Seventh Annual George C. Griffin Road Race Drew 200 Runners
Things are looking good here. So good that 16 new firms have come to Technology Park in just the past year. So good that close to 1,200 people are now working here. But it’s not only numbers that say success for Technology Park. It’s also the kind of firms who’ve found homes here. Continental Telephone Labs, Sangamo-Weston, Beckman Instruments, Informatek, Ebasco and Mariner Marine are a few of the names you’ll probably recognize. And every year the list gets longer. Technology Park is looking good. In fact, about the only thing we have more of than new tenants are baby ducks.

For further information, contact Charles R. Brown, President, Technology Park, (404) 448-7280.
For Alumnus of the "Old School"

When you come to Atlanta for a Tech game you can be sure there will be a crowd. Not only at the game, but often in your hotel.

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JUNE 1979
Dwayne Sanders is a typical 19-year-old college student who thinks in terms of what he can do, rather than what he cannot do. What makes him extraordinary is that six months after he broke his neck and damaged his spinal cord in a cheerleading accident, he resumed classes and extracurricular activities at Georgia Tech.

Dwayne is a quadriplegic, paralyzed from the shoulders down, as a result of an accident which occurred when, as a Georgia Tech cheerleader, he was practicing on the trampoline before the Tech vs. Duke football game last Sept. 9 in Durham.

During the last nine months, the personable young man has had to relearn to feed and dress himself, to write, to drive and to do other everyday activities which he formerly did without a conscious effort.

"I like to say I'm completely independent," Dwayne said in a recent interview. "My parents do things to help me, but it only speeds up the process by doing things that I'm capable of."

Dwayne is a member of the Pi Kappa Alpha fraternity and spends a lot of time at the Pike house. During his freshman year, he held two fraternity offices — secretary and little sister coordinator. He hopes to be elected to another fraternity office. "I like to be active and contribute," he said. "I'd like to hold an office that wouldn't require a lot of physical work, one which would allow me to think and coordinate some activity."

"I want to contribute," he continued. "We're trying to think of a work project I can do around the house. It may be painting. I want to do my part."

Immediately following the accident, Dwayne was taken to Duke University Hospital, where he spent six days until he was able to fly home to Atlanta. He was then admitted to Shepherd Spinal Cord Center, affiliated with West Paces Ferry Hospital in Atlanta, for intense therapy and rehabilitation.

He spent 13 weeks at Shepherd where he was taught to dress and feed himself again. He battled high temperatures and pneumonia. He had spinal fusion surgery on Oct. 1. A bone was taken from his hip, laid across his spine, and fused. After surgery, he was able to remove the vest and halo which doctors at Duke had placed on him to hold his neck and back in place.

At Shepherd, he exercised from 9 a.m. until 4 p.m. daily, then relaxed until dinner. "The rules were very lenient there," Dwayne said. "We were allowed visitors anytime that we weren't involved in therapy. We were allowed to decorate our rooms so that they didn't look like hospital rooms. I brought my stereo, a bookshelf and plants. We were also allowed to leave on weekends if we were well enough. I went home four weekends."

Dwayne attended two Tech football games while he was a patient at Shepherd. He went to the Tech vs. Florida Homecoming game at Grant Field and the Tech vs. Georgia game in Athens.

He was released from the Shepherd Center Dec. 22 and went home, where he spent the winter building up his strength and waiting 13 weeks for a van to be customized so that he could have independent transportation. The top of the van had to be cut off and a fiberglass top installed so that his wheelchair could fit in it. The floor had to be lowered for the same reason.

The Chevy van has a hydraulic lift which lifts his wheelchair into the van. He then moves his wheelchair into the space for the driver's seat and operates the van with electric hand controls. Brakes, gas pedal, steering, windows, lights and all other devices are operated with hand controls.

Dwayne’s hands are paralyzed, but the casual observer would not realize it. He operates his hands by his wrist muscles, which are located higher in the arm near the elbow. He has a brace which he puts on his hand to drive, write, eat, button his shirt, brush his teeth and perform other activities.

The van was ready March 15 and Dwayne re-enrolled at Tech later that month. In the spring quarter, he took history and psychology.

A chemical engineering major, Dwayne had to develop his writing ability since he must take notes, rather than use a tape recorder, in many classes. "The tape recorder is fine for lecture classes," he pointed out, "but I can't record mathematical problems off a blackboard. I have to be able to take my own notes." Dwayne had completed his freshman year before the accident, and earned an "A" in both chemical engineering classes he took. He plans to attend school summer quarter and hopes he can continue to do well in courses toward a chemical engineering degree.

"I'll probably have to change my career plans to some degree," Dwayne said. "I want to use my work in chemical engineering for the best job I can perform. I've considered becoming a sales representative for a pharmaceutical firm."

Dwayne's doctors have not given him any hope that he will regain any motor activities other than those he has now. "I can always hope for a miracle, but I have to plan on not being improved so that I can make the best of the situation and make plans for the future. Quadriplegics who say that they are not going to get this piece of equipment or that because they are going to recover completely are not being realistic. They also limit what they can accomplish, whether they recover or not."

Dwayne hopes to move into the Pike house next fall, after some modifications are made. "I plan to live with three other brothers in the large room that was designed as the housemother's suite," he said. "We need to modify the bathroom, widen some doorways, construct a ramp and make other minor adjustments." Dwayne had just moved into the house last fall when the accident occurred.

Dwayne judged cheerleading tryouts last quarter and is active as the student representative on Tech's Handicapped Committee and as a FASET (student orientation) leader for handicapped new students. He has also been appointed to a DeKalb County School System committee to implement Section 504 which states that public schools must be accessible to handicapped persons and employment and special education available to them. "I'm the input for accessibility," he said. "I supply the need and they find ways to meet it."

Dwayne played high school football as a linebacker for four years at Henderson High in DeKalb County. He also played baseball and basketball in a church league. "I think being an athlete helped me recover faster than someone who is less active. If I had been less active and out of shape, that probably would have set the pace and I would do less now."

The six-footer lost 40 pounds after the accident and has regained 20 pounds. He doesn't engage in any physical therapy now. "A lot of non-activity — getting ready to go out and just moving around — is exercise for me. I guess I'm like a normal person who doesn't participate in sports. I probably could be stronger if I worked out," he said.

Dwayne is living at home until he is able to move into the fraternity house. "Although I'm very independent, I'm not ready to be totally on my own," he said. His parents had to make some adjustments to their home: moving his wheelchair into the van, modifying his bathroom.

Dwayne plans Active Future
Editor's note: This story started out as a feature on the oldest known alumnus, Walter Estes, EE'04. While interviewing him, a chain of 20 relatives who graduated from Tech between 1904 and 1973 was discovered. If any reader knows of a living alumnus who graduated before 1904, we would appreciate the information.

James Walter Estes of Rex, Georgia almost didn't get into Georgia Tech in January 1900. The December 1899 high school graduate had qualified for admission to Tech, but when he was ready to register, he was told that the Institute was filled to capacity and couldn't accept any more students.

Estes and his father decided that rather than wait until the fall of 1900 to continue his education, he should consider another school. So Estes packed his trunk and boarded the train for Locust Grove Institute in Locust Grove, Georgia. The same evening that Estes arrived in Locust Grove, the Atlanta newspaper carried a story saying that a Philadelphia philanthropist named A. French had made a $5,000 contribution to Georgia Tech so that the Institute could accept more students. Estes' father sent him a message with the good news and told him to take the return train to Atlanta the following day. So Estes repacked his belongings and set off for Atlanta and Georgia Tech.

Now 96 years old, Walter Estes chuckles at the memory. The 1904 electrical engineering graduate of Georgia Tech has many fond memories of his alma mater and an outstanding business and political career which followed his graduation.

Estes, who is extremely alert, enjoys good health and a clear memory. He will be 97 on Dec. 1 and renewed his driver's license on his 94th birthday for four years. He lives in Rex (in Clayton County just outside Atlanta) in the house his father built. The former state legislator was the first man from Clayton County to graduate from Georgia Tech.

Walter Estes points to his 1904 senior portrait from Georgia Tech.

Estes attended a one-room, one-teacher elementary school, then Jonesboro High for three years. He entered Tech as a sub-apprentice in January 1900.

"Lyman Hall, a West Point graduate, was president of Georgia Tech when I was a student," Estes recalled. "He was a strict disciplinarian. I was a day student. I lived in my uncle's home in Atlanta and rode the streetcar to school every day. I remember that Swann dormitory and the old electrical engineering building were built while I was a student."

"Back then, there was a rule that if you made a certain mark on your daily report, you didn't have to take an exam. I did well in math, and the whole time I was at Tech, I took one math exam."

"I remember that in 1903, Clemson beat our football team 73-0. They were inspired because they had beaten Georgia the week before, 54-0 and someone promised the Clemson team a barrel of apples for every point more by which they beat Tech."

"In the early 1900's, the classes were named sub-apprentice, apprentice, junior, middle and senior," Estes said. "I was a member of Phi Kappa Phi and worked one summer at Atlanta Telephone Company and another summer for a produce company. I remember that when I graduated, there were two automobiles in Atlanta."

