



REG JONES ON GE PRIORITIES, ORGANIZATION CHANGES



**AT THE SIGN OF
G DOUBLE E**

**DISNEY WORLD—
HERE COMES GE**



VOLUME 50, NUMBER 4

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, 1973, General Electric Company.

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'IT'S TIME NOW FOR THE TRANSITION TO BE OVER'

A Monogram interview
 with Chairman of the Board
 Reginald H. Jones

Mr. Jones, do the major organization changes announced recently reflect basic new directions in managerial philosophy?

There's no sharp break with the past, but certainly we're moving in new directions. My associates and I in the Corporate Executive Office have been trying to take a look at the challenges facing General Electric and how we might organize for them. We wound up listing well over 100 challenges, and from these selected six that we think are really top priority.

Response to these six challenges is, then, the rationale behind the recent restructuring?

Right. They provide the basis for our realignment of executive responsibilities. The first of these challenges will be no surprise to GE people. It calls for *accelerating our profit improvement*. Now we've done a pretty good job in the last couple of years, but our goal has to be a continuation of solid earnings growth. Coupled with this is the second challenge: *effective utilization of investment*. If we can increase our profit improvement *and* achieve the most effective use of our investment, then of course we enhance the return for our share owners. These goals have to come first because we're speaking of people who *are* the owners of the business and are, in effect, our bosses. I think all of us have to be disturbed by the steadily declining return on investment in the manufacturing sector of the U.S. It's been a steady erosion now for the last decade. And we in General Electric are not exempt from this pressure, although I'm very happy that our return on share owners'



"From a listing of over 100 challenges we came down to six that are really high priority for GE"



"The Vice Chairmen will be advocates in the CEO for the Groups they're responsible for"



"We must counter anti-institutional attacks with responsible stewardship"

equity went back up to 18% in 1972, for the first time since 1965. Performance on this front eases our path in other critical sectors. As capital becomes more difficult to acquire on reasonable terms, for example, the importance of controlling investment will increase. The third challenge is to *emphasize strategic planning*.

You intend to continue putting a high priority on this?

By all means. Strategic planning is no passing fancy for us. It's been a substantial help to us in the last three years since Fred Borch put it in place. I want to see it become an integral part of our established way of life. We want to continue to strengthen our capabilities at the corporate level, as well as in the Strategic Business Units, because our corporate strategic planning has got to be more than just the sum of the SBU strategic plans. Also, it has to define clearly the future directions and thrusts of the enterprise. We've come a long way on this. I'm very encouraged with what I see in the strategic planning of our operating units and with the job they're doing in making their operating plans and budgets consonant and consistent with the strategic plan. From our corporate vantage point, we wind up with a much better feel for the allocation of resources on a meaningful basis.

What do you see as the fourth major challenge?

One that may be the most difficult of all in some respects: *successfully defending our enterprise and its governance, by proving its value to our many publics*. These are times in which all institutions are under attack. The highly publicized irregularities involving the government and some prominent corporations have created an extremely sensitive atmosphere for all business. So we must earn and deserve the support of the public by responsible stewardship of the assets, human and material, that have been entrusted to our management. This means that we're stewards not just for the assets of share owners, but for the economic lives of our employees. By discharging responsibilities such as these with great concern, we gain the opportunity to prove the value of this enterprise, and the way we govern it, to our many publics. It's going to be difficult. So will be our fifth challenge: *sustaining the Company's role in filling the equipment needs of the electric utility industry*.

The basic question there is Why single out this one industry?

The reason is that we feel very strongly that the energy needs of this nation, and indeed of the whole world, will require continued advances

(continued on next page)

REG JONES (continued)

in electrical technology and also offer a tremendous growth opportunity for General Electric. We've been working on this so-called energy crisis for quite a few years, well before it became so popular a topic in the press. And increasingly we've become convinced that in view of the limited supply of some hydrocarbons, such as gas and oil, we've got to advance electrical technology so that electrical energy can fill many of the gaps. There are some areas of transportation—aircraft, for example—where it's extremely difficult to envision any other energy source than hydrocarbons. So, increasingly, our petroleum products are going to have to go to those areas, while electricity from nuclear fuel and coal gasification takes on the other energy needs. If we can bring our electrical technology along so we improve efficiencies and reliability, then we'll be in the position to realize a great growth opportunity while rendering a great public service.

That brings us to a final challenge?

And that is, to continue our *building of a much stronger international approach*. The worldwide economy is evolving very rapidly, and worldwide competition is a pervasive reality, meaning that we must necessarily become even more of a worldwide Company in terms of outlook and resource allocation. From this perspective, for example, the second largest electrical manufacturing company today turns out to be not Westinghouse, but Siemens of Germany.

How do you see these challenges affecting the organization structure?

Together with what might be described as my own personal style of management, they lead to a number of organizational needs. Let me list just a few.

First, the evolution of the organization structure that Fred Borch put in place three years ago has now developed to the point where we are able to make more specific and definitive assignments of responsibility to the Vice Chairmen and Senior Vice Presidents.

Second, the Chief Executive Officer will no longer retain direct operating management of any selected Groups. Henceforth, all Groups will report directly to the Vice Chairmen.

Third, there is a need to recognize two discrete areas of work in our strategic planning program. One involves counsel and support of the SBUs, and the other, utilizing the SBU plans as a base, develops an overall corporate strategy that defines our future directions and thrusts.

CORPORATE EXECUTIVE OFFICE

REGINALD H. JONES

Chairman of the Board and Chief Executive Officer



WALTER D. DANCE

*Consumer Products Group
Major Appliance Business Group
Power Generation Business Group
Power Delivery Group*



JACK S. PARKER

*Aerospace Business Group
Aircraft Engine Business Group
International & Canadian Group*



HERMAN L. WEISS

*Components & Materials Group
Industrial Group
Special Systems & Products Group*

CORPORATE EXECUTIVE STAFF



OSCAR L. DUNN

*Senior Vice President—
Corporate Development.
Responsible for Corporate-level
review of acquisitions, dispositions
and new ventures.*



REUBEN GUTTOFF

*Senior Vice President—
Corporate Strategic Planning.
Developing Corporate strategic
plan and overall planning
guides, as well as reviewing
SBU strategic plans.*



THOMAS O. PAINE

*Senior Vice President—
Technology Planning and
Development.
Corporate-level technical
review, including technical
feasibility of all new ventures
and seeing that the Company
leads in technology.*



CHARLES E. REED

*Senior Vice President—
Corporate Studies and
Programs.
On-going Corporate-level
studies and programs, includ-
ing transportation, communi-
cations, product quality,
product facilities, etc.*

OTHER DIRECT REPORTS TO CHAIRMAN



HERSHNER CROSS

*Senior Vice President—
Corporate Administrative Staff.
Will also continue to serve as
member of Corporate Policy
Committee and Executive Boards.*



ROBERT M. ESTES

*Senior Vice President, General
Counsel and Secretary.
Continues to be a member of
Corporate Policy Committee.*



ROY L. JOHNSON

*Vice President and Staff Executive—
Executive Manpower.*

NEW FINANCIAL STRUCTURE



ALVA O. WAY

*Vice President—
Finance.*



PAUL E. WALLENDORF

Vice President and consultant.



RUSSELL E. WHITMYER

Vice President and Treasurer.



MAURICE H. MAYO

Vice President and Comptroller.

Plus Corporate Audit Staff and
Financial Manpower Operation.

Fourth, we see many opportunities for innovative and imaginative use of the Company's financial resources. I don't foresee any changes in our sound approach to accounting practices or our conservative approach to financing. I've learned their value over many years. But I do see many opportunities to take a bolder approach to corporate development. By this I mean corporate moves such as the formation of Honeywell Information Systems, Inc., with General Electric sharing an interest with Honeywell—an innovation that's done a great deal for us.

Now fifth, there's a need to strengthen further the technological side of the Corporate Executive Staff. Among the very fundamental resources at General Electric are science and technology, and we need assurance that we're placing our bets, near-term and long-term, on the right technologies.

Sixth and last, we have need for strong control over the activities and expenses of our corporate-level staff work, as well as a more productive interplay of staff and operating strengths.

From this combination of top-priority challenges and derived organizational needs, what follows for the organization?

The next task was to put our top-level talents in the assignments where they could make the best contribution. We began with rewriting the Position Guides of the Vice Chairmen, the Senior Vice Presidents and the Group Executives. While the Group Executives are the Chief Operating Officers for their Groups, the Vice Chairmen are now responsible for the overall planning and financial results of assigned Groups:

- Dave Dance is responsible not only for the Consumer Products and Major Appliance Groups but also the Power Generation and Power Delivery Groups. Actually, there's a great deal of interrelation between the consumer and utility sectors. Utilities have been interested in our consumer activities because of their importance in terms of energy requirements. And Dave has worked closely with many of the utilities on their marketing activities. He'll have quite a load—four Groups—but he's a tremendously productive executive.

- Jack Parker is responsible for Aerospace, Aircraft Engine, and the International and Canadian Groups. Jack is well known in the aircraft industry throughout the whole free world, and his worldwide business experience will enable

(continued on next page)

REG JONES (*continued*)

him to build the stronger international stance that is now one of our primary challenges.

- And Herm Weiss is responsible for the Components and Materials, Industrial, and Special Systems and Products Groups. Some of our most important growth businesses will be under his wing—or perhaps I should say his very profit-minded direction. We need an individual to look at those growth businesses—transportation, communication, chemical, medical—and help them come along. Herm will do that.

Thus we'll have three tough and seasoned executives, members of the Board of Directors, directly responsible for the performance of our ten Groups of businesses.

What about changes in the CES?

We've strengthened it with added talent and a clearer definition of responsibilities. The Senior Vice Presidents will now report directly to the Chairman of the Board because, as the person finally responsible for the Company's future thrust and direction, I want their inputs directly.

This is a change from having the Senior Vice Presidents report to a Vice Chairman.

That's right. That's the way we had it before. It was a good transition but it's time now for the transition to be over.

