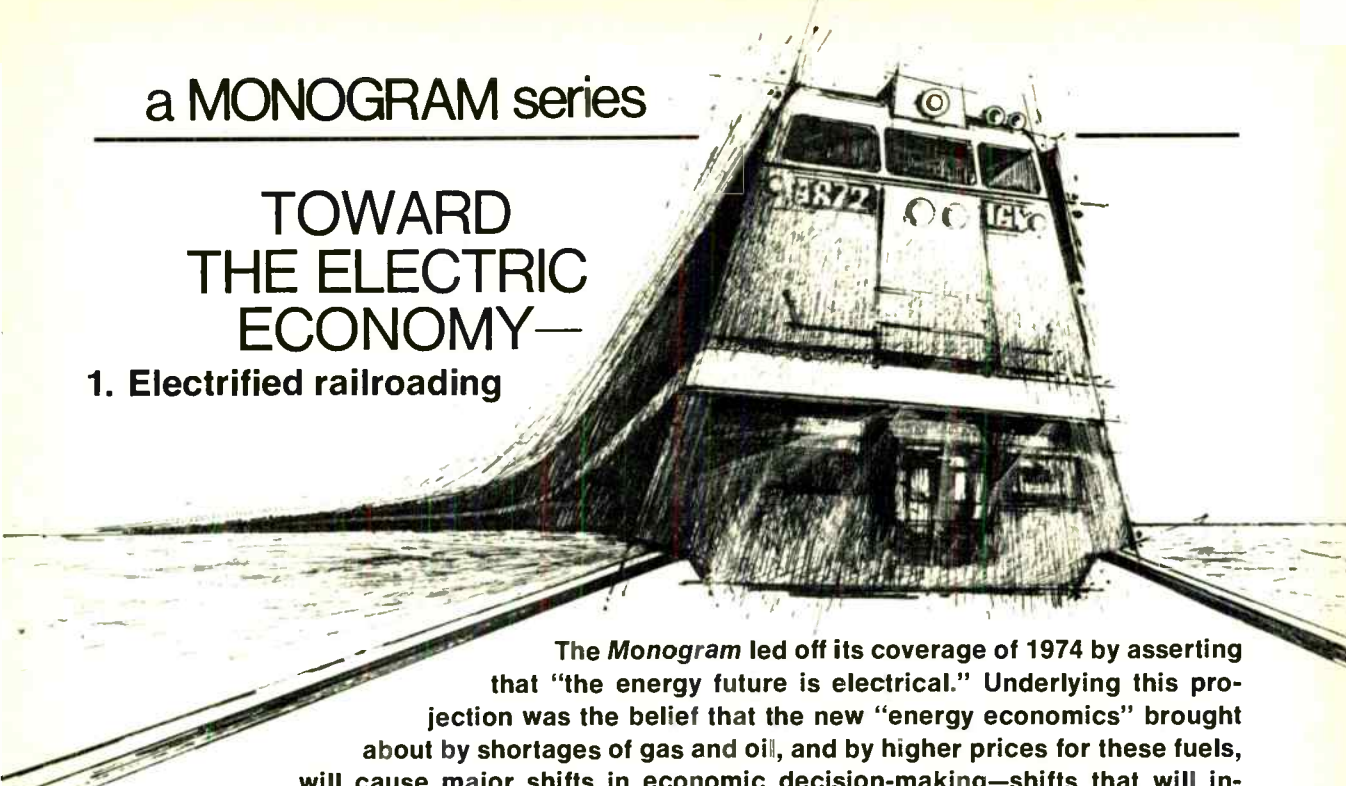
Jones told guests: "There were people who said you can't take thousands of the poor, train them with attitudes and skills and move them from welfare rolls to payrolls—so Leon invited skeptics to see it being done. There were people who said you can't get sophisticated, single-purposed business to dedicate itself to this kind of social action, and he promptly mobilized the leaders of American industry behind his program. And there were even those who said black and white could not work together in harmony—that they were destined to go their separate ways—and Leon went on to develop one of the most enduring experiences in cooperation and brotherhood that this nation has enjoyed in the nearly two hundred years of its existence."

The audience let Jones know he had spoken for all of them—with a standing ovation. ■

a MONOGRAM series

# TOWARD THE ELECTRIC ECONOMY—

## 1. Electrified railroading



The *Monogram* led off its coverage of 1974 by asserting that “the energy future is electrical.” Underlying this projection was the belief that the new “energy economics” brought about by shortages of gas and oil, and by higher prices for these fuels, will cause major shifts in economic decision-making—shifts that will increasingly favor direct use of electric power. Electrical options that have long been held in abeyance by cost and other factors suddenly look more attractive. With this issue the *Monogram* begins a new series: a one-by-one re-examination of some of these electrical options that promise to accelerate the swing to an electric economy.

“A reappraisal of railroading is underway that can only benefit the industry,” says Louis V. Tomasetti, Vice President and General Manager, Transportation Systems Business Division. “The energy shortage is causing a rediscovery of the substantial advantages of railroads.”

As he sees it, railroading is receiving a well deserved boost principally because of the oil shortage and its cost impact on other forms of transport. “Railroads already haul the largest share of U.S. freight—39%—and many analysts believe that share should increase because of railroads’ inherent efficiencies,” says Tomasetti. “Many studies conclude, for instance, that for most trips railroads can move freight for one-third or one-fourth the amount of fuel required for a truck. The renewed interest in coal as a fuel

will benefit railroads, also, because 70% of the coal produced in this country is hauled by railroad.”