After graduation in 1904, Estes joined General Electric at its main plant in Schenectady, NY, then worked for two other firms before returning to Rex in 1907 to found Estes Manufacturing Company. He manufactured school desks and grain cradles. Then he formed the Estes Corn Mill and Estes-Wolcott Company. Both were later taken over by the Rex Chair Company, which he served as president.

Estes' father had founded the Bank of Rex and in 1912, Walter was named vice president of the bank, then president in 1926. In 1929, he moved the bank's headquarters to Lakewood Avenue in Atlanta and changed the name to the Southside Atlanta Bank.

In 1923, Estes and his wife moved to Decatur so that their daughter could attend school in Atlanta. It was supposed to be a brief move, but the Estes had two more daughters and ended up staying "in town" for 28 years. Estes committed to work in Rex from Decatur from 1923 until 1951 when he and his wife returned to his native Clayton County.

Estes served two terms in the State Senate, from 1939-40 with Gov. Ed Rivers and 1943-44 with Gov. Ellis Arnall. Although he lived in Decatur in DeKalb County, he was elected by and represented his neighbors in Rex since he maintained a permanent residence there. He says that he knew practically every one of the 3,500 registered voters in his district. Estes recalls major opposition to the law which was passed in 1944, giving 18-year-olds the right to vote in Georgia.

Estes was once the mayor of Rex and served two five-year terms on the Clayton County Water Authority. He served as chairman and a member of the Clayton County School Board, often attending meetings on horseback when the dirt roads between Rex and Jonesboro were too muddy for an automobile.

Estes was president of the Atlanta Area Boy Scout Council and received the Silver Beaver Award. In 1920, he was a member of the Georgia Technical Industrial Committee, which consisted of 125 Georgia businessmen who toured the East Coast attempting to raise an endowment of $5 million for Tech. They charted a train for a week, telling the Georgia Tech story in Cincinnati, Pittsburgh, Buffalo, Niagara Falls, Boston and New York.

One of Estes' favorite stories concerns an incident which happened when he was 18
Span 70 Years At Tech

By KAREN BUTTERMORE

months old. His parents left him with a neighbor while they attended a funeral. The neighbor was hosting a "quilting" and lost sight of Walter. He wandered over to and fell into a 55-foot deep well. A woman saw him fall in and began screaming just as his parents returned. His father jumped feet first into the well, pulled Walter out of the water, and scaled up the sides of the well until he could pass his son up to a neighbor. Walter had spent seven minutes in the well, but had no water in his lungs. He apparently had the breath knocked out of him from the shock of the fall.

Estes said that the last class reunion he attended was his 50th in 1954. He had season tickets for football games for more than 20 years. The last time he visited Tech was for a tailgate party in the electrical engineering parking lot five or six years ago before a football game.

Estes and his wife Winnie were married for 62 years. She died on Christmas Day in 1971. Since then, one of his daughters and a nurse/cook alternate staying with him.

There are 40 members of Estes' immediate family, ranging from his three daughters to three great grandchildren. He is especially proud that more than 20 of his relatives attended Georgia Tech.

"Do in moderation, don't hurry, don't worry, and don't get mad," is Estes' advice for those who want to live a long life. He spends most of his time gardening, tending to real estate which he has divided among his children, and speaking on the history of Jonesboro and Clayton County.

Bill Bourne, IM '40

BILL BOURNE is married to Walter Estes' youngest daughter Winifred. Bourne's son Brad and his son-in-law, Bill Noethling, are both Georgia Tech graduates. In addition, Bourne's uncle was La Vance Maree, left estate which he has divided among his children, and speaking on the history of Jonesboro and Clayton County.

Bourne said, "My first two years at Tech were entirely different from my last two. My freshman and sophomore years, nearly everyone at Tech was in the service. The dorms were all converted to Army, Navy or Marine barracks. We were all on active duty, attending class until we were called up. It was a very serious time. The only civilians at Tech lived in fraternity houses. I remember the living room of the SAE house was filled with beds."

"When I served in the Navy from 1944 until 1946 and was present at D-Day," Bourne said. "When I came back to Tech, I moved into the fraternity house. We were an older group because most of us were veterans. My Uncle Vance, my son Brad and I were all members of Sigma Alpha Epsilon fraternity.

"The attitude of students in 1946-48 was quite different than it had been during the war. There was a great feeling of relief, a lot less pressure to deal with. It was a much more pleasant atmosphere."

After graduation, Bourne held jobs in sales and management for several companies. In 1970, he bought Universal Steel Company in Decatur. The 25-employee company fabricates structural steel for industrial and commercial buildings in the Southeast.

Bourne contributes to the Roll Call and attends several football games each year. He said that he encouraged his son to make his own choice of where to attend college, but was glad when Brad chose Tech.

"Besides my family ties, I chose Tech because there were no athletic dorms," Bourne said. "I liked the idea that your life was not completely controlled by the Athletic Association."

In 1971, Brad married Jane Healy, whose father Bill was captain of Tech's 1947 football team and an All-America guard. Brad and his brother-in-law Rob Healy were football teammates at Tech. Brad and Jane have two sons and a daughter.

An SAE at Tech, Brad remembers an increased enrollment of women as one of the major changes when he was a student. "My freshman and sophomore years, coeds were a rare sight on campus," he said. "But by the time I graduated in 1972, there were two dorms full of women students.

"I'm excited that Tech has joined the ACC," Brad said. "I think Tech belongs in a conference. It will be especially good for basketball. Independent football teams can go to bowl games, but it is harder for basketball independents to attain national status. The football program carries the other sports and Tech's entry into the ACC should make our games"
Bourne

(Continued from page 5)

attractive to television and provide great regional coverage. Being in a conference will give the players more incentive to win.

"The proposed varsity athletic facility is needed," Brad continued. "I didn't pay much attention to the physical facilities when I was recruited, but the modern athlete does look for nice facilities. Tech has to be in a position to compete with the other schools in recruiting."

After graduation, Brad joined Universal Steel. He handles production, his brother-in-law Bill Noethling handles sales, and his father Bill "runs the company."

"When asked what he remembers best about Tech, Brad replied, "Saturday afternoons. Also the closeness with the people I worked hard with."

"My son is going to have the same indoc­

trination that I had. He already knows the

White and Gold and that his dad would like for him to go to Georgia Tech."

Bill Noethling, GM '72

BILl NOETHLING is married to Lynne Bourne, Walter Estes' granddaughter and Bill Bourne's daughter. Like his father-in-law and brother-in-law Brad, Bill entered Tech on a football scholarship.

Bill played high school ball in Pittsburgh and said that Dick Bestwick (formerly Tech's freshman football coach and now head coach at University of Virginia) was the reason he decided to come to Tech. Bill played offensive tackle in the fall of 1968, but was injured and never able to play varsity football after his first season at Tech.

Bill married Lynne in 1970 and earned a general management degree in 1972. After graduation, he worked at C&S Bank for a year, then joined Universal Steel, where he handles sales.

The Noethlings have two daughters and a son. Bill said that he hopes one or more of his children will go to Georgia Tech. "They can go wherever they want, but I'd like to see at least my son become a Ramblin Wreck."

Malcolm Keiser, ME '35

MALCOLM G. KEISER has a father, a brother, a father-in-law, and three sons who graduated from Georgia Tech as he did.

Keiser's father, A. C. Keiser, Sr., attended Tech night school division in 1918. Malcolm's brother, A. Charles, Jr., graduated from Tech in 1932 and is a retired executive of Texaco, Inc. Charles is in the process of moving from Westport, Connecticut to spend his retirement in Texas. Malcolm earned a mechanical engineering degree from Tech in 1935. He is married to Walter Estes' daughter Eloise. His three sons who graduated from Tech are interviewed in another section of this story.

Malcolm won a partial scholarship to Tech and went to school during the Depression years. He remembers the banks closing while he was in school and that a lot of students had to leave school for financial reasons. "But those of us who were able to stay had a lot of fun because everything was so low-priced."

A member of Pi Kappa Phi fraternity, Keiser lived at home when he attended Tech. He was on the Tech tennis team for four years and participated in several campus organizations. "I could almost say that I minored in extracurricular activities," he said.

"My most vivid memory is that we had a lot of school spirit. There were only 5,000 students, so we got to know one another. I knew all the seniors and a lot of fraternity people."

After graduation, Keiser joined IBM, then two other companies before working for the Estes family business, the Rex Chair Company. In 1961, he joined Georgia Maple Block Company and bought out the other partners in 1964. His company manufactures laminated hard maple products. "We made the kitchen counter tops in the President's home at Georgia Tech and the benches in the Student Center bowling area. We do rails and benches in a lot of shopping centers, including Cumberland and Southlake malls," Keiser said.

Keiser contributes to the Roll Call and has bought season tickets for football and basketball for many years. "I've been hoping for some time that Tech would get back into an athletic conference," he said. Keiser thinks Tech has a bright future ahead. "I don't foresee any problem in attracting quality students. Tech's academic reputation will always be attractive to the best students. The only limitations I can see would be physical, on how much the campus can grow."

