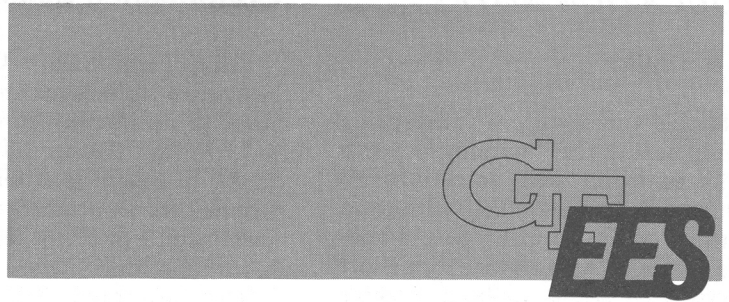


STATION NEWS



ENGINEERING EXPERIMENT STATION • GEORGIA TECH

VOLUME 5 NUMBER 6

JULY, 1976



GTRI Board member R. K. Whitehead (left) along with Georgia Tech President J. M. Pettit (center) talk over new improvements in the Alpha Galvanizing, Inc., company with the firm's president, Roy W. Smoak.

Savannah Office Hosts GTRI and Area Development Staff

A joint meeting was held June 5-8 in Savannah by the Georgia Tech Research Institute (GTRI) and Area Development Division, EDL staff members from Atlanta and surrounding field offices.

ADD members attending included: **B. E. James**, chief of area field offices; **L. R. Edens**, Savannah; **R. L. Hughey**, Augusta; **W. N. Craig**, Macon; **W. C. Darley**, Rome; **S. L. Dudley**, Douglas; **W. T. Studstill**, Albany; and **H. W. Hodges**, Carrollton.

Members of GTRI in attendance were: **Dr. V. D. Crawford**; **Dr. J. M. Pettit**; **Dr. T. E. Stelson**; **Dr. J. E. Boyd**; **R. K. Whitehead**; **G. P. Robinson**; **R. H. Ferst**; **W. B. Harrison**; **C. M. Kennedy III**; **M. W. Long**; **G. M. Shatto**; **W. H. Borchert**; **A. P. Sheppard** and **E. E. Renfro**.

Following the GTRI board meet-

ing, the EES Savannah area office hosted a presentation followed by a tour of two industrial firms. Both firms, Alpha Galvanizing, Inc., and Rotary Mower/Duramatic Products, Inc., have received EDL technical assistance from the field office staff.

Alpha Galvanizing requested assistance in selecting a new plant site, pollution control, capital and financial concerns and market potential. Rotary Mower, following a lengthy feasibility study prepared by the Savannah office, is now realizing a steady profit from the EES/EDL recommendations to purchase their own equipment, construct a new facility and begin manufacturing their own mower blades and components. The total manufacturing employment within the county has already increased by 20 percent.

Each of the seven EES/EDL field offices are working daily with industries and organizations seeking technical expertise and recommendations for improving their operation.

EES Team Contributes to Solar Energy History

Solar energy history was made last week by a team of scientists from the U.S. and France at the CNRS 1000 kilowatt Solar Furnace in Odeillo-Font Remeu, France.

The history-making event was a new solar boiler which will be used to develop equipment and techniques for producing commercial quantities of electric power using solar radiation.

The design, construction and testing of the solar boiler was a joint effort by the Solar Energy and Materials Technology Division (SEMTD) of the EES; Martin Marietta Corporation, Denver Division; Sandia Corporation of Albuquerque and the French National Center for Scientific Research (CNRS).

Heading the SEMTD/EES participation was **Nick Poulos** assisted by **Dr's S.H. Bomar, Jr.**, and **C.T. Brown**, principal investigators of the Tech program. Also, **J.D. Walton, Jr.**, Technical Manager of Solar Energy Programs of SEMTD, holds the distinction of being the first and, at present, the only foreign member of the board of directors of the Solar Energy Laboratory at CNRS.

The boiler is designed and looks like a cube (10-feet on each side) with an output of 1 megawatt of thermal energy with a steam flow rate of about 2,600-pounds per hour. The steam output is equivalent to 300 kilowatts of electrical energy.

