GENERAL ELECTRIC

Monogram

MAY-JUNE 1976

With the aid of projects by GE employees...

THE CENTENNIAL'S MOMENTUM PICKS UP

PLUS:

The Company's professors; Utah's Navajo Mine; Tackling health care costs

The role of a 'National Executive'

London activities of GE Board throw a special light on managers who serve as the interface between host countries and General Electric.

Around the world today a number of General Electric managers bear the extra title of "National Executive." One such double-titled manager is R. Peter Davidson. He is President of International General Electric Company of New York Limited. And he is also National Executive for the United Kingdom and Eire.

Recently the *Monogram* interviewed Pete Davidson in his office overlooking London's Park Road. It was a critical time for him. Members of General Electric's Board of Directors were on their way to London to participate in their first European meetings. While in London they would join in a "hands-across-the-seas" dinner with GE customers and associates in the UK. Finally, the Directors would conduct

GENERAL ELECTRIC Monogram

May/June 1978 Volume 55, Number 3

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Donna R. Carpenter, *Editorial Assistant;* Ron V. Taylor Associates, *Design.*

On the cover: dozens of aluminum roses commemorating the Company's 100th birthday represent Ft. Wayne employee Joseph Horvath's way of celebrating Centennial. Many other GE100 activities are shown on pages 8-11.

Contents

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

Clothworkers' Hall in old City of London was site of Company dinner on April 27. In receiving line: Mr. and Mrs. R. Peter Davidson (left) with Mr. and Mrs. Reginald H. Jones. Top: Jones chats with the UK's Secretary of State for Industry, Eric Varley.

business reviews with a number of the managers of GE's international operations.

Despite the day's pressures, Davidson agreed that this was an advantageous moment to gain insight into the role of a National Executive.

Two types of work: "In my book," he said, "the National Executive handles two kinds of jobs—both of which are, in my case, put very much on the line by this visit of the Directors."

First, he noted, is the task of serving as the interface in representing General Electric to key customers and others whose support is vital to the business, and maintaining good relations with government officials. "This task comes down sometimes to conflict resolution," he explained. "The National Executive must work to make sure that GE operations aren't in conflict with each other in their pursuit of business opportunities or with the social, political and economic environment of the host country."

In terms of representing GE to UK influentials, the Board's trip was a golden opportunity for Davidson, and he was out to make the most of it. Handsome Clothworkers' Hall in the old City of London had been reserved for the formal dinner, and invitations had been accepted by some 200 guests representing a wide range of affiliations. Moreover, the Labor Government's Secretary of State for Industry, Eric Varley, had agreed to join GE's Chairman Reginald H. Jones as a speaker for the occasion.

The second primary task of the National Executive cited by Davidson is "a regional manager role—the entrepreneurial responsibility of determining how to grow General Electric profitably in the host country. That applies not only to those businesses already in place but also to answering what new businesses we should be in and whether our response should be export sales, licensing or local manufacture.

"Fortunately, through hard work and sound investments by a number of GE managers, we in the UK have a good account to give to the Board," he said. "Over the past five years we have, without much fanfare, been building a much stronger GE presence here."

Over the next two days the *Monogram* was there for the follow-through on these Board-related events.

At Clothworkers' Hall on the evening of April 27, a red-coated toastmaster called out the names of those attending the GE dinner: "Lord and Lady Aldington . . . Air Commodore and Mrs. Banks . . . Sir Derek and Lady Ezra . . . the Secretary of State for Scotland." Pete Davidson and his wife stood beside Grace and Reg Jones as they received the arriving guests.

The GE hosts and their dinner guests joined in the ceremony of passing the Loving Cup—on this night, as over the whole thousand-year history of the ceremony, a symbol of mutual regard and cooperation.

At meal's end, the toastmaster rapped with

(continued next page)

Among the European-based GE managers who reviewed their operations April 28 with Board: VP Alastair Gowan (upper left); VP Paolo Fresco (top); Glen Hiner (bottom left).

his gavel and called, "Pray silence for the Secretary of State for Industry, Mr. Eric Varley."

As a member of Britain's Labor Government, Secretary Varley might have been expected to make only polite remarks to the representatives of an American corporation. But he went well beyond that. He found the Board's visit "a reminder of our dependence on world trade and the world economy." World trade, he said, "is the only way to solve the underutilization of the world's resources."

He noted the British government's awareness of the UK's slippage in world trade over the past decade and its determination to reverse this trend. "The government is committed to give industrial development a high priority" and recognizes that it "must encourage real profitability."

As for General Electric, the Secretary expressed gratitude for "the enormous contribution you make to our balance of payments" and added: "You bring new ideas, new technology and efficiency. We have every respect for what you are doing." He concluded: "We hope your second hundred years are as successful as the first."

"Pray silence for the Chairman of General Electric, Mr. Reginald Jones," the toastmaster now called out.

Reg Jones responded by noting the contrast between Britain a few years back and today. "We've seen responsible fiscal and monetary policies bring about a dramatic reduction in the rate of inflation here. The restraint of the trade unions in recent years has been a welcome sign. We've been delighted to see the priority accorded to investment in manufacturing industry, and the government's recognition of the essential role of profits in attracting the necessary long-term capital investments."

As a consequence of these improvements in the business climate, he said, "we in General Electric are bullish on Britain—enough so that we have expanded our presence here in the past few years. Peter Davidson reminds me that when we started the joint venture of GE and Tube Investments in 1966 we had approximately 400 people on the payroll. Last year we had almost 6,000 of your loyal subjects on our payroll in the United Kingdom."

The business reviews began the next morning with Dr. Alastair C. Gowan, VP and General Manager—Europe Area Division, who gave an overview of the growth of GE operations in Europe. Jan M. Garvin, Manager—Eastern Europe Operation, told of the many-fold increase in trade with the countries of this area in recent years, while J. Ignacio Trillo, Board Chairman of General Eléctrica Española, reviewed the progress of GE activities in Spain. GE's highly successful European plastics business headquartered at Bergen op Zoom, Holland, was described by Glen H. Hiner, Managing Director, and Peter Sanders, Marketing Manager.

Paolo Fresco, VP and General Manager—Africa/Middle East Area Division, told of "the explosive growth" of export opportunities in the oil-rich countries in his region. He also detailed the Company's plans to look beyond these immediate business opportunities and position GE for solid long-term growth.

The final report came back to GE in the UK. It was presented by W. Blake Miller, Managing Director of the TI/GE joint venture.

From modest beginnings in 1966, the TI/GE operation has proved so successful, Miller said, that last December TI agreed to merge its entire Industrial Electrical Division with the joint venture. This move further extended the product offerings so that now the joint venture offers a broad line ranging from electrical control and distribution devices to sophisticated control systems and industrial lighting. The venture now has eight manufacturing plants, and sales and earnings have steadily improved.

Miller closed by reporting that Apparatus Service has now expanded its UK facilities to nine service shops. It's a move that will enable General Electric to participate more fully in the UK's $650-million service industry.

Coming-of-age for relations work?

Top GE professionals meet at Belleair to assess the changed perception of their expertise mandated by today's "issues climate."

Facing more than 350 of General Electric's top relations professionals, Chairman Reginald H. Jones reminded his audience of how the Company has escalated its estimation of the importance of their work over the past twenty years.

Back then, he said, "when we talked of the main functions required to run a business, we'd talk of manufacturing, engineering, marketing and finance. If we had time we'd also mention relations, but that kind of work was not really accepted as central to the organization's success."

He added: "How that has changed! Public relations has become so important that the Chairman of the Board now spends a very large percentage of his time in that kind of work, and every manager has had to make a place for it in his or her schedule. Employee relations has become so important that it has moved up as one of the primary objectives of the Company, and human resources management is represented in the Company's topmost councils."

The occasion for Chairman Jones' remarks was a landmark conference held at Belleair, Florida, at the end of April. There, for the first time in memory, GE assembled in one place representatives from all of the Company's people-oriented activities: Employee and Public Relations, Organization and Manpower, Government Relations and Medical Operations.

Co-hosted by Leonard C. Maier, Jr., Senior VP—Corporate Relations, and Theodore P. LeVino, VP—Executive Manpower, the conference reaffirmed the burgeoning importance that these interrelated activities have been given by today's "issues climate."

Central to the conference, Len Maier said, is the concept of human resources management, which "encompasses anticipating and responding to the needs and wants of all the people important to the profitable conduct of the General Electric Company's business."

It's a field of work, Maier made clear, that today must concern itself, as never before, with the societal, regulatory, economic and political issues that weigh upon the Company. "Any process for resource planning and management,"

(continued next page)

Relations professionals hear GE leaders place relations work among top Company objectives...

Reginald H. Jones

Leonard C. Maier, Jr.

Theodore P. LeVino

"Relations is now one of the key activities of business, and one of the chief criteria by which an organization's success is judged."

he said, "will inevitably include a need for issue identification, issue analysis, strategy development and resolution management."

The effect of these changes was well articulated by Dr. Thomas R. Casey, VP—Corporate Medical Operation. If past expectations of a GE physician's role still held, Casey said, he'd be there "passing out aspirin" to the conference participants. Instead, his task at the meeting was to review an awesome array of governmental regulations that now require the involvement of GE's medical operations.

Today, GE doctors are charged with conducting component health and safety appraisals, to make sure the Company is in conformance with the shifting regulations resulting from such legislation as the Occupational Safety and Health Act. Further, GE physicians' responsibilities extend to identifying, measuring and controlling possible hazards in the GE work environment.

So it went throughout the three-day conference: speaker after speaker, both from within the Company and from outside, emphasized the enlarged public-issues consciousness that must permeate relations work as the Company heads toward the 1980s. Remarked VP Ted LeVino: "Because of General Electric's size and diversity, the Company is very visible. How we conduct our relationships is also very visible. What is really needed is excellence in all aspects of employee relations work. This can be a strategic advantage, but excellence is clearly a moving target. The contributions we must make may be as specialists in one aspect of relations work, or as generalists. We need both."

Highlights from a few of the speakers' talks:

• Harrison A. Williams, Jr., U.S. Senator from New Jersey and chairman of the Senate Human Resources Committee, reviewed how business can be more effective in Washington. He rejected the attitude adopted by many businessmen that government doesn't listen to people. On the contrary, he said, "we spend most of our time listening." It's true, he acknowledged, that at times, with so many voices shouting, a clear and thoughtful message may have trouble getting through. But in general "we hunger for information from reliable sources." The Senator commended GE's governmental relations programs as "the most enlightened approach possible."

• Stanley C. Gault, Senior VP and Sector Executive—Industrial Products and Components Sector, assessing the critical need for the U.S. to attain growth rates in productivity that begin to match those of other leading industrial nations, challenged the assembled relations specialists to overcome the distrust of corporate objectives that limits productivity gains and leads to walkouts, absenteeism and other ills. "Our collective mission," he said, "is to see that, to the best of our ability, every individual and contributor-claimant group understands what the Company is doing and why, and believes it is the best available course of action."

• Walter K. Joelson, Staff Executive—Economic Research and Forecasting Operation,

Outside speakers . . .

"Government *does* listen—we hunger for information from reliable sources."

U.S. Senator Williams

"Opportunity is *the* motive force behind people's productivity."

Yale professor Kanter

"Continuing efforts must be made toward a greater sense of worker dignity."

AFL-CIO's Donahue

Inside speakers...

"Our mission involves insuring that everyone understands *what* the Company is doing and *why*."

Senior VP Stan Gault

"GE doctors must help keep the Company in conformance with shifting regulations."

VP Tom Casey

"During the 1980s, international forces will make personnel selection more complex."

Walt Joelson

anticipated what the economic reality of the 1980s will be like: "International forces will compel American companies to adopt more flexible strategies. As a result, personnel selection and training will become more complex as we do our purchasing and producing, selling and financing, as well as our research and development work, on a worldwide scale. Tomorrow's labor leaders, in mirroring the interests of their constituents, may advocate policies that differ substantially from those of today."