In defining what's expected of the CES, we came up with four packages of work:

- First is corporate development—the hard-nosed evaluation of the acquisitions, dispositions, spin-offs and ventures proposed either by the Operating Groups or at the corporate level. We've asked Oscar Dunn, a seasoned operator and a very astute businessman, to take an objective and penetrating look at all the propositions that come up. He'll give me his personal feel as to whether a given venture is worth the candle.
- Next comes the technological areas that I referred to. We have a need for someone capable of looking over the horizon, to foresee technological trends and opportunities that will affect the entire enterprise; a man with vision who can help us make long-term choices among the expanding repertoire of technologies around which we can build successful businesses. We have such a person in Tom Paine, who headed NASA when the U.S. put men on the moon and who has been serving as Group Executive of the Power Generation Group. Tom moves up to the CES as Senior Vice President, and his area is technology planning and development. Working with the Research and Development Center and our other laboratories across the

IN NEW GROUP EXECUTIVE ASSIGNMENTS



EDWARD H. HOOD, JR.

*Vice President and Group Executive—
Power Generation Group.*



JOHN F. WELCH, JR.

*Vice President and Group Executive—
Components & Materials Group.*



JOHN F. BURLINGAME

*Vice President and Group Executive—
International and Canadian Group.*

Company, he'll be telling us what technologies should receive concentrated attention—including the power generation technologies to which he has been giving so much attention.

- Our other brilliant technologist on the CES is Charlie Reed, who has been doing an outstanding job on a whole series of corporate-level studies of business problems and opportunities, bringing in crisp and actionable recommendations. Charlie will take more of a near-term look at our uses of technology, to be sure we're getting the necessary productivity, product quality, cost effectiveness and other factors that go into operating a profitable enterprise. We'll have two preeminent scientists up there advising us right in the Corporate Policy Committee—Dr. Paine and Dr. Reed.
- The fourth package of work in the CES is strategic planning. Reuben Guttoff, who has been Group Executive of our Components and Materials Group, moves up to be Senior Vice President—Corporate Strategic Planning. Reuben's done an outstanding job on strategic planning and then profitably implementing those plans. Now he'll concern himself with two areas of work. He'll counsel and support the planning work of the SBUs, and will also continue the development of total corporate strategy alternatives and options that delineate the future op-

portunities of the enterprise as a whole.

Would you comment on the Corporate Administrative Staff?

Hershner Cross now has the assignment of Senior Vice President of the CAS. Hersh had that assignment temporarily a few years ago and did a magnificent job of coordinating the activities of all these diverse corporate staffs concerned with day-to-day staff work. He's one of the best communicators we've got. And he's taken on the task with tremendous enthusiasm because he liked the assignment while he had it. He reports directly to me. We'll be working together to enhance the productivity of our fine staff work. Hersh will stay on as a member of the Executive Boards. This will provide a vehicle for inputs to CAS and, equally important, CAS inputs to the Boards.

We've made one significant change within the CAS: the establishment of the position of Vice President-Finance to serve, as I once did, as the Company's Chief Financial Officer. Alva O. Way, who has returned to General Electric from the Honeywell organization, will have this position. He has the Comptroller reporting to him, the Treasurer and the auditing and financial personnel functions. This will bring about better integration of the various financial functions and will also enhance our efforts to utilize our financial resources in a more imaginative and innovative manner, without in any way abandoning the sound accounting and financial practices that underlie our high "quality of earnings" reputation.

One part of the change involves Mr. Estes. Would you explain that?

Bob Estes leaves the CES and reports directly to me as Senior Vice President, General Counsel and Secretary of the Company. His great strength is his deep philosophical perception of the character and governance of the corporation and its relationship to society. He will work directly with me on that important challenge of defending the enterprise and its governance in the face of increasing attack.

So you have reporting to you the three Vice Chairmen and six Senior Vice Presidents—four in the CES, one in the CAS and Mr. Estes.

I have one other direct report—Roy Johnson, Vice President and Staff Executive for Executive Manpower. The function of manpower development and selection at the highest level is intimately related to the function of the Chairman as Chief Executive Officer, and can't be

delegated. I must, personally, follow this area of executive manpower.

Would you comment on changes at the Group Executive level?

Succeeding Tom Paine as Group Executive of the Power Generation Group is Ed Hood, a young man who has been Group Executive of the International and Canadian Group. Ed was trained in college as a nuclear engineer and he's had wide experience in the field of turbines. And because the markets for power generation equipment are worldwide, Ed has a lot to bring to this assignment. He knows the businesses and the international markets, but in addition, at 42 he has time to provide some much-needed continuity in the electric utility field.

Another young man who is moving up to replace Reuben Gutoff is Jack Welch. He's 37 and he's now Group Executive of the Components and Materials Group. Jack is a very entrepreneurial manager. He's demonstrated great ability as one of the finer strategic planners in this Company, with imagination and carry-through.

And John F. Burlingame becomes the Vice President and Group Executive of the International and Canadian Group. The task of serving customers worldwide with a broad range of GE products and with diversified manufacturing, licensing and equity interests requires an outstanding combination of technical and managerial experience. John has the personal qualities to meet this challenge effectively.

One observation prompted by these changes is that you are structuring the CEO differently.

It's a different concept in that the Vice Chairmen will now be advocates for their Groups. The four of us will continue to formulate and issue policy. We'll review all of the major ventures. Obviously, one of the four will be in the role of advocate; the other three are expected to be more objective. Also, the four of us will be working as a group with the CES on the future direction and thrust of the enterprise, on the quality of strategic planning both corporate and operating, on the areas of development and technology, on corporate governance with Bob Estes, on the CAS with Hersh, and with Roy on executive manpower.

In short, with these changes in assignments, and these more sharply defined responsibilities and accountabilities, I believe General Electric is better positioned to meet the six key challenges I have outlined. ☐

Energy on the analysts' couch



Once a year GE's Investor Relations staff gives financial analysts the opportunity to plumb deeply into a main sector of the Company's business. On June 20-21 in Chicago it was energy's turn to mount the analysts' couch. Some 200 analysts gathered to hear reports by the Power Generation and Power Delivery Groups, to inspect Commonwealth Edison's world-leading complex of three GE-equipped nuclear stations and to tour both the GE BWR Training Center and Midwest Fuel Recovery Plant.

While the meeting followed a script whose broad outlines are familiar to most GE people, the special effort that went into developing a full dozen special reports turned up a number of useful points of information relating to GE's role in meeting the energy challenge:

- Electric power gains steadily as the desired form of energy. This is indicated by the increasing percentage of energy used to produce elec-

tricity. In 1960, 18% of U.S. energy consumption went to make electric power. By 1970 it was up to 25%. The expectation: 32% in 1980; 37% in 1985; and nearly 50% by 2000.

- Power generation markets will continue to be enormous. The cumulative U.S. market forecast for power equipment orders between now and 1985 totals over \$50 billion, with demand from the rest of the Free World estimated at \$57 billion. And the international opportunity "grows even greater when you add Russia, Mainland China, East Germany and other Iron Curtain countries, where we are beginning to see increasing interest in our advanced technical products." GE power generation shipments last year produced a \$200-million surplus in aid of the U.S. balance-of-payments.

- The Company continues to help meet energy shortages by stepping up power apparatus deliveries. Steam turbine-generator shipments by GE in 1973 are scheduled to be 23 million kw—



a 12% increase over the 1972 record. Even so, the backlog totals 125 million kw.

- GE is developing a wide range of technologies for future electrical generation, and whether the fuel choice swings more largely to coal, gas, oil or nuclear fuel, GE is "well positioned" since it is investing in all these technologies.

- Power delivery businesses are competing in a \$1.65-billion market this year, with total markets expected to rise to \$2.5 billion in 1978.

- The share of U.S. markets going to overseas producers of power delivery equipment has been reduced to less than 5%. Contributing factors: devaluations of the dollar and Government action in finding foreign producers guilty of dumping transformers in the U.S. market.

- GE has become a "joiner" with other enterprises in its drive to help solve the energy challenge. Examples: a joint program with Lurgi of West Germany to apply Lurgi's coal gasification

system to fuel GE gas turbines; and, subsequently, a GE-Exxon effort to explore production of enriched uranium for nuclear plants.

- The energy crisis is producing other business opportunities for GE. Currently, for example, contracts are being negotiated for six more huge tankers to haul liquefied natural gas. GE is bidding to supply the high-performance propulsion systems.

Overall, the impression lodged with the analysts in Chicago was that GE's energy businesses did not have to reach or strain in presenting a picture of business health. At the same time, managers of these businesses showed themselves aware that "we have a lot to learn in many critical areas" and that GE must continue to press forward on such fronts as improving the utilization of presently available fuels, increasing energy conversion efficiencies and developing new energy sources. E

MONOGRAPHS

Union contracts ratified. "It was about as good a contract as anyone could have hoped for." This characterization by *Iron Age* magazine typified the response to the tentative agreement on new 37-month contracts between GE and major unions announced June 7.

Employees agreed. Contracts with the United Electrical Workers (UE) and International Union of Electrical Workers (IUE) were ratified June 19. Also signed: 135 local union contracts with 23 other unions.

Including wage increases up to 88 cents per hour over the 37 months, as well as major improvements in employee benefits, the contracts provide steady progress for GE employees while falling within the guidelines established by the Cost of Living Council.

"Credit for the success of these negotiations needs to be broadly shared," says John R. Baldwin, manager—Union Relations and chief negotiator for GE. "Company components did an outstanding job of setting the climate for



success. The bargaining was hard but participants displayed a great deal of candor. And both sides held to an issues-oriented approach. We feel that a major step forward has been taken in GE-union relations."



Word processing previews at GE Headquarters: Jean Henches and Judith Jones (above) are key figures in the first application of a program underway at the New York Office—a program that may set new work patterns when the Fairfield, Conn. headquarters facility begins operating next year. It's called "word processing" and it utilizes sophisticated editing typewriters and transcription equipment with the

capability to "error correct" and store information. More than that, it's a whole new approach to secretarial tasks.

In Corporate Public Relations' new word processing system, secretaries were asked to choose between two categories of work: preparation of typed materials or administrative duties. Those choosing to be correspondence secretaries were moved to a centralized word processing center where they transfer dictated material to finished copy. Administrative secretaries, freed of typing duties, take on larger shares of responsibilities in telephone handling, preparation of research reports, and other administrative functions.

Word processing thus rearranges procedures and equipment with the objective of producing needed paperwork at new levels of efficiency. Proponents also claim it provides the opportunity to create definable career paths for secretaries and creates functional management positions to which the secretary may aspire.

Elsewhere in GE, primarily at engineering and manufacturing operations with heavy typing volumes, word processing systems have already been put in place, some for several years. The International Sales Division maintains the largest GE center to date. Also, some smaller components have isolated pieces of equipment tailored to their specific needs.