Keiser said that although his three sons all went to Tech, he did not push them to go there. He encouraged them to choose the school where they thought they could do best. "I try to stay in touch with Tech," Keiser said. "Georgia Tech has always been close to my heart and that of my family. I've worked with the Joint Tech-Georgia Development Fund and helped build the tennis center at Tech. I'm very interested in Tech, both academically and athletically."

Gordon Keiser, IE '66

MALCOLM KEISER'S OLDEST SON, Gordon, attended Tech in the mid-1960's and says that three things stand out in his memory: Tech's win over Alabama, the theft of the Tech whistle, and the fraternity system.

"I remember vividly that win over Alabama in 1962," Gordon said. "We arrived at the stadium at 11 a.m. that morning to wait for the game. We had to watch the Alabama people strut around Grant Field in their red blazers before the game. But that sight was overshadowed by our great victory.

"The whistle that signaled the change of classes was stolen while I was a student," Gordon continued. "The Magnificent Seven were responsible for the theft, and they gave the whistle to Dean George Griffin a year later. He had it placed in a trophy case, since the whistle had been replaced."

"Fraternities were almost exactly like those portrayed in the movie 'Animal House'. There were lots of crazy antics and Hell Week lived up to its name." Gordon served as rush chairman and social chairman of his fraternity, Delta Tau Delta. He decided to attend Tech because he was rushed by a Tech football player who had gone to his high school, Jonesboro High. At Tech, Gordon was a member of the Bulldog Club and played fraternity sports. He lived in his uncle's house on Briarcliff Road while he was a student.

After earning his BS degree in industrial engineering in 1966, Gordon enrolled at the University of Pennsylvania's Wharton School of Finance, where he obtained his MBA in 1968. He worked with Peat Marwick and Mitchell as a certified public accountant, before joining his current employer, The Landmarks Group. He serves as vice president and treasurer of The Landmarks Group in Atlanta.

Gordon is a member of the Greater Atlanta Georgia Tech Club and has season tickets for Tech football and basketball. He and his wife Cyndee attend reasonably close out-of-town football games. Gordon has three sons and

(L-R) Malcolm Keiser and his three sons Gordon, Stephen and Walter all graduated from Tech.
Walter Keiser, ME '74

WALTER KEISER REMEMBERS "beating Notre Dame in football as the most memorable event at Tech, except for my graduation." Walter is named after his grandfather, Walter Estes, EE '04. He is the second son of Malcolm Keiser, ME '35. Walter started at Tech in 1965 as a co-op student. He left school for three years to serve in the Army during the Vietnam War. He was a helicopter mechanic in Vietnam and served at several U.S. bases. A member of Delta Tau Delta fraternity. Walter worked at Tech's Engineering Experiment Station in his co-op quarters. He was a draftsman in the radar branch. He earned his degree in mechanical engineering in 1974. After graduation, Walter joined Georgia Power Company. When he is now an associate plant engineer at Plant Yates in Newman, Georgia. "I never had to make a decision between Tech and other colleges," Walter said. "Tech was the only school I applied to and I was pleased when I was accepted. Getting a degree was important to me and Tech has an excellent academic reputation. Walter attends fraternity alumni events and has season tickets for Tech football and basketball games. He is engaged to be married to Lynne Chambers June 23.

Stephen Keiser, Text '73

"I THINK OUR blood is Old Gold in color," Stephen Keiser said in explaining why he, his two brothers, his father, and two grandfathers attended Georgia Tech. "There was never any question where I would go to school," Stephen said. "I think my family and I all expected it." Stephen received a BS degree in textiles in 1973. "What I remember most is how the professors made you do the work yourself," he said. "You had to learn to do a job by yourself, and this was excellent preparation for the business world." After graduation, Stephen went to work for Oxford Industries and several textile-related companies in the dyeing and finishing end of the business. One year ago, he joined Georgia Maple Block, his father's company. "We manufacture counter tops, tables, benches and rails out of hard maple which we obtain from West Virginia, Michigan, Wisconsin or Canada. I had worked for Georgia Maple Block during the summers while I was in school and knew that I wanted to return to this business after I got experience at other firms. I like a small business situation."

At Tech, Stephen was a member of Delta Tau Delta fraternity. He contributes to Tech's general scholarship fund, goes to most home football games, and listens to all basketball games. "In the fall, I live and die with every first down and fumble," he said.

Stephen met his wife Deb while he was a student at Tech and she attended Massey Junior College. They have one son, Roman, who is five. "I hope my son will want to go to Tech," Stephen said. "But by the time he is old enough, as a male, he will probably have to be near genius level to get in. I'd like for him to go there, if that is what he wants to do."

William Estes, IM '40

"THERE WAS NEVER any doubt from the day I was born as to where I would go to college," W. B. Estes says. Estes' father, William Barney, was Walter Estes' brother who died when his son Bill was eight. "My youngest son continued the tradition by graduating from Tech three years ago," Bill Estes continues.

Besides attending Tech, Estes was associated with Tech for 18 years as sales director and assistant station manager of WGST radio. Estes entered Tech on a partial scholarship for football and track. He played freshman football and earned four varsity track letters. His career in broadcasting came about when Coach William A. Alexander assigned him to help WSB radio when it began broadcasting Tech football games. "It was the first college network broadcast in the South," Estes said. "I worked with Douglas Edwards (now with CBS) and Marcus Bartlett (now vice president of Cox Broadcasting). I primarily spotted players for them.

"When I earned my industrial management degree in 1940, Dean George Griffin was in charge of employment. He found me a job with the National Theater Supply Company in Cincinnati," Estes said. "I served four years as a captain in the U.S. Army's Signal Corps, then went to work as the general manager of radio station WQAA in Cedartown, Georgia." Estes was an account executive with WBTV when it signed on the air. Then he joined WGST radio and stayed there more than 18 years, until Georgia Tech sold the station to the Meridan Corporation. "In my opinion, WGST was one of the greatest assets Georgia Tech ever had," he said. "I was disappointed when the station was sold."

After WGST was sold in December 1974, Estes joined radio station WBIE-AM/WCOB-FM in Marietta as assistant general manager. Estes was an SAE at Tech. Through his work at WGST, he became personally acquainted with Dwane Morrison, Jim Luck, Bobby Dodd and George Griffin. "They are the best coaches anywhere," he said. "I think joining the Atlantic Coast Conference was one of the best moves that Tech has ever made. It hurt basketball, baseball and minor sports when we were not in a conference."

Estes' son, Robert Bruce, earned an industrial management degree from Tech in 1976 and is employed by Fesco Industries. He is currently on assignment at a coal washing plant in Charleston, West Virginia.

W. B. Longino, IM '41

WALTER BRUCE LONGINO is Walter Estes' nephew. Longino's brother, Dick Randolph Longino, Jr., also attended Georgia Tech. Longino's cousins, W. B. Estes and W. A. Ware, were students at the same time he attended Tech and the three spent a lot of time together.

Longino was a native of Atlanta and attended Boys' High. A co-op student at Tech, he earned a BS in industrial management in 1941. He lived at home as a student and was a member of Chi Phi fraternity and the Naval ROTC.

"It was quite different then," he said. "There were only 3,300 students enrolled when I graduated." Longino went on active duty in August after his graduation, then re­signed his commission and reenlisted in Navy flight training school. He spent 28 years as a Navy pilot, spending most of his duty time in the West Pacific. He retired from the Navy in Texas in 1969 and moved back to the Atlanta area in 1974.

Longino's son, Bruce is a Tech graduate.

Bruce Longino, ME '72

WALTER BRUCE LONGINO, JR., decided to go to Georgia Tech because he was "good in math and science; engineering seemed like a good career field; and because my dad went there."

Bruce earned a mechanical engineering degree in 1972 under the co-op plan. He thinks the co-op program is extremely valuable. "It let me know what engineering was really all about," he said. "It made going to school more pertinent. It also spreads the financial burden of attending school. The only drawback is that it takes an extra year to earn your degree. But it is worth the extra time."

At Tech, Bruce was a member of Pi Kappa Alpha fraternity. After graduation, he joined Southern Engineering Company of Georgia, which is owned by another Tech alumnus, T. Foley Treadway. He is a member of the Georgia Society of Professional Engineers and the American Society of Heating, Refrigeration and Air Conditioning Engineers.

Bruce and his wife Lynn have a daughter Julie. They attend Tech football games and think that the fact that Tech joined the ACC will help attendance at games, although they enjoyed the teams Tech has always been able to play as an independent.

Bruce said that another cousin, Donald Mosley, attended Tech at the same time he did. Mosley is currently in the Air Force serving overseas.

W. A. Ware, Text '40

"IT WAS A MIXTURE of family tradition and the fact that Georgia Tech offered the courses I wanted to take," W. A. Ware says of his decision to attend Georgia Tech. Ware is the son of W. A. Ware, Sr., ME '16, and the nephew of Walter Estes, EE '04, and another uncle, Ni-
Nuclear Engineering School Offers Diversified Programs

By BRIAN HAMILTON

NUCLEAR ENERGY opponents can name one problem after another with that form of energy and the nuclear power industry. They chastise everything from unsafe radiation levels to problems with transportation and storage of nuclear wastes to the possibility of nuclear core meltdowns. However, one thing is nearly certain—if these problems do exist the most logical solutions will likely come from the industry itself at a place like Georgia Tech's School of Nuclear Engineering, one of 30 such schools in the country.