• Thomas R. Donahue, Executive Assistant to AFL-CIO President George Meany, represented the "amazingly diverse community" of the U.S. labor movement—a total of some 21½ million organized workers in 60,000 local unions. He reminded the conferees that U.S. workers don't join unions to express political viewpoints but, instead, as an affirmation of human dignity, as symbolized by the placard borne by a picket-line striker that said, simply, "I am a man." It is this sense of dignity, he said, that must be given a greater place in company-union relations in the 1980s.

• Dr. John T. Dunlop, former U.S. Secretary of Labor who is now a Lamont University Professor at Harvard, told the conference flatly that the future of American business in the next decade will be determined more by the handling of relations than by the conduct of any other business discipline. "Relations," he said, "will be the most decisive factor in how companies will fare." Presenting a picture of the business community as more fragmented than union leadership, he challenged the conferees to help business reach a consensus on key issues—a positive consensus that will enable business to win the friends and allies it needs if it is to stem the flood of governmental regulation and limitation on business effectiveness.

• Dr. Rosabeth Moss Kanter, Professor of Sociology at Yale University, posed the difficult problem of "expanding opportunity in a no-growth society." Opportunity, she said, has been the motive force behind people's aspirations, achievement drives, work commitment and productivity. Yet we are into a time when slower economic growth will mean a decline in opportunity—unless business takes measures to create more meaningful jobs and new options for challenge and career growth.

What all these forces add up to, Reg Jones suggested in closing the conference, is "the coming-of-age of the relations function. It's now one of the key activities of business, and one of the chief criteria by which an organization's success is judged." Following up on the statement by General Motors' Dr. Delmar L. Landen, Director—Organizational Research and Development, that business success goes hand-in-hand with job satisfaction, Jones observed that "today's relations personnel must simultaneously meet business *and* human requirements." The GE chairman sensed "a new excitement in relations work and a new opportunity to make an unprecedented contribution to the fortunes of the General Electric Company."

The pace quickens

Michigan's Tulip Time pageantry includes GE anniversary entry

Each May, Holland, Mich., captures international attention when its local Tulip Time Festival is celebrated with quaint Dutch costumes, *klompen* dances, street scrubbings, parades and millions of tulips. In honor of the GE Centennial, Hermetic Motor Department in Holland entered a GE anniversary float this year as part of the tulip gala's four-day celebration.

Along the ten-mile parade route, an estimated half-million visitors saw GE's tulip-bedecked float, which also honors the local GE plant's 25th anniversary. To give *Monogram* readers an advance "peek" at what onlookers would see, a GE100 float dress-rehearsal was held with the help of, left to right: engineering program trainee Jeffrey F. Watson; Bryan E. Lary, son of manufacturing manager John E. Lary; Kristi J. Horton, daughter of personnel secretary Jo Ann Horton; and marketing secretary Marcia L. Hart.

Symposium for McGraw-Hill editors given by Power Systems Sector

With energy questions on everyone's mind these days, Power Systems Sector decided the Company's 100-year milestone was a good time to bring editors and writers up to date on GE's energy systems business. On March 28 in New York City, 14 GE executives participated in a symposium at the McGraw-Hill Publishing Company, one of the world's top producers of business, trade and scientific periodicals. The meeting's purpose, as introduced by Senior VP and Sector Executive Dr. Thomas A. Vanderslice (right): "To emphasize GE global attention to technical, political and social trends that represent dramatic and unprecedented change."

Following the talks, Dr. Vanderslice was joined by Harold W. McGraw, Jr. (left), McGraw-Hill president and chief executive officer, for a cake-cutting ceremony.

for Centennial

GE's 100th birthday 'goes local': tulip parades, 'Town Meetings,' Edison essays—even a giant cookie!

For Rockville's GE100 observance: 200 happy youngsters go to camp

Recognizing the Company's long history of community involvement, Rockville's Information Services Business Division is celebrating GE's 100th birthday by sending 200 children from Maryland's low-income neighborhoods to nine two-week summer day camps. First recipient: Anthony Fitch (l), who received his award from ISBD's Edson B. Gorsuch. Rockville and surrounding Montgomery County communities are each receiving 100 GE scholarships.

Saying 'happy birthday' with keepsakes worth having

Emphasizing quality collectors' items to celebrate the GE Centennial, Scotia, N.Y.'s Distribution Services Operation has created some 40 Company items for employees and customers—everything from antiqued brass desk pen sets to men's ties and women's brooches. To be unveiled this summer: limited-edition pewter plates, which feature a bust of Edison and GE's most significant achievements. Notes DSO's Ralph W. MacLachlan, Jr.: "There will be only one production run, and then the mold will be broken—making the plates true collectors' items."

For 17 young Edison essayists in Brazil, it's off to Disney World

This summer, Brazilian youngsters with a sharp mental grasp of Thomas Edison's electrical legacy will be crossing the equator for a splendiferous holiday at Florida's Disney World. GE plants at Rio de Janeiro, Campinas and Santo André have invited 60,000 eighth graders from 17 area schools to enter a GE essay contest that explores Edison's contributions to today's society. Shown at São Paulo's Galileo High School: hopeful essayist Nicolau Chicani Nêto.

As GE100 gesture, employees offer a personal 'thank you'

How can employees celebrate their product's market acceptance and at the same time promote after-the-sale customer contact? One way: when Juanita Eidson (left) purchased a new GE microwave range for her remodeled Virginia kitchen, Columbia, Md., employees Doris J. Steward, LeRoy E. Gardner and Russell L. Smith stopped by with a large chocolate-chip cookie, a GE coffeemaker, and a set of cookware designed especially for use in the new range.

First use of GE's birthday insignia in Company advertisements

Sculptured for use in December 1977 trade ads promoting semiconductors and DC motors and generators, a hefty, wood-carved Centennial symbol conceived by Albany's Creative Services Operation holds the distinction of being the first GE100 insignia used in GE advertising.

Now a "traveling trophy" for Syracuse's Electronic Components Business Division—to be competitively passed between ECBD's various departments as a 1978 symbol of business excellence—the sculpture made its trophy début at a recent Elfun meeting, where ECBD's Dr. Erwin M. Koeritz (left), VP and general manager, presented it to James W. Ritcey, Semiconductor Products Department general manager.

'Dan Patch' locomotive rides again— with Minneapolis Service Shop's help

Named for a celebrated trotting horse, the "Dan Patch No. 100" gas-electric locomotive should see a second 65 years of service with the Minnesota Transportation Museum—thanks in part to a Centennial gesture by the Minneapolis Service Shop. GE employees recently donated 400-plus hours to restore No. 100, the world's first such locomotive on a common carrier railroad. Inspecting the work: retired "Dan Patch" engineers Lloyd and Ernest Chadwick (left and right), with their young friend Paul Wickre.

On display in Bloomington—Jim Knight's 'wire art'

Nailing down artistic acclaim for his wire-and-nails GE monogram, Bloomington's James G. Knight, a General Purpose Control Department designer, created his Centennial work using 833 nails, one mile of wire and 80 hours of painstaking labor. Assisting him: an interactive graphics computer which enabled the pattern to be "blown up" to 72 times its original size. Knight's GE wire art is on view in the plant auditorium.

In New England-style town meetings, Aerospace looks at technology's value

Launched last year as part of a GE Centennial series of meetings "to establish a two-way information flow between experts and community residents," Aerospace Business Group's Town Meetings on Technology have reached Chicago, Atlanta and San Francisco thus far—with plans afoot for future gatherings. Included on the rosters of esteemed panelists: Nobel Prize laureate Dr. Glenn Seaborg, U.S. astronauts Alan Bean and Rusty Schweickart, and numerous top governmental and business leaders.

The forums encourage attendees to probe the experts on such difficult issues as energy, jobs, education, environment and the public's chronic disenchantment with life's complexity.

Among the GE contingent on hand in Atlanta to examine technological challenges during GE's *second* 100 years (1 to 1): now-retired Aerospace Business Group VP Dr. Mark Morton, Patricia A. Dolan, Dr. R. Cecil Gentry, Lewis W. Fogg and Lawrence I. Lady.

To achieve a 'safe' Centennial—GE-Erie televises safety campaign

Topping Erie, Pa.'s TV Nielsen ratings in early February during a half-hour, weekend time slot on a local ABC affiliate station, a GE TV special kicked off the Erie plant's Centennial safety program by opening with an employee safety message—and then provided a community business report, aired critical issues ranging from tax legislation to international trade, and awarded GE100 prizes to employees. Grand prizes yet to be awarded: trips for two to Hawaii based on employees' 1978 safety performance.

Shown being filmed at the plant: GE tester Martin Kruk.

Monographs

Another smoke-detector save. At 3 a.m. last February 27, John and Darla Large and their two children were jarred awake by the squawk of their GE Home Sentry® smoke alarm located in a bedroom hallway. Scrambling out of their Frankfort, Ind., home, all four reached safety—though the house suffered $22,000 worth of interior destruction.

Naturally, with so much damage incurred, the family assumed that their smoke alarm had been destroyed. Not completely. Although the fire's intense heat melted its plastic casing, the GE smoke detector works today!

To spread the word about the alarm's service, the Larges sent the never-say-die unit to General Electric, which presented it to the product's manufacturer and wholly-owned Company subsidiary—Shannon, Ireland's E.I. Company. Pictured here: E.I. managing director Frank McCabe (left) and GE-Bridgeport's Personal Care and Home Security marketing manager George Holley.

Hearing-impaired athletes. Familiar with deaf students' problems—his own daughter, Elaine, 16, has been deaf since birth—Cleveland's George L. Naples in 1972 organized a basketball team for deaf children, devised two different systems of signals to replace referees' whistles, and recruited volunteers to help coach. The next year, he formed a second team and set up a cheerleading squad as well.

"For the 1978 season," notes the former Phillippe Award winner, "we've expanded to three teams—the Comets for kids 8 to 12, the Rockets for those 12 to 14, and the Satellites for kids up to 18. About 40 youngsters, including the cheerleaders, are participating this year."

The teams' biggest block of boosters? General Electric's Austintown Coil and Youngstown Lamp plants. Remarks Naples, "Thanks largely to our employees, we have team and cheerleaders' uniforms, a van, a scoreboard and an awards banquet with trophies every year."

At work on Centennial booklet, New Mexico artist Tracy H. Seidman is now designing a hand-stitched quiltwork cover for the *Monogram*'s upcoming 52-page booklet, which will commemorate the Company's 100th birthday. Comprising the six chapters of GE historical highlights now appearing in *Monogram*, the keepsake will be printed in mid-August and is being made available on a pre-publication order basis only.

All GE operations now have the ordering information in hand, and orders must be received by June 15—so that bulk shipments can be made well before the Centennial peaks. The booklet is designed to be distributed to employees, customers and dealers by interested components.

Industrial ads on radio? This spring, Chicago commuters heard something on their car radios other than the typical travel-agency and savings-bank commercials. Snappy 60-second GE radio spots for Bloomington's General Purpose Control Department were broadcast 176 times during prime "drive-time" hours across the Windy City's airwaves.

Advertising strategy: among the sports fans, news hounds and weather watchers who tune in to Chicago's WBBM and WGN radio stations are thousands of potential buyers and specifiers of GE controls—to be exact, 51% of some 40,000 possible customers.

It's too early to tell if the radio blitz has worked, but a similar GE advertising campaign aired last year in Detroit produced a 50% jump in target-audience awareness. Shown playing the GE message in Chicago: WBBM anchorman Frank Beeman.

GE 'adopts a lot.' As one of Chicago's oldest suburbs and an area beset by serious urban blight, Chicago Heights is fighting to come back. When Mayor Charles Panici recently issued a call for lot-improvement projects, Food Service Equipment Business Department—a long-time resident of the area—quickly took to heart the mayor's "Adopt-A-Lot" program. The mayor, incidentally, is a former GE employee.