The program is sponsored by the Energy Research and Development Administration (ERDA).

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CONTINUING EDUCATION NOTES

R. E. Collier

People involved in advertising firmly believe that "nothing happens until someone sells something to someone." In continuing education nothing much happens until someone comes up with an idea for a short course that seems to be a saleable item; prepares it for delivery and advertises to the public. If one understands procedures for developing and marketing short courses, the chances of success are measurably increased.

The Department of Continuing Education administers all short courses, for which each attendee pays a fee. Fee-type short courses initiated within EES are handled like research projects; i.e., time spent on such a course will be charged on time sheets to a "C" type project, which is a laboratory account set up to reimburse for these services. Procedures for establishing a continuing education course are quite simple.

- First, the academic administrator who will head the course prepares background material that includes:
 - a. Course objectives (typically two paragraphs) — a statement of what should be learned
 - b. Course outline (1½ pages typed) — material for advertising brochures
 - c. Statement regarding the audience, for which the course is designed, as well as prerequisites, etc.
- The prospective academic administrator reviews plans including personnel, financial needs and schedules with the division chief and Laboratory Director. The EES Representative on the Continuing Education Advisory board is available to furnish assistance (Call Bob Collier at 3820).
- The academic administrator reviews plans with the Director of Continuing Education and final planning is undertaken. This should be accomplished about six months prior to the scheduled date of the course.

Financial profits and risks are shared by the research unit and Continuing Education.

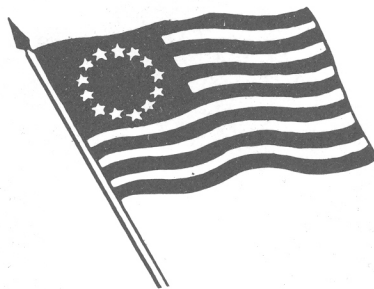
★ ★ ★ ★ ★ ★ ★ ★

Long Term Salary Continuance Insurance

Long Term Salary Continuance Insurance is available on an optional basis to all employees who participate in the Group Life Insurance Plan. It covers disability resulting from either an accident or an illness sustained on or off the job and lasting more than ninety days.

This insurance will provide an income of 60% of your "monthly salary" subject to a maximum benefit of \$1,500. This will be reduced by Workman's Compensation, Teachers Retirement, or Social Security benefits. The minimum payment in any case is \$75.

The cost of this program is 70¢ per \$100 of monthly salary.



Systems and Techniques Lab

During June **Sam Alford**, **Bill Dittman**, **Neal Alexander**, and **David Keith** visited MICOM in Huntsville, Alabama, for project discussions, — **Charlie Hilbers** made a contract development visit to Eglin AFB, — **Bob Somers** participated in field exercises at Boca Raton, — and **Henry Cotten** and **Al Byers** were involved in field exercises at Aberdeen Proving Grounds, Maryland.

R.A. Plumlee attended a Management for Engineers short course June 14-18.

Several new employees have recently joined the staff of the Systems Development Division of STL. These include **Tim Smith** as research engineer, **Ralph Ragan** and **Jerry Burge** as technicians, and **Ms. Deborah Frye** as division secretary. Also during the same period, **Bud Bauman**, who has been a draftsman with EES for 10 years, retired, and **Ms. Mary Herod** resigned as secretary.

Services:

Tom Jones, head of the Office of Facilities Management recently attended the Inner Service Committee on Technical Facilities held at Florida State University in Tallahassee.

Attendance included representatives from government and educational institutions who met to share equipment and facility knowledge within each of the member organizations and to help solve facility problems.

Georgia Tech benefitted from the last meeting as ERDA at Oak Ridge Tennessee, contributed 15,000 pounds of lead shielding to a Tech research project.

Tom, secretary of the organization for the past three years, said the members have responded overwhelmingly in helping solve problems within each of the facilities.

There have been several additions and changes in personnel in the Technical Support Department:

Jackie Sutton is the new receptionist in the Baker Building under the supervision of **Tom Jones**.

Gerald Davis is a new machinist in Mechanical Services.