Disasters affect two Company locations

The Black River is normally a peaceful stream running through the New England village of Ludlow, Vermont, and behind the site of the GE Aircraft Engine Group plant on Main Street.

On June 29 it became a raging torrent, smashing through the basement of the plant, below, and inundating most of the town, including many employee homes.

The water reached the 8-foot level in the basement of the 400 employee plant, where many production machines operate.

Second and third shift employees fought a

dramatic but losing battle against the river with sandbags. Plant Manager Gil Ray, who recalls a similar flood in 1952, praised the actions of the employees and set an August 1 target date for the plant to be fully operational again. Engine parts are still being made on the top floors while employees meticulously clean the machines in rented tents.

In Jonesboro, Arkansas, hometown of many Specialty Motor Products Department employees, a tornado cut a path of destruction at 1:00 a.m., Sunday, May 27. The early hour made it a devastating surprise for most residents.

The GE plant was undamaged but 20 employee homes were totally destroyed and 100 more heavily damaged. Personal injuries were miraculously light.

Plant manager Richard B. Washer put an immediate emergency aid and loan program into effect and on June 7 a tractor-trailer truck full of household goods donated by GE employees in Fort Wayne, Tell City, Springfield and Linton, Indiana arrived to help reestablish households for Jonesboro employees.

Washer told GE Indiana employees, "Your thoughtful gifts have conveyed a human concern which has even greater value than material goods. Thank you."

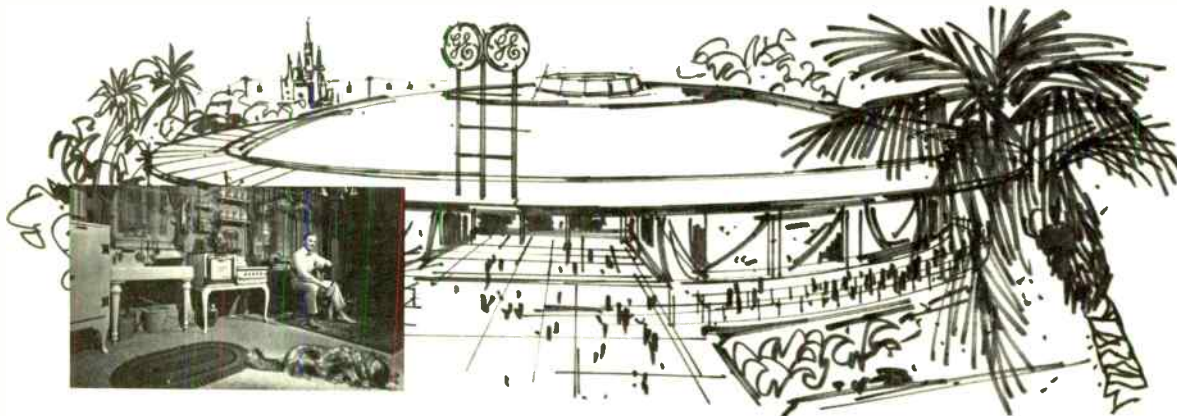


Walt Disney World—here comes GE. Nine years and 45 million visitors later, General Electric's popular "Carousel of Progress" exhibit will soon be playing to a new audience at Walt Disney World in Orlando, Florida. Completely refurbished and updated from its long run at Disneyland and its genesis at the New York World's Fair, the new Carousel is being readied for a December 1974 grand opening.

The circular Carousel at Walt Disney World, like its predecessors, will rotate visitors through a four-act play on stages manned by life-like audio-animatronic characters, depicting how electricity has improved the quality of life in the home for American families.

The skit opens to the pre-electric era of the 1880s through 1900s. The family marvels over "modern" appliances that include a mechanical

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washing machine that "takes only five hours to do the family wash." As the Carousel turns, viewers are shown electrical appliances of the early days, the electronics era and the present—scenes representing a true revolution in home-making and entertainment for the American family. The final scene will also suggest future

trends in urban living.

Opened just two years ago, Walt Disney World is already one of the world's most popular tourist attractions. On the basis of its first-year total of almost 11 million visitors, the new "Vacation Kingdom" attracts more visitors by itself than all but six of the nations of the world.

Electricity gains a youthful look: Even grade schoolers like to be asked for their opinions—so when General Electric and Metropolitan Edison Company asked third and eighth graders from Reading, Pa. to interpret on paper their definition of electricity, each class entered over 300 pictures.

Sponsored by GE, Metropolitan Edison and the Reading school administration, the contest, "What's a Metropolitan Edison?" had relatively simple guidelines:

"We want to see your idea of the Metropolitan Edison Company... power stations, street lights, power lines, workmen, meters on the side of the house. Do what you wish. Lots of us have different ideas about the power company... put them on paper. No two people think of the power company the same way. We want to know what you think. Use crayon, magic marker, water color, paints or anything you like."

The results ranged from outstanding to interesting. Each participating school received a GE color TV set for use with their education



programs. After a judging by local art authorities, the winning student received prizes of GE audio products for the categories of imagination, artistic ability and graphics.

Other contest winners were Metropolitan Edison and GE. The utility won a closer relationship with their community and a better understanding of symbols which kids associate with the utility business. GE won 600 colorful impressions to highlight its upcoming Utility Executives' Conference.

World trade's importance to GE people was underscored by the statement filed June 15 with the Ways and Means Committee of the House of Representatives, representing GE recommendations on proposed trade reform legislation.

Pictured as "a company with deep roots in the U.S. economy," GE still relied on exports for \$894 million in sales in 1972. Over 20,000 jobs of U.S. employees are provided by the Company's international activities, with at least 20,000 more jobs provided in other organizations such as suppliers and shipping companies. Some GE high-investment businesses—locomotives, gas turbines, aircraft jet engines, marine propulsion—are dependent on the volume of business made possible by world markets and export sales. Of total employment of 369,000 some 78,000 employees, or 21%, are located outside the U.S.

With these facts as background, the GE statement supported basic features of President Nixon's "Trade Reform Act of 1973":

- Increasing the flow of world trade by lowering both tariff and non-tariff barriers;
- Providing temporary safeguards for industry and assistance to employees adversely affected by import competition.
- Protecting U.S. industry against inequitable import competition; and
- Permitting imposition of import controls to correct persistent imbalances of U.S. international payments.

But the GE statement (copies available from the *Monogram*) disagreed sharply with Administration proposals to modify the tax treatment of foreign source income because these changes would seriously impair the Company's ability to compete effectively in the international marketplace. ❏



AT THE SIGN OF G DOUBLE E

To U. S. eyes it seems strange: a second script E crowded within the familiar GE Monogram. But in Spain it's a widely known symbol. It stands for General Electrica Española, S.A., Spain's largest electrical manufacturing company. Established in 1929, Española became a GE affiliate in 1967, when the Company re-acquired majority ownership.

It's a big operation, with two major facilities in its headquarters city of Bilbao, on Spain's northern coast. Employment is about 7,000. Manufacturing 21 different lines of products, it's a smaller parallel to General Electric, with a Spanish accent.

The man in charge of this complex is a 6-foot-7-inch former Dartmouth basketball player named George H. Hartmann. Backing him is Bilbao-born Javier Prado, who—to bring better coordination both within GE Española and between the affiliate and International General Electric of Spain—serves as Chairman of the Board of both companies.

The big story about GE Española today, Hartmann makes clear, is its profitability. After several years of additional investment, GEE made a modest profit in 1972 and is continuing on an improving earnings trend.

"When General Electric resumed majority ownership, there were great expectations on the part of both the Spanish government and GE," Hartmann told a *Monogram* visitor to his Bilbao office recently. "There were also great problems. The fact of becoming profitable is important not only in itself but as a sign of business health—an essential step toward meeting the expectations on both sides. Having achieved profitability, we can step up growth in selected areas. We're already planning a new facility for our electro-medical business, as an example."

The importance of this turnaround is emphasized by Chairman Prado, who is broadly



George Hartmann



Javier Prado

active in Spanish banking and industrial life in addition to his dual GE responsibilities: "To have achieved a sound management team and an efficient operation places Española in a position to benefit from the extraordinary development of Spain, whose economy has become the fastest-growing in Europe. With this growth requiring great advances in our electrical system, Española is a vital element in Spain's future."

Looking back, George Hartmann feels an understandable sense of inevitability about his present position atop the Spanish affiliate. "If I hadn't wanted to be here, I would feel that events had conspired against me," he says. "In the first place, as a GE Test Engineer I took a special interest in manufacturing—an expertise that's been a most urgent need here. I did a stint in the Navy's Civil Engineer Corps and was assigned to

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G DOUBLE E (continued)

the building of a pipeline in Spain. Back at GE I worked as a consultant in Manufacturing Services—and, sure enough, one of my special studies concentrated on manufacturing at Española. In effect, I was asked to put into practice as the manager here what I earlier, as a consultant, had said needed to be done. Who could resist?"

He moved himself and his family into Bilbao in 1971. His strong manufacturing background gave him a special advantage, Hartmann acknowledges. "When we began to unravel the manufacturing problems, others became easier to solve. For example, the record of delivery promises kept on heavy rotating apparatus was unacceptable. And one main reason for this was a sheer lack of dependable information in such things as plant capacity, factory loading, number of hours required per process, and so on. The first job was to pin down reliable data in all these areas. With that, we were able to develop a master schedule and all the supporting schedules—and began to deliver on time."

This step eased another problem area: uncollectible bills. "It was a vicious circle. Bad delivery performance gave customers a strong reason for delaying payment. When we did better, customers began to pay."

Pulling everything together

Another asset he put to use was a heavy application of the expertise of GE-USA, including a crack financial team under James R. DiBona. Hartmann credits the work of some 25 U.S. manufacturing and financial experts, and the cooperative spirit exhibited by their Spanish counterparts, as key factors in Española's turnaround, adding: "We also think the experience of bringing about needed changes under tough circumstances helped these functional experts become unusually valuable managers."

Last year everything began to pull together. Receivables were reduced. So were inventories, swelling the cash flow. "We were able to decrease our borrowing, and our interest rates went down. We also started a formal cost-reduction program—Española's first." Add a dash of reorganization to trim the structure to a size commensurate with the business scope and Española in 1973 presents a relatively healthy picture. "We've still got plenty of problems, but we're on our way."