Endorsing His Honor's idea by becoming the "foster parent" of an 80-by-180-foot lot adjacent to its plant, General Electric funded city workers to clean up the lot and plant trees and grass. GE volunteer workers Silas Parker (left) and Marie Bellamy here maintain the grounds—part of the Company's effort to reinvest in the city's continued vitality.

Lofty love message. She said the sky was the limit of her love—and she proved it! For Valentine's Day, San Jose's Irene Coffey, the wife of Nuclear Energy Business Group's Warren C. Coffey, rented a helicopter and via the airways declared her feelings for her husband of 23 years. States Warren: "Irene stands less than five feet tall, but she likes to do things in a big way!"

Honors. Dr. Robert N. Hall, an R&D Center physicist, has been elected to membership in the National Academy of Sciences—one of the highest honors that can be accorded a U.S. scientist.

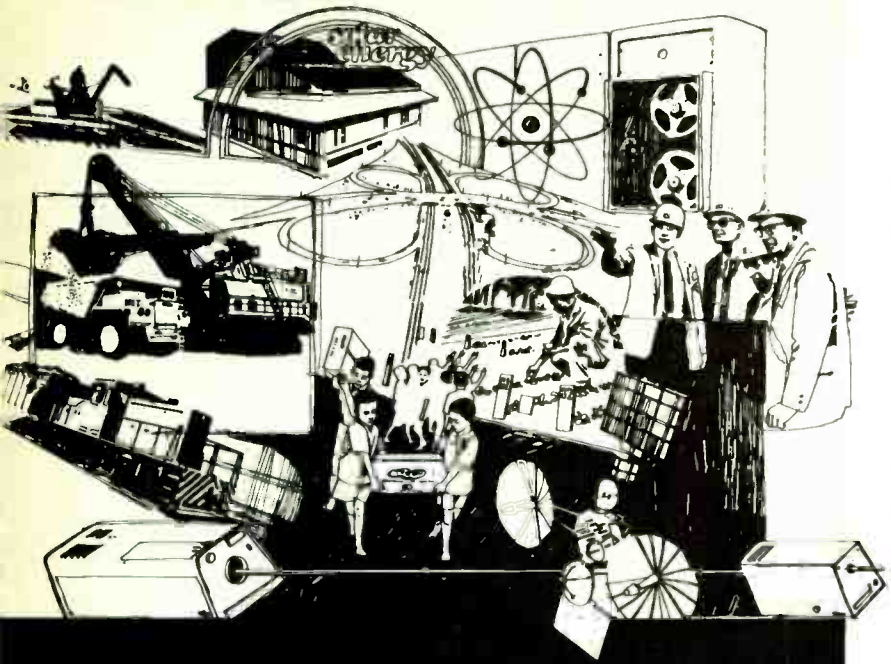
• The R&D Center's Dr. Roland W. Schmitt has been elected to membership in the National Academy of Engineering.

• Gas Turbine Division's Mary F. Griffin has been named a National Director of the American Association of Occupational Health Nurses.

• The American Society of Mechanical Engineers has awarded its 1977 George Westinghouse Silver Medal to the R&D Center's Dr. James C. Corman for his mechanical engineering achievements.

• San Jose's Philip R. Robinson and Evendale's Carolyn A. Abron recently received 1978 Black Achievers in Industry awards, given by the Harlem YMCA and several national corporations.

Correction: The last issue inadvertently stated that Aircraft Equipment Division's William Kuehl and Francis Kattell were employed in Evendale instead of Binghamton.



GE's TEMPO: more than a 'think tank'

As an independent GE research team, Santa Barbara's 'deep thinkers' do more than 'brainstorm' new ideas. They bring us the future.

What will the traffic habits of Tokyo commuters be in 1985?

How should a town in the Sahara desert be designed?

What can the U.S. Coast Guard do to best improve ship navigation and traffic control?

Is it feasible to expand Egypt's flat-glass industry?

These aren't idle questions placed before some august academic committee. They represent orders from customers of General Electric.

All have been addressed by Santa Barbara's Technical Environmental and Management Planning Operation (TEMPO), a unique GE organization which since 1956 has served as a combination prophet, odds handicapper and objective expert—and continues to make a profit in the bargain.

To help customers find answers to perplexing questions, TEMPO now maintains a 150-member staff at five U.S. locations. Two-thirds of TEMPO's professional employees hold doctorates or master's degrees, and their specialties include engineering, economics, business administration, hydrology and geology, mathematics and the social sciences. That's the kind of interdisciplinary team required to reduce galactic-sized problems to definitive reports, TEMPO's end product.

"Though we're in the ad-

vanced analysis business, TEMPO is not simply a 'think tank'," states TEMPO manager William H. Raber. "We're action-oriented. Our mission involves developing new applications for advanced technologies, making technology more relevant to society, and supporting national defense programs."

While TEMPO performs intra-GE studies, especially aerospace and energy programs, it derives about 90% of its revenues from outside clients. It is not a GE service organization, but rather a self-supporting consulting group founded to generate independent studies.

Says Raber: "In 21 years, we've completed more than 3,000 projects in over 40 countries. While the Department of Defense is still our largest single customer, other government clients, both domestic and overseas, are furnishing an increasing volume of business." He adds, "Although TEMPO undertakes development studies for GE, it remains a profit-and-loss enterprise—not the Company's long-range planning arm. As an advanced analysis center it is unique—the only organization of its kind in General Electric."

Renowned for pioneer work in such diverse areas as groundwater hydrology, advanced energy systems and social planning, TEMPO has worked for the White House, the United Nations and various foreign governments. Other clientele: industrial, financial, scientific and educational organizations and private businesses.

Whoever the customer, an important part of TEMPO's job is to read the future—not with crystal balls or tarot cards—but through application of systems analysis techniques that help the client prepare for events five to ten years hence.

Among its more notable environmental studies was a methodology designed in 1972 for the EPA (Environmental Protection Agency) which has since become a government standard for monitoring groundwater pollution. In a second ongoing EPA study begun in 1976, TEMPO is applying this methodology to design groundwater monitoring programs for seven Western coal surface mines and four oil shale extraction sites.

Observes TEMPO's Dr. Lorne G. Everett, Manager—Water Resources Program: "More than 97% of the world's fresh water is stored underground. Our methodology involves monitoring potential pollutants *before* they reach the groundwater, rather than the less accessible groundwater itself."

Market benefits for General Electric have been an occasional spin-off of several TEMPO studies, though this was not originally foreseen. A 1969 TEMPO study for Algeria, which developed an electric power system expansion plan for the 1970-1990 time period, recommended that gas turbines be used, based on the country's ample natural-gas resources. Later, in open bidding, GE received a $77 million order for gas turbines from the Algerians.

TEMPO has maintained excellent rapport with key Algerian government ministers, and in the process, TEMPO personnel continue to gain firsthand knowledge of current Algerian attitudes. TEMPO's work in Algeria began in 1965, and 17 projects have been commissioned to date.

TEMPO is now helping design a new Sahara desert town, Gara Djebilet, to support development of Algeria's iron ore resources. TEMPO is producing a community master plan and, in league with Schenectady's Projects Engineering Operation, an energy supply system plan.

Prior to this Algerian project, TEMPO was *the* prime study contractor of the Gara Djebilet iron ore resources, and provided metallurgical tests, a world iron ore market survey and an evaluation of transport and port alternatives. Also, it has helped formulate and structure Algeria's National Standardization Center, by identifying proper measuring equipment and preparing national standards procedures.

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Santa Barbara's lovely El Paseo shopping area houses TEMPO headquarters. Declares manager Bill Raber above: "As life becomes increasingly complex, new techniques and methodologies are vitally needed."

"Because GE's experience in standards development and application probably exceeds that of any other company worldwide," notes TEMPO international analyst Patricia L. Green, "it's only natural that TEMPO should excel in standards development." Case in point: Korea Standards Research Institute, created in 1975, was planned, staffed and equipped using GE guidelines.

The GE organization also has assisted the Ecuadorian Institute of Standards, and has conducted training seminars for standards personnel from such countries as West Germany, Japan, Algeria, Bolivia, Cameroon and Upper Volta.

TEMPO's widely cited energy expertise results to a great extent from its association with General Electric's Aerospace Business Group, Corporate Research and Development, Power Systems Sector and International Sector. As one of its GE-related duties, TEMPO now chairs the joint ABG/CRD Advanced Development Council which identifies technology gaps and new marketing opportunities for these two Company components.

Santa Barbara scientists have numerous advanced energy studies to their credit: a National Science Foundation commercial analysis of *solar heating and cooling;* a DOE (Department of Energy) design of *photovoltaic power systems;* a feasibility evaluation of *wind energy systems* for DOE; and an ongoing DOE commercial assessment of *ocean thermal energy conversion.*

TEMPO's *heat-storage-well studies* are internationally famous. Conducted for such organizations as the Departments of Interior and Energy, NASA and EPRI (Electric Power Research Institute), heat storage wells involve storing hot water during summer in deep underground aquifers, and then pumping it out in winter and using the water's BTUs for energy. "Such wells resemble artificial geothermal sites and have possible future value in industrial and district heating cogeneration applications," notes TEMPO energy consultant G. Garth Leeth.

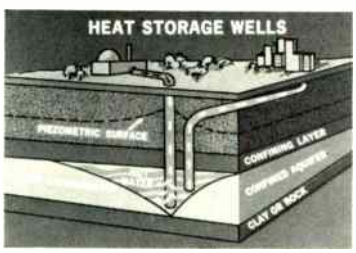
Naturally, with GE's long involvement in the nuclear systems field, TEMPO *nuclear-related projects* abound. Also of note: TEMPO's latest *coal energy study* begun this April for EPRI. Its purpose: to develop a rationale for the siting of coal-burning power plants, based on the respective environmental impacts of single and dispersed power stations.

Ask anyone—motorcycles are noisy, raucous interlopers on the community calm, right? Well, how noisy *are* they? Again, TEMPO has an answer—this one requested by EPA. TEMPO's recent findings: new motorcycles are surprisingly quiet! Invariably, the clangor and discord associated with motorbikes result from their later being "souped up" at home.

The EPA's new proposed noise standard for the nation's motorcycles and trash-compacting trucks—released March 15—is based on this TEMPO research.

"We must always be at the technical leading edge to serve our customers' widely varied needs," comments TEMPO manager Raber. He concludes: "The market for TEMPO-type studies, after a mid-1970s lull, is again burgeoning. Our sales last year were the highest since 1971, and as life becomes increasingly complex, organizations such as TEMPO can expect to be asked to develop newer techniques and methodologies to cope with even thornier problems.

"Frankly, it's a fascinating and useful business and we intend to stay in the forefront."



Evidence of TEMPO's diversity: Warren Chan manages information center for Defense Department. Drawing explains TEMPO heat-storage-well concept. The Crow Indians receive technical support to protect their water supply.

CHAPTER 4

A peek into an American kitchen of 1910 would reveal a conspicuously non-electric lifestyle. There was no electric refrigerator, no electric range, no electric coffeemaker—and certainly no electric dishwasher. Yet, Thomas A. Edison emphasized that "the introduction of electricity in our daily lives is the greatest factor in human progress."

While Americans were increasingly aware of electricity's many benefits, the orders that kept General Electric shops humming were mostly for heavy apparatus for the burgeoning young electrical industry. The only GE consumer products manufactured in volume were electrical lamps and fans.

Fan with GE monogram (1899).

American kitchens of the era were dominated by an imposing cast-iron black stove fueled by wood, coal or kerosene. An oaken ice box brought regular visits from a leather-shouldered iceman, whose horsecart would deliver him, tongs in hand, to countless kitchens of oilcloth and linoleum. The legacy of a relentlessly melting block of ice was, of course, a full drip pan, rescued by a member of the household, emptying it seconds before the flood.

