STATION NEWS

EES

ENGINEERING EXPERIMENT STATION • GEORGIA TECH

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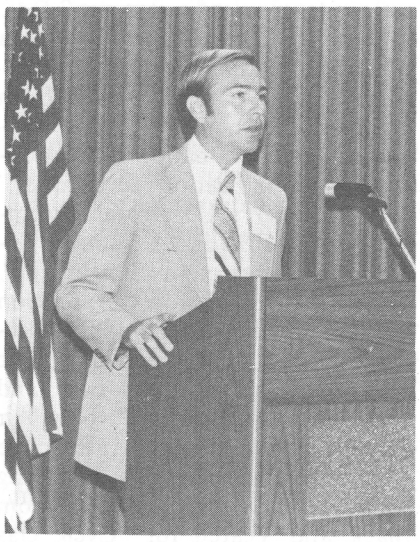
Productivity Conference Held

Productivity Conference attendees pack Baker Building Auditorium August 5.

The Productivity and Technology Applications Group hosted a regional productivity conference August 5 and 6 in the Baker Building. The purpose was to pull together people who are working on productivity in industry and government to exchange information about program activities and to develop common recommendations to federal agencies which fund programs in this area. Keynote speaker at Tuesday's luncheon was Dr. Larry Stewart, Director of the Energy Conservation and Productivity Conservation Division, Energy Research and Development Agency (ERDA). Workshops and panel discussions were held on topics such as Human Productivity Improvement; Energy, Technological Innovation and Productivity Improvement, and Measures of Productivity Improvement in Private and Public Sectors. Some 66 participants attended, representing universities, research and economic development organizations, business organizations and federal agencies. These discussion sessions should lead to developing more effective ways and techniques to deliver and apply results of productivity research.

Productivity is the ratio of goods and services supplied divided by the inputs of people, money, energy and materials. It is a measure of efficiency; as production gets more efficient, more is produced at some previous cost level. In recent years productivity in the U.S. has been declining relative to some other highly industrialized nations such as Germany and Japan. Increasing this declining productivity rate is seen to be a major way of combating inflation and recession. Georgia Senator Sam Nunn is sponsoring a bill to create a national productivity center which has come out of committee and looks favorable for passage. This proposed national productivity center will work with state productivity centers to assist both industry and government to increase productivity.

The EES has been designated by the General Assembly as the Georgia Productivity Center, the first such state center in the country. The Station works closely with industrial associations such as the Georgia Poultry Federation, the Southeast Lumber Manufacturers Association and the Elberton Granite Association as well as with municipal governments on a variety of matters in the productivity area. Among current research interests are: energy conservation in industry and municipal government; utilization of agricultural, forest and industrial wastes; process automation and measurements of productivity. The results of such productivity research are transferred to uses through the EES Industrial Extension Service, conferences and workshops and video tapes.



Jerry Birchfield of the Productivity Group and TAG tells the Conference what it's all about.

Research Awards

N.L. Faust, S&T, from NASA for "LANDSAT Information for State Planning;" *G.E. Riley,* S&T, from Army Missile Command for "GRAY ROCK Seeker and Electronics-Phase II;" *H.A. Ecker,* RD, from Army Research Office for "In-VIVO Determination of Energy Absorption in Biological Tissue;" *R.E. Collier,* IDD, from State Energy Office for "Substate Energy Management;" *N.C. Wall,* IDD, from AID for "Stimulating Growth of Small-Scale Industry;" *N.C. Currie,* S&T, from Army Frankford Arsenal for "Penetration and Backscatter of Land Clutter at Microwave Frequencies;" *J.D. Adams,* S&T, from Air Force Rome Air Development Center for "Broadband Antenna Measurement Techniques-Phase II;" *H.W. Denny,* S&T, from Parsons Brinckerhoff-Tudor-Bechtel for "Development of Grounding and Lightning Protection Requirements for the MARTA System;" *J.M. Akridge,* EMTD, from Department of Agriculture for "Design of Collectors and Instrumentation for Solar Drying of Agricultural Crops" and from Black and Veatch for "Design, Solar Materials and Components Test Facility;" *J.J. Heckman,* RD, from Air Force Systems Command for "EMC Application of Avionics Equipment;" *D.G. Bodnar,* RD, from Wright-Patterson AFB for "Radar Target Scintillation;" *R.N. Trebits,* RD, from Wright-Patterson AFB for "Development and Evaluation of Stationary Target Indication Techniques;" *R.P. Zimmer,* RD, from Wright-Patterson AFB for "A Tactical Expendable Assessment Study;" *J.C. Toler,* CD, from Cordis Corporation for "Response of Implantable Pacemakers to Pulsed Electromagnetic Environments;" *C.S. Wilson* and *R.W. Moss,* CD, from Rome Air Development Center for "Interactive Communication Systems Modeling Study;" *J.N. Harris,* EMTD, from Black and Veatch for "Cycle Gas Turbine Solar Power System;" *S.T. Alford,* SSD, from General Dynamics for "Missile Seeker Antenna Development and Fabrication;" *J.A. Cribbs,* RD, from General Dynamics for "Design, Fabrication, Test and Delivery of Selected SADS VI/M Electronic Subsystem."