How about strategic planning? "It has a

double importance to us here. Our first rough plan, drawn up last year, helped us focus on where we want to go. Also, the concepts of strategic planning are of great interest to government officials with whom we meet. Aware that Spain's industry is too fragmented to be competitive in world markets, they're interested in developing a strategic rationalization of the country's businesses."

'If we weren't here...'

Española has a special importance to GE-USA in supplying "local content" in Spain. In an effort to develop itself technically, Spain has passed a number of laws requiring that a percentage of machinery be manufactured locally. "It's too often overlooked in the U.S.," Hartmann explains, "that for GE's domestic operations to receive big export orders such as those for nuclear and turbine-generator equipment, we have to guarantee that significant parts of that apparatus will be built here. It's business for Schenectady and San Jose and elsewhere that they wouldn't get if we weren't here."

As for Española's long-term perspective, Hartmann points to three critical factors. One is internal: his objective of seeing Spanish employees in more of the affiliate's top managerial positions. "That's coming along," he says. "Our general manager in Apparatus Products is Spanish, and others with excellent managerial potential are developing."

Of the two external factors, one is the evolving changeover in political leadership. "It's our belief that political stability will continue. The succession of leaders has now been established, with both a chief of state and the head of government designated. We look for a smooth transition."

Also ahead is the broadening of the European Common Market. Hartmann confirms that "That's a real challenge for GE Española and for all of Spain. Agreements already reached mean that, by 1978, up to 65% of Spain's products are going to be traded with the Common Market. In 1980 it will be 95%; in 1985, 100%. Española and the rest of Spain have got to be competitive with our equal numbers in the other European countries—that includes productivity levels and cost levels. For what has been a protected economy it will be a severe test. Our goal is to get GE Española ready to meet that test—ready to compete for larger European markets as well as those in Spain."



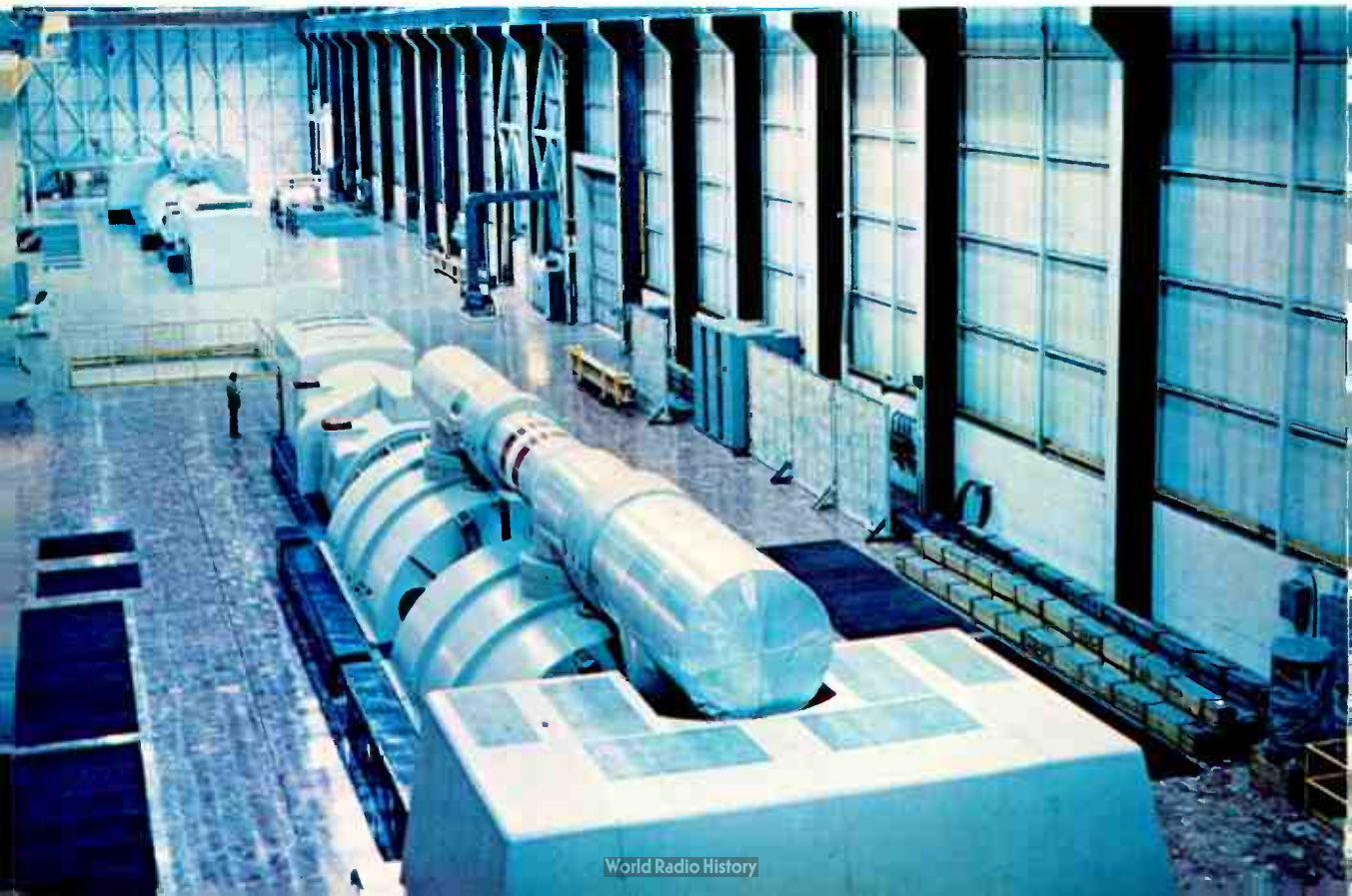
G double E signs along Spanish roadways remind passers-by of General Electric Española, Spain's leading electrical manufacturer. Española is equipped to build large electrical equipment for the Spanish market. Below: 435-MVA transformer in final assembly at Galindo plant in Bilbao.



G DOUBLE E (continued)




Regional landmark for GEE people in Bilbao is the "hanging" bridge over the Nervion River. Busy harbor traffic makes cantilever or drawbridge impractical. Solution: pedestrians and cars are carried on barge-like above-water platform suspended from rollers on bridge superstructure. Below: big 541-megawatt turbine-generator at Santurce thermal plant represents joint manufacture by GE-USA and Española.

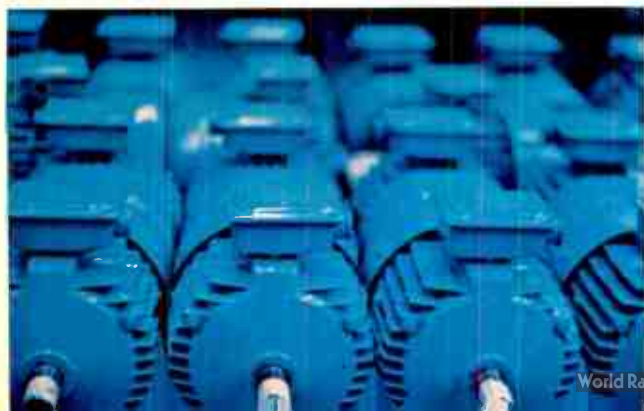




Often in Europe the oldest structures are called "new." This is true of "Plaza Nueva," a picturesque collage of palm trees and ancient masonry in the heart of Bilbao's oldest section.

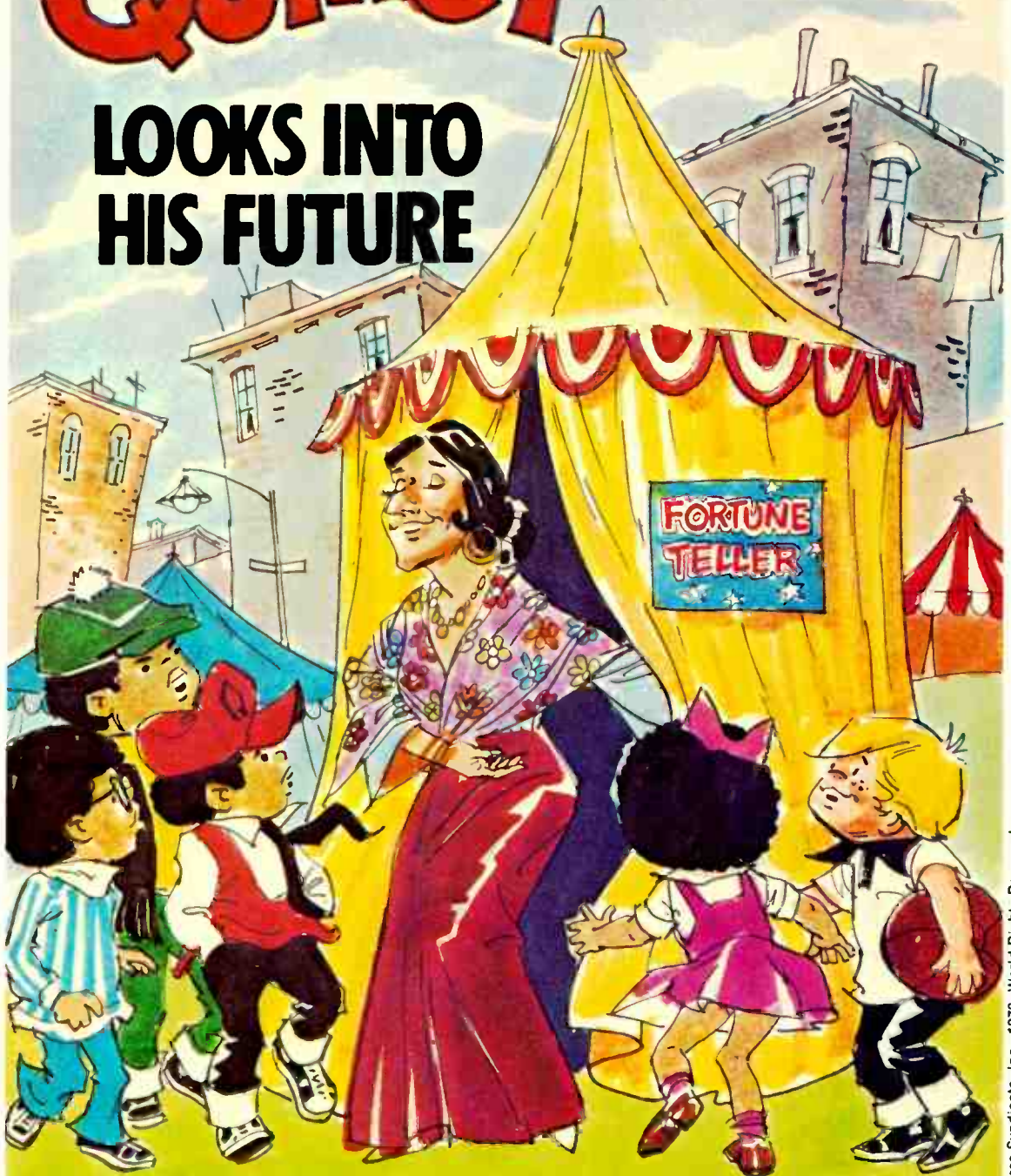


A variety of light industrial products are produced at Española's Trápaga plant near Bilbao. Shown: (above) outdoor lighting luminaires; (below) small motors and distribution transformers. 