But over and above this prospective boost for the whole railroading industry, powered



VP Tomasetti: “Greater use of our railroads is essential to an energy efficient transportation industry.”

by some 27,000 diesel-electric locomotives, is the potential new opportunity for all-electric railroading on high density freight lines. “Railroad electrification could provide important economic advantages to U.S. railroads and save the U.S. billions of gallons of diesel oil,” says Tomasetti. “For example, more than 50% of US rail traffic is concentrated on 10% of the track. Diesel locomotives on that 10% use roughly 2 billion gallons of diesel oil annually.”

What is the likelihood of a resurgence of interest in—and orders for—electrified railroad equipment?

Locomotive Products Department’s new General Manager, S. Graham Hamilton says: “The beginning of renewed interest is, we think, already apparent. A new prototype of electric railroading is in place, the 78-mile Black Mesa and

(continued next page)

## RAILROAD ELECTRIFICATION (continued)

Lake Powell Railroad (see pages 16-17 for a close-up), and is attracting the attention of many railroaders—a constant stream of visitors trek out to the Navajo reservation in Arizona to see how well it operates. It's the world's first 50KV electrification, an important GE development."

The new interest has already become more concrete than potential customer visits. "We have additional new electric locomotive orders from Amtrak and from Taiwan," says Hamilton. "And there has been an increase in the number of serious major freight line electrification studies we are conducting with railroads."

Railroad motivation is not the problem. In addition to the serious electrification studies, one major western railroad is well into an experiment with electrification of two short stretches of track to test the overhead power lines called catenaries.

**But there is a single problem** still standing between the railroads and electrification—capital funds. "Railroads, like all industries, must balance their use of capital improvement funds," observes Graham Hamilton, "and they are looking seriously at when they might have funds available to begin."

Help could be in sight from two parallel legislative proposals now being considered in Washington. The administration-sponsored Transportation Improvement Act of 1974 and a similar act proposed by Congress would back up private financing used for electrification and other railroad improvements with guarantees.

This needed new legislation would be a help to the nation's efforts to improve efficiency of energy use in transportation.



*New locomotive chief Hamilton: "GE's 50KV electrification technology in place at Black Mesa is a head start on the railroads' electrical future."*

"And this new legislation could be the step that would permit restoring a more efficient and economical rail transportation balance," says Hamilton.

**Whether the trend** is gradual or accelerated, it is good news for GE people at the Locomotive Products Department's headquarters in Erie, Pa. For in the U.S., General Electric is a leader in electrification technology. "We see the 50 KVelectrification technology now in place at Black Mesa as a head start," says Hamilton. "Innovations like the GE 50 KV vacuum circuit breakers and other product features at Black Mesa make us hopeful that the next major electrification project in the U.S. will use our 50 KV technology."

But there's more to railroad electrification than just locomotives. Hamilton: "There is a synergistic effect on the whole

electrical equipment industry. It's evident at Black Mesa. When a railroad goes electric, the electrification technology opportunities extend all along the line—from tiny sensing devices to large power delivery apparatus."

**Timing of electrification** is still the question. "The energy crisis has not changed the fundamentals of electrification technology, but it has improved the already sound economics and could improve the timetable," says Tomasetti. "As you can imagine, the transportation industry is experiencing a substantial fuel cost increase and availability push now. Each permanent rise in diesel fuel costs tips the economic balance even more toward electrification on the high density freight lines, of course."

Help for the railroads on the capital improvements front is also crucial to the timing of the next major electrification. "We hope that legislation will be passed to assist railroads in introducing electrification on their high density lines now that the economics are more favorable than ever," Tomasetti continues. "Moreover, we hope that this legislation will further encourage the utilities to install the required power stations to support the railroads in their efforts to improve transportation efficiencies."

Tomasetti's conclusion: "Diesel-electric locomotives on the lower density lines and electric locomotives on high density lines will provide a balanced, efficient and economic approach to freight and passenger transportation. Greater use of our railroads for both freight and people is essential as we move towards an energy efficient and energy economic transportation industry."





## Black Mesa: prototype for all-electric railroading.

**Problem:** how to connect most efficiently the coal available for power generation near Kayenta, Arizona, with the cooling water available at Lake Powell, 78 miles to the northwest?

**Solution:** America's newest railroad—an all-electric train that shuttles back and forth between mine and lakeside power plant.

The GE locomotives are the

world's first electrics to operate at 50,000 volts (previous high was 25,000). They pull 83 cars full of coal, 120 tons to the car, over the route at 55 miles per hour—the sole source of fuel for the Navajo Generating Station which supplies 2.3 million kilowatts of power.

The gleaming new equipment superimposed on the stark scenery of the Navajo

Indian Reservation gives visitors the impression of looking at a tabletop model. There is an increasing likelihood that the Black Mesa and Lake Powell railroad is a model—a GE state-of-the-art model of electrification and automation for other high-tonnage U.S. railroads of the future.

Photos show the highly automated sequence from the auto-

matic coal loading silo to the unloading building, the conveyor that lifts the coal to the steam plant and the GE turbine-generators that turn out the power.