Change in Travel Reimbursement Rates

Three changes in travel regulations increase the amounts faculty and staff may claim for reimbursement of certain travel expenses. These changes become effective July 1, 1975.

The *mileage reimbursable rate* is increased from 10 cents to *12* cents per mile when traveling on official business via personally owned vehicles.

Faculty and staff may now be reimbursed for actual expenses *incurred* for *toll charges* and *parking fees.*

Should a faculty or staff member begin a trip in June and conclude it in July, he or she would be reimbursed at the old 10 cents per mile rate for travel in June and at 12 cents per mile for July travel.

Dick Moss, Communications Technology Group, was in Rio de Janeiro, Brazil July 21 through July 24 to discuss design and development of a radio monitoring network for the Government of Brazil.

New Personnel Orientation

The EES is initiating an orientation tour for new staff personnel to help familiarize them with the Station's functions and facilities. Included in the orientation are a slide presentation and brief tour of the laboratories and activities in the Baker Building, Electronics Research, Area Two and Hinman. Representatives of the Divisions visited explain their area and work.

The initial orientation tour was scheduled for Monday morning, August 11. Future orientations will be conducted to meet the personnel needs and interest. The tours are organized and coordinated by the Publications Services Office, 3405.

E.E. Donaldson, CD, EMC Group gave an invited presentation at The Naval Surface Weapons Center, Dahlgren, VA on July 15, entitled, "Radiated Measurement Techniques for Shielded Enclosures."

ASD News

Globetrotter-of-the-Month award goes to **Ray Young,** who left July 23 and returns August 17 from Paris and Toulouse, France; Amsterdam, Holland, and London, England. In Toulouse, he will be working with Gilbert Bonel who was here last summer on a NATO grant. Ray will go to Amsterdam August 4 for ten days to present a paper at the 10th International Union of Crystallography. He will speak on applications of profile-fitting-structure-refinement method to X-ray powder diffraction data. The last stop is London where he will work with J.C. Elliott, another researcher who has worked several summers in Ray's Crystal Physics Branch.

Rice Industry Project In Ecuador

Charles Wommack, IDD, left for Ecuador in early August for a three-week activity involving possible introduction into the country of medium-technology rice cultivation and harvesting equipment developed by the International Rice Research Institute in the Philippines.

George Morelos, an IDD staff member since 1970, has resigned to devote full time to writing his dissertation for the Ph.D. in Business Administration at Georgia State University.

Nancy C. Thomas has replaced **Barbara Williams** as secretary for IDD's International Development Data Center.

Mr. and Mrs. **Clyde Roby** had a baby girl July 16. Clyde is an Assistant Research Engineer in the Sensor Systems Division.