When escape from the non-electric kitchen allowed, entertainment was provided by a hand-wound Edison phonograph, whose cylindrical offerings might include "Cuddle Up A Little Closer" by the vocal duo of Ada Jones & B. Murray. Just a trolley ride away was a nickelodeon, or, at the Rialto, Cecil B. DeMille's "The Squaw Man." There were also Chaplin or Sennett comedies punctuated with a piano player's well-worn snippets of "Pony Boy" or "Oh, Promise Me."

The first electric appliance to be widely accepted in American homes was the "Hotpoint" iron, and its success can be partially attributed to an Ontario, California housewife, Mary Richardson. Her husband, Earl, an employee of the local power company, had been experimenting with an electric flatiron since 1900. He could win favor with women customers, Mary told him, if he would only make an iron with a hot point so that it could press around buttonholes and into ruffles and pleats.

Richardson followed up this idea with a new iron design with heating elements converging at the tip. In 1905 he loaned several samples to volunteers. A week later he returned, happily discovering that no one would part with the "iron with the hot point." Richardson had found the ticket to success. He established his own Pacific Electric Heating Company to manufacture "Hotpoint" irons and soon was selling more electric flatirons than any other company.

While Richardson was experimenting, a Fargo, North Dakota entrepreneur was tinkering with an electric range. George Alexander Hughes, founder of an electric power company, recognized that encouraging the use of electricity in the home could boost sales and lower rates. Hughes was convinced that in order to sell electric cooking, the cook had to see the heat. His range was crude. The heating elements were open wires set in bricks, and they burned out after only a few hours of use. Yet, over several years his ranges were satisfactorily tested, and eventually he sold his interest in the utility to devote full attention to his designs.

Hughes converted gasoline and oil stoves to electricity, reasoning that they should resemble present models. He selected a new nickel-chromium alloy for heating elements mounted in an asbestos-brick compound. His first major range promotion occurred in 1910 at the National Electric Light Association convention, where he doled out tasty tidbits from his range while extolling the virtues of electric cooking to curious utility executives. Hughes received a number of orders for sample ranges and, thus encouraged, opened his new Hughes Electric Heating Co. in a Chicago loft building.

Production was barely begun when a rush order arrived from Jack Roche, manager of a Montana power company. "It was my first big order," recalled Hughes later, "and it's easy enough to remember what time of year I received it, because I spent that Fourth of July of 1912 at a workbench getting those six ranges ready for shipment."

Typical 1930s kitchen as it appears in General Electric Carousel of Progress at Walt Disney World.

GE ads in the *Ladies Home Journal* (1920-28) explained benefits of electrical living.

A brass band was at the Billings railroad station when the shipment arrived. The enterprising Mr. Roche placed large ads inviting customers to "Have a cool, economical kitchen." Later that summer he joined a circus parade with camels carrying Hughes ranges and salesmen. Soon, Roche began ordering ranges in 200-lot carloads and offering a low three-cent-per-kilowatt-hour rate for electric cooking.

By 1915, Hughes' company was in the black. He continued to improve his product, adding white enamel doors and bright nickel trim. In selling his ranges, Hughes pointed out that while coal and wood stoves had to be black to hide their soot, electric units had no such byproducts and therefore would make the kitchen more pleasant. Hughes added a deepwell cooker and in 1918 introduced long-lasting wire heating elements in seamless tubes that were forerunners of today's Calrod® heating units.

Monitor Top & Chris Steenstrup

While Hughes and Richardson were building their businesses, the young General Electric Company was similarly moving into new consumer markets. In 1906, a crude electric cooking device was introduced. It consisted of a wooden table with elevated back equipped with retractable cords that plugged into individual electrified utensils used for grilling, frying or broiling. In 1911, a GE subsidiary, the Fort Wayne Electric Works, began producing a commercial refrigeration machine and, by 1917, GE took its first tentative steps toward development of a household electric refrigerator.

By 1918, all three companies were producing good products and had excellent reputations in the growing appliance industry. Each felt that they could better capitalize on these products and gain financial strength by joining together. So a merger was agreed upon, combining the heating device section of General Electric, the Hughes Electric Heating Company and the Hotpoint Electric Company. The new firm, the Edison Electric Appliance Company, soon offered a variety of Hotpoint® electric appliances and housewares, including radiant heaters, foot warmers, ranges, electric percolators, sewing machines and three types of hand irons. Since then, Hotpoint has been an integral part of the General Electric family.

By the mid-twenties, the familiar GE monogram that had appeared since 1899 was found on a growing number of electrical appliances. GE's "Initials of a Friend" were as well-known as Babe Ruth's home run total. Living standards and leisure time were growing, thanks to electricity, giving Americans more time to read bestsellers like "Elmer Gantry," watch Al Jolson's new talkie "The Jazz Singer," or do the fox trot in a dance marathon.

GE emphasizes major appliances

General Electric's strong move into the major appliance field is perhaps best symbolized by the famous Monitor Top refrigerator, manufactured between 1927 and 1937. The Monitor Top was the first hermetically-sealed household unit that the average person could afford. Its name derived from the round top-mounted compressor unit that sprouted, mushroom-like, from the storage cabinet. It was designed by an enterprising Danish toolmaker,

GE's Key Dates in History

1951—GE pioneers the junction-type semi-conductor and piezo-electric transformer. Construction begins on Appliance Park, Louisville, Kentucky. **1952**—New switchgear development laboratory dedicated in Philadelphia. GE develops autopilot for navy jet aircraft. **1953**—Lexan® polycarbonate resin announced. **1954**—GE designs J79—world's first jet engine to move aircraft twice the speed of sound. First industrial installation of numerical control for machine tools.

GE continues its heritage of leadership in consumer products with GE & Hotpoint® major appliances for kitchen and laundry. Innovations also include energy-efficient Weathertron® heat pump and expanded factory service.

Christian Steenstrup, who started life in America digging ditches in Bridgeport, Conn., and who eventually became supervisor of mechanical research at the GE Schenectady Works. The Monitor Top was a welcome relief from the ice box with its drip-pan ritual, and significantly better than earlier refrigerators that were merely modified ice boxes equipped with noisy external motors and pulleys. Today, over 50 years after their introduction, a goodly number of Monitor Tops are still in service.

Under the leadership of GE president Gerard Swope, the Company continued to broaden its consumer product lines through the 1930s. Among the new products introduced were the floor cleaner (1927), electric mixer and vacuum cleaner (1929), commercial clocks (1930), clothes washer (1930), ironer (1931), heat pump (1933), room air conditioner (1934), radios (1934), and food waste disposer—an industry first (1935). The Company began marketing the first GE dishwashers in 1932, a year in which consumer financing of appliances also began. The first GE wood cabinet portable radio was introduced in 1936 and the first FM radio in 1938.

Through the Depression years, the Company weathered a slower consumer market and adopted the advertising theme, "More Goods for More People at Less Cost." The emphasis was on value, and as GE's Swope observed, "If you are convinced that you are giving a better article and better service, you can easily convince your customers that that is true, and the public is perfectly willing and able to pay a fair price for a good article and good service."

GE toaster circa 1927

With World War II, consumer goods manufacturing halted as GE employees turned their talents from refrigerators to rockets, from ranges to radar. Cheering them on were patriotic radio broadcasts by Kate Smith and the homefront humor of Bob Hope and Jack Benny.

Postwar products

Postwar appliances resembled those of 1941, but soon new technology would create a dazzling new array of products to meet pent-up demand. Shoppers were reminded that "You Can Put Your Confidence in General Electric." In 1947, GE's first automatic clothes washer and two-door refrigerator-freezer were introduced, along with TV sets featuring bright aluminized picture tubes.

During the 1950s, the baby boom was followed by a housing boom, and young suburbanites flocked to retailers for appliances for their new homes. With GE production facilities strained, President Ralph Cordiner purchased 942 acres of farmland near Louisville, Kentucky, and announced a major new manufacturing complex to be called Appliance Park. Some called it "Cordiner's Folly." But its success would erase such labels. When completed in 1957, its six major manufacturing buildings and warehouse would provide four million square feet of space (since expanded), and the Park would be acknowledged as the world's largest and most efficient appliance plant.

Consumers were reminded that "Progress Is Our Most Important Product" in the mid-fifties. In major appliances, traditional white yielded to a bright

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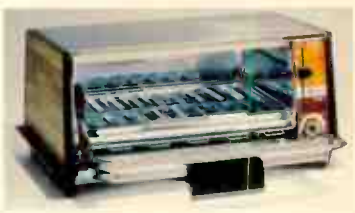
1955—GE announces creation of industrial-grade (Man-Made®) diamonds. USS Seawolf launched—powered by KAPL's first nuclear reactor for naval use. 1956—New Management Development Institute opens at Crotonville, New York. 1957—GE receives nation's first AEC atomic reactor license for operation of the 5-megawatt Vallecitos atomic power plant. First thyristor—a silicon-controlled rectifier—invented by the Company.

Historic housewares include, above, 1900 Hotpoint® iron, 1909 electric fan and 1932 portable GE sewing machine. Modern housewares span, clockwise from right, Light 'N Easy™ iron, Toast 'N Broil Toast-R-Oven™ toaster, mini AM-FM tuner cassette recorder, food processor, Super-Pro™ hair dryer, digital clock-radio, Home Sentry™ smoke alarm and timer.



rainbow of new colors—petal pink, canary yellow, cadet blue and more. New GE housewares included table-top broilers, skillets, Toast-R-Oven® toasters, spray, steam and dry irons, and portable hair dryers. A new five-transistor pocket radio weighing only 15 ounces was introduced. Hotpoint entered microwave cooking by unveiling an electronic oven in 1956.

During the space-age sixties, American lifestyles were altered by new forces—Beatlemania swept the Woodstock generation, astronauts made history in space, while Mantle and Maris did likewise on the ground. The new GE P-7® pyrolytic self-cleaning oven (1963) allowed a bit more time for a cinematic rendezvous with James Bond or the Sundance Kid. The electric slicing knife made its debut (1963), and a new line of youth electronics included trendy tape recorders and CB transceivers. A tiny electronic chip revolutionized the radio receiver industry, with GE designing a miniature rechargeable model the size of a cigarette pack. In TV, there were transistorized sets, lightweight portables and a new in-line picture tube.

In the seventies, change is still very much the name of the consumer products game. A new family of housewares includes food preparation products such as hamburger makers, deep fryers, drip coffeemakers, food processors, and the Peeling Wand® electric peeler. Also new are smoke alarms and CB radios. In television, an innovative new vertical interval reference (VIR) system allows broadcast controlled color TV reception. After a hundred years of "Progress for People," consumer products remain a significant segment of General Electric.

The outlook for consumer products

Costlier energy and new laws and regulations that will require appliances to be more efficient are among numerous changes anticipated in the future of GE consumer products. "Many such changes have already begun," observes Richard O. Donegan, vice president and group executive of the Major Appliance Business Group. "Many of the appliances we make today are significantly more efficient than those we were making just a few years ago.

"Electronics—a science that made a vast contribution during our Company's first century—is only beginning to show up in the products themselves. Few doubt that the pace will accelerate; some say that the electrical servants of today will be succeeded by electronic servants of the future.

"There appears to be little danger that any of the kinds of products we're currently making will become obsolete in the foreseeable future. No matter how the people who use our products may change, they will continue to wash and dry clothes, cook food—increasingly with microwave ovens—and seek the comfort of air conditioning. Millions will live in homes heated and cooled by heat pumps.