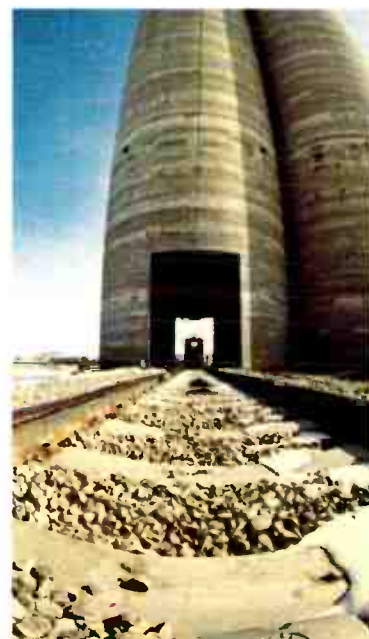
Two of the photos below show something else: examples of other electrical products that gain special opportunities when a railroad goes electrical: one of the 202 GE automation system sensors embedded between the tracks

and the GE-equipped electrical substation that relays electricity to the railroad. At Black Mesa, the GE monogram shows up in many other places: aboard the three locomotives, which are a blend of GE technology from all over the country, from the large transformer, thyristors and switchgear to tiny relays and wiring. Trackside there are GE signal devices at grade crossings, status display boards, more switch-

gear and protective devices.

The synergistic effects of railroad electrification for the electrical industry as illustrated at Black Mesa would extend to electric utilities also, should a major U.S. railroad decide to electrify.

**Conclusion:** The time is ripe for electric railroading's emergence. Continued oil shortages and government support could supply the impetus needed to get the wheels rolling. □







An AMTRAK order for 26 GE electric locomotives and a diesel-electric locomotive in final assembly for Southern Pacific are both symbolic of the renewed vigor of the U.S. railroad outlook in general and of the renewed interest in electrification in particular. The AMTRAK units, representing GE electric locomotive technology and manufacturing experience, will be carrying passengers up and down the electrified north-east rail corridor later this year. The Southern Pacific unit is already at work hauling West Coast freight.



New General Electric Headquarters, well on its way to completion amid meticulously landscaped hillsides with terraced rock walls, already includes finished offices, as previewed at left. Helicopters were used to lower air conditioning units into place on the buildings' rooftops. Integrated modular ceiling units provide heat and air conditioning outlets as well as lighting.





## PRODUCTS

### New HQ: showcase for GE technology and products

**I**t stands to reason that when GE set about building a new headquarters, the Company would strive to take full advantage of its own leadership technologies and product excellences.

A close-up examination of the Corporate Headquarters, now in the home stretch of completion in Fairfield, Connecticut, shows that this assumption is being borne out.

Behind the sleek contemporary exterior, GE monograms show up everywhere. Over 30 different GE operations are contributing to the new complex. Some of the GE inputs are, or will be, highly visible: lamps, clocks, Textolite® plastic paneling, water coolers, GE commercial cooking equipment, etc.

**Right: On the headquarters west wing, workmen connect one unit of some two thousand tons of air conditioning condensing equipment ordered from GE's Tyler, Texas facility.**

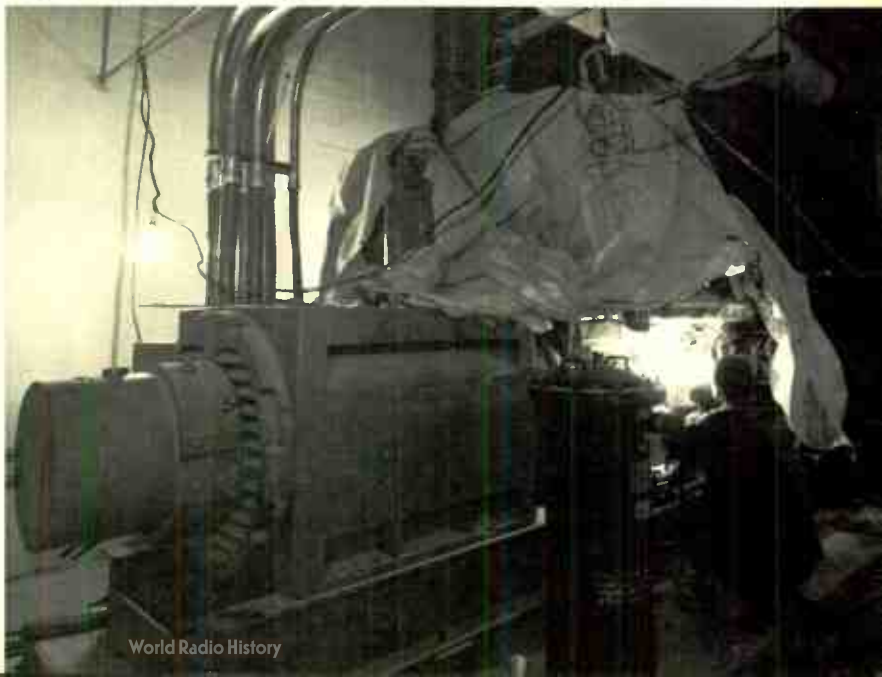
**Below, right: This giant diesel generator from the AC Generator Department is ready to provide stand-by emergency power for essential building services.**

**Below: Minimount® luminaires from GE's Lighting Systems Business Department brighten the underground parking garages at Fairfield.**

Other products will perform behind the scenes: GE silicones, wire and cable, lamp ballasts and the like.

Says the resident manager, Alfred E. Schuman of Real Estate and Construction Operations: "It's a point of pride for GE departments to have their products represented in this new complex. Even the casual observer can see that we've made every attempt to utilize the wide variety of GE products for the headquarters project."

On these pages: a sampling of Company innovations to help guarantee a smooth transition for 700 GE'ers who are scheduled to report to Fairfield August 12. *(continued next page)*







**NEW HQ (continued)**

Clockwise, from upper left: Fairfield's 'Nerve Center,' armed with switchgear from GE-Philadelphia, controls electrical distribution throughout the new headquarters.