Tech has 18 full-time and part-time faculty members studying virtually any aspect of nuclear energy you can think of. Topics of study in terms of current technology include the effects of low level radiation on the environment, health physics, advanced reactor design, and fusion energy technology, to name a few.

"Because we have such a wide variety of research going on here, we can offer a diversity of programs in the field and that's where the strength of our department lies," said Dr. Lynn Weaver, director of the School of Nuclear Engineering, who was just elected a fellow of the American Nuclear Society.

"I'd say if there's one area we need to improve it would be in thermal hydraulics and the associated computer technology. However, we are searching for a good man in that area."

Stacey Internationally Known

While the faculty of Georgia Tech's School of Nuclear Engineering is highly regarded around the country, Dr. Weston Stacey is probably its best-known member.

Stacey, a 1959 Tech physics graduate, is a pioneer in the field of fusion energy, the next plateau in the continuing story of nuclear energy research. Before returning to Tech to teach in 1977 (he earned his doctorate in nuclear engineering at MIT) he was director of the Fusion Power Program of the Argonne National Laboratory, where he helped develop the first experimental fusion power reactor.

As a result of his research he has been leading a four-man team of American researchers in the International Tokamak Reactor Workshop (INTOR). The one-year workshop, which is sponsored by the International Atomic Energy Agency of the United Nations, is bringing together scientists from the Soviet Union, Japan, Europe and the United States to assess the feasibility of a Tokamak fusion device. The Department of Energy is funding the research for the Americans.

"We have about 100 scientists in this country working on teams and the four of us are guiding their work," Stacey said. "We will have another meeting in Vienna this year to bring together the conclusions of the work being done by scientists in each country. We hope to have an international consensus in the early 1980's and have the plant operating by 1990. The plant would cost one to two billion dollars."

According to Stacey, the prospects for nuclear fusion energy look good for the near future. He said the technology should be scientifically feasible by the 1990's. "When we talk about a fusion reactor, we are talking about a process that is not only technologically possible, but economically feasible as well," Stacey said.
Students and visitors toured the nuclear reactor.

First Nuclear Energy Day A Success

Georgia Tech's School of Nuclear Engineering was the last school in the College of Engineering to receive its initial accreditation (1975), but it may be the first school to originate a national tradition.

May 1 was the first national Nuclear Energy Day, a day designed to give support to the often-criticized nuclear industry. It was a student-conceived and implemented day with seven speakers, displays and free tours of the Neely Nuclear Research Center reactor. It was sponsored by the local student chapters of the American Nuclear Society, American Society of Mechanical Engineers, American Institute of Chemical Engineers, American Society of Civil Engineers, Society of Women Engineers, Tau Beta Pi National Engineering Honor Society and the Society of Black Engineers.

To the outsider, it could seem as though the day was a public relations gimmick in response to the Three Mile Island incident. In reality, however, it was just a case of bad timing. The gears were spinning long before the accident. Planning began in December after the idea was envisioned by student Ed Moyers, last fall. In fact, the initial press releases announcing the event were sent out the day before.

"I thought we did a good job," said Tom Batchelor, the student chairman of the event. "We learned a lot of things to avoid and I'm sure the day will be even better next year."

The speakers involved were NAACP Chairwoman Margaret Bush Wilson, Dr. David Rossin of the Commonwealth Edison Corporation, Dr. James Buckham of the Allied General Nuclear Services Corporation, Paul Schutt of the Nuclear Assurance Corporation, Dr. and Mrs. Aden Meinel of the University of Arizona, Dr. Harold Lewis of the University of California-Santa Barbara, and Drs. Weston Stacey and George Sowers of Tech. The day ended with a banquet and speech by Washington Congressman Mike McCormack.

Each speaker covered a different aspect of the nuclear energy industry.

Wilson led off by saying essentially that there was no excuse for Three Mile Island, but without nuclear energy the United States would be forced to accept a lower standard of living and that many people can go no lower.

The thrust of Rossin's speech was that nuclear energy is by far the cheapest way to generate electricity and has the potential of solving many of the country's economic ills.

Schutt discussed the transportation of nuclear wastes in terms of how relatively safe it is. He said transportation has been well-tested in various types of containers and he showed a series of slides of a truck crashing into a wall at 80 miles per hour with no apparent waste leak.

The Meinels, both longtime researchers in solar energy, concluded that there are too many problems with solar energy (economic and functional) and other alternate forms to give up on nuclear energy.

Buckham said technology has the means of disposing of nuclear waste safely but the industry is not doing it. He said nuclear pollution is coming from the weapons program.

Stacey, one of the country's foremost figures in fusion energy research (nuclear energy today is fission energy), talked optimistically about the prospects of its development in the next decade. (See related story.)

Sowers reviewed the methods of constructing containment buildings and how to choose a reactor site.

Lewis, who led a team that critiqued the Rasmussen Report (which predicted the probability of nuclear accidents) said that the report was too optimistic when it concluded the chances of being killed were about as good as being killed by a meteorite. However, he said the errors were not substantial.

Finally, McCormack praised the work of the Tech students and gave what amounted to an informative pep talk to inspire nuclear propo-

(Continued on page 11)
Spurrier Joins Coaching Staff

By BRIAN HAMILTON

PEPPER RODGERS knew what it would take to get Steve Spurrier to come to Tech as an assistant coach. He turned on the charm and did a sales job on him, just as he had helped recruit him more than a decade ago to play football for the University of Florida.

It also didn’t hurt that Pepper understands the mind of a passing quarterback, since he was one himself. The pitch to Spurrier, the high school senior, was, “we’re gonna throw the ball.” The pitch to Spurrier, the out-of-job assistant coach was, “we’re gonna throw the ball and we’ve got the boy who can do it.” It was simple enough.

So now Spurrier, the 1966 Heisman Trophy winner, is coaching at the school where the man whose name the trophy bears began his career. And, of course, he’s coaching the quarterbacks.

“I had some feelers out that I didn’t really inquire into because I didn’t want to stay in coaching unless the opportunity was really right,” Spurrier said. “To be a college coach here was the best opportunity I could think of.”

Spurrier became available only because frustrated Florida football fanatics forced the firing of Doug Dickey last year. When former Clemson Coach Charley Pell was hired for the job, Spurrier became expendable. Spurrier himself was a longshot candidate for the job. He says if he had had more than one year coaching experience he would likely now be the Gators’ head coach. “But just because you’ve got a name for yourself doesn’t mean you’re a good coach,” Spurrier admitted.

Spurrier indeed does have a name for himself, and it’s been that way since he was an All-Tennessee passer his senior year at Science Hill High School in Johnson City. He threw for 2,400 yards his senior year with 15 touchdown passes and was recruited by many schools in the Southeast including Tech. Oddly enough he was also all-state in basketball and baseball but never even considered a career in those sports.

“I remember I stayed in the Tech Motel and later watched Tech play LSU,” Spurrier recalled. “An LSU player ran the second-half kickoff all the way back for a touchdown and that decided the game. The main reason I went to Florida was that Ray Graves, the head coach, was from East Tennessee and he came up four or five times to recruit me, which was legal back then. He said I’d have an early opportunity to play.”

Spurrier started for the Gators a little more than half the time his sophomore year. His first start was against SMU on regional television. “My first pass was a screen pass that was good for 54 yards. That was a sure way to get a completion.”

By the time Spurrier was a senior, he had broken most of the Florida passing records, most of which have been broken by John Reeves. At one point he had 99 completions without an interception and his entire senior year he passed at a 60-percent-plus rate, which caught the eyes of the San Francisco 49ers, who drafted him in the first round.

For most players that would be the highlight of a career. But not for Spurrier.

“My biggest thrill was when we won important games,” Spurrier said, alluding to Florida’s 28-12 victory over Tech to win the 1970 Orange Bowl. “Individual honors are nice to have but at the time those things are not as important as an important victory.”

The limelight slowly dimmed for Spurrier after being drafted by the 49ers. There he was backup to the legendary John Brodie. In 1972 he played a good bit after Brodie was injured but not nearly as much as when he later went to the Tampa Bay Buccaneers.

“I played too much there,” Spurrier said with a grimace. “I played 16 whole games and one half of the other four. We won one of 20 games that year, the only win coming against the Falcons in the preseason in Jacksonville.”

Spurrier has the dream most assistant coaches have at one time or another — to be a head coach. But he’s in no hurry and he says he has no desire to return to Florida.

“I don’t have a timetable for myself,” Spurrier said. “Coach Rodgers gave me a chance to come up here and I’ll try to coach the best I can. I’d like to be here three or four years at the least. This group here works better together than we did at Florida — the atmosphere is much better. If I don’t stay in coaching I’d like to stay connected with football somehow.”

So far now Spurrier is content to make his mark in Tech football and restore the Jackets to prominence. He comes with lofty credentials as a coach even though he only has one year of experience. Last year Spurrier had total control of the Gators’ offense, who were second to Mississippi State in passing in the Southeastern Conference. State threw about 100 more passes than the Gators. With Rodgers at the helm and a promising sophomore quarterback named Mike Kelley, Spurrier likes his chances for success.