QUINCY

LOOKS INTO HIS FUTURE



CAREERS IN ENGINEERING

QUINCY, the delightful comic strip character created by Ted Shearer and appreciated by minority audiences through syndication in many daily newspapers, has been adapted by the Batten, Barton, Durstine and Osborn advertising agency to help the GE minority engineering effort. Educational Communications manager Jim Clark will use Quincy to tell it like it is to grade school and junior highers in minority areas this fall.

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The minority engineer challenge one year later

Just one year ago, General Electric took the initiative on a major national issue—one that Senator Hubert H. Humphrey recently called “the prime second generation civil rights problem of the 1970s.” The issue: dramatic progress in equal job opportunity for minorities in the last decade has not yet been achieved in the upper managerial and professional ranks of industry.

For General Electric and other major industrial companies, the problem of giving substance to the words “equal opportunity” at the higher levels of the Company is inextricably linked with the lack of minority engineering degree holders. This is a progress report, one year later, on an unprecedented GE task force effort sponsored by Chairman Reginald H. Jones and headed by Corporate Education Services Manager Lindon E. Saline in an effort to be a catalyst for a national solution to the minority engineering supply problem.

The task force, known around the Company as PIMEG (Program to Increase Minority Engi-

neering Graduates) is moving for dramatic short range gains as well as a long range solution. The program intends, for instance, to cause a 50% jump in minority engineering college freshmen this fall.

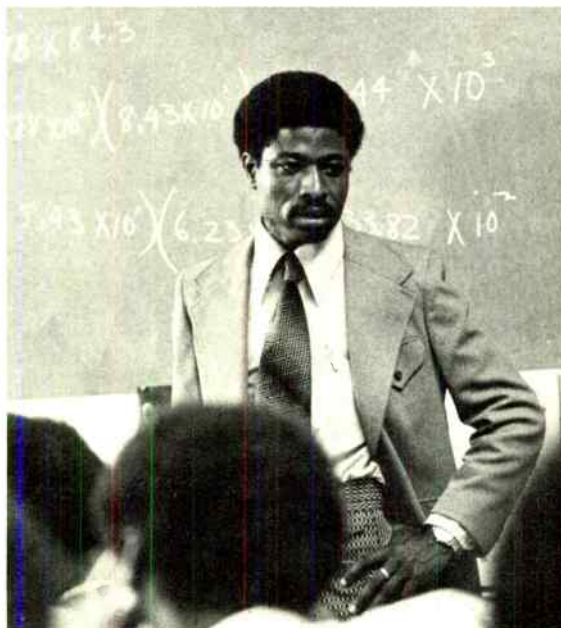
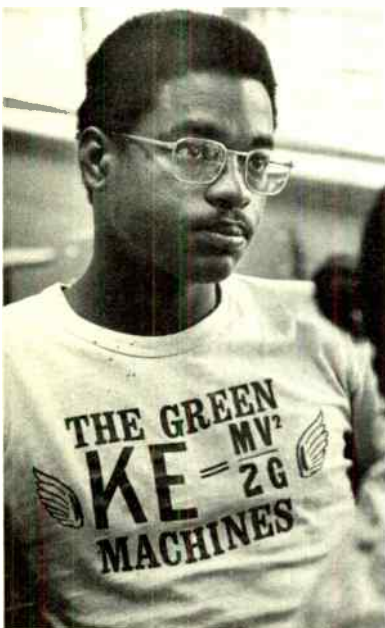
Dr. Saline illustrated the urgency from the GE perspective. “Right now on the whole GE payroll the percentage of minorities is greatly improved. In the exempt salaried ranks, though, it’s only 2.1%. And when you consider the top 20% of managerial and professional jobs, less than 1% are minorities. With the current rate of supply of four year technical minority graduates to the managerial and professional pipeline, the best we could hope for would be 1.5% by 1982. That’s completely unsatisfactory. We need 10% by then.”

The Company strategy this year has been to establish a national program on a permanent on-going basis with appropriate third party leadership. At the same time GE has committed substantial resources of its own to solving the problem.

It began on July 25, 1972 at a conference for engineering deans when the Company’s leadership and brainpower was pledged to help reverse the trends. One year later the pledge has proved to be more than just rhetoric. The Company’s strategy is beginning to work. Here are some of the highlights:

(continued on next page)

Prairie View A&M College, Texas. GE Foundation money got minority students together with GE engineers this summer.





GE's Expotech van, a unique communications "vehicle," will be bringing the best of technology right into minority schoolyards. The purpose? To motivate kids toward engineering careers. Corporate Educational Communications manager Jim Clark will use this 40-foot expandable-sides van in a pilot test in Philadelphia this fall. Creative down to the last square inch, Expotech will feature "hands-on" exhibits of principles behind engineering, from simple machines through nuclear energy. Minority youngsters with technical aptitudes who are fascinated by this can get advice on math and science courses and information on engineering careers.



Dr. Saline and the challenge: "We intend to be the catalyst for a ten-fold increase in minority engineering graduates..."

"My vote for creativity"...Cal Conliffe and his ME³ task force. Minority engineering enrollment up 50% this fall?

• **National attention**—The program has been endorsed by George Shultz, Secretary of the Treasury, Caspar Weinberger, Secretary of Health, Education and Welfare, Peter Brennan, Secretary of Labor, and other high administration officials. At a May 6-8 Washington, D.C. symposium on minority engineering education conducted by the National Academy of Engineering, 250 representatives from all societal sectors heard Senator Humphrey call for a national council to spearhead the project. The Academy itself is considering full sponsorship of such a council composed of representatives from all segments of society.

• **Fall 1973 results**—A unique task force of outside educators put together by Corporate Educational Relations Consultant Calvin H. Conliffe, has pinpointed more than 8,000 of this year's minority high school graduates who have potential interest in, and ability for, engineering. Their names have been supplied to 115 cooperating Deans of Engineering. Most have gotten personal letters from schools inviting them to visit. As an example, the Dean of Engineering at the University of Texas issued invitations to 130 of the State's minority high school seniors on the list. Forty showed up for a day on campus.

The task force, called ME³—Minority Engineering Education Effort—has performed yeoman work towards meeting the fall 1973 goal of increasing minority engineering enrollment half again over 1972 levels. ME³ results will not be known until the fall; more than 300 possible additional enrollments have been reported already.

The task force is now looking beyond 1974 for long range solutions. Efforts will have to begin in the earliest grades of school to produce minority students adequately prepared in math and science. Members of ME³ include the Engineering Council for Professional Development (ECPD), the American Personnel and Guidance Association, *Scholastic Magazine*, the National Urban League and the National Council of Teachers of Mathematics, Inc. "Cal Conliffe and ME³ get my vote for creativity and productivity so far," says PIMEG program manager Saline.

• **Communications**—A multi-faceted effort to motivate pre-high school students toward engineering careers has fallen to Corporate Educational Communications manager Jim Clark, and Educational Consultant Art Sears, some of whose innovative methods are featured on these pages.

• **Financing the college programs**—The General Electric Foundation has decided to step up an already substantial commitment toward education of minorities. In 1973 support of minority programs will increase from \$630,000 to more than \$1,000,000. Special competitive awards of \$50,000 each have been given to Prairie View A&M University and Tuskegee Institute. The Foundation is also supporting the four other predominantly black engineering schools which together produce 70% of all black engineers.

Many grants have also been directed to other accredited predominantly white engineering schools to aid minority students. "The permanent solution is cooperative financing, however," says Foundation Secretary Donald J. Watson. "The need is far beyond the resources of one foundation."

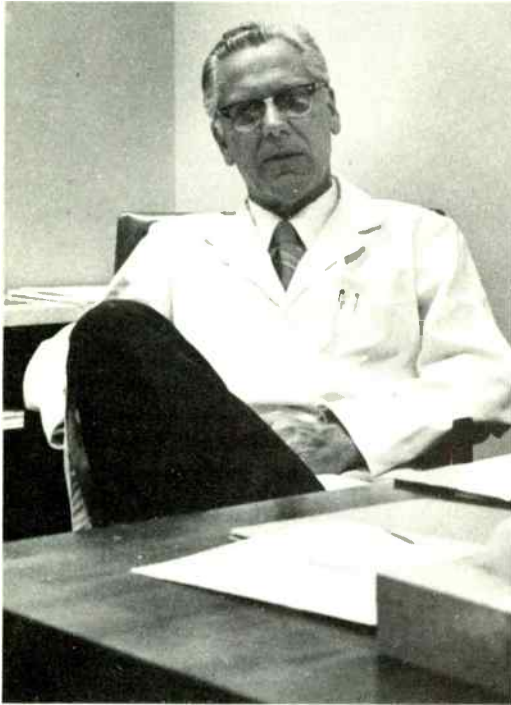
• **Participation by GE components**—The array of innovative techniques being used around the Company to support the project is impressive. Most easily quantified are commitments for summer jobs and co-op program openings for minority students. GE locations have guaranteed 802 openings, 226 of them definitely pledged for minorities. "Summer jobs working with engineers have motivated many kids to enter engineering careers," says Robert N. Mills, manager of the Recruiting and Entry Level Programs Operation at GE's Crotonville "campus." Mills is taking a Traveling Workshop for operating managers around the country to multiply local participation in minority engineering programs.

The program's overall goals are not only to increase minority engineering enrollment by 50% this fall, but to increase enrollment by 100% in the fall of 1974, 200% in 1975, and 10-15 fold by the mid 1980s. That would equal 4,000-6,000 minority engineering grads per year, in contrast to 1972's 405.