Stacks of Mod - U - Line lamps from Nela Park and ballasts from GE's Ballast Business Department are installed in each waffled ceiling module.

Space heaters from GE-Shelbyville were on hand during cold winter months to warm workmen.

Heating for the building is supplied both by the overhead lighting system and by Major Appliance's baseboard heaters along each office window wall. Contractors made extensive use of GE silicones and Glyptal paints throughout the complex.

General Electric commercial cooking equipment, including ranges, Disposal® waste disposers and dishwashers, occupy the main kitchen in the west wing. It will service three dining facilities. ▯



# GE'S JOB OPPORTUNITIES: TWO NEW FACETS

In recent weeks GE people have begun pioneering not complete new jobs but interesting aspects in two new areas which supplement their existing jobs. Both have the excitement of representing important new facets of the Company's response to today's social challenges: "Consumer Coordinators" are now in place in over 100 locations across the U.S. to step up GE's efforts to meet consumers' needs; and "Environmental Systems Analysts" are receiving new training to help safeguard the work environment of their fellow employees.

## 1. Consumer Coordinators

"I'm sorry, but that's not my department."

Everyone knows how frustrating it is to call some company with an inquiry only to hear this apologetic but unhelpful response.

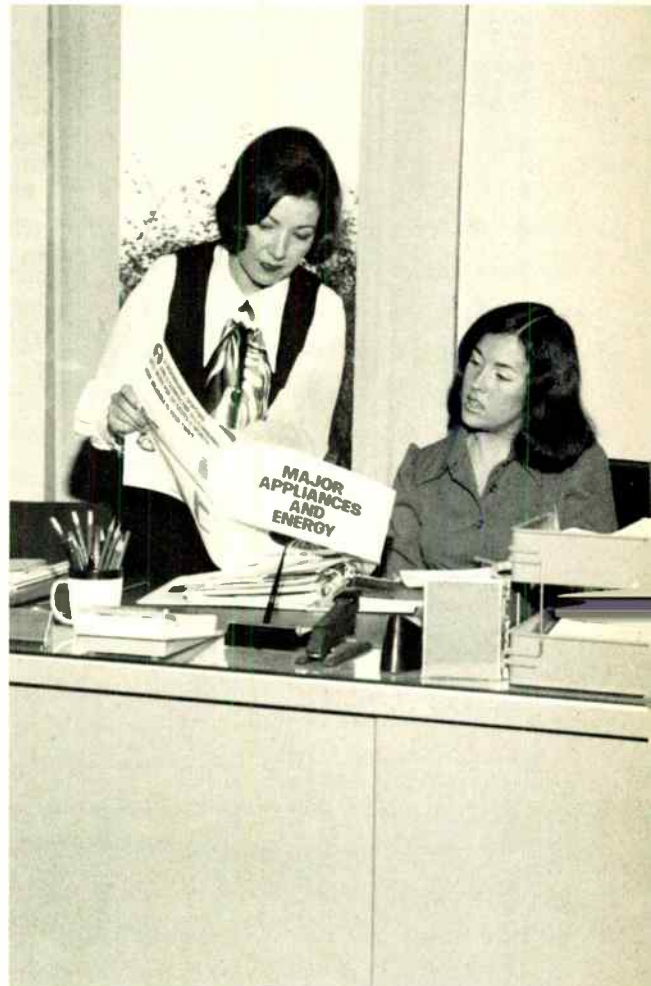
Well, there's good news for consumers: Major Appliance Group employees are being given the opportunity to become "Consumer Coordinators"—to help consumers get quick, reliable answers from a Major Appliance representative who is "in the know" and nearby.

One strength of the Consumer Coordinator concept lies in numbers. There are currently 109 Consumer Coordinators in Major Appliance distribution zones around the country, with more to come. What this means is that an estimated 75-85% of the public will be able to contact a General Electric Consumer Coordinator by a local phone call.

Until a year ago, when the Consumers Institute began training Coordinators to communicate with people outside the Company as well as internally, the Institute's charter of protecting the consumers' "right to know" was carried out by working through utility home economists, teachers, sales counselors and GE dealers. Now, among their other duties, the Institute's four Regional Directors work closely with Consumer Coordinators in the field to help them provide reliable information to consumers who have questions.

What kind of inquiries are made of the Coordinator? To find out, the *Monogram* spent a day with Denise Smith, the Group's zone coordinator in Memphis, Tennessee. With Denise was one of the Institute's Regional Directors, Rose Franklin, who was

*(continued next page)*



*Consumers Institute Regional Director Rose Franklin, at left above, briefs Consumer Coordinator Denise Smith on new Major Appliance product guides and energy brochures.*



there to show Denise some new reference material. A key item: a new *Consumer Inquiry Guide* of the most frequently asked consumer questions and appropriate Coordinator responses.

Before the two women had gotten very deeply into the material, however, Denise's phone began ringing. She courteously gave one caller the approximate cost-per-year difference of operating a frost-free refrigerator-freezer over a manual defrost refrigerator-freezer, and explained some advantages of the former which made this small difference insignificant.

A second caller, inquiring whether GE makes appliances in black to match her furnishings, was given a polite "no" along with a suggestion to get in touch with a local handyman who could repaint appliances. Frequently, Denise explained, a homemaker calls in because an appliance is not operating properly. Denise checks over all the points in that product's Use and Care Guide with the caller and, if that doesn't help, refers the customer to the service department for more detailed information. Occasionally, too, someone will walk into the zone office for information. Denise will answer questions, offer the shopper brochures to look at and even give a demonstration of the appliances in the office's model kitchen.