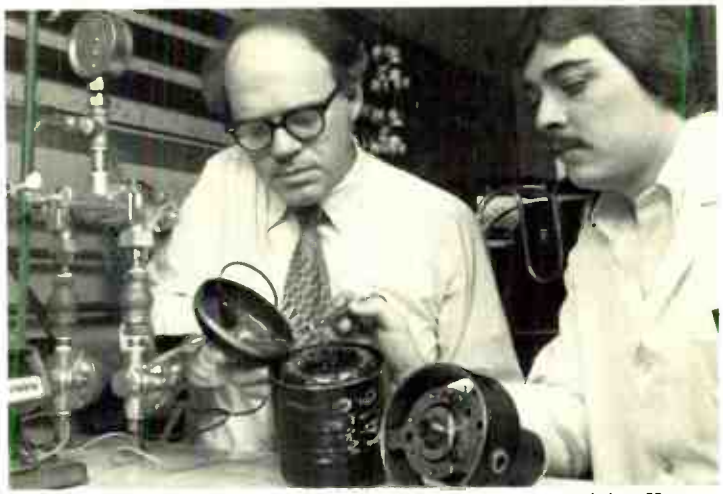
"The history of GE consumer products is a history of changes made to meet changing consumer needs. This record of innovation, product development and improvement supplies a solid foundation for General Electric's continuing leadership in providing a variety of outstanding products of quality, reliability and value."

Research shaping tomorrow's major appliances involves, left, noise measurements in anechoic room and, right, evaluation of new dishwasher tub coatings exposed to hot water vapor test.

PEOPLE

Energy 'Answer Man'

R&D Center's Jim Comly takes on readers' queries about saving energy—and money.



"Answer man" Dr. Jim Comly (left) confers with technician Ken Zarnoch on advanced air conditioner designs.

Readers of a regular "Energy Q&A" column in the *Christian Science Monitor* have been told on several occasions in recent months that for further information they should "get in touch with Dr. J. B. Comly" at General Electric's Research and Development Center in Schenectady. As a result, many energy questions have found their way to Jim Comly's desk.

Answering such queries is the kind of unofficial duty that Comly believes in taking on as a supplement to his official duties as manager of the Center's Energy Sciences Branch. "As we in the Center see it," he says, "this type of public exchange is a part of what is expected of R&D people—to make our special knowledge available and useful to others."

His energy consultant role began when the column's editor, Charles E. Dole, encountered a question requiring special technical expertise and asked the R&D Center for help. Comly agreed to supply the answer, beginning a collaboration that has generated frequent requests.

In the same spirit, Comly has twice testified on energy-related subjects before Congressional subcommittees, has given frequent talks to local professional societies, and has worked with architects on energy-conserving home designs.

What kind of information does Comly pass along? "Mostly, people are looking for straightforward, down-to-earth advice," he says. "So I emphasize basic things, telling questioners to button up their homes against heat leaks, to insulate properly, to use storm windows. We add pertinent facts to give perspective." For example, his calculations are that for every degree the home thermostat is lowered—and kept at this lower temperature—homeowners will save about 3% on their heating bills.

How much energy—and cost—can be saved by switching from incandescent to fluorescent lighting? "The savings from conversion to fluorescent lighting are a little tricky to assess," according to Comly. "Basically, a fluorescent makes light at least three times more efficiently than an incandescent lamp, but one fluorescent may replace more than one incandescent."

Comly recommends that Q&A readers consider GE's Bright Stik® fluorescent, an easily-installed 33-watt plug-in unit producing as much light as a 50-watt incandescent bulb and lasting five times as long.

Emphasis on the heat pump: Above all, R&D's Comly urges conservation-minded consumers to inform themselves about the all-electric heat pump. He thinks the heat pump is under-appreciated in comparison with other devices, such as solar collector systems. "In our view, heat pumps represent the best hope for an optimal solution to the residential heating problem. They are economical and energy-efficient, conserving scarce fuels better than other existing systems."

First costs, he acknowledges, are higher. "The installation cost will vary, particularly in a retrofit situation," he explains. "But with a heat pump you can save from 25% to 60% of electrical heating costs, if you install the heat pump correctly—and you get air conditioning, too." He suggests that readers check with a local builder or heat-pump dealer for facts.

Business students shouldn't fear mathematics: David Boulanger

Now playing at the University of Vermont: "Welcome Back, Boulanger"—the saga of a man who returns to his alma mater as an adjunct instructor and takes such a genuine interest in his students that they now visit him at home as late as 11 p.m. to discuss their homework. In the title role: Burlington's David G. Boulanger, Armament Systems Products Department.

Since 1970, by applying General Electric industrial experience and mathematical solutions to management problems, he has shown calculus-fearing business majors that "engineers aren't the only ones who can work with math to get answers." Boulanger teaches courses in operations research and management quantitative methods, and finds that his campus experience keeps him apprised of new information useful at work. "The Company provides me with good classroom case studies, and in turn, my dialogue with students has led to several graduates being recruited by GE."

The Company's professors

Use of one's professional knowledge doesn't have to stop at day's end. For many GE men and women, teaching keeps their creative juices flowing.

Dr. Donald Mack: helping GE engineers apply the basics

For 55 years, in a constant effort to teach young engineers to enlarge upon and apply their basic knowledge, General Electric has conducted The Advanced Course in Engineering for its employees —a program unique in American industry. Ten GE plants now offer such courses in the form of three-year academic curricula, which lead to master's degrees at various leading universities. Schenectady's Dr. Donald R. Mack, Professional Education Operation, administers this Company program across the country, and also manages the Schenectady-Pittsfield course section.

Shown here in yet another role, as adjunct professor at Rensselaer Polytechnic Institute, Dr. Mack proudly notes that "the GE program's graduates are generalists —engineers who are capable of solving engineering problems in a wide variety of fields."

Appliance retailers-to-be learn the ropes from Frank Archer

A modern dilemma: years ago, Ma and Pa open a small appliance store. Their skills grow along with the business. Then, with little or no management training, the son or daughter inherits a now-complex enterprise. Costly mistakes occur. What to do?

One answer is IRAM (Institute of Retail Appliance Management), developed in 1971 by GE in conjunction with Western Kentucky University. Its purpose: to teach financial management, sales, advertising and other subjects to young appliance retailers. Notes GE-Louisville retiree Frank W. Archer, an IRAM instructor: "The university's business school dean, Dr. William Jenkins, became so enthusiastic about the program that he opened his own store and became a franchised GE dealer—in addition to his teaching duties!"

Drs. Tiemann: linking physics hypotheses to social research

One sure thing—there's no lack of conversation in the home of Drs. Adrian R. and Jerome J. Tiemann. As husband Jerry describes it: "Adrian's the social scientist who interprets the answers I've reached as a physicist and statistician." Complicated? Not to their students. After their work at Schenectady's R&D Center, Adrian teaches at Union College as an adjunct sociology professor. Jerry teaches signal processing at Rensselaer Polytechnic Institute.

Researching public reaction to the use of various U.S. energy sources, Adrian points out: "People's perceptions change. In the 1880s, people were frightened of electricity—they believed the wires would come down and electrocute horses. Today, society can't live without electric power." Jerry tells his students: "In industry, you must solve problems as they come up—so you must become expert in whatever field your problem leads you to."

Dr. William Owens: president of Bridgeport Engineering Institute

Asked by his GE manager in 1947 to teach a physics course at Bridgeport Engineering Institute, Wire and Cable Business Department's Dr. William J. Owens (right) advanced to Dean of Engineering in 1957, Vice President - Provost in 1962 and finally President in 1970. During his three decades of involvement with the school, BEI grew from an organization that held its courses in high-school classrooms to a multicampus institution which has now received full regional accreditation.

Comments Dr. Owens: "Since our faculty comes from the business community, students quickly learn to blend academic principles with practical applications. Many case studies assigned to students are actually being tackled by their instructors at work."

William Hart looks at business in society

Recently, Fairfield's Sacred Heart University sought a very special person as adjunct professor of its new graduate course entitled "The Ethical Environment of Business." Requirements were stiff: a degree in theology, plus experience in *both* the ministry and the business world. Who could qualify? Corporate Public Relations Operation's William C. Hart (c)—shown discussing the course with the Rev. Philip S. O'Shea (r), a Sacred Heart professor, and another instructor.

Before joining GE 19 years ago, Hart served 16 years as a parish minister and Air Force chaplain. "Public affairs work requires high credibility, so business ethics have always been central to my GE job."

Dr. Sinclaire Scala: probing technology's leading edge

"Nowadays, so much of what one learns in engineering and science quickly becomes obsolete," remarks Re-entry and Environmental Systems Division's Dr. Sinclaire M. Scala. "One can't afford to stop learning or sharing information." Dr. Scala has lectured at university seminars nationwide and has taught at MIT, Temple University and New York University.

In 1974, at the behest of Otto Klima, VP and RESD general manager, Dr. Scala established a special GE training program to help employees acquire and update skills in rapidly advancing technologies. Last year, Pennsylvania's Department of Higher Education approved many of the courses for college credit. "It's so much easier to solve multidisciplinary problems if your people quickly understand each other, ask the right questions and get the right answers."

(continued next page)

Sims and Grimaldi: they've each taught for 20 years

On the campus of Utica's Mohawk Valley Community College, two Aircraft Equipment Division employees have been almost permanent fixtures.

For the past 20 years, George G. Sims (foreground) has served as a professor of transistor technology and electronic circuitry: "Explaining the material to others makes *you* understand it better. Preparing lectures helps *you* re-evaluate your own work." Observes Victor J. Grimaldi (background), who taught marketing courses at Mohawk Valley for 17 years and for the last three years at Utica College: "I earned my own undergraduate degree in the evening division so I know what college meant in terms of changing my life and perspective. It's a thrill to see my students graduate. In fact, some now work for GE."

Ruthe Justice: the traditional classroom approach isn't enough

Her guest lecture four years ago at City College of San Jose prompted the school to request the longer-term instructional talents of Sunnyvale's Ruthe A. Justice, Fast Breeder Reactor Products Department. Gaining her credentials as a college educator by receiving credit for her long working career in purchasing, she now is an instructor of a purchasing and materials management course.

Her teaching philosophy: "In today's fast-paced world of materials purchasing, the former clinical-classroom approach to learning doesn't suffice. With years of 'hands-on' experience in the subject, I try to give students a more practical, in-depth exposure to applications than someone who lacks business experience. Teaching others helps me reexamine my own work at GE—and hopefully, I can improve the caliber of new people coming into the field."

The many college titles of Dr. David Spalding

Before joining GE in 1951, Erie's Dr. David P. Spalding was head of Pennsylvania's St. Francis College chemistry department. In 1968, he briefly left GE to help found the new graduate center on Penn State University's Erie campus—serving from 1968 to 1974 as Assistant Graduate School Dean and Director of the Behrend College Graduate Center. During the same time interval, he also taught freshman chemistry at Erie's Gannon College, where he is still a member of the adjunct faculty.

As a chemist with Transportation Systems Business Division, Dr. Spalding asserts that "most chemistry instructors are good theoreticians—but don't always sense what's important in business. I emphasize some of the more mundane technical aspects so my students can actually be chemists."

The enviable teaching career of retiree Dr. Thomas Gordy

Applauding the academic accomplishments of Dr. Thomas D. Gordy when he retired last December from Pittsfield's Ordnance Systems Products Department, the local *GE News* described this engineer as Ordnance Systems' "original master teacher." From 1936, the year he joined GE, through 1977, Dr. Gordy had taught one or more mathematics courses every year at colleges, at work, and even at a girls' finishing school. The last 22 years had included professorial assignments in math and statistics at Union College, Williams College, Rensselaer Polytechnic Institute and the University of Massachusetts.

Now living in High Point, N.C., Dr. Gordy notes: "I'm firmly convinced that excellent work derives from the instructor's thorough advance preparation."

Drs. Giaever and Bean: a steady diet of research is too isolating

"Pure research is tremendously invigorating—but exchanges with other professors and students can avoid scientific duplication and trigger new ideas," remarks the R&D Center's Nobel-Prize-winning physicist Dr. Ivar Giaever (left), shown here at a recent University of Illinois seminar with R&D's Dr. Charles P. Bean (center). Continues Dr. Giaever: "Getting too absorbed in one's work can be self-defeating. Teaching straightens things out—you must thoroughly understand a subject to teach it."