Why is General Electric the national leader in this? "Of course, it's the only fair-minded thing to do, but it will benefit the Company and the nation far more specifically than that," Dr. Saline replies. "We have an interest in minimizing the impact of the predicted engineering shortage which will begin to affect us in 1976. Whenever you develop previously undeveloped human resources, moreover, you get the additional benefits of reduced tax burdens for public assistance. The minority engineering effort is not a peripheral 'good will' program, it's one of the most important things we're doing." ❧

A GE doctor talks about

ALCOHOLISM: Industry's multi-billion-dollar hangover



How should the employee-alcoholic be handled? As a moral weakling to be fired forthwith or a sick individual to be helped? How serious is the problem? The *Monogram* directed its questions to Dr. Herman D. Pocock, of GE's Corporate Medical Operation in New York, who has taken a special interest in this aspect of employee health.

Dr. Pocock, how serious is industry's alcohol problem?

The problem is more widespread than most would care to admit. Alcoholism is the fourth leading health problem in the U.S., behind cardiovascular disease, cancer and mental illness. There are over 8,000,000 alcoholics, including 5-7% of all employees in industry. These alarming statistics clearly make the disease a major industrial health problem.

Concern with the problem exists because alcoholism is on the increase, because the ill health of the alcoholic represents a marked waste of manpower, and because the cost in terms of absenteeism, turnover, inefficiency, wastage, accidents, administrative handling and diversion of supervisory time is staggering. For

industry overall, it's been estimated that the total cost of alcoholism exceeds \$2 billion per year.

How does industry characterize the problem drinker?

Alcoholism assumes many different forms, but essentially it's an illness characterized by dependence upon alcohol to such a degree that it interferes with health, personal relationships, social conduct and economic position. As far as industry is concerned, the definition is simpler: an alcoholic is one whose repeated overindulgence results in excessive absenteeism, reduced efficiency on the job or problems of behavior.

How long has industry recognized the problem?

For some time, but it is only in recent years that industry has been successful in developing effective rehabilitation programs. Unfortunately, in the early or middle stages of the illness, when the alcoholic is most susceptible to assistance and rehabilitation, the disease often goes unrecognized through ignorance and misconception, or is covered up by well-intentioned but misinformed supervisory personnel. Industry has come to the conclusion, however, that the disease can no longer be ignored and has recognized the fact that early recognition of the problem can result in problem drinkers being successfully rehabilitated.

What's GE's position?

The Company takes the position that personal drinking practices off the job are not the concern of industry. However, when excessive drinking results in unsatisfactory attendance, inefficient job performance or inappropriate on-the-job behavior, then the matter becomes of legitimate concern to management. It is believed that many alcoholics can be helped and that the Company can and should assist the individual in obtaining the necessary personal assistance through referral to an appropriate community health resource.

Who has ultimate responsibility for identifying alcoholic employees?

Responsibility for early recognition of the alcoholic employee and initiation of corrective action rests with the immediate supervisor. It is in the interest of both the employee and the



Company that the problem be identified as early as possible—in fact, imperative for successful rehabilitation.

There are few persons in a better position to identify the alcoholic than the immediate supervisor. Because of his close association with employees, the supervisor is in the unique position of observing daily behavior, physical appearance, personality and work efficiency.

Following identification what actions should the supervisor take?

When evidence has accumulated that an employee has, or may have, a drinking problem, we suggest that the first step in GE's administrative procedure is for the supervisor and a relations representative to document the facts. At this point, they should then conduct a frank and firm discussion with the employee. Problem drinking should not be discussed without relating it to the employee's work. Actions taken must be on the basis of difficulties on the job. If an employee denies or refuses to admit to a drinking problem, disciplinary action, when indicated, may be put into effect by the appropriate members of management.

If an employee does admit to a drinking problem, however, and expresses a desire for medical counsel or rehabilitation, he should be referred, together with the documented data, to the responsible physician.

What's the Company physician's responsibility?

Once an alcoholic employee has been referred, the first task of the physician will be to review the data and check it against the employee's medical record for such supporting information as it may contain. Following this review, an appointment should be made for an interview and examination of the employee.

The physician's interview and medical examination should be as complete and extensive as may be required to establish the diagnosis and provide a base for recommendations. The conclusions should be reviewed and discussed with the referring members of management. (In seldom-occurring instances of self-referral, where management is not involved, the conclusions and recommendations remain confidential.)

What courses of rehabilitation do you recommend?

Company medical clinics generally lack the resources for rehabilitative services for employees with drinking problems. Therefore, referral to specialized medical resources in the community is necessary. These include: private clinics or

(continued on next page)

ALCOHOLISM (*continued*)

hospitals specializing in alcohol detoxification and rehabilitation, individual psychiatrists, psychiatric clinics, Veterans Administration hospitals, community alcoholic centers and, of course, Alcoholics Anonymous.

What about follow-up?

Once an employee embarks upon a course designed to effect rehabilitation, it becomes vitally important to establish a careful and sensitive program for follow-up. This accomplishes several purposes: it permits a means of demonstrating sincere interest in the welfare of the employee; it allows for a determination of the progress the employee is making; and it establishes a means of scheduling prompt and effective administrative action if it becomes evident that the employee does not intend to follow a prescribed course of action.

Do most GE components follow such a program?

The majority of our medical clinics have some program for dealing with the alcoholic employee. The success that any of the clinics achieve is related primarily to the interest and knowledge of local plant management and to the availability of community resources for dealing with the problem. The lack of such resources is a major factor why components in many small locations aren't successful. But in our installations located near urban centers, excellent resources for diagnosis and treatment are available to GE employees. Some components have developed self-help. Examples include Evendale, where a unique in-plant program is conducted by members of the medical staff, and Lynn, which has engaged a full time counsellor for victims of alcoholism and drug abuse. At Louisville, an AA group has been formed by interested members of the union local.

So we are making progress?

I would say that industry has taken long strides in the past decade by viewing the alcoholic as a victim of a disease rather than as a moral weakening. There is still a long way to go. No two alcoholics are the same and drinking patterns vary. However, early identification is possible by the alert supervisor with an understanding of the course of the disease. Community rehabilitation services are improving. An encouraging note is that union officials are taking an informed interest in the problem. GE's procedure on alcoholism, combined with increased union-management participation and additional trained counsellors in alcoholism, will do much to insure success. □

ORGANIZATION CHANGES

Recent management changes in addition to those listed on pages two to seven include the following:

CORPORATE COMPONENTS

Robert H. Pry, *Research and Development Manager—Materials Science and Engineering.*

AIRCRAFT ENGINE BUSINESS GROUP

James E. Worsham *elected a Vice President.*

COMPONENTS AND MATERIALS GROUP

George B. Farnsworth *elected a Vice President.*

CONSUMER PRODUCTS GROUP

Patricia Newcomb, *Vice President—Advertising and Public Relations, Tomorrow Entertainment, Inc.*

Glenn S. Olinger, *Manager—Group Strategic Planning and Review Operation.*

INDUSTRIAL GROUP

Myles A. Duffy, *General Manager—Western Apparatus Service Department.*

C. Eugene Hart, *General Manager—Southern Apparatus Service Department.*

Lawrence A. Shore, *General Manager—Central Apparatus Service Department.*

INTERNATIONAL AND CANADIAN GROUP

Robert J. Houghton, *Manager—newly established Group Employee Relations, Organization and Manpower Operation, International Support Operations.*

MAJOR APPLIANCE BUSINESS GROUP

A. Melcher Anderson *elected a Vice President.*

Richard O. Donegan *elected a Vice President.*

Donald S. Beilman, *Manager—Group Technical Support Operation.*

POWER DELIVERY GROUP

Tsai H. Lee, *Manager—Switchgear Equipment Strategic Planning and Review Operation.*

SPECIAL SYSTEMS AND PRODUCTS GROUP

Kertis P. Kuhlman *elected a Vice President.*

What ERTS is telling us

Planned for a design life of one year, the GE-built satellite called ERTS-1 (for Earth Resources Technology Satellite) swept smoothly past that anniversary in the early morning hours of July 23 and kept on sending back its masses of observations on the state of the Earth. Aground, GE'ers marked the occasion with an official birthday celebration, hosted by GE Space Division VP Daniel J. Fink and NASA Administrator Dr. James C. Fletcher.

During the first year of its operation, the one-ton NASA spacecraft orbited the earth more than 5,000 times from its 500-nautical-miles-high orbit; produced over 70,000 original images of the earth's surface; photographed all the United States land mass; and has provided over 300 investigators here and abroad with storehouses of data on the earth's seasonal changes and valuable natural resource base.

"Since last July, ERTS has produced a

wealth of scientific data that has exceeded our most ambitious pre-launch expectation," Fink told the celebrators. "The continuing program clearly illustrates the effectiveness of using remote sensing techniques to focus on the earth and its ecological systems and natural resources."

A sampling of the list of ERTS accomplishments compiled by GE's Space Division indicates the types of information ERTS is supplying:

- **Agriculture**—California farmland has been divided into five crop categories with 95% accuracy at one-seventh the cost of conventional aircraft surveys. In addition, Southern California cotton cropland, infested by cotton bollworms, is being monitored by ERTS to insure compliance with state regulations for dealing with diseased crops.

- **Marine resources**—Imagery from ERTS is being used to correlate sea-state parameters, such as salinity, turbidity and tidal effects, for obtaining maximum commercial fishing yields.

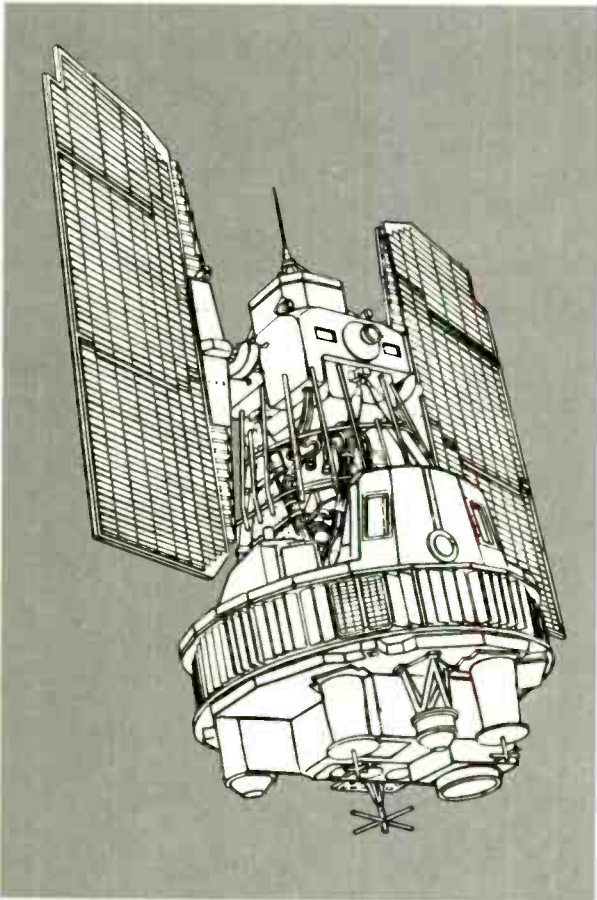
- **Mineral resources**—Photos from ERTS have helped identify numerous new faults, fractures and other geological features generally associated with mineral and petroleum deposits. In one instance, geological characteristics in South Africa have been found to resemble features present in nickel-rich areas of Canada. As a result, South African mining activities, prompted by ERTS findings, are expected to begin soon in this region.