"We all know what it's like to get a run-around," said Denise. "Now, consumers with questions, suggestions, even complaints are turned over to me. If I don't have an answer on hand, I'll find it out as soon as I can and get back to that individual. People know, then, that they have a person at General Electric who is concerned about their problem and will try to do her best to solve it."

The new concept, Rose explained, "stems from the idea that the consumers are in a continuous cycle of ownership and the consumer identifies with the brand. An unhappy experience at any point in the cycle can affect a decision ever to purchase that brand again." The object of the Consumers Institute, through the Consumer Coordinator, is to maintain a satisfying contact throughout the ownership cycle.

"I'm so happy I was given this opportunity," Denise commented. "I love to talk to people and help them and it's such a satisfying feeling to have a consumer tell me: 'Gee, I really appreciate your spending so much time helping me.'"

## 2. Environmental Systems Analysts

That's the new title that 24 GE people can now begin applying to themselves.

It's not an exclusive job title or a full-time activity for any of the 24. Rather, it represents an opportunity for them to expand the scope of their current technical and safety jobs in the Components and Materials Group, to add a new hat as in-house environmental health specialists.

In order to support these new job responsibilities, the 24 recently attended an Environmental Systems Analyst training seminar conceived by the Group Environmental Support Operation in Bridgeport, Connecticut, and presented by the new corporate-level Environmental Support Services.

Thomas A. Bates, a process engineer in the Valox Products Section of the Plastics Business Division, and one of the 24 participants, explains the seminar's purpose: "This whole ESA concept reflects the Company's rising concern for a healthy working environment, as well as the desire to comply fully with the new standards set by the Federal Occupational Safety and Health Act. Those of us

*Measuring atmospheric content levels in GE's Pittsfield, Mass. plant is just one of many tests Tom Bates will perform as an Environmental Systems Analyst.*



chosen to attend the first of what will be a number of such seminars received the instructions that will enable us to supplement the Group's industrial hygiene staff and broaden the health and safety programs at each of its 46 facilities."

Participants received more than instructions. "Each ESA was provided with a valuable kit of measuring instruments. Part of the instruction at the seminar was given to demonstrating the use of this equipment in the Group's Environmental Systems Laboratory."

Also, there was the stimulus "to really get out and improve the environmental health front at each of our home plants." The stimulus came in a talk to the seminar by VP and Group Executive Jack Welch. Bates: "His enthusiasm for us was contagious. We saw that besides contributing to the health and safety of our fellow employees and helping the Company adjust to a new social challenge, we've made a start on what could be a terrific opportunity for us. I myself left there convinced that if I decided to enter this field as a career I couldn't find a better way to begin."

How will this knowledge, spirit and equipment be applied? "One of our most important jobs will be to go out into the plant to sample and measure any potentially toxic materials

and safety hazards. This includes chemicals, dusts, fumes, gases, noise, vibration and heat. More generally, we'll be formulating a program of circulating information not only to our plant medical personnel and the Corporate Medical Operation which is directing the program, but to our purchasing agents with whom we'll be working on the purchase of all new equipment and chemicals ordered, and our legal people and management. If an OSHA compliance officer suddenly appeared for a plant inspection, for example, he should be accompanied on any tour with GE management representatives."

Other important duties will be documenting the testing measurements, alerting safety and medical personnel if any unhealthful or unsafe condition is discovered and developing implementation plans to comply with OSHA standards. Evaluation of the tests and measurements will be performed in the Environmental Systems Laboratory. "From there" Bates said, "we can proceed to eliminate any hazards identified following the guidelines set by OSHA."

"It's a model program for the Company," Bates added, "and, as such, we'll be pioneers in our field. If we take advantage of this opportunity we can make some great strides for ourselves and for the Company." ▢

*VP and Group Executive Jack Welch, advises Environmental Systems Analysts to "take advantage of this opportunity which could become a leadership role."*





# You can stop smoking

GE's Neil Corrigan  
and his Nela Park  
"Cignot" associates  
prove it can  
be done

*Despite the warning on each pack of cigarettes sold in the U.S. that "The Surgeon General Has Determined That Cigarette Smoking Is Dangerous to Your Health," millions still remain addicted to a habit that the American Cancer Society projects will kill 75,000 people this year. Encouraging, however, is the fact that 21 million Americans are ex-cigarette addicts. The Monogram recently visited with one Company employee who, with the aid of a unique club formed by him and his fellow employees, has joined these ranks and is on the way to beating the rap.*

For the past seven months, Neil C. Corrigan, Advertising Specialist for the Lamp Division's Miniature Lamp Department, has been off cigarettes. He quit "cold-turkey" and attributes his success to a sincere desire not to smoke—combined, as Corrigan admits, "with a little help from my friends."

A two-pack-a-day addict for 16 years, Corrigan participated in the first Five-Day Plan to Kick the Habit held at Nela Park last October, and is the founder and president of "Cignots," a club formed to help quitters stay

*"Cignots" president Neil Corrigan officiates at the club's*



quit and encourage other employees to stop.

"It's simply a question of attitude," says Corrigan. "I had, first, to convince myself that I wasn't giving up anything but instead was gaining something by not smoking. Making this decision wasn't easy. I continued to rely on that old one liner: 'Oh, I can quit smoking just like that . . . Sure, hundreds of times.' I concluded that I couldn't go it alone."