Dr. Bean agrees: "As a teacher, I learn as much or more than the students. Classroom exchanges force you to reexamine your bases of understanding." Because of their research work as GE biophysicists, both men are in great demand as college lecturers and as adjunct professors at Rensselaer Polytechnic Institute.

Edward Belyea: adding his experience to textbooks

In Binghamton, Edward G. Belyea's talents are courted by three different organizations: Aerospace Controls and Electrical Systems Department, the city's Planning Commission and Broome Community College. What is Belyea's claim to fame? His expertise regarding human resources planning, budgeting and economic forecasting.

Whether he stands before undergraduates in the classroom as an economics professor, before his community as a zoning adviser, or at General Electric as a manufacturing administration specialist, Belyea makes sure that his past experience "provides the 'common denominator' for the advice that I give." To date, Belyea's boss has received two Broome Community College letters commending Belyea for championing the practical aspects of business administration with his students.

Organization Changes

CORPORATE
Standley H. Hoch, Staff Executive—Strategic Planning Integration Staff

CONSUMER PRODUCTS AND SERVICES SECTOR
Roger W. Schipke, General Manager—Dishwasher & Disposal Product Management Department

INDUSTRIAL PRODUCTS AND COMPONENTS SECTOR
Larry J. Bucklin, General Manager—Small AC Motor Department
William R. Fenoglio, General Manager—Specialty Motor Department

INTERNATIONAL SECTOR
Frank D. Kittredge, General Manager—Latin American Business Development Division
Lindsay T. Mac Alister, President and General Manager—Australian General Electric Limited

TECHNICAL SYSTEMS AND MATERIALS SECTOR
Donald S. Bates elected a vice president
Gregory J. Liemandt, General Manager—Battery Business Department
Russell L. Noll, Jr., General Manager—Special Health Programs Department
Ladislaus W. Warzecha, General Manager—Space Systems Operations
James J. Costello, Staff Executive—Technical Systems and Materials Finance Operation
Charles A. Huebner, Staff Executive—Technical Systems and Materials Strategic Planning and Development Operation

Visiting the Lamp Gallery: student Nancy McCoy (l), Lighting Institute manager James Jensen (c) and the Institute's Earl Print, senior program planner.

PRODUCTS

Lessons in lighting

By Donna R. Carpenter

A Nela Park interior design course provides tips on better home lighting.

How can we who work for General Electric make better use of light in our homes and our own lives?

To find fresh answers, this reporter recently participated, along with 38 other lighting novices, in a Nela Park Lighting Conference for Residential Interior Designers. Here are some of the main points picked up in the three-day seminar:

- Learn how to use both incandescent and fluorescent lighting more effectively.
- Make lighting a part of basic planning rather than an afterthought.
- Put greater flexibility into lighting patterns.
- Analyze "visual task" areas in the home.

As Nancy E. Christensen, Residential Lighting Specialist at the Lighting Business Group's Nela Park headquarters, pointed out to the designer-students, lighting is one of the most important tools for creating and shaping space in the home. It can add or subtract from the perceived height, length or width of a room; it can change the color of rugs, furnishings and walls; it can create decorative effects. Despite these advantages, 80% of American homes remain inadequately illuminated, and there is a widespread lack of understanding of what lighting can do.

"The psychology of home lighting is difficult to sell," Christensen said. "After the carpeting and furniture have been put into a room, lighting is usually added as an afterthought. Good lighting should be unobtrusive—and one of the best ways to achieve this result is to build the lighting into the original design plan. Lighting

should also be an integral part of any redecorating project."

The course included a thorough evaluation of both incandescent and fluorescent light—the two most commonly used residential lighting sources. Incandescent, the more widely used—though less energy-efficient—source, is prized for its flexibility, true rendition of color, and ability to emphasize the texture of wall surfaces such as brick and stone. At the 1939 World's Fair, GE introduced the first practical fluorescent lighting, which accounts today for three-quarters of all lighting (including commercial and industrial) installations in the United States—but is still not being used effectively often enough in *home* lighting plans.

Fluorescent tubes last a dozen times longer than comparable incandescent bulbs, are three times as efficient at less than half the operating cost, and because of their shape will fit effectively in hard-to-light places like cabinets or under shelf areas. Homeowners, however, have objected in the past to the need for bulky ballasts with fluorescent installations and to the less-than-ideal way that people and furnishings appear under fluorescent light.

The use of deluxe warm white or deluxe cool white fluorescents will take care of the color-rendition problem and, for many residential situations, the installation problem has been solved by General Electric's Bright Stik® fluorescent, a self-ballasted plug-in unit that needs no extra fixture or wiring.

Special attention at the seminar was directed to the need for flexibility in lighting for the home. In a family room, for example, hobbies may be pursued at a desk; children will play on the floor; books will be read in an easy chair; and TV may be watched from the sofa. Use of dimmers, three-way lights and a few well-chosen fixtures provides a variety of lighting levels to meet all these family needs. Cornice or valance lighting and the judicious use of spotlights to highlight paintings, plants or art objects can dramatically change the mood of the same room for special entertaining.

Perhaps the most neglected areas in the home—from the standpoint of adequate lighting—are such "visual task" locations as the kitchen and bathroom. Because much kitchen work is done after nightfall, the area needs both a good overhead source of illumination and adequate "local" lighting—near the sink, the range and the counter areas where specific tasks are performed.

And the bathroom requires, in addition to an overhead light, illumination at the top and both sides of the mirror, for grooming purposes.

Residential lighting design, we also learned, does not stop at the outside walls of a house. Landscape and patio lighting, utilizing efficient mercury vapor lamps, extends family living and entertaining to the out-of-doors. Safety and security lighting for walkways and entrances, often incorporating a timing device to turn lights on automatically at night, is becoming increasingly important to homeowners.

The first Edison electric light bulb pushed back the darkness. Using today's wide variety of residential light sources properly will add convenience, visual comfort, beauty and flexibility of living to every area of the home.

As James H. Jensen, manager of the Lighting Institute, put it: "The key function of lighting is for seeing, and as the only control we have over our ability to see, it must be utilized to the fullest extent possible."

Attendees at Nela Park's interior-design lighting course in April try out lighting techniques demonstrated during Residential Lighting Center workshops. Both designers and representatives from utilities and universities attended the three-day seminar.

Utah's Navajo Mine

It offers a leading example of the possibilities and problems of meeting U.S. coal objectives.

Giant Navajo Mine dragline emphasizes coal's ability to meet U.S. energy

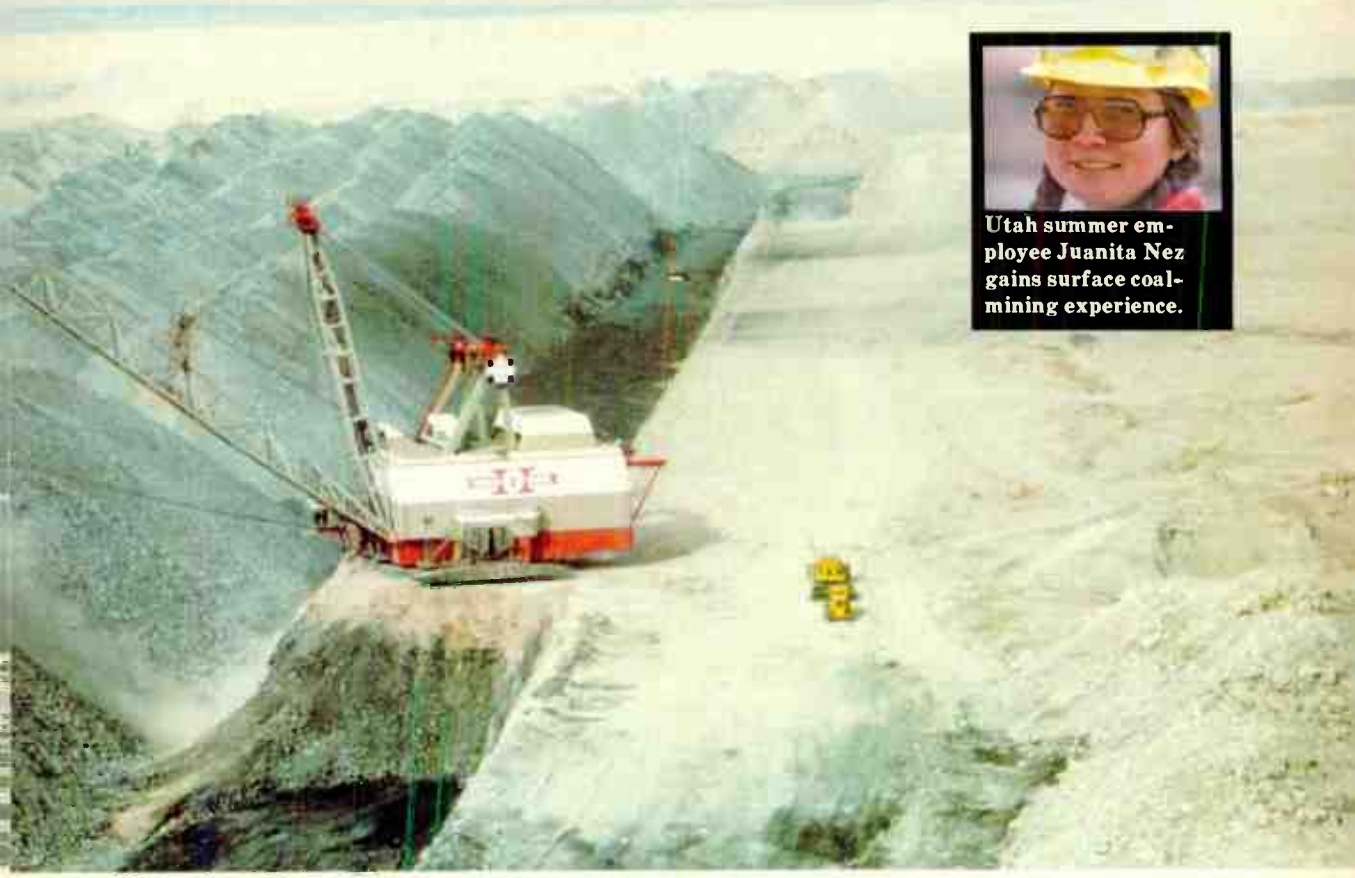
President Carter's National Energy Plan recognizes the importance of a major shift away from imported oil to domestic coal and uranium. For example, his plan calls for an unprecedented increase of more than 75% over the 673 million tons of coal mined last year—boosting output to 1.2 billion tons a year by 1985.

Analysts point out, though, that to achieve such a massive use of coal will require turning around long-established trends in investment and in coal-mining productivity, not to mention an enormous upgrading of rail transport. Additional doubts are raised by last winter's 109-day coal strike and new regulatory and environmental restrictions on coal mining and use.

In an effort to separate fact from fiction regarding future U.S. coal production, the *Monogram* traveled to the Navajo Indian Reservation in northwestern New Mexico to take a look at one of the nation's largest and most highly mechanized steam coal surface mines, operated by General Electric's natural resources affiliate, Utah International Inc., 20 miles west of Farmington.

After coal is fractured and blasted, front-end loaders (above) lift coal into giant bottom dump trucks for delivery to coal preparation facility (right).

The scale of man to Nature and to his machinery out here



Utah summer employee Juanita Nez gains surface coal-mining experience.

needs, while underscoring the large capital costs required.

spellbinds. Standing outside Utah International's Navajo Mine headquarters, one can see Arizona buttes, Utah natural monuments and the Colorado Rockies—the latter more than 90 miles away. The mammoth Navajo Mine draglines—which remove the shale and sandstone "overburden" from above coal seams—weigh nearly 4.5 million pounds each and can reach the length of a football field. Each bucketful of material the dragline scoops up could fill the average American living room.

If all the estimated 1.1 billion tons of coal on the 31,400 acres of land currently leased from the Navajo Nation by Utah

(continued next page)

Reclamation begins with grading of stripmining's "spoil" piles. Seeds are collected, planted and irrigated to produce healthy revegetation (above).