- **Environmental monitoring**—ERTS photographs have been used by various states, including Vermont, New York, Virginia and Illinois, to detect and monitor air impurities and water pollutants.

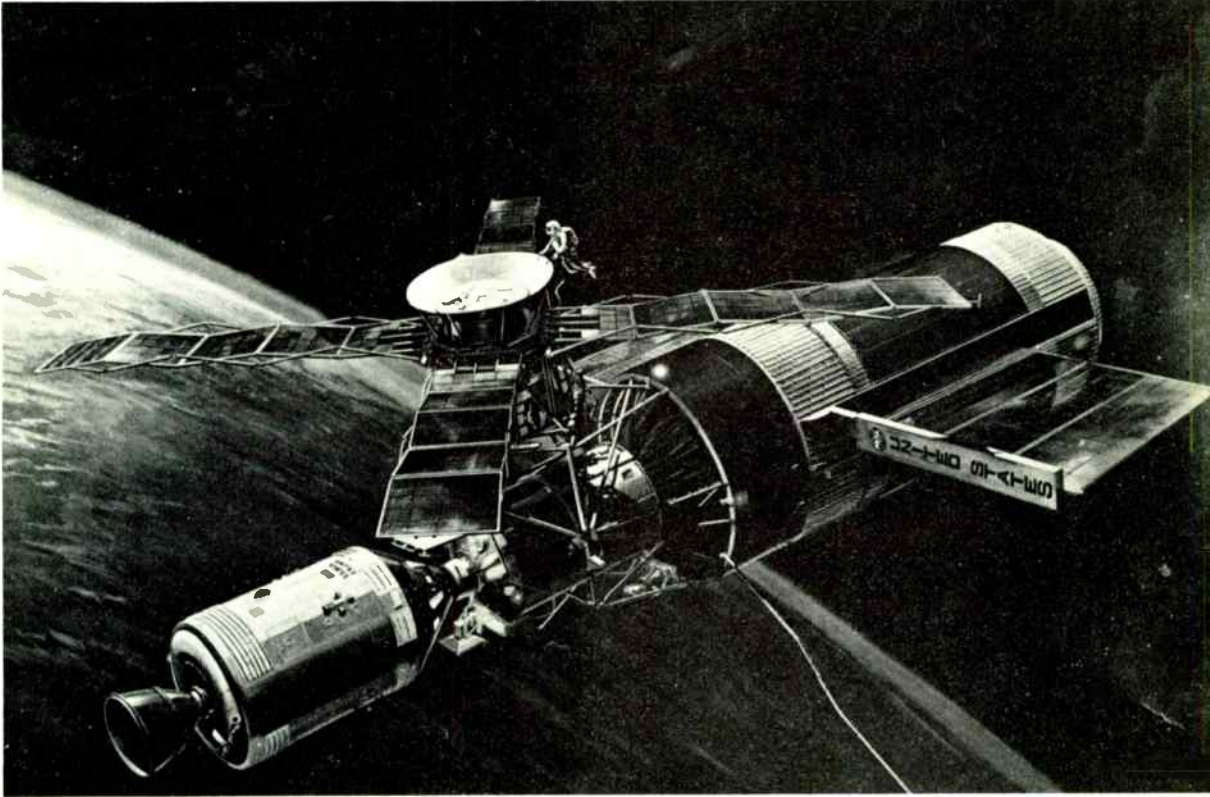
- **Flood assessment**—A number of states are using imagery from ERTS to assess flood damage and evaluate rain and snowfalls for an early indication of possible flooding.

- **Land use management**—In little more than a week, the entire state of Rhode Island was divided into 11 land-use categories, such as residential, industrial and recreation areas.

Under NASA's continuing Earth Resources Technology Satellite Program, the second spacecraft in the series — ERTS-B — will be constructed by GE's Space Division for launching scheduled for early 1976.



GENERAL ELECTRIC SUPPORTS



General Electric's contributions to the absorbing drama of Skylab—a \$2.6 billion project salvaged by pure Yankee ingenuity—have been low-key but substantial.

In a mission where GE is not even a prime contractor, the wide diversity of Space Division expertise has still produced scores of unique contributions, from the world's largest checkout consoles to dart boards.

Among those contributions: prime responsibility for one of the key experiments on board, the S-193 Microwave Radiometer/Scatterometer/Altimeter. The S-193 is an extremely sensitive three part microwave transmitter/receiver able to see through thick cloud cover and focus on a variety of environmental conditions. Its measurements can provide information on ocean wave heights and surface wind fields, chart vegetation, monitor snow cover, detect ice fields and record flooding. As an idea of its accuracy and resolution, the radiometer portion of the S-193 could measure surface temperature differences of less than one degree from its 250-mile height in the Skylab.

Space Parasols

The most valued NASA contractors are the

ones than can respond quickly in crises. When the piece of shielding tore off Skylab during the initial launch, all the resources of NASA focused on a quick solution to the resulting overheating.

GE's Houston Operations, right across the street from Johnson Space Center near Houston, already had the capability to sew space age materials such as Kapton and was immediately called to help make the world's first space parasol.

"It was an around the clock crash effort to save the mission. We slept in the shop in shifts," says Gerry Wood, Crew Provisions Engineering Manager at GE Houston. The parasol canopy currently shielding the orbited workshop was fabricated by GE. There's another GE canopy, an improved design, aboard Skylab III, that may be used to replace the deteriorating original.

Packing for a 56-day trip is a science

The most varied and unusual of GE Skylab contributions came from the same specialized Crew Provisions shop. There customized products for the astronauts' personal use were meticulously designed from the ground up or refitted from commercial prod-

MAN'S LONGEST SPACE STAY



Skylab entertainment center



A 28 day astronaut wardrobe

ucts by Company engineers. Every item on board was evaluated by weight, space, performance in zero gravity, and flammability.

GE packed all the astronauts' clothing, scientifically planning each fold in what might look like a magician's trick to the average vacationer. Twenty-eight days' worth of clothing are packed in one small bag, each piece individually made to the crew member's measurements.

On the back of each astronaut's locker door is a stereo cassette system and tape library customized by GE. Astronaut tastes have varied from all classical to all country-western. Among the interesting design considerations: sound carries less well in the 5 p.s.i. atmosphere of Skylab's cabin than on earth at 14.7 p.s.i. Actually, the most important part of the GE customizing involves flameproofing. Even the novels and playing cards here must be flameproofed.

GE also designed and packed the personal hygiene kits for the astronauts. They include digestible toothpaste, disposable brushes, a wind-up shaver and a skin moisturizer required because of the drying effect of the extra low humidity aboard Skylab.

Space: a future GE plant location?

The scientific and practical emphasis of the Skylab mission has revived interest in an idea which has been intriguing Space Sciences Lab scientists at the GE Space Division in Valley Forge, Pa., for some time.

There's no space program on the boards right now that could do it, but the scientists call the concept of space manufacturing a potential multi-billion-dollar business.

They and other industrial colleagues know that zero gravity and the resulting lack of artificial convection currents in liquids could be used to refine highly complex biological serums such as vaccines, for instance, to a new order of magnitude of purity. Pure crystals for electronics are another potential in zero-G manufacturing. Manager of Space Processing Louis McCreight says, "We had electrophoresis experiments aboard Apollo 14 and 16 that could be used for making new biologicals and we're continuing to explore the possibilities." The Skylab astronauts have used an electron beam to melt metals in a NASA experiment that could lead to production of pure metals and very strong materials impossible to make on earth. □

'From uncomfortable attitudes, uncomfortable solutions'

Vice Chairman Jack S. Parker stresses greater economic understanding as the prelude to better international relations.

Jack S. Parker's most recent business tour in Japan brought him face-to-face with two influential audiences: the Japanese financial community and a special Conference on the American Economy—Its Implications for Japan.

Presenting a number of hard-hitting opinions on U.S.-Japanese relations, the GE Vice Chairman chose an unexpected point for his first emphasis in his Conference talk: that of *attitudes*, the intangible barriers in people's minds that determine their actions.

The goal sought by Parker is "a two-way investment street between our countries" that will, he is convinced, "do more to relax economic tensions between us than all the goodwill-and-bargaining missions that today cross and re-cross the Pacific Ocean."

The main obstacles he sees in the way of achieving this improvement in international relations are deeply entrenched attitudes on both

sides of the ocean. Many Americans, for example, "see themselves threatened" by imbalances in U.S.-Japanese trade. Many are also distressed by the "seeming unwillingness of our trading partners to take on a 'fair' or reasonable portion of the compensating expense for America's readjustment to the world of the Seventies," following the substantial post-war sacrifices the U.S. made to insure the growth of the international economy.

The GE Vice Chairman emphasized "attitudes in plural because there is no monolithic U.S. attitude." Rather, labor unions and their members have tended to adopt protectionist attitudes while consumer organizations generally favor freer trade. Industry attitudes vary widely. Government attitudes center on the international monetary situation and the balance of payments.

He cited the "repetitive frustrations of non-tariff barriers which U.S. businessmen and traders experience in trying to gain access into the European and Japanese markets." Also, there are the suspicions about the "real" or "fair" value of Japanese exports to the U.S. which will persist so long as some Japanese producers sell at lower prices in the U.S. than in Japan.

"These are uncomfortable attitudes in uncomfortable times," Parker said. "It is no surprise that they produce agitation favoring uncomfortable solutions"—proposed new laws to tighten up the U.S. borders, impose mandatory quotas on imports, restrict technological agreements and in other ways limit the flow of trade.