The Reports & Procedures Office has added several people to its staff: **Cathy Penn**, **Alberta Wu**, and **Kim Huey**.

Welcome to **Gedney L. Vining** who joined the accounting department as Accountant II. Vining was formerly with Southern Discounts.



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J. A. Donovan, Editor	3405
Bette Justice, Assistant Editor	3405
Deborah Arial, Assoc. Ed.	3445
Maggi Rampling, Assoc. Ed.	3523
Mary Ann Clarke, Assoc. Ed.	3507
Martha Ann Stegar, Assoc. Ed.	3873
Sis Hancock, Assoc. Ed.	3492
Marie Harden, Assoc. Ed.	3412
Gayle Hudson, Assoc. Ed.	3542
Denise Kisselburg, Assoc. Ed.	3460
Olga Kilpatrick, Assoc. Ed.	3620
Nancy Price, Assoc. Ed.	3500
Albert H. Becker, Reproduction	3570

Beating The Drum For EES



The smallest section in the EES Service Group working under the guidance of Howard Dean, associate director for programs and services, is the **Information-Publications Office** located in Room 275, Baker Building.

Organized by Jim Donovan in the fall of 1972 with the primary purpose of publicizing the EES and its accomplishments for our various publics, the Information Office has accumulated a variety of related PR and publications production tasks.

According to policies formulated by the Director, this office strives to create greater public awareness of the EES as the principal technological resource in the State and region, and to inform interested people and organizations at the local, state and national levels of EES's capabilities, activities and accomplishments.

The scope of the Info. Office's activities divides into two general areas: public relations and publications production.

Public relations includes news releases about EES activities and personnel for metropolitan, state and national media use, a periodic newsletter to specific individuals and organizations, information for the staff in the form of a newspaper, handout folders with information on the history of EES, and assistance with tours, conferences and visitors.

Publications production involves planning, writing, editing, designing and producing a variety of printed material such as: *The Annual Reports*, brochures, the monthly *Station News*, the semi-monthly newsletter *EES Report* (which is mailed to some 600 people around the nation), as well as other printed matter.

Ms. Bette Justice joined the Office in early 1976 to contribute her background and experience in jour-

ASL News

Jeff Tiller presented a paper entitled "Cost Benefit and Net Energy Analysis as Methodologies for Technology Assessment: Assessment of Hybrid Energy Systems" to the Technology Assessment of Energy Alternatives Conference at Rensselaer Polytechnic Institute, May 17-19. **Stephen W. Day** gave a paper entitled "The Energy Analyst: His Evolution and Mission" at the same conference.

E. J. Scheibner and **W. H. Hicklin** presented a paper entitled "Characterization of Metal-Oxide Systems by High Resolution Electron Spectroscopy" to the 30th Annual Symposium on Frequency Control Held in Atlantic City, NJ, June 2-4.

R. S. Ingols presented a paper entitled "Fish Kills in Hypolimnetic Water" to the meeting of the American Society of Limnology and Oceanography in Savannah, GA, June 21-24.

H. L. Teague was in Washington, D.C. on June 23 participating in a proposal presentation made by Sanders Associates to ERDA. Sanders Associates intends to test a 250 KW Air Cycle Receiver at the Georgia Tech 400 KWth Solar Thermal Test Facility.

F. C. Apple was in Denver on June 16-18 reviewing the design and construction of the Georgia Tech Thermal Storage Subsystem's control panel with Martin Marietta Corporation personnel.

nalism and publicity. She assists Donovan and works on news publicity, news writing, photography and special projects.

The Info Office also is available to assist in the design and production of visual aids; slides and transparencies, the Baker Building auditorium operations, recruitment ads, displays and exhibits, conference materials and, not of least importance, it organizes the staff Christmas party.

If you have an unusual problem in any of these areas, take it to the EES Info. Office. You may not get a solution — but you will get advice and sympathy.

J.N. Harris travelled to Kansas City, Mo. June 22-23 to attend an EPRI Quarterly Review Meeting.

J.M. Akridge was in Washington, D.C. June 27-30 attending the Solar Industrial Process Heat Process Workshop sponsored by the University of Maryland.