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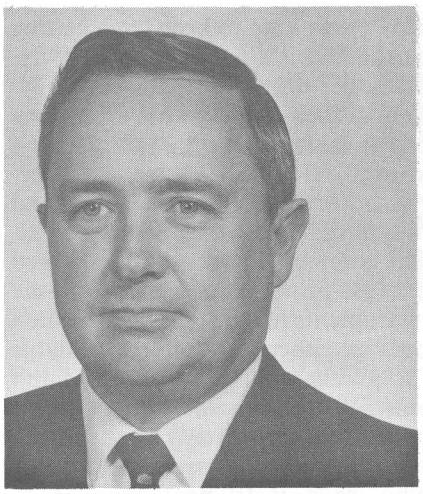

Bill Howard of IDD

Better Utilization of Human Resources

Bill Howard, Head of the Special Projects Branch, IDD, recently made the following comments in the Georgia Chamber of Commerce newsletter:

"A community's human or manpower resources are quite likely its most valuable economic asset. Certainly manpower resources constitute one of the prime determinants in the expansion or location decisions of most industrial and commercial firms, and communities must maintain a good manpower availability image if they are to attract new employers and stimulate the expansion of employment opportunities. The ultimate purpose of all community economic development should be to upgrade human resources, develop skills, increase production, increase income, create new payrolls and to raise standards of living. Yet, the human resources factor is probably the most neglected and poorly presented of all local community assets. The more a community can learn about its human resources, the more valuable such information will be in developing the full economic potential of the community.

"In light of this recognized need and in support of the overall industrial and economic development of Georgia, personnel from the Industrial Development Division have conducted demonstration-type Better Utilization of Human Resources Seminars in three communities within the state. The basic objectives of these seminars are: (1) to encourage the interchange of understanding between local employers and community leaders who are responsible for industrial and economic development, and (2) to provide a forum for dialogue between those interested in bringing new business and industry into a community and those employers in the community who are opposed to it because of the difficulty they have in recruiting, hiring and maintaining their work force.

"Five more demonstration seminars are planned between now and May 31, 1976. A manual on "How to Conduct a Better Utilization of Human Resources Seminar" is being developed."

NEW PROJECTS

ERDA to EMTD **(S.H. Bomar)** for solar power system and component research — Appalachian Regional Commission to TAG **(J.L. Birchfield)** for technical assistance for local government — Montana Department of Intergovernmental Relations to IDD **(R.B. Cassell)** for economic development training program — University of Ife, Nigeria, to IDD **(N.C. Wall)** for Industrial Research and Development Unit training — University of Georgia Community Continuing Education Service to IDD: **R.E. Collier** for improving substate government productivity through technology; to **W.C. Howard** for providing instruction and assistance to develop and utilize human resources; to **D.E. Lodge** for providing instruction and assistance in evaluating and understanding the role of mobile homes in local housing; to **P.D. Koos** for increasing understanding of land use development management for energy conservation and productivity; to **E.A. Bethea** for educating and assisting minorities to understand establishing industrial businesses; to **W.G. Dodson** for increasing understanding of community economic development —

NOTICE

Users of the Baker Bldg loading dock should be sure that the door is locked when loading is completed.

EMTD News

Jack Spurlock attended and participated in the Fifth Intersociety Conference on Environmental Systems, (ICES), held in San Francisco on July 21-24, 1975. The Conference is co-sponsored by several societies including the Society of Automotive Engineers (SAE). Dr. Spurlock is Chairman of the Spacecraft Environmental Systems Committee of the SAE which coordinates Intersociety Conference participation for the SAE. Dr. Sprulock also serves on the Steering Committee for the Intersociety Conference which coordinates planning for each conference.

Bob Mason, EMTD, has returned after a month in Europe. He was co-chairman of a conference on technology transfer, held June 22-July 4, in Les Arcs, France, (near Grenoble). His family joined him the second week of the conference and for a two-week vacation following the conference. Their itinerary included Italy, Austria, and Switzerland.

IDD Exchanges Visits With Counterparts

Kay Auciello visited the Industrial Development Center of Ecuador (CENDES) in Quito and Guayaquil July 26-August 2 to interact with counterpart information specialists in Georgia Tech's 211(d) grant program sponsored by AID.

Dick Johnston was in Korea July 20-August 10 assisting Soong Jun University's Integrated Development Center with information collection needs.

IDD's Area Development Branch conducted a five-week training program in industrial extension work for two Soong Jun University professors and a Korean industrialist in July. Participants were Prof. Won Fae Koo, head of the Chemistry Department on the Taejon campus; Prof. Young Ho Lim, Assistant head of the Mechanical Engineering Department on the Seoul campus; and Young Ho Chae, president of Sam Hou Machine Industries Co.

David Asbell has joined the Sensor Systems Division staff as a Research Engineer.