The vehicle for Corrigan and others came from an item in the GE News advertising the Five-Day Plan developed by the General Conference of the Seventh-day Adventists, and supervised by Nela's medical staff. On first glance, Corrigan ignored the ad but was finally persuaded by several co-workers and his two daughters to attend the first session. "Anti-smoking ads on TV really had the kids in an uproar over my smoking. Each time I would reach for a cigarette they would feign coughing attacks. After awhile their cries really made me realize that I had procrastinated long enough. I wanted to quit and for their sake would try."

The consequence was that Corrigan was able to take advantage of an opportunity set

up by another GE'er, Mardig Tookmanian. Associated with the plan for the past eight years, Tookmanian persuaded the group to utilize Nela's camp facility to test the response for future clinics. He explains that the Five-Day Plan takes an overall better health approach, besides just quitting smoking: "We recommend more exercise, deep breathing, better diet and so forth. We try to handle the smoking problem in both physiological and psychological ways. You enroll and quit outright while we attempt to show various ways to lessen the craving to smoke day by day."

Much to the surprise of Corrigan and his cohorts, the first meeting of the Five-Day Plan proved vigorous. Each participant was asked to make an immediate commitment to quit by surrendering all cigarettes on his person. "It's quite a shock for a smoker to have his cigarettes taken away," explains Corrigan, "but it's their approach to convince you that you've rationalized not quitting long enough—here's the opportunity."

A basic theme of the Five-Day Plan is the motto "I choose not to smoke," and heavy reliance is placed on the "buddy" system used

*(continued next page)*

*regularly scheduled monthly meetings . . . members band together to strengthen their desire to stay quit.*





so successfully by Alcoholics Anonymous. Corrigan elaborates: "Each participant retains a booklet of do's and don'ts for the five days, with instructions to call his chosen 'buddy' several times each day. Such calls follow the time-proven axiom that 'misery loves company.' No matter—the calls provide the needed reassurance that everyone is having the same problems. Additional "musts" include: eight glasses of water or fruit juice each day to help flush away nicotine residue; the avoidance of alcohol or any stimulant that might strengthen the craving for tobacco; several long walks each day; and rhythmic breathing to reduce tension and help each individual relax."

How successful is the approach? For 70% of the graduates the Plan worked. Said one: "The group meetings are much more effective than trying to quit on your own." Said another: "The plan helped give me a positive attitude that I was improving my health." Still another graduate said: "It's a great feeling to know that for today I do not have to smoke."

Corrigan's only complaint was that the Five-Day group approach is too short: "Our group felt we needed additional encouragement and that's why we banned together and

formed 'Cignots.' The Club is not restricted to Five-Day Plan graduates or even ex-smokers. Anyone who has quit smoking or who would really like to quit is invited to attend 'Cignots' monthly meetings. Non-smoking is encouraged in a variety of ways at each meeting by feature speakers, films and testimonials. Cignots' main purpose, however, is to help those who quit stay quit. We're encouraging the holding of additional Plan courses at the Park and we've already completed registration for one later this month."

How can other GE'ers profit from Corrigan's experience? Corrigan reports that "The Five-Day Plan offered by the Adventists is only one of a number available; however, it worked for a majority of our group and it's given nationwide. Course listings can be obtained by writing to the General Conference of the Seventh-day Adventists, 6840 Eastern Avenue, N.W., Washington, D.C."

Reflecting on joining the ranks of 21 million quitters, Corrigan admits that the desire to return to smoking remains potent: "I'm still hooked, I'm still an addict, but my attitude has changed because the urge to smoke declined and I'm in control of a habit that offered few, if any, rewards." ■

## ORGANIZATION CHANGES

### CORPORATE

Thomas R. Casey, M.D.,  
*appointed Company Medical Director—  
Corporate Medical Operation.*

Louis G. Cheek, *Manager—Executive  
Compensation Operation.*

Raymond J. Stumberger, *Manager—  
Corporate Executive Manpower  
Planning Operation.*

### CONSUMER PRODUCTS GROUP

H. Gary Carlson, *General Manager—  
Television Component  
Products Department.*

Paul W. Van Orden, *General Manager—  
Audio Electronics Products Department.*

### INDUSTRIAL GROUP

George A. Roupe, *General Manager—  
Nuclear Energy Marketing Department.*

John W. Thurlow, *General Manager—  
Distribution Assemblies  
Product Department.*

### SPECIAL SYSTEMS AND PRODUCTS GROUP

Walter L. Robb, *General Manager—  
Medical Systems Business Division,  
elected a Vice President.*

# 1974 Phillippe Winners: only the tip of the iceberg

Five men and women have won the 1974 Gerald L. Phillippe Awards for Distinguished Public Service. But their leadership in improving the lives of people is only the highly visible surface of a large reservoir of outstanding community work by GE employees, according to William A. Orme, new Secretary of the GE Foundation.

From his vantage point on the Phillippe awards evaluation committee, whose membership includes Board Chairman Reginald H. Jones, Orme and the committee got acquainted—on paper—with each of the 80 nominees. “We thought all the nominees’ efforts were of award-winning quality,” he says. “It is frustrating to be limited to just five.”