J.D. Walton, Jr. was in Europe (Again!) June 14-20 visiting several organizations concerned with solar energy research and development. Among these were SOFRETES in Paris, Messerschmitt-Bolkow-Blohm in Munich, and SPILLING-CONSULT in Zurich. He assisted the Georgia Tech team in completing preparation for the Georgia Tech/Martin Marietta Solar Boiler Test to be conducted at the French CNRS Solar Furnace in Odeillo-Font Romeu. J.D. Walton also visited with ANSALDO, S.p.A. in Genoa and discussed details of the construction and layout of the Georgia Tech 400 KWth Solar Thermal Test Facility.

Gail Tucker of SSSD has replaced **Janie Lovern** who retired last month. Gail transferred to EES from the Physical Plant.

Sharon Sebaly of EEAD has replaced **Mary Ann Mayo**. Mary Ann will soon be moving to California.

T.P. Lang's many conversations and trips to Washington have resulted in an increase funding for his neutrino project: \$100,000 for the last 6 months of this year.

New Authors Sought

According to **M.W. Long**, Consulting Editor, an extensive series of books of importance to electrical engineers is being developed by the Lexington Books Division of D.C. Heath and Company. New areas and approaches are emphasized in these books because the four-month production schedule used at Lexington Books is the fastest in the industry. Interested authors should send a table of contents and introductory material to M.W. Long, 1036 Somerset Drive, N.W., Atlanta, Georgia 30327.

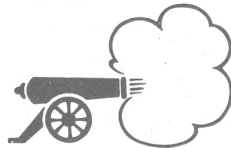
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A Small World— Diamonds and Microwave Solid State

In our electronic society of solid state wrist watches, transistor radios and hand held calculators it isn't news that the world of solid state is a small one. It may be news though that diamonds can play an important part in this world.

The Solid State Sciences Division of ASL is actively engaged on a contract with the Air Force Avionics Laboratory to increase the power output from several microwave signal sources. Some of these high frequency signal generators are so small that the power density within them exceeds that near the surface (photosphere) of the sun. Removing waste heat from these devices becomes one of the most difficult problems associated with them—that's where the diamonds come into play. Certain types of diamond are better heat conductors than any other known material—between two and six times better than copper and silver. Fortunately the best type of diamond for heat conduction (type IIA) is also an excellent electrical insulator. These two desirable properties allow multiple semiconductor chips to be mounted close together on a common cooling surface while allowing heir electrical independence to be maintained. To do this, several diamond chips are first mounted on the cooling surface such as copper with electrically conducting layers applied only to their top and bottom surfaces. The semiconductor chips are then mounted on the top conducting surface. The result is an array of several semiconductor chips each capable of independent electrical operation but each connected equally well to the cooling surface. Because of their electrical independence the semiconductor chips can then be connected either in series or in parallel electrically, a property which provides the microwave designer with a new capability to combine their power outputs. At the same time the series connection helps to keep the efficiency high while in the past, without diamond mounting, significant efficiency reduction was always present when multiple devices were used.

Impractical? Too expensive? Not at all. To understand this one needs to return to the small world again; the semiconductor chips used are seldom larger than fifteen thousandths of an inch in any dimension. As a result, thin diamond chips about thirty thousandths of an inch square are all that's needed and these cost only five or ten dollars even though gem quality type IIA diamonds must be used. Compared to the overall cost of solid state signal generators (\$200 to \$1000) this added cost becomes insignificant.



Liberty

Mrs. Bailey Retires

After 18 years of employment with EES, Mrs. Frances Bailey has announced her retirement from the accounting department.

Mrs. Bailey began working for the Comptroller Office in the Knowles Building at Georgia Tech in 1956. In 1958, after a temporary departure to Knoxville, she returned and was hired as a bookkeeper for the EES under Tony Bryant and then Billy Atcheson. During this time she advanced to her present position, Clerk III.

Following her retirement, Mrs. Bailey plans to visit with her three sons and their families and then seek part time employment. "These 18 years have been great", she said, "I've really enjoyed it." Her many friends at EES wish Frances a happy retirement.