Energy from the Navajo Mine's coal travels via transmission lines throughout the Southwest.

were loaded onto railroad cars, the load would require a train at least 50,000 miles long, which is roughly twice the earth's circumference.

The large, crescent-shaped coal basin, on part of which the Navajo Mine is located, encompasses an area about the size of New Jersey. The mine was dedicated in 1963 and now delivers approximately 7 million tons of coal per year, under fuel supply agreements, to the nearby 2,085-megawatt Four Corners Generating Station, owned by six utilities and operated by Arizona Public Service Company.

Electric power produced on this New Mexico high desert travels via extra-high-voltage transmission lines to as far away as Los Angeles, Tucson, Phoenix, Albuquerque and El Paso.

Navajo Mine is helping the 160,000 Navajos who still live on the reservation diversify their income sources. In 1977, for the first time, more Navajos made their living through wages than through livestock grazing. Some 73% of all the mine's employees are Navajo.

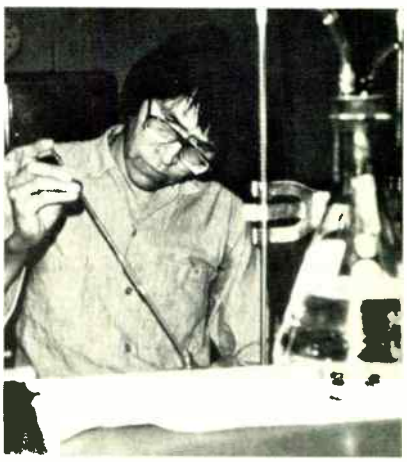
A *Monogram* interview with Navajo Mine manager John T. Atkins quickly telescopes the large role that Navajo Mine continues to play in meeting America's behemoth energy needs. "The U.S. has at least 434 billion tons of coal that are economically recoverable using existing technology," states Atkins. "Recoverable U.S. coal reserves are some 660 times the volume of coal production last year. Despite huge reserves, however, government projections of the speed with which this nation's reserves can be mined, transported and put to use remain in question. President Carter's coal growth scenario of 1.2 billion tons of coal by 1985 cannot be achieved without certain policy changes."

For substantiation, Atkins cites present conflicting, overlapping Federal and state regulatory requirements that must be met in securing permits to open a new mine. A second area of needed policy attention, he feels: assuring long-term commitments to coal mining's infrastructure. Notes Atkins: "Land use is becoming restricted; railroads are reluctant to commit huge amounts of capital to upgrade aging roadbeds because of unresolved environmental restrictions on mining; and a considerable proportion of U.S. coal reserves is located far from needed water."

Continues Atkins: "It's difficult to get new mining operations underway quickly. The 1977 Surface Mining Control and Reclamation Act is the latest example in a trend toward increased government mining regulation. While Utah's mines will be affected financially to different degrees by the legislation, many provisions of the new law are irrelevant for Western surface mine operations."

Atkins faults the new law for not recognizing the environmental advantages of low-sulfur Western coal. "The Environmental Protection Agency requires that electric power plants install the best coal-smoke-cleansing 'scrubbers' on Western coal as well, and this has reduced Eastern demand for Western coal."

Strongly optimistic about coal's future if regulatory concerns are resolved, Atkins speaks with great enthusiasm of the success of the GE subsidiary's three steam coal operations—Navajo Mine, San Juan Mine located eight miles north of Navajo, and Trapper Mine near Craig, Colorado.



Among variety of mine activities: field engineer Leonard Benally (left) surveys "overburden" removal area. William Skeet explains revegetation efforts to resident Mary Brewster Begay.

In the case of Navajo, Utah in 1957 signed the first large coal-mining lease issued by the Navajo Nation, and in 1960 signed a 35-year coal supply agreement with Arizona Public Service for the Four Corners Power Plant—one of this country's first "mine/mouth" generating stations. The fuel agreement includes a 15-year renewal option and GE, incidentally, furnished all five turbine-generator sets for the plant.

When viewed firsthand, the gigantean size of the Navajo mining operation is breathtaking. Huge scrapers remove the topsoil and stockpile it for later use. Next the rock, or overburden, covering the coal is drilled and blasted with "ANFO"—a mixture of ammonium nitrate, a fertilizer product, and fuel oil. After draglines remove the shattered rock, the coal is blasted and loaded into 120-ton coal-hauling trucks with the help of front-end loaders.

The term "stripmining" comes from the strips that the dragline creates as it removes the surface rock. These strips, about 100 feet wide, vary in length from one to three miles long. After one strip is removed, the dragline begins a second strip adjacent to it, and empties the second strip's overburden into the first strip. As mining progresses, the conical-shaped piles of overburden are leveled by large graders and the land is reclaimed.

Once dumped in giant trucks —which tower three times taller than the average human —the coal either goes directly to Utah's coal crushing and blending plant adjacent to the Four Corners station, or is hauled to an intermediate railroad stockpile from which the mine's two hopper-car trains deliver the coal by rail.

Up to 40,000 tons of coal per day are received at the preparation plant, where the coal is sampled and blended to a uniform grade of 8,750 BTUs-per-pound—the grade necessary for the efficient operation of the nearby plant.

Environmental engineer John Blueyes (left) performs soil analysis. Bert Wisner, industrial hygiene supervisor, conducts mine tour for Ft. Lewis (Colo.) College science students.

Utah's emphasis on land reclamation is receiving favorable recognition in the national media. CBS national correspondent Terry Drinkwater said in a recent TV story aired on the morning edition of CBS News: "When the coal companies started digging the giant open pits, Indians and environmentalists objected. The land, they said, could not be restored after the coal—the riches—were taken away for the white man's use in the cities. But the efforts of Utah International and time have proved the critics wrong."

As early as 1966 Utah was involved in a three-phase program to revegetate mined areas. The program's purpose? To develop land reclamation methods which would minimize water and wind erosion; investigate different forms of desert revegetation; and study various cost-effective reclamation procedures.

Touring this arid desert region, one immediately notices the harsh condition of the terrain. Sparse grasses and tumbleweed dot the landscape. Much of the land is barren, with large areas of badlands cut by dry washes and arroyos with sandstone escarpments. Topsoil is thin or non-existent. A long history of severe overgrazing by sheep has eliminated many of the more palatable species of plants, and the area now supports an average of only one sheep for every 100 acres.

Compare the natural condition of this land with Navajo Mine's 1,700 acres of revegetated terrain and differences are at once striking. Such common desert plants as fourwing saltbush, Indian ricegrass, Mormon tea, sand dropseed, galleta grass and alkali sacaton flourish on the reclaimed lands.

An environmental study completed in May by the World Wildlife Fund found that small-animal populations on the mine's restored lands far exceeded those on neighboring terrain.

Observes Navajo Mine's Sterling Grogan, senior environmental engineer: "Time will be the real judge of Utah's revegetation efforts. Many years must pass before we can be sure of success, but results to date are positive. We believe that continued research and careful planning will assure successful reclamation."

Since it's normal for two-thirds of the seeded plants to die when irrigation is removed after the second growing season, only the hardiest plants survive. But enough of the six tons of seeds hand-picked and planted annually *do germinate*

(continued next page)

and thrive that the revegetated areas apparently will soon resemble the neighboring terrain.

In 1977, 399 acres of mine land were disturbed by mining, while 564 acres were revegetated at a cost of $1.5 million. Utah plans to revegetate the Navajo leasehold at the rate of 540 acres a year, while mining at a rate of 300 acres a year. In this way, Navajo Mine's revegetation program will catch up with its mining operation by 1985, when mining and reclamation will progress at the same rate.

Ultimately, the entire strip-mined area will be restored to a vegetative condition *equivalent to or better than* the condition before mining began.

The 1977 Award of Honor for Safety, sponsored by the New Mexico Mining Association and the State Inspector of Mines, recently went to Navajo Mine as Operator of the Year of a Large Surface Operation. This award honors the surface mine with the fewest number of days lost each year due to work-related injuries per million man-hours worked.

In 1976, the National Safety Council presented its Award of Merit to Navajo Mine, again for its noteworthy safety performance.

John Atkins is a man "obsessed" with providing a safe work environment for his mine's 660 employees. "Not only are accidents costly to companies and to families of the injured—let alone the harm done to the employee—but they heavily impact on the community's livelihood."

Utah International involvement with the local Navajo community is a natural extension of its presence on the Navajo Indian Reservation. Atkins explains that "we *must* be responsive to the needs and culture of our Indian employees for, in a very real sense, we operate in a foreign land. We continually urge our non-Indian employees to understand the Navajo's point of view, in the hope that they, in turn, will understand the company and the free enterprise system."

To spawn increased interest in mining-related disciplines, a Navajo Mine electrical and mechanical apprentice program was begun in 1973. Twelve Navajo employees have since graduated from the rigorous four-year technical course; 18 Navajo employees are now enrolled.

Among the Navajo Mine's more unusual community projects: Utah graders and bulldozers are loaned out periodically for grading local roads and for building stock ponds. Since 1968, such mine employees as personnel manager Allen King and mine engineer Leonard Raymond have led Utah efforts to improve the Navajo Methodist Mission School's sports facilities—including the addition of a football field and bleachers, a softball field and backstop, and a refurbished track.

Government regulatory frustrations notwithstanding, John Atkins predicts an exceptionally bright future for the Navajo Mine operation. "Our relations with the Navajo Nation remain fine, business is healthy, and the caliber of our people continues to provide the source of our greatest strength."

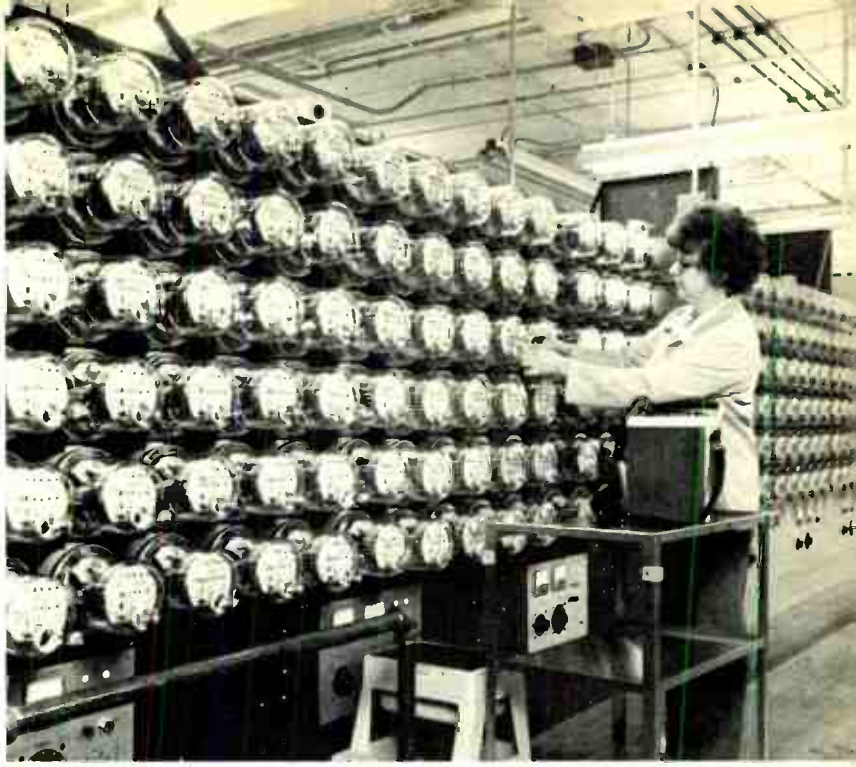
He concludes: "We remain optimistic that this country's massive future energy needs can be met—but we're impatient to see America's most abundant natural resource better and more fully utilized."

Work hard—play hard. Last summer's Navajo Mine Safety Picnic was attended by 2,000 Utah employees and family members.