**Clockwise, from top left, Phillippe winners at work:**

*In the environment where she has spent more than 25,000 hours over 25 years, **Lucille Boehm**, employee of Tube Products Department in Owensboro, Kentucky, serves young cerebral palsy victims.*

***Stanley C. Corwin**, patent counsel for Television Receiver Products Department in Portsmouth, Virginia completely rehabilitated Senior Citizens Village, a dilapidated home for 60 poor, elderly, black people, using his organizational and business skills.*

*Originator and organizer of the Sickle Cell Center at Deaconess Hospital in Milwaukee. **Joe Cleveland**, left, is manager of Field Service Development Engineering for Medical Systems Division. The center has screened hundreds of inner city residents for sickle cell anemia.*

*Director of the Erie Housing Authority is one of numerous hats worn by **Ellen Curry**, a medical claims review clerk for Transportation Systems Business Division in Erie, Pennsylvania, after 20 years of pioneering in the service of civil rights in Erie. One of the numerous activities flourishing with Ellen on its Board of Directors is the Har-Lin Community Day Care Center.*

***Robert E. Warr**, manager of advanced reliability studies in the Electronics Lab, Syracuse, New York is a weekly radio show host, an NAACP, Urban League and Neighborhood Legal Services leader and a respected Syracuse community figure. Being sworn in on the Syracuse Common Council here, Warr was the first black to be elected.*





## Scientific community meets the new generation in Albany

Budding engineers and scientists from high schools in 33 states and six countries spent three jam-packed days on the campus of the State University of New York at Albany where they were guests of General Electric in celebrating the 127th anniversary of the birth of Thomas Alva Edison.

This 18th International Edison Birthday Celebration was jointly sponsored by the Thomas A. Edison Foundation and General Electric, which now holds the distinction of being the event's first industrial co-sponsor. The celebration, one of the highlights of each scientific year, was held in Taiwan last year.

The aspiring scientists' quick grasp of presentations on subjects like holography, genetics and electron microscopy led to sessions punctuated with questions. Speakers, who included top scientists and technology executives from around the country, were motivated to wonder, in half seriousness, how long their jobs were safe. The purpose behind the celebration? To encourage engineering and scientific careers.



Reaction to "Lucky Accidents, Great Discoveries and The Prepared Mind" by Princeton Chemistry Professor Dr. Hubert Alyea was intense.



Corporate Research and Development VP Dr. Arthur M. Bueche chaired the sessions, mingled with interested students later. Other GE executives participating included Senior VP Dr. Thomas O. Paine, Vice President and Group Executive Edward E. Hood, Jr., and Dr. Thomas H. Lee of the Power Delivery Group.

# Science and Society: the longest view in the shortest time

Something of a masterpiece in time-condensation was achieved recently by Dr. Thomas O. Paine, GE's Senior VP—Technology Planning and Development. In a single half-hour he spanned for members of the American Physical Society the past 50 centuries or so of the interaction of science and society and then used this historical perspective as the springboard for a leap forward into the technology for the last decades of the Twentieth Century. Not to be outdone, the Monogram telescopes time even further by excerpting his talk:

Although science as we know it is a recent phenomenon, systematically acquired knowledge arranged in consistent, meaningful patterns has been central to all great civilizations . . . its cultural roots can be traced back to the dawn of history . . .

From our vantage point in the second half of the Twentieth Century we can look back over fifty centuries and see how science and society have interacted through technology, stimulating cultural advance. The artifacts of previous societies surround us today; in various parts of the world we can still see the links in the evolutionary chain that created modern science-based society.

Basically, three technical breakthroughs triggered the first civilizations: the domestication of animals, encouraging the move from nomadic food gathering to village life . . . the invention of agriculture, which increased the quality and quantity of nutritious, storable food . . . and the irrigation of rich river valleys, furnishing reliable crops and a labor surplus that supported the growth of urbanization and regional organization along the Euphrates, Nile, Indus and Yellow Rivers . . .

In cities, specialization and improved communication became possible, leading to the breakthrough of literacy. Men became kings and sculptors, priests and merchants, scribes and warriors. Capital was formed and large-scale administration established to build and maintain irrigation systems, roads, granaries and temples. Regional transportation developed,

and with it commerce, which required record keeping and arithmetic as did increasingly ambitious engineering projects. Astronomy was born from systematic observations that related the annual movement of the sun through the constellations to the seasonal flooding of the Nile and spring planting. Powerful ruler and priestly classes codified science, law, history and religion to disseminate and pass down from generation to generation the cultural lore.

The central core of Greek civilization was the democratic city state, a penetrating theory of political science and a broad academic program to educate the young citizen. Our Greek heritage includes the theater . . . magnificent sculpture . . . a rich literature . . . new heights of dialectic philosophy, geometry and natural science.

Central to ancient Roman culture was a superb legal system, military technology and continental administration . . . The Romans pioneered the load-bearing arch and concrete mortar construction, as in their famous aqueducts, some of which are still in use. Roman architecture built the grandeur that was Rome . . . as well as an efficient water and sewage system. Its excellent highways provided a vital transportation network that bound together the far-flung empire . . . today's European Common Market is an attempt to recreate the continental economy which the Romans administered 20 centuries ago with a common language, law and monetary system.

(In similar fashion, Dr. Paine highlighted the contributions of the Orient, the Moslems, Venice and other Italian city states, where "a remarkable renaissance of science and culture was born" and "the modern university emerged, greatly stimulating scholarship and science.")

Perhaps the most remarkable outpouring of European physical and intellectual energy was in transoceanic exploration and colonization by the Atlantic coastal nations . . . The technological development of the sailing ship, celestial navigation, cartography and naval cannon rapidly projected western culture throughout the world, bringing Europe a global view.

Modern urban society is the result, based

*(continued next page)*



upon a scientific industrial revolution, a scientific agricultural revolution and a technology-oriented social revolution... A central institution of modern society is industrial organization to apply technology in the service of man.