PERSONALITY

Bill Livesay

A Man of Varied Interests

Dr. Bill Livesay has had a varied and rewarding career in the Applied Sciences Department since joining it in 1960. He has changed his emphasis from being a physics instructor to metallurgy in charge of the micromechanics and magnetics labs he designed and developed. His PhD is in metallurgy from Tech; his other degrees are in physics from Texas Christian and University of Texas. His primary interest has been concerned with metallic materials and that is the area of his current work. His early work at EES was devoted to studies of the magnetic behavior of metal films. The behavior of thin metal films is particularly important for the operation of modern electronic devices such as tiny integrated circuits which in turn make possible items such as the small electronic calculator.

Bill studies the surface effects of materials used in these circuits; what happens to the overall properties of the metals due to corrosion and imposed mechanical and thermal stresses. The circuits are made of layers of different metal thin films on a silicon single crystal substate. The migration of the atoms across interfaces changes the properties of the materials over time and in the operation the processes are accelerated. However, people have recently begun to realize the importance of determining the reliability of a circuit during periods of non-use. For example, these thin film circuits are used in rockets which are to be stored for many years. Although the circuits are not operating, they are still subject to degradation processes due to factors such as mechanical stresses because of cyclical heating and cooling in storage as well as long-term chemical environmental effects. This may cause weak metal-to-metal bonds to deteriorate, resulting in failure when the system is finally needed. These bonds are often the weakest link in the circuits, particularly when they join different metals, such as gold to aluminum.

Bill points out that such sophisticated circuits are used increasingly for many new applications such as controlling trains, airplanes and even laboratory experiments. In fact, the main reason they are now available, he says, is because they were essential for military and space applications. Since they are so new, it is difficult to predict how their properties will change over time; a more basic understanding is needed of the processes going on that contribute to failure.

As he says, "I enjoy working with things that are very small, although I may cuss them at times while working. It is very, very difficult work. And although I haven't taught since 1961, I do like teaching very much. In fact, I like to do a lot of things, which sometimes leaves me spread a little thin professionally."

Bill also likes to do a variety of different things at home, too. He grows part of the family's vegetables, "What the birds and bugs don't eat first." In his church, he is an Elder and teaches Sunday School. He continues his high school interest in sports by working with his 12-year-old son's little league baseball and football teams. "I end up doing a lot of coaching." Bill is also an assistant scoutmaster for Doug's troop.

Bill and his wife Ann also have two daughters. Connie is a chemistry major at Tech and will be a cheerleader in the fall. Cathy will be a senior at Cross Keys High School, where Bill is president of the gymnastics booster club. The Livesays have a travel trailer they use for camping; this summer in Durham, NC and on the Carolina coast. He said they haven't had much camping time in the past few years because of the children's activities. He has a private pilot's license, but says he hasn't flown for a long time.

"Flying is one of those things you have to do a lot to keep from getting rusty. And it's not a family activity. I'd rather do things with the family. I enjoy them as people; they're some of the most interesting individuals I know."

In describing the magnetics and micromechanics labs he designed, Bill commented they both emerged because of necessity. "I designed the instruments for the labs from scratch because either they weren't available for purchase or they simply didn't exist. You just couldn't buy what we needed. There are only about fifteen or twenty other places in the country who have instruments similar to those in the magnetics lab, and those in the micromechanics lab are probably unique. I designed them to do a job; to explore and measure metals and alloys. None of the instruments is patented; I've been too busy. And I don't know what I would be able to take time from to devote to the patenting process."

Another recent program the Ft. Worth, Texas, native has involves investigating the mechanical behavior of the elastin in biological materials. Elastin is a fibrous material that contributes to mechanical strength of ligaments and skin. It exhibits behavior like a "super rubber," he said.

Another recent program monitored the simultaneous electric signal and mechanical force of low-energy sliding electric contacts. He made correlations for the different types of interfaces formed on these low-friction devices which are in many electrical systems needing electrical signals without lubricants. Typical metals are gold and copper alloyed with nickel and cobalt. Other interests include the bonding of metals, hydrogen storage in metals and high strength metal composits film structures.

"I'm pleased with my work. I sincerely enjoy what I'm doing. However, the financial constraints on some projects have forced me to do less than I would have liked. There are a few aspects I would have done a lot better and other aspects I might have explored. But projects usually have only so much money."

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