TECHNOLOGY

Time-of-day meters

GE is ready to meet industry's requests for these cost-saving products.



Busy producing GE time-of-day meters: Somersworth tester Anita Doherty.

What budget-conscious and energy-minded homeowner wouldn't like more control over electricity bills? It's happening, with a philosophy that is gaining steady acceptance by utilities—and creating a growing demand for a General Electric product of the Meter Business Department in Somersworth, N.H.

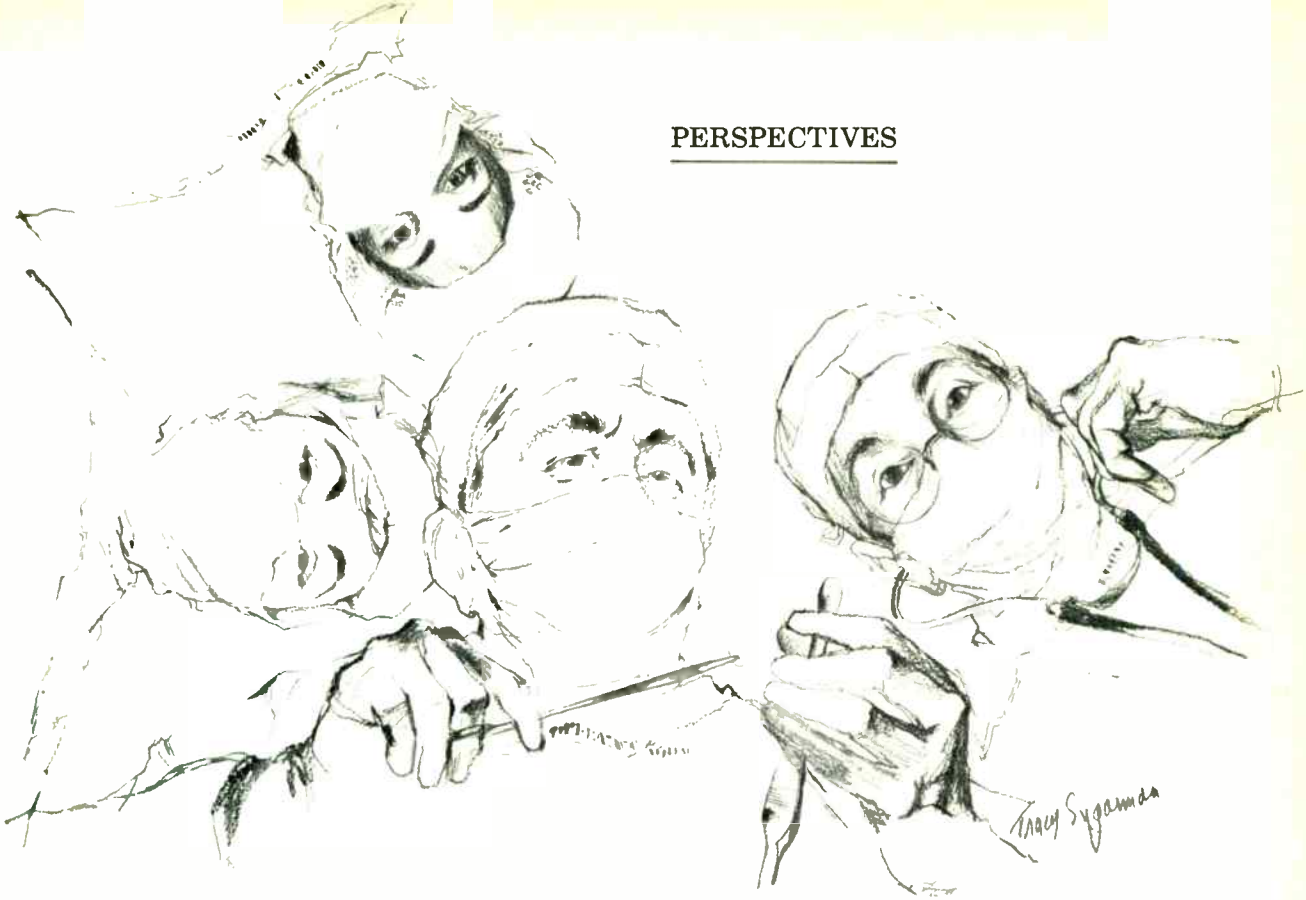
Numerous utility companies now are installing the Company's IR-70 programmable time-of-day (t-o-d) watthour meters to provide a precise base for price-structure revision. Applied in a concept called electric load-management, t-o-d meters permit time-differentiated pricing, a technique that generally means higher prices for peak electricity usage and lower relative prices for off-peak usage. They help create a fair pricing formula and effective power conservation for utility companies. And growing numbers of residential customers—in knowing when to alter their electricity usage patterns by means of t-o-d meter-operated "alert" lights that signal when a peak rate is in effect—are endorsing the idea.

GE is the only manufacturer currently in production on a time-of-day meter. Featuring a programmable and reprogrammable multirate register with three independent sets of dials, the product is unique. Orders have steadily increased since its introduction about a year ago.

What's behind all this? For some time, electric utilities have struggled with a capital crunch and escalating fuel costs. Today, additional pressure is being placed on them by utility commissions, Federal and local governments, and consumer price groups to restructure their rates. Installation of t-o-d meters in homes was seen as a good starting point for cost and energy control, but exhaustive evaluations first had to be made by state commissions.

By the end of 1977, various public utility commissions almost simultaneously stamped their approval on widespread use of t-o-d pricing. Wisconsin, Connecticut, Ohio, Massachusetts and South Dakota, for example, all have ordered the option of time-of-day rates for residential customers be placed into effect this year. To meet the expected demand for these new products, the Meter Business Department is augmenting production capability in its Somersworth plant, including a complete new manufacturing area for building the electronically programmable time-of-day meter register.

Concludes Meter Business Department marketing manager William S. Smith: "There are approximately 75 million residential-class customers currently served by U.S. utilities. We estimate at least 20% of these customers may go on t-o-d rates over the next ten years. That's a potential of 15 million installations between 1979 and 1989."



Tackling soaring health care costs

How do they affect GE people? Through pilot projects, the Company is exploring new ways to obtain quality care—while keeping hospital and other costs in line.

Private health insurance protection, financed largely by employers such as General Electric, has become a standard item of an employee's benefits package. GE has always taken pride in its benefits program which has provided comprehensive protection against medical expenses.

But health care costs have escalated so rapidly in recent years that the Company, along with other employers, labor unions and government leaders, is intently searching for new ways to bring such costs into line.

The average American's yearly expenditure for health care has more than doubled since 1970—and now stands at about $600 per person, or $2,400 for a family of four. Our country's health care bill—$160 billion in 1977—now consumes about 9% of our Gross National Product, compared to 7.2% in 1970. With health expenditures forecasted to continue to rise by 15% annually, *in five years the country will spend twice the current $160 billion.*

Observes Fairfield's C. Stephen Tsorvas, Consultant—GE Insurance Plans: "The Company's health care costs increased by 80% from 1971 to 1977. Last year, health care expenditures under the GE Comprehensive Plan were more than $230 million, and can easily double in the next five years if the expected rate of escalation is not reduced."

Notes Fairfield's Sam Dolfi, Manager—Employee Benefits: "This trend is alarming, and we are examining any possibilities which may help to deliver medical care in a more efficient manner, and are encouraging more cost-effective use of health care facilities and services."

Skyrocketing health care costs have precipitated a national debate. Escalating charges are

troubling everyone—the public, government, insurance companies, business, consumer activists and the medical profession itself.

These costs cannot be attributed to any one reason. But certain key characteristics stand out, including the public's frequent over-reliance on medical care to solve virtually all health problems. Among other causes:

- After-the-fact reimbursement practices don't encourage cost-effective health care, and actually encourage over-use and waste.
- Hospital costs are rising at a faster rate than other medical costs, and much faster than most other components of the Consumer Price Index.
- Consumer awareness of health care costs is now diminished because of third-party reimbursement and insurance coverage.

It's obvious that there is a missing ingredient in this nation's health care system. With 92% of the population covered by some form of third-party payment, price is simply no longer considered by the doctor, patient and hospital. The system is designed to absorb all the dollars made available to it.

Comments Sam Dolfi: "Soaring health care costs are a matter of national concern. They represent an increasing burden on all segments of the economy and contribute to the inflationary spiral. It's essential that employers become involved along with others in developing solutions which will improve the quality and cost-effectiveness of health care over the next decade."

Two GE pilot programs to help achieve more cost-effective use of health care services—and to help employees become better-informed health care consumers—are currently underway in Milwaukee and Ft. Wayne.

To reduce unnecessary surgery, GE-Milwaukee last October began encouraging its employees to seek second opinions when faced with non-emergency surgery. As a special feature of this Voluntary Surgical Opinion Program, all second-opinion costs are being reimbursed *in full*. If a second surgeon disagrees with the first as to the need for surgery, then the opinion of a third surgeon is secured in the same manner. This project will be evaluated over the next several years.

A second GE pilot program, designed to reduce hospital costs, was introduced several years ago in Ft. Wayne. Briefly, local employees are encouraged to have comparatively simple operations performed at local ambulatory, one-day surgical centers. Such surgery can provide equivalent health service while lowering overall costs from 20% to 50%, and can spare the trauma of overnight hospital stays and family disruptions. This project, too, will be monitored for several more years.

A third activity to curb health care costs—the monitoring of claims by insurance carriers to assure "reasonable and customary" fees—has continued since 1955, when GE Comprehensive medical coverage was introduced. Reimbursing on a "reasonable and customary" basis is a protection for GE employees since, under the GE Plan, employees pay 15% of surgical charges exceeding $500 in a calendar year as well as 15% of non-surgical medical charges. The increased cost level of these "reasonable and customary" fees has been largely absorbed by the Company.

In addition to these programs, GE also regularly evaluates insurance carriers involved in GE's health care coverage, and has made periodic changes in the interest of cost-effectiveness.

Working to develop remedies for excessive U.S. health costs, General Electric became a charter member of, and continues to participate in, such groups as the Washington Business Group on Health, the U.S. Chamber of Commerce's Special Committee on the Nation's Health Care Needs, and The Labor/Management Group—the latter a private, informal group of national labor leaders and business executives including GE Chairman Jones.

Also, GE works with such employer organizations as The National Association of Manufacturers and the Aerospace Industries Association on health care issues.

As an important part of its cost-containment activity, the Company also has urged its managers to become knowledgeable about health-care delivery systems and to participate in local health-planning activities. In a number of Company localities, GE managers and officers have become members of employers' groups studying health care costs and developing cost-containment programs.

As a member of The Labor/Management Group, General Electric recently participated in a hallmark project, completed in May, which identified in 11 position papers the areas where health care costs could be reduced and quality of care improved.

Comments Steve Tsorvas: "Since employers now pay a major share of health care costs, they have a crucial stake in the development of national health policy, and are realizing in growing numbers the need to participate along with other segments of society in the search for practical answers."

GENERAL ELECTRIC
General Electric Company
Fairfield, Connecticut 06431

Simulated TV Picture

THE BIG PICTURE. Featuring a color picture three times the size of today's standard 25-inch console, General Electric's new Widescreen 1000 Home Television Theater was unveiled April 10 in New York. Designed specifically for home use, this flat-screened color TV set has a 1,003-square-inch picture, but a depth no greater than that of a traditional GE 25-inch color console.

As the TV industry's first one-piece widescreen unit offered by a major TV manufacturer, the Widescreen 1000 model features VIR broadcast controlled color, random access remote electronic tuning and dual dynapower speakers. With rear projection design, reflected light on the screen is practically nonexistent.

As a companion to the huge color TV receiver, the Company also has introduced a new VHS (Video Home System) video cassette recorder, which features a built-in timer, its own tuner and a selector which allows two- or four-hour recording.

Both units are now in production, and will be available this summer.