“He (Rodgers) has a lot of strong suits as a coach,” Spurrier says. “One is the way he drills into the kids not to make mistakes, to throw the ball away when you have to and play good percentage football. And of course, he’s always had a lot of enthusiasm. That even shows the few times we’ve played tennis together.”

Kelley is generally regarded to be one of the finest prospects Tech has had in a number of years. Last year he passed for roughly 1,500 yards after sitting out the first game. If he gets the protection he got last year (he was sacked only three times, an NCAA record) he could likely be the best passing quarterback in Tech history.

“He’s bigger and stronger and throws a lot harder than I did,” Spurrier says. “A quarterback is generally as good as the people around him and Mike’s got a lot to learn. He picks things up quickly, and works hard. He’s a good guy for a quarterback coach to have around. His strong point is his ability to get rid of the ball and not take losses and throw interceptions. He doesn’t always throw the ball where he should, but that just comes with experience. He has a lot of ability and a quick release.

“We’re working hard on reading defenses. When I was playing, there were basically only a couple of defenses to read but now every team is real sophisticated. Mike will probably audible a little more than he has before.”

Spurrier surmises that Tech will throw the ball an average of 25 to 30 times a game this year. The dropback pass had been installed for next year although Spurrier says, “We’ll be sprinting out a lot.”

Amid all of Spurrier’s enthusiasm for the Tech football program lies one major criticism, one that’s frequently heard around Tech. That is that the athletic facilities are “inadequate.”

“I’m sure Tech alumni want to continue in big time football,” Spurrier says. “But we’ve got to have something better to recruit with. Basically we have to sell kids on the educations they’ll get here at Tech and on Rodgers’ idea of letting them grow up (Tech players can live off campus, contrary to the policy of most schools), and the fact that Tech isn’t a football factory. A new facility would really help.”

Outside his football life, Spurrier is married and has three children.
Nuclear (Continued from page 8)

Weaver speculated that the area most likely to be affected is research since most of it is funded by government — with more emphasis placed on areas related to safety. He says there shouldn’t be any changes in the undergraduate curriculum.

Weaver pointed out that, if nothing else, the nuclear industry has learned how to weather criticism well over the years. The industry has been verbally battered since the first nuclei were split. And he said, students are quick to pick up that mood.

“We try to teach the students through seminars that the engineer of the future, and not just the nuclear engineer, is going to have to be well-versed to deal with the social and political aspects of the job. We as engineers are more and more going to have to justify our actions. And in the nuclear field we are kind of pioneering in a way. For example, when someone says a road needs to be built, the engineer is going to have to justify to the environmentalist that the road is needed. And the other energy sources are going to have to justify their actions. Even solar energy will have problems. There are going to have to be tradeoffs because solar energy on a large scale will require a great deal of land. Any major enterprises of the future are going to have to deal with this kind of criticism.”

The Three Mile Island incident has kept the school on its toes lately. Tech engineers have been constantly in demand as guest speakers.

Stacey (Continued from page 8)

Stacey said that fusion energy is technically feasible in the next four or five years and that the next step would be testing the engineering feasibility.

With fusion energy, Stacey said, there are two alternatives — the fusion of deuterium to tritium or of deuterium to deuterium. In the former option, tritium has to be synthesized from lithium, of which there is a finite amount. In the latter option, deuterium is a common component of water and the supply is virtually limitless but the reaction needs a much higher temperature to enable the nuclei to bond together.

Stacey said with fusion there is no nuclear waste disposal problem except with some of the actual plant structure when it is decommissioned after 30 to 50 years.

After the one-year INTOR project is completed, Stacey said he will return to full-time teaching and research at Tech.

Energy Day (Continued from page 9)

Mc Cormack is unique in politics in that he has a master’s degree in chemistry.

“‘We’ll start to work a lot sooner next year,’” said Dr. James Rust, faculty advisor of the ANS chapter.

“‘We’d like to get it going on every college campus with an ANS chapter but we might have trouble coming up with 500 speakers.’”

HAVE YOU ORDERED YOUR 1979 GEORGIA TECH FOOTBALL TICKETS?

The 1979 Georgia Tech football schedule is one of the Yellow Jackets’ finest ever. With sensational sophomore quarterback Mike Kelley leading coach Pepper Rodgers’ new wide open offensive attack, the Jackets will open the season Sept. 8 at home against the defending co-national champion Alabama Crimson Tide. Other exciting home dates include Auburn Oct. 20 and Georgia Dec. 1.

If you have already mailed your order, THANKS!

If you have not ordered your tickets yet, please use the application below.

GA. TECH ’79 HOME SCHEDULE

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Season Ticket books include all seven home games. When ordering individual game tickets, indicate the number for each game in the spaces above. All seats $10.

Number of season ticket books ........................................ x $70 =

Number of individual game tickets .................................... x $10 =

Postage & handling .......................................................... $1.00

TOTAL $ .................................................................

Name_________________________ Phone_________________________
Address________________________ State________________________ Zip________________________

Return order form with check payable to:

GEORGIA TECH ATHLETIC ASSOCIATION
Ticket Office / Atlanta, Ga. 30332

Contributions to the scholarship fund should be made payable to

Alexander-Tharpe Scholarship Fund, Inc.

For More Information Call (404) 894-5447
(Top) The Mr. Pretty Legs contest was one of the main attractions of the week.

(Middle) The Chariot Race is a perennial favorite.

(Bottom) Tech has 29 fraternities and 5 sororities with a total Greek membership of 2,000 or 20 percent of the student body. Pi Kappa Alpha won the fraternity division of Greek Week and Alpha Xi Delta won the sorority division.
In a hectic event, a girl is carried across the field on a mattress, jumps off to chug a beer, then is carried back across the field on the mattress to the finish line.

The keg toss drew intense interest.

One of the contestants warms up for the Grits-Eating event.

Photos by Dana Dobbs

Spectators watch judges (L-R) Miss Atlanta and fraternity advisor Jerry Gallups tally points.

JUNE 1979
Technology Transfer Magazine Approved

THE BOARD OF TRUSTEES of the Georgia Tech Research Institute approved at its April meeting a proposal to establish a quarterly magazine devoted to commercialization of technology developed by Georgia Tech faculty and research staff. The proposal was originally offered by the Alumni Association's Committee of Twenty as part of its project on technology business development. The proposal approved by the GTRI board calls for the magazine to be established under the direction of an overview committee to be appointed by the GTRI executive director.

The magazine will attempt to highlight commercially feasible technology which has been developed as a result of research on the Georgia Tech campus. It is anticipated that the magazine will carry articles on the successful commercialization of such technology by both large and small companies. In addition, the magazine will feature current research projects which have developed products or ideas that may have commercial viability.

The emphasis of the magazine will be on the transfer of technology developed in the research program to the commercial sector. It is hoped that the first issue of the magazine will be published in the early fall of 1979. The GTRI board earmarked $20,000 to supplement the first year of operation.

The proposal for the magazine originated with the Committee of Twenty's effort to stimulate the assistance which Georgia Tech provides to advanced technology businesses.

"The basic philosophy of the technology business development project is that an overall economic development plan for Georgia should include an effort to plant the seeds of high technology business enterprises," according to project chairman John Hayes, IE'70. "We believe that high technology companies will make a meaningful contribution to the State's economy in coming decades, through significant employment and other advantages."

Committee of Twenty members feel that the time and circumstances are favorable for such a project. During the past three years, the amount of contract research conducted by Georgia Tech has tripled, and is expected to exceed $38 million for fiscal 1979. This research frequently results in innovations which have commercial applications and could spawn small, high technology business ventures. Enrollment in Tech's graduate schools has experienced a healthy increase and would provide a pool of highly skilled engineering and science graduates as potential employees.

Tech's Engineering Experiment Station employs more than 500 fulltime scientific, technical and administrative personnel and performs contract research in applied sciences, economic and management analysis. The station has laboratories and shop facilities which are available to commercial firms. These include two electron microscopes, chemical and physical analytical laboratories, a central machine shop, and a printing and photographic center. The Station's research and development laboratories include some of the most sophisticated technological facilities in the Southeast.

In addition, the Price Gilbert Memorial Library contains over 792,000 bound volumes and 750,000 technical reports. The collection of technical and scientific literature is complete and convenient.

Finally, Tech's Office of Computer Services can provide valuable services to businesses.

Two problems which the technology business development project plans to address are the difficulty that unique small companies have in securing equity capital and the outflow of Georgia Tech graduates to other states and regions.

Committee of Twenty members point to "Silicon Valley" in Palo Alto, California and "Route 128" in Boston as successful examples of high technology business growth spurred by resources available at Stanford University and the Massachusetts Institute of Technology.

Georgia Tech's project is built around a five point plan: (1) establishment of an Advanced Technology Development Service (ATDS); (2) a public education effort; (3) publication of a quarterly technology transfer magazine; (4) construction of an "incubator" building near Tech; and (5) a venture capital effort.