1976 Annual Report

Production will soon begin on the published version of the *EES 1976 Annual Report*. Laboratories and Divisions are requested to select their most interesting and representative photographs of research programs for possible use in the Report. Black and white prints, color prints or slides are acceptable. Please submit to Jim Donovan at the EES Information and Publications office, 275 Baker Building. All photos will be returned to owners.

EDL Conducts Seminar for Community Action Agencies

Representatives of 11 Community Action Agencies (CAA) in Georgia attended a Seminar on Economic Growth and Expansion through Industrial Development conducted by members of the Economic Development Laboratory June 16-17. The seminar, held in the EES auditorium, was co-sponsored by the federal Community Services Administration. EDL personnel on the program were **Edwin Bethea** (Project Director), **Ross Hammond**, **William Ward**, **Edward Nelson**, **Robert Cassell**, **Donald Lodge**, **Eric Berg**, and **William Howard**.

The objective of the seminar was to acquaint the participants with the techniques of industrial development as a means of stimulating industrial growth and job creation in their respective areas.

Ed Nelson has resigned from EDL to devote full time to his consulting business. Ed is president of Applied Management-Technical Assistance and Research, Inc. (AMTAR).

Group Insurance

An employee's University System Health Insurance stops on the date the employee terminates. Therefore, it is very important for those terminating employees who desire to continue insurance coverage to make personal arrangements with a company of their choice.

Contact the Staff Benefits Office (Extension 4627) for additional information.

Spurlock Elected

Tech President, J.M. Pettit recently informed **Jack Spurlock** of ASL that he had been elected to serve as the **EES representative on the Tech Executive Board for a three-year term beginning September 1, 1976.**

The Executive Board reviews the matters recommended for action by the general faculty, develops agendas for faculty meetings and assigns study committees for specific issues.

EES Productivity Center Analyzes Energy Consumption

"The rapidity of energy consumption and depletion should be a major concern for all Georgia industry," claims **Jerry Birchfield**, senior research engineer with the Georgia Productivity Center (PTAL) of EES.

To aid Georgia-based industries, the Productivity Center has initiated a program, funded by the Economic Development Administration (EDA), to analyze energy consumption and recommend energy saving techniques for over 75 companies in the state.

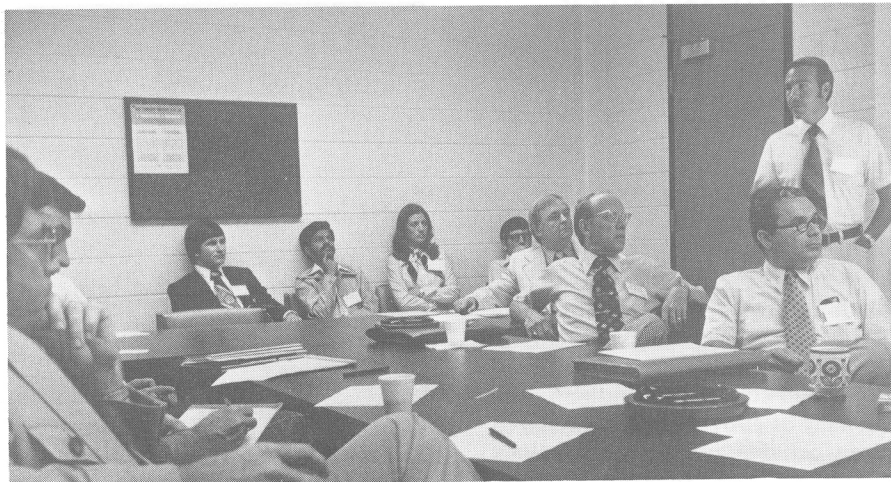
"Our objective is to come out with documented case studies," Birchfield said, "we want to spread the word and show Georgia industry leaders what can be done to conserve energy and reduce operating costs in their plants." Georgia's industries are almost entirely dependent upon external energy supplies, consuming over 20 percent of the available energy in the state in 1973.

A three-member team of Georgia Productivity Center engineers; **Grant Curtis**, **Doris Willmer** and **Bob Fulford**, will conclude in-depth energy studies of 25 Georgia companies and provide technical assistance to an additional 50 firms.