(A fast review of progress through scientific agriculture, the emancipation of women from the drudgery of primitive agricultural tasks, and great strides in medical science and education, leads Dr. Paine to the intensification of the interaction of science and society in the last few decades "as bold government programs triggered by social upheavals have redirected R&D into new fields.")

The results usually have had a widespread impact on society a decade or two later... Thirty years ago, for example, World War II was the social upheaval which galvanized scientists and engineers into accelerated technical advances. Major 1944 technology programs included the allied atomic bomb project... radar and microwave research... jet propulsion and V-2 rockets... ballistics calculators and fire control systems... and high-polymer chemistry to produce synthetic rubber, pharmaceuticals, insecticides...

A decade later, a number of major 1954 businesses stemmed from this 1944 R&D: the nuclear Navy, home TV, defense electronics, microwave communications, military jet aircraft and industrial gas turbines, intercontinental ballistic missiles, digital computers and continuing advances in high polymer chemistry, creating major growth industries in GRS and Butyl rubber, silicones, other synthetic polymers and new pharmaceuticals...

(Dr. Paine's analysis of the subsequent two decades are indicated by the slides below, used to illustrate his talk).

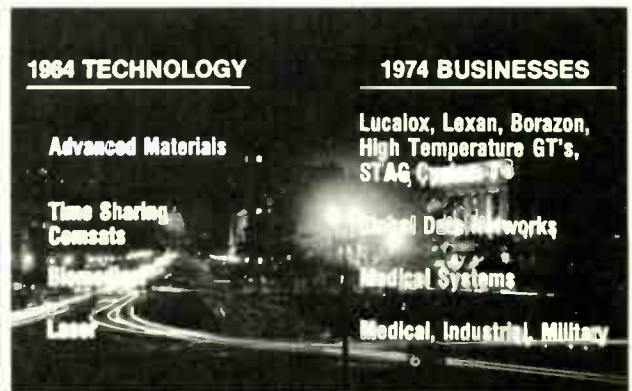
Now to move a decade forward to the 1974 technology thrusts that I think most likely to produce 1984 businesses:

- **Power generation:** The successful development of mixed uranium-plutonium oxide or carbide fuel should open the way for the first economical liquid metal, fast-breeder reactors... Reactor standardization and security demands should also make nuclear parks the preferred siting option by '84, with on-site fuel processing... Higher 1974 fossil fuel prices and conservation needs are encouraging the development of advanced cycles and synthetic fuels from coal and shale. This, combined with high-temperature material advances, should make possible 50 to 60% efficient prototype power plants including coal-fired steam and gas cycles. Coal and shale refining will produce new clean fossil fuels, and air-cooled condensers will reduce thermal impact.

- **Heat pumps:** Advances in refrigeration engineering, materials and solar collection should open the way to greatly extended space heating and cooling by efficient heat pumps that require less fuel than direct combustion, with solar augmentation in many installations.

- **International space stations:** NASA's space shuttle development program... should be providing low-cost regularly-scheduled service to and from earth orbit by 1984, where refurbishable satellites will be providing a wide range of economical services. New international space stations will be under construction in orbit for laboratories, observatories, space transportation centers and defense posts.

- **New materials and medical systems:** Continuing advances in polymer chemistry will create lightweight engineering plastics that will





Globe of Mars, with physiographic details filled in by photos sent back by NASA's Mariner 9 spacecraft is the newest addition to Senior VP Tom Paine's memento-studded office.

replace metals in the much more efficient automobiles of the '80's. Biomedical R&D will continue to advance health care technology, including automated medical systems and prospects for conquering heart disease and cancer.

- **Automation and uranium enrichment:** Data processing technology will continue its rapid advance, making possible more effective engineering and manufacturing automation. Today's ultra-centrifuge R&D should lead to a billion-dollar 1984 industry in low energy uranium enrichment, to support the world's growing nuclear power needs...

Finally, a peek even further beyond the horizon at the potential significant activities of 1994 that will be based on new 1984 technological advances:

- **Synthetic protein development...** If a global food crisis occurs in the next decade, perhaps this will be the "NASA" of the 1980's to decrease man's fifty-century dependence on agriculture.

- **Heuristic data systems** with large associative memories will make human communication with computers almost effortless, greatly extending data processing applications and impact.

- **A controlled fusion demonstration** should have been achieved, and the first design studies initiated for prototype power plants and space propulsion drives. For earth the implication would be an inexhaustible supply of energy for mankind in the next century. The implication for Mars would be to reduce travel time from earth to a few weeks, with greatly increased payloads and an indigenous supply of Martian energy.

- **Advances in 1984 electric auto systems** technology may make possible the 1994 electrification and automation of the last big local-combustion, manually-steered power system...

- **The "hydrogen economy":** A particularly exciting future prospect is a clean hydrogen energy system based on nuclear-powered water-splitting. A practical thermal process for producing cheap hydrogen and oxygen from water might be demonstrated by 1984 if a major effort is mounted now. This would open the way in the late '80's for the extension of nuclear energy across the entire spectrum of energy use, from clean auto and jet fuel to synthetic fertilizer and steelmaking... The "Hydrogen Economy" is speculative, but attracting wide R&D interest as perhaps the greatest energy system challenge of the late Twentieth Century... ☐





**Two new types of job opportunities** being explored by GE people are detailed on pages 21-23. Above: Consumer Coordinator demonstrates GE oven to a consumer in the Major Appliance Group's Memphis, Tenn. zone. Left: In a GE-Bridgeport, Conn. lab, Environmental Systems Analysts check over instruments they will be using to monitor the working environment in each of the Components and Materials Group's 46 facilities.