Progress has been made on the "incubator" building project. The building, which is proposed to be located near the Tech campus, will provide engineering development and light manufacturing space to small high technology companies at reasonable rates. A 60,000 square foot building is currently being considered. A high technology company with growth potential could use the facility for up to three years, then would be expected to move out and make room for another new business. The reduced rental space costs and proximity to Tech personnel and library, technical and laboratory facilities should do much to stimulate the growth of companies which use the building.

The Committee of Twenty, with the assistance of Talmage Dryman, a member of the National Alumni Association's Board of Trustees, is currently investigating the rental of a small amount of space to initiate the use of "incubator" space.

Work is also underway on the establishment of an Advanced Technology Development Service which will provide a small professional staff to support and administer an overall program of commercialization of research technology.

It is anticipated that the ATDS, if established, will assist target companies with ideas and advice, and can assist fledgling companies in finding marketing, legal, accounting, and economic advice. The ATDS would attempt to help companies evaluate factors which indicate the company would have a high probability of succeeding, provide a meaningful level of employment when mature, and be of a nature that the ATDS could make a meaningful contribution from the technology side. The ATDS effort is being assisted by staff of Tech's Engineering Experiment Station.

One of the critical problems a new small high technology business experiences is obtaining venture capital. There are high technology venture capital groups operating in other parts of the country, but none exist in the Southeast. The Committee of Twenty hopes to encourage these existing firms to increase their activity in the Southeast by serving as a referral agency for promising ventures. The Committee is also exploring the idea of establishing a high technology venture capital pool in the area. An on-campus committee has been set up to provide information and to assist venture capital groups in identifying companies in the Southeast.

The concept of a seed money revolving fund is being studied. The most critical stage of a new venture may be the first several months when high risk seed money is needed and the technical innovator does not have the personal resources to develop his concept. Since venture capital groups are often reluctant to enter at the high risk seed stage, a venture capital fund should be developed as a revolving loan to be returned to a revolving fund when a company identifies a permanent equity source.

"We have a lot of work to do, but we are pleased with the progress made to date," Hayes said. "The Committee of Twenty is pushing ahead." The Committee of Twenty is composed of two representatives of each of the last ten graduating classes at Tech. The technology business development project began in 1977 as an effort to seek new opportunities for service and to spotlight and expand established programs at Georgia Tech, specifically in the area of research and economic development.

-Karen Buttermore

Bill Ware (Continued from page 7)

Charles B. Ware, who graduated from Tech in 1912 or 1913.

At Tech, Ware was manager of the varsity basketball team, a member of Alpha Tau Omega fraternity, and several student organizations. He lived in dormitories his first two years at Tech, then moved into the ATO house which used to be located at 129 North Avenue and has since been torn down.

"I had a lot of fun as a student," Ware recalls. "I had a lot of friends and relatives who attended Tech. My cousins Bruce Longino and Bill Estes were in school with me and we managed to spend a lot of time together, even though we were all in different fraternities."

After earning a degree in textiles in 1940, Ware went to work for U.S. Rubber Company in New York. He is now the corporate purchasing agent in the corporate headquarters at Naugatuck, Connecticut.

Ware's son Steven attended Tech for over a year, then transferred to the University of Connecticut. Ware's oldest daughter, Janet, married Tech graduate Leon Folsom, Physics '64, and lives in Atlanta.

Ware has two grandsons and he thinks "there is a pretty good chance that one of them might go to Tech."
Information Questionnaire For
Advanced Technology Development Space

The Committee of Twenty of the Georgia Tech National Alumni Association is seeking information about potential users of low-cost advanced technology development space for new companies and satellite engineering space for established companies. (See the article on opposite page.) If you or your company has a potential interest in using this type of space adjacent to the Georgia Tech campus, please complete this questionnaire and return it to:

Georgia Tech National Alumni Association — Committee of Twenty
% John B. Hayes
1200 Citizens & Southern National Bank Building
35 Broad Street
Atlanta, Georgia 30303

The information supplied will be used by the Committee of Twenty in determining the feasibility and the requirements for low-cost development and office space. If you indicate that this information is confidential, committee members will not disclose any specific information about your response. Please feel free to add remarks or provide additional information.

1. Your name: ____________________________
2. Company name (if not yet formed, please indicate): ____________________________
3. Address: ____________________________
4. Phone: ____________________________
5. At what stage of development is your company?
   Company established in 19________ we have ______ employees, $________ sales in 1978.
   plan to establish a company ________ would like to join forces with another company ________
6. Please give a brief description of your advanced technology product or service idea:

7. At what stage of development is your new product or service:
   ______ only an idea (no prototype) ______ a rough prototype which is not fully developed and tested
   ______ a market-ready prototype ______ product has been marketed, number (amount) sold ______

Space Requirements
8. How quickly would you be interested in moving in, if space is available?________ days
9. How much development and production space do you need immediately? ______ sq. ft.
12. How much growth in space requirements do you project over the next three years? ______
    % increase
13. If a facility was located near Georgia Tech offering access to technical facilities and technical assistance, what would you consider a reasonable rent for production, development, and warehouse space? $________/sq. ft.
14. If office space (adjacent to development space) was available located near Georgia Tech, what would you consider a reasonable rent? $________/sq. ft.
15. Do you expect to need access to a truck loading dock? No ______ Yes ______ (how much usage? ______)
16. Do you expect any special facility requirements? (i.e., special power or other utility requirements, clean room, laboratory facilities, etc.) No ______ Yes ______ Explain ______

Supporting Service Requirements
17. Do you anticipate requiring technical assistance from Georgia Tech faculty and research personnel and private business? No ______ Yes ______
    If so, in what particular areas would you need assistance?
    management ______ company formation ______ evaluation of equipment ______ production engineering ______
    identification of market or advertising ______ financial resources identification ______ basic science and technology ______
    other, please specify ______
18. Would you be interested in shared use of specialized equipment (i.e., microprocessor development system)? ______ No ______ Yes ______
    (please describe ______)
19. Would you require computer support? ______ No ______ Yes ______ (please describe ______)
20. Would you need access to specialized Georgia Tech labs? (i.e., scanning electron microscope, gas chromatograph, etc.) ______
    No ______ Yes ______ (please describe ______)
21. Would you need access to the Georgia Tech library? ______ No ______ Yes ______
22. Would you be interested in centralized supporting services?
    Reception/Secretarial ______ No ______ Yes ______ Duplicating ______ No ______ Yes ______
    Accounting ______ No ______ Yes ______ Shop space ______ No ______ Yes ______
23. Should we treat your response as confidential? ______ Yes ______

JUNE 1979
'Conservation' Is Key At E-Tech

By KAREN BUTTERMORE

"I like to pioneer new fields, to start small businesses," Glen P. Robinson, Jr. said of his decision to found E-Tech, Inc., a successful new firm which utilizes Georgia Tech brainpower.

E-Tech was formed in June 1978 to develop high-technology products related to energy conservation, energy conversion, and solar energy applications. The criteria established for these products was that they be technically excellent and that they offer "real" savings to the user.

Robinson was one of the founders of Scientific Atlanta Inc. in 1952 and served as president until 1971 and chairman of the board until 1978, when he took early retirement to establish E-Tech. Scientific Atlanta is the world's largest producer of antenna-testing instruments and satellite communications earth terminals.

Robinson, who earned a BS and MS in physics from Georgia Tech in 1948 and 1950 respectively, is chairman of the board of E-Tech. Robert G. Hill, ME'58 is president of E-Tech. After graduation from Tech, Hill served in the Navy for two years, then earned an MBA degree from Harvard Business School in 1962.

E-Tech's first product is an electric heat pump water heater which reduces electric water heating costs by 50 percent. The Efficiency II unit connects to an existing electric water heater and is designed to be installed by homeowners without professional assistance. Instead of converting valuable electricity directly into heat by resistance elements in the tank, the heat pump takes heat from the surrounding air to heat the water. One unit of electricity yields two units of heat output, resulting in a COP (coefficient of performance) of two, and thus the name for the unit, the Efficiency II.

The Efficiency II can be attached to gas hot water heaters, but this is not recommended at this time, since the cost of natural gas is still relatively inexpensive. The savings for homeowners with gas water heaters is not competitive with that for consumers with electric water heaters.

Robinson said that E-Tech guarantees this product for five years, but expects a life of greater than 10 years. An unusual aspect of the product is the service arrangement. An extensive service manual is supplied to owners, enabling them to fix most problems which might occur. If they cannot repair the unit with the aid of the service manual, owners are asked to call E-Tech personnel for analysis of the problem and a solution. Parts are readily available and E-Tech literature states, "We are confident you can fix it faster yourself with our help. We believe your problem will be resolved as soon or sooner than through the use of authorized, local service points."

"Payback for the homeowner is approximately three years," Robinson said.

Since residential electricity consumption represents 20 percent of the total U.S. electrical usage, and 16 percent of that electricity is used to heat water, Robinson feels that his new company can make a definite contribution in the area of conservation.

"The biggest thing that people can do now to prevent shortages is to conserve energy," Robinson said. "Solar still has a long way to go. I believe it will prove cost effective in time. I think there has been too much emphasis on brute force demonstration projects and not enough on basic research."