Energy areas to be studied include heat recovery from boiler stacks, dryers, hot water waste streams and refrigeration systems. Other energy saving methods will cover steam efficiency from end use control, condensate return and insulation.

Preliminary energy-saving programs conducted by the Productivity staff and field office personnel have proved successful in the poultry, food, carpet, textile and paper industries.

The twelve-month long program, including seminars, workshop study materials, a field agent training program and media presentation, with the assistance of PTAL staffer, **Ron Pearl**, will be documented and presented to the U.S. Department of Commerce for distribution to industrial and commercial firms across the country.



Several members of the Industrial Energy Conservation Program Advisory Committee met with PTAL representatives to discuss a new energy conservation program for Georgia industry. Seated left to right: Tom Glanton, House Industry Committee; Ivan Winsett, Georgia Electrification Council; Ron Pearl, Gopalaswamy Soora, Doris Willmer, Jim Lowry and Grant Curtis of PTAL; Ken Allen of Simons Eastern and John Quarles of Star Finishing Company. Standing is Jerry Birchfield, PTAL.

EDL News

Bob Cassell, attended the 51st Annual Conference of the American Industrial Development Council (AIDC) in Anaheim, Calif., May 25-27. He is Chairman of AIDC's Advisory Board this year.

George Dobson, attended the Georgia Municipal Association's 43rd Annual Convention at Jekyll Island June 20-23, at which 11 Georgia municipalities were recognized for achieving certification in the Georgia Certified City Program, which George administers. This year, 41 cities participated in the program, sponsored jointly for the past 12 years by EDL, Georgia Power Co. and the Georgia Municipal Association. Additional support for the program for the next 18 months will come from the Coastal Plains and Appalachian Regional Commissions.

Nelson Wall, EDL, participated, at the invitation of the Government of Mexico, in an international meeting on small industries and intermediate technology held in Mexico City June 21-26.

Ken Stephens, EDL, was coleader of a Quality Control Workshop in Bangkok, Thailand, May 2. An article by Ken, "Research on Rice," appeared in the *Bangkok World's* May 31 supplement on "Rice." He recently returned from a five-month

stay in Thailand working on a rice farming machinery project for the International Rice Research Institute.

Hardy Taylor has received notice from the Economic Development Administration that it will fund EDL's program of management and technical assistance to economically depressed counties in Georgia for the 12th consecutive year.

Nelson Wall, will be in Nigeria July 11-August 7 training the staff of the University of Ife's two new industrial extension field offices and providing technical assistance to industry under the AID Small Industry Grant program.

Georgia Tech will have an opportunity to demonstrate its capabilities in solar energy and related fields to two leading Korean scientists July 13-25, when Drs. Sae-Zong Oh and Won Hoon Park of the Korean Institute of Science and Technology (KIST) will visit the campus. **Ray Manoff** of EDL will coordinate the project, assisted by **Max Akridge** of ASL. During their two-week stay, the KIST team will be assisted in the design of a solar heated house for construction in Korea and in the development of program data for the preparation of a \$900,000 full-scale project on solar energy utilization.



PERSONALITY

Harvey Diamond — EDL's Wonder Wiz With Numbers and Names

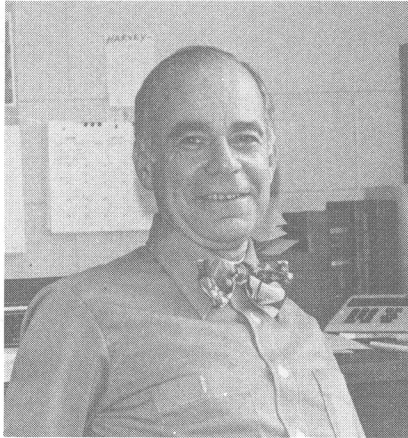
Last Thursday marked Harvey Diamond's 16th year of employment of EDL/EES.

"Our office used to be on the fourth floor of the Tech library in what is now the west wing," Diamond reflected. "We were crammed into an 800-square foot bullpen until February of 1961 when we moved to more workable quarters at 680 West Peachtree Street. In May 1965 we again relocated to 1132 West Peachtree Street and finally in July 1972 we moved here to the EES Baker Building," he said.