"Such measures are not my kind of solution," he made clear, "nor, I suspect, are they yours." GE's Vice Chairman outlined the adjustment and changes necessary by both partners if world trade is to expand. But in the end he came back to the problem of attitudes:

"And there is the challenge of trying to get enough economic education on the part of our peoples so they will understand and support what it takes to resolve these problems. The last may very well prove to be the most difficult of all."

The words Jack Parker delivered in Tokyo are obviously as meaningful in Lynn, Cleveland or San Jose. Anyone in the U.S. unwilling to see Parker's list of "uncomfortable solutions" be translated into law will join with him in promoting economic understanding and more informed attitudes on this side of the equation. ■



Jack Parker in address to Japanese financial community.

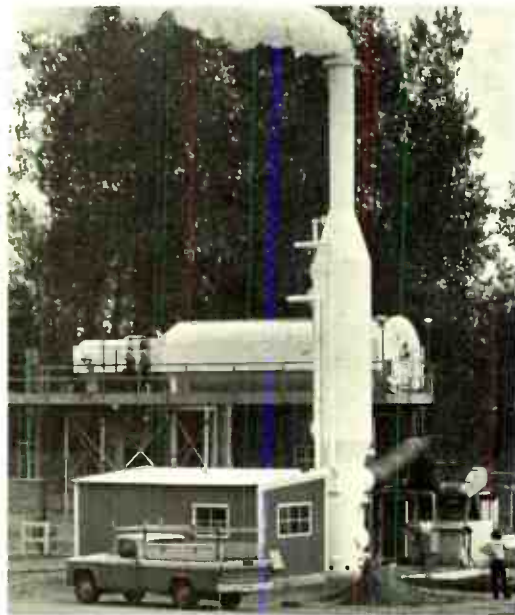
Environment: GE's mid-'73 scorecard

General Electric's Environmental Protection Policy (20.13) assigns responsibilities for implementing three main types of protection. Here is how the experts say GE is measuring up on all three counts at the 1973 midpoint:

1. Minimizing pollution by GE facilities. When one group of "Nader's Raiders" recently listed General Electric among the worst polluters in Greenville County, South Carolina, it wasn't GE that answered. The reply came from State officials, who pointed out that, contrary to the Raiders' claim, GE Gas Turbine's Greenville plant had one of the State's best waste treatment programs.

"In a sense, this reply illustrates a major Company goal—to operate all of our plants so that they merit environmental bouquets, not brickbats," says Dr. Edward L. Simons, manager of GE's corporate-level Environmental Protection Operation.

How close is the Company to achieving that objective? Simons: "Pretty close—and some 15 points closer this year than a year ago." He explains that EPO, charged with auditing the en-



Example of ingenuity being applied to limit pollution at GE plant facilities is Pittsfield's self-developed thermo-oxidizing system which converts liquid wastes to harmless compounds—without air pollution. It recently won an Ecologue flag from the Associated Industries of Massachusetts for "outstanding contributions to the environment."

vironmental safeguards put in place by GE operation, has established 12 elements that, together, make up a protection program geared not just to statutory requirements but to getting bouquets for GE. Two procedures have been adopted to determine how well GE operations score in these dozen measurements. Professionals in the field grade their own operations on their performance. And engineers from EPO's staff conduct independent on-site appraisals.

In 1972 the composite Companywide score on these double assessments was 76%. The most recent review showed an average performance against all 12 measurements of 91%.

The specific environmental targets that GE and all industry must meet are just now taking shape. "The formative years for environmental legislation and program organization are behind us," Simons notes. "Now we're in the midst of what we call the regulatory years. A flood of new standards and regulations are pouring out of federal, state and local agencies. They will require new pollution control methods and will bring with them increased risks of violation and litigation. None of us can rest on his oars."

One course that EPO is pursuing is "to encourage a shift from pollution controls to process controls. This means asking ourselves 'Do we have to generate pollution in the first place? Can't we develop processes that avoid emissions or that recycle wastes?' An increased number of our plants are accomplishing environmental control at the process level. We'd like to see the trend accelerated."

2. Limiting pollution by GE products. James S. Nelson recently reported to top management on another sector of the Company's environmental controls: where General Electric stands in its drive to reduce the adverse environmental effects of GE products.

As Consultant—Product Environmental Compatibility on the Corporate Executive Staff, Nelson pulls together the final assessment. But it's a Companywide effort, based on inputs from some 250 people who have accepted responsibility to make GE products non-polluters.

"Because of the diversity of possible environmental effects—everything from the noise a product makes to the problems it can cause when it's thrown away—there is no single technical measure of how well we're doing," Nelson says. "What we can and do measure is the degree to which recommended managerial controls are in place and functioning to assure environmental compatibility. Just as in the case with

(continued on next page)

GE facilities, GE product measures show a dramatic improvement: from 68% in 1972 to 94% in 1973. There is ample evidence that this emphasis on environmental impact is paying off in terms of improved product qualities." He holds up a thick binder. "There are plenty of examples."

Item: Concern over energy use by air conditioners finds General Electric in the favorable position of offering the most efficient units on the market—both in room units and central air conditioners.

Item: In noise reduction, GE products from jet engines to dishwashers have shown progress in lowering the decibel levels that assault our ears. The DC-10 Tri-jet, powered by GE's CF6 engines, was the first to meet new Federal noise-limit regulations.

Item: The Company's environmental concern extends beyond the life of GE products. The Tube Products Department, for example, has reduced the use of mercury in GE thyratrons by 87% to minimize any concern over eventual disposal of the tubes.

3. Products to solve environmental problems. GE's Policy commits the Company to contribute to environmental protection "by offering products and processes which will help solve environmental problems."

Here the measurement of progress comes primarily in the form of examples, several of which have recently made news headlines:

- In July, General Electric completed its commitment for the system design phase of the Connecticut Solid Waste Management Program. Earlier, Connecticut's Governor Thomas J. Meskill signed into law a solid-waste bill authorizing creation of a 10-member Resources Recovery Authority to build and manage solid waste installations that will recover glass and metals from trash and convert combustible rubbish into energy. The bill acts on recommendations from a GE interim report. The design phase project was spearheaded by GE's Research and Development Center, with participation by the Space Division.

- The U.S. Environmental Protection Agency has awarded a contract to GE's Ordnance Systems for further work, in cooperation with GE's Electronics Laboratory, on a GE-developed Infrared Laser Atmospheric Monitoring System (ILAMS). The system is used to monitor and measure urban concentrations of ozone—one of five gaseous air pollutants for which federal standards have been set.




Minimizing pollution by GE products takes many forms. GE's development of quieter dishwashers, as pictured by tests at Appliance Park's Dishwasher and Disposal Laboratory, has been cited in the Congressional Record as a leading example of reducing noise pollution.



Winding up phase one of Connecticut's Solid Waste Management Program required voluminous reporting by Dr. Kenneth W. Jenkins, and Dr. Julius A. Mirabal—Manager of the Solid Waste Program at the R&D Center.

- The National Society of Professional Engineers has selected GE's oil separator, developed in Pittsfield and being marketed by Reentry and Environmental Systems Division, as one of the ten outstanding engineering achievements of 1972. The separator skims oil from oily water and collects it for reuse.

Overall, the words that Jim Nelson uses in describing his own field of concentration seem to apply to GE as a whole: "We're not just window dressing nor only a response mechanism. General Electric is devoting considerable resources to environmental protection, and the results have begun to mount up." 

LETTERS

ANOTHER RECORD FOR SEA-LAND COMMERCE

Monogram's May-June feature covering the sea-trials of the Sea-Land Commerce was enthusiastically received here at Lynn River Works.



Your readers might be interested in learning that the Sea-Land Commerce established a new record for trans-Pacific crossings by travelling 4,424 nautical miles between Seattle and Kobe, Japan in five days, 23 hours and 30 minutes. The ship averaged 30.82 knots on her maiden voyage.

F. G. FOLSOM, JR.
*Manager—Advertising and Sales Promotion
Marine Turbine and Gear Department
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HIGH SCHOOLERS MASTER THE COMPUTER

The basics of computer technology, normally reserved for college-level courses, have been mastered by seven advanced students at East Henderson High School. The three-month program, completed this week, was developed by General Electric Value Planning Engineer Robert J. Moffa and has included computer logic, language and communication plus probability. The special class used Information Services Division's computer time-sharing network through a remote terminal.

"These students," Moffa said, "have given up their study hall time to learn basic skills in writing computer programs...converting math problems in machine language for solutions, and they have fantastic strides in comprehension and use of the computer."

W. THOMAS NEAL
*Manager—Communication and Community
Relations
Lighting Systems Business Department
Hendersonville, North Carolina*

IT AMOUNTS TO AN ERROR

On page 31 of the May-June issue you say "averaged over 24 hours, 17 watts per square foot per day (of the sun's energy) reach the earth's surface." The term watt refers to a rate, not an amount of energy.

It would have been more correct to say that averaged over 24 hours (and I assume over the total earth's surface), 17 watts per square foot reach the earth's surface or, on the average, 17 x 24 or 408 watt-hours of energy per square foot per day reach the earth's surface.

This reminds me of the football commentator who continuously says "so-and-so averages x yards each time he carries the ball."

JOHN L. DUTCHER
*Consultant—Engineering Reviews Operation
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MORE ON GE SCULPTORS

After reading the article on the creative GE welders/sculptors in the last *Monogram*, I was reminded of a hand-crafted sculpture recently built by employees of the Vertical Motor Products Section.



The three-feet-tall knight, nicknamed PAL (Prevent Accidents Logically), meets OSHA safety requirements by being fully clad in safety equipment from his hard hat to his steel-toed safety shoes. As an occupational safety crusader, PAL might have some interest for shop employees in manufacturing operations around the country.

STEVEN T. OPHAUG
*Specialist—Employee Practices and
Communications
Vertical Motor Products Section
San Jose, California*



Energy Odyssey: Rush additional power generation capacity needed by booming Brazil will arrive by sea, via a barge-mounted multiple gas turbine power system from General Electric. Above: The journey's beginning, out of Bath, Maine, with Salvador, Bahia, as the destination. Sale of the 131-megawatt plant to Centrais Eletricas Brasileiras S.A. resulted from the coordinated efforts of GE's International Sales Division, Gas Turbine International Department and General Electric do Brasil, S.A.