"Many people are still not convinced of energy shortages," Robinson continued. "They get used to paying higher costs. It is not necessarily price that will wake people up, but rather unavailability. When they see that there is no gas in the pumps, it will hit home. Big users are using everyone else's supply. We need some type of mandatory conservation.

"There is a lot of wasted energy. Industry often won't spend money for conservation unless it can see a payback in a year or so."

"Nuclear energy can be a tremendous source of electric power," Robinson said. "The Three Mile Island incident is unfortunate, in that it will set nuclear power back, but it also may be helpful if it shows that catastrophes can be avoided."

E-Tech personnel are working to develop several other products, including a solar-powered air conditioner and water source heat pumps for water heating. In addition to product development and manufacturing, E-Tech staff members are involved in government funded research projects in order to stay at the forefront of their fields.

E-Tech has 12 full-time employees (four engineers, four lab technicians, three production people, one office manager) and a couple of part-time employees who are Georgia Tech students. Robinson said that they hope to outgrow their present facilities soon.

The original nucleus of E-Tech was expanded by the acquisition of Scientific Atlanta's Special Products Division. Staff, research contracts, patented products in solar energy, and specialized equipment came with the purchase.

"To date, we have sold our units by word of mouth or through local utility companies," Robinson said. "Our first advertisement was to customers of electric cooperatives in rural areas of Georgia, since gas is not as readily available as in urban areas. We have used the direct order approach and have aimed at the do-it-yourself market because of the simple installation and service procedures."

"A motel at Callaway Gardens has installed a unit to heat water for 10 rooms and has reported a savings of 65 percent in that portion of the electricity bill. The Air Force has indicated that it is interested in testing our unit in military living quarters," Robinson said.

Hill said that the heat pump is shipped by motor freight with installation instructions.

Glen P. Robinson, Jr.

Robert G. Hill
Micromeritics Founded By Alumnus

"MICROMERITICS" MAY NOT EXACTLY be a household word, but a Norcross company owes its existence and name to the term... and to some humble beginnings nearly 30 years ago at Georgia Tech. Micromeritics Instrument Corporation was founded in 1962 by Dr. Clyde Orr, Jr., of Tech's micromeritics engineering department and by Warren Hendrix, one of Orr's research assistants. The company manufactures high technology scientific instruments and accessories for use in the area of particle technology - the measurement of particle size, surface area, adsorption qualities, density, and other characteristics. Orr is a 1953 chemical engineering graduate of Georgia Tech. But the roots go deeper than 30 years. In fact, they go the way back to the 1940's. The term "micromeritics" was coined by Dr. J. M. DallaValle, a Georgia Tech professor and pioneer in the field of particle technology. His work led to the establishment of a micromeritics laboratory at Tech. Orr joined the lab in 1948 and greatly expanded DallaValle's original work. Orr's extensive research in particle technology and associated instrumentation has been the subject of a phenomenal number of scientific papers. In their research work, Orr and Hendrix developed and refined a machine to measure and analyze the size and absorption characteristics of small particles. And what began as part of a research program became a rapidly growing business enterprise. From a few hundred feet of garage space in the beginning, Micromeritics Instrument Corporation has grown to a $10 million per year business occupying a facility in Norcross containing more than 55,000 square feet. The company employs more than 200 people and enjoys a worldwide market, including the People's Republic of China. In fact, the company has had only one unprofitable year in its history, as sales have grown at an average of 30 percent a year. The company's facility houses office space, manufacturing, production, and research and development departments, plus the most complete particle technology instrumentation and laboratory services available anywhere in the world. The laboratory operates on a fee basis for customers with insufficient volume to justify purchase of the equipment, and for potential customers to use the machines before purchase. The importance of Micromeritics' instruments can be seen in its customer list. The company boasts nine of the top ten companies of the Fortune 500 as customers, 23 of the top 25 industrial corporations, and 39 of the top 50 industrial corporations in the United States — often on a repetitive basis. And the instruments have been used to measure particle size, surface area, and other characteristics of everything from cosmetics to catalysts to candy bars. In 1974, Micromeritics expanded into the area of high performance liquid chromatography, an industry that is growing at an annual rate of 40 percent. The instruments and accessories developed and produced by the company are designed for the rapid separation of chemical compounds from complex mixtures. And according to Orr, the Micromeritics instruments allow faster and more accurate test results than were previously available. The company has achieved industry leadership in particle technology through its broad product line, and holds a respectable market share in liquid chromatography through its state-of-the-art instrumentation. "We're the only company which offers a full line of equipment in both particle analysis and liquid chromatography," explained Hendrix, now president of the company. And Orr, who now serves as the company's chairman of the board, sees the increasing pressure to maximize the use of natural resources and develop more usable energy sources as a boom for Micromeritics. Orr has been a full-time professor at Tech for three decades, but has now cut back to half-time and devotes 2-3 days a week to the company. But even with his shift to part-time professor, the ties between Tech and Micromeritics will likely remain strong.
Former Jackets On Pro Rosters

By KAREN BUTTERMORE

Ten former Yellow Jackets are currently playing for professional football teams. In this final installment of a two-part series, five players are featured. The March 1979 edition of this magazine included interviews with the other five players: Randy Rhino, Montreal Alouettes; Jimmy Robinson, New York Giants; Steve Raible, Seattle Seahawks; Lucius Sanford, Buffalo Bills; and Randy Pass, Green Bay Packers.

Seven Georgia Tech players who were selected in this year's pro draft are listed at the end of this story.

David Sims/
Seattle Seahawks

Seattle Seahawks running back David Sims scored more touchdowns last season than any other player in the National Football League (NFL). Sims' 15 touchdowns made him the leading scorer, outside of kickers, in the NFL in 1978. His record is even more remarkable since he missed five games last season due to injuries.

Sims, who was drafted in the seventh round by Seattle in 1977, said he was glad he got the chance to prove himself. He was named the Seahawks' most valuable player by the Newspaper Enterprise Association, a national organization.

He was Seattle's top rusher with 800 yards last season. He holds the team record for carries in a game (23) and carries in a season (166). He is the first player in the Seattle team's three-year history to have four games in which he rushed for more than 100 yards. He holds the team record for longest pass reception (82 yards), which he made in the game against Cincinnati last season.

Sims had trouble with a strained knee last season. "It was not a serious injury," Sims said, "but the coaches kept me out of the game so that it wouldn't become more serious. The highlight of last season for me was the game in which I returned to action after being out two games with the knee injury. In that game against Baltimore, I rushed for 56 yards and disproved those who doubted whether I could carry the ball again effectively."

Sims attended the Super Bowl this year and said it was "quite a different perspective, watching it as a pro player. Next year, I want to be playing in it."

An industrial management graduate, Sims is participating in the executive training program of Weyerhauser Inc. during the off-season. He said he enjoys the exposure to the business world.

"Atlanta will eventually be my home again, but for now, it is better for me to spend my off-seasons in Seattle," Sims said. "Seattle is a beautiful place, it is God's country with moderate weather and a lot of rain. There are a lot of differences between Atlanta and Seattle. The pace of life and social activities are slower here. The people here are very nice and I enjoy playing here."

Sims' contract was extended for five years last month. "I'd like to stay here as a player, if all goes well and I stay healthy," Sims said. "We play good teams and our team has improved steadily."

Sims finds several differences between college and professional football. "In pro ball, the mental part of the game and the mental preparation are much more intense," the former Yellow Jacket said. "You can't make mistakes. Everyone is good and they don't make mistakes. Nobody sits on the bench. You have to be in great shape. The basic football is the same, but you are playing against much larger and more experienced guys."

At Tech, Sims set several records, including most touchdowns career (21), most yards rushing career (2274), most yards rushing season (881) and most touchdowns career rushing (21). He was named to the Associated Press All South Independent team and received the Coach Bobby Dodd Award for Tech's most valuable player. His senior season at Tech was fall of 1976. He played high school ball at Decatur High, where he was the quarterback.

Eddie Lee Ivery broke some of Sims' Tech rushing records in 1978. When asked about that, Sims said, "I couldn't think of a better person to break my records. Eddie Lee is a personal friend. I visited with him before he came to Tech and gave him a vivid picture of what to expect at Tech."

Former Yellow Jacket Steve Raible is one of Sims' teammates in Seattle. "It's always nice to know someone when you move into a new situation," Sims said. "Steve showed me around and explained how things operate out here. He has his job with the team and I have mine."

In his free time, Sims, who is single, enjoys backgammon, music, dancing, and learning to play golf.

David Sims

Billy Shields/
San Diego Chargers

"THE KEEN COMPETITION at Tech — whether it is on the athletic field or in the classroom — is one of the factors which I think helped me get into professional sports," San Diego Charger Billy Shields said in a recent interview. "There was always competition at Tech as a student and we always played good football teams. I think pro scouts look at the caliber of teams you play."

Shields, the starting left tackle for the Chargers, is in his fifth year with the team. He was drafted in January 1975 and came back to Tech his first two off-seasons to complete work on his BS in civil engineering, which he received in 1977. The last two off-seasons, he has remained in San Diego, working in civil engineering.

Shields finds that pro football differs from college ball in that "it is a job, it is your means of putting food on the table and supporting your family. Whether you get paid or not depends on whether you make the team. In college, even if you didn't make the first team, you still could count on meals."