The former hardware store co-owner with a degree in textile engineering from North Carolina State University joined the then Industrial Development Branch (IDB) of EES to work on the textile segment of a study for the Southeast River Basin Commission. Credit for hiring Diamond goes to Ken Wagner, former head of IDB, who knew of Diamond's background in textile engineering. That was in 1960 and since then Diamond has become a major contributor to the growth of the department, following its transition from IDB to the Industrial Development Division (IDD) to the Economic Development Laboratory (EDL) in 1975.

"As IDB grew and became a division instead of a branch, we incorporated more industrial services and economic development programs into our work, thus becoming a multifaceted organization with numerous branches...and one of these was marketing analysis," Diamond said.

As a senior research engineer in EDL's market analysis section, Diamond's responsibilities include compilation of directories, surveys and market reports for state agencies and private industries as well as for internal sponsorship. "We're paid to quantify and qualify industries, products and services," Diamond remarked. "Years ago when we first were formed, most of the marketing work involved preparing manufacturing opportunities and concentrating on promoting Georgia for specif-



Harvey Diamond

ic industries or products. Most of our early reports were designed to show Georgia as a profitable state for manufacturing and business opportunities," he said.

Today, market analysis plays a highly supportive role to all other EDL Divisions in providing market expertise on a wide range of subjects. Specific surveys and studies are prepared under Diamond's watchful eye, and, as a result, directories and reports offering a full scope of information on such industries as metal working, plastics and agribusiness, have received recognition from libraries, state governments and other educational institutions across the state.

Diamond's desk as well as the bookcases against the wall in his office boast of his years of fruitful work...stacks of directories and reports on practically any industrial product or economic service available in the state or region can be found.

Some of the marketing projects take as few as 20-working days to complete while others take almost four months of effort. Rarely do any of his projects exceed three months.

Every ounce of energy that goes into compiling these directories comes directly from Diamond — sort of a one-man operation. Whether employing his professional research techniques, drawing up survey questionnaires, collating, mailing or collecting data, Diamond puts on the steam and produces the results.

During his 16 years with EDL he has completed somewhere between 40 to 60 reports and directories

On a more informal side, the New York native has resided in Atlanta

for 26 years with his wife, Paula, and two sons, ages 11 and 14. Ten of Diamond's years were spent managing the Dux-Mixture Hardware and Supply Co. on Marietta Street with his brother-in-law. Now his 14 year old son is employed at the store for the summer.

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Applied Engineering Laboratory

At the IEEE International Convention (Electro '76), the session entitled "Radar Counter-Countermeasures" won the award as Best Technical Session. This session was organized by **Steve Johnston** and the chairman was **Dr. Allen Ecker**.

Dr. Donald G. Bodnar, presented a paper at the National Conference on Electromagnetic Scattering, at the University of Illinois on June 15-18. The paper entitled "Near-Zone Radar Cross Section Measurements" was co-authored by **Dr. J. Lee Edwards**.

C.P. Burns and **T.M. Hedges**, went to ECOM, Fort Monmouth, New Jersey, on June 21, to discuss a near-field measurement system for the MALOR antennas. Hedges continued the trip by presenting a paper at the Microprocessor Standards Workshop at NADC, Warminster, Pennsylvania, and with a one-day visit to AFAL.

J. C. Toler and **E. C. Burdette** gave a presentation at the University of Miami on EES Biomedical Capabilities on June 18. This presentation was also given to personnel at the Emory University School of Medicine and the Medical College of Georgia.

Fred Cain attended the 1976 International Microwave Symposium held in Cherry Hill, New Jersey on June 14-16.

The AEL welcomes **William Licata**, senior research engineer who joined the Station on June 28. He is working for **Jerry Eaves** in the Radar Technology Division.

Sharon Toporek, Secretary I, was employed in the Systems Engineering Division under **Bob Zimmer**, as of June 21. **Frank Gramling**, assistant research engineer and former GRA, has also joined the Systems Engineering Division under **Zimmer**.