Shields played high school ball at Banks High in Birmingham. He chose Tech "because the degree is so valuable. I was looking for a good education, along with the opportunity to play football. In the pros, I've met players from other colleges who said there was often more emphasis on playing ball than on going to class or getting a degree."

Shields was captain of the 1974 Yellow Jackets. That year, he was named to the All Southeast Independent team and played in the post-season Blue-Grey game. He played in the 1972 Liberty Bowl, but he said the highlight of his career at Tech was when the Jackets beat Georgia 34-13 his senior year. "It was a miserable game for those in the stands," he said. "We
played in the mud and rain, but it was a great victory for us.” Shields played under three coaches at Tech: Bud Carson, Bill Fulcher, and Pepper Rodgers.

He names the second meeting of the Chargers and the Oakland Raiders in 1978 as the highlight of his most recent pro season. “Oakland beat us on a crazy play in the last quarter of our first game with them,” Shields recalled. “We beat them in the second game, the same way they had beaten us, in the last minutes of the game. If we could have written the script, it would have gone exactly the way the actual game did.”

Shields has not been back to Tech since his commencement in 1977. “But I do keep up with school and the team,” he said. “I saw the Georgia game on television this year. Our receiver coach, Pat Hodgson, had played at Georgia. We bet on the outcome of the game, and he and I had already conceded when Georgia pulled it out.”

Shields thinks Tech’s joining the Atlantic Coast Conference (ACC) was a good move. “But I liked being an independent,” he said. “We could play anyone and not be bound to conference schedules. I know the independence status will help with recruiting and the players will be able to compete for conference honors. I understand the ACC schools are more similar academically to Tech than Southeastern Conference schools.”

“The proposed varsity athletic facility is really needed,” Shields continued. “I hope it will be something that the whole school—not just athletes—can be proud of.”

Tony Daykin

Daykin thinks the hiring of Steve Spurrier and Norm Van Brocklin as Tech coaches was a good move. “I met Spurrier at an alumni club meeting in Augusta this year and he made a very good impression,” Daykin thinks the decision to build a new facility for varsity athletes “is fantastic. I love Georgia Tech, but the athletic facilities are some of the worst around. When I started playing for Tech, we didn’t even have a weight room. Pepper put one in, but it is outside. The new facility will be great for recruiting.”

“I’m glad Tech has joined the Atlantic Coast Conference,” Daykin said. “It will help financially. I hope Tech will continue to play the big Southeastern Conference schools, including Alabama, since fans usually associate Tech with the SEC.”

Daykin is 6'1 1/2” and weighs 220, approximately the same size he was at Tech. He has had only one minor injury in pro ball which caused him to miss one game.

Daykin is single and enjoys scuba diving in his leisure time. When he retires from pro football, Daykin hopes to go into business for himself. “Someone has told me what to do for most of my life, especially in organized athletics. I think it would be nice to be my own boss for a change of pace.”
Wilkes selected Philadelphia’s last game against the Giants as the highlight of last season. “That win gave us the Eagles’ best record in 15 years and the chance to meet the Atlanta Falcons in play-offs. Philadelphia lost to Atlanta in the play-off game 14-13.”

Wilkes broke his hand last season, but was able to play in spite of the injury. “There is a big mental transition from college to pro ball,” Wilkes said. “Mental preparation is mandatory and the players have great physical strength. There are so many offensive plays and the defensive plays change week by week.

“I’m very excited to hear about the proposed facility for varsity athletes at Tech,” Wilkes said. “It will definitely help with recruiting. I think it’s my duty as a former player who benefited from my experience at Tech to help this effort along.

“I think Norm Van Brocklin and Steve Spurrier will be good for Tech’s football program. Their experience and intelligence will be assets. It’s easy for a player with physical talent to play under an intelligent coach.”

Wilkes was the player representative on Tech’s Athletic Association Board of Trustees when Tech decided to join the Atlantic Coast Conference. “Joining the conference will better the overall athletic program,” he said. “It will certainly help financially. I think being an independent hurt Tech to a degree. We will see more better quality athletes decide to go to Tech in the future.”

Wilkes, who is single, plans to spend some time in the off-season with his family in Atlanta. The former Southwest High player has a variety of leisure time interests. “I enjoy reading, playing basketball, jogging, and getting out and meeting people,” he said.

Seven Selected In Pro Draft

GEORGIA TECH had more players drafted in the May 4 professional football draft than any other school in the Southeast. Seven of Tech’s players were selected by pro teams, while national champion Alabama had only five players drafted.

1979 Heisman Trophy candidate Eddie Lee Ivery was drafted in the first round by the Green Bay Packers. He was picked fifteenth overall and had been sought by the Packers, the Cincinnati Bengals and the Atlanta Falcons.

Kent Hill, an offensive tackle, was another first round choice from Tech. He was picked twenty-sixth overall by the Los Angeles Rams.

Don Bessillieu, defensive back, was chosen by the Miami Dolphins in the fourth round. Roy “Sugarbear” Simmons, offensive guard, was selected by the New York Giants in the eighth round.

In the eleventh round, defensive tackle Mike Blanton was called by the Miami Dolphins and offensive tackle Mike Taylor was drafted by the Houston Oilers.

Drew Hill, one of the top kickoff returners in the country, was selected by the Los Angeles Rams in the twelfth round. Split end Drew Hill will join teammate Kent Hill at the Los Angeles mini-camp.

Joe Harris/San Francisco 49ers

Joe Harris, linebacker for the San Francisco Forty-Niners, could not be reached in the off-season for an interview. Harris holds two Tech records: most “hits” season (188 in 1974) and most “hits” career (415 in 1972-74).

E-Tech (Continued from page 17)

boards of Tech’s School of Electrical Engineering and Georgia State University’s School of Business Administration. Formerly chairman of the Georgia Science and Technology Commission and a member of the Advisory Committee to the Department of Defense, he became a member of the Young President’s Organization in 1960. The Small Business Administration named him as Georgia’s Outstanding Small Businessman in 1965. He was elected a fellow of the Institute of Electrical and Electronics Engineers (IEEE) in 1977 and selected as Outstanding Engineer of Region III by the IEEE in 1978.

A trustee and treasurer of the Episcopal Radio-TV Foundation, Robinson enjoys gardening, tennis, his family’s vacation home in the mountains, and helping his five children get established in business. His wife, Jan, is active in civic affairs.

Robinson is the current chairman of the Georgia Tech Research Institute (GTRI), which is Tech’s contracting agency for research and development. Last year, GTRI allocated $25 million in research funds.

GTRI is playing a major role in the progress of the Alumni Association’s Technology Business Development (TBD) project. GTRI’s board of directors recently allocated funds for the establishment of a quarterly technology transfer magazine. Robinson’s E-Tech is an example of the type of small, high technology businesses which the TBD project is designed to assist.

“There is a lot of opportunity for development of high-technology companies as spinoffs from existing and new research at Georgia Tech,” Robinson said. “The TBD project is designed to encourage and assist entrepreneurs who could form new businesses which will expand the economic base of our region. These entrepreneurs may not have all the support resources they need, such as financial planning, use of various services, shop facilities, and technical assistance. Another objective is to find career opportunities for Tech graduates to stay in Georgia.

“There are a lot of students and faculty who would like to do this, but think the hurdles are too great. We want to give them the spark of encouragement to go on,” Robinson said.

“We hope to be able to build a building on or near the Tech campus where space can be rented for a new venture and where products can be developed using some of Georgia Tech’s resources at a modest cost. As soon as a new company is past the early development stages, it would move out of this ‘incubator’ building and make room for another new company.”

Hill and Robinson both have advice for people who are thinking about going into business.

“LARGE scale venture capital is not hard to find if you have a history of solid accomplishment and a product or service that offers the customer a real economic advantage,” Hill advised.

“The hard job is in finding the ‘seed money’ needed to develop and prove the initial product. This money usually comes from personal sacrifices and from close friends and relatives.”

Robinson advises entrepreneurs to “be willing to listen to and take the advice of others. Many entrepreneurs are blind to ideas other than their own. They are often so wrapped up in a technical concept that they can’t recognize that a product won’t sell or an idea won’t work.

“Problems bring opportunities,” Robinson said. “The world’s energy problem has given us an opportunity to start a new business in energy conservation and alternate energy sources.

“If you have a good idea that meets an economic need and are so inclined, I encourage you to consider starting a new business. It is very exciting and sometimes can be rewarding,” Robinson concluded.
A Touch Of Glass

THANKS TO WALT DISNEY and an abundance of science fiction movies to come out of Hollywood over the last few decades, probably the most familiar symbol of a scientist or other technical person is the test tube. Mad scientists mix their mysterious formulas in them, and in one movie a small monster climbed out of one. Even today the test tube stands for something greater than just a piece of glass. Witness the world's first test-tube baby. The baby didn't grow up in one and it wasn't made out of test tubes. And chances are the standard test tube played a fairly small role in the whole event.

In reality, science and the glassware it uses, are infinitely more complex than it is ever depicted. No one knows that better than Georgia Tech's master glassblower, Don Lillie. If anyone could make a test tube specialized enough for a baby to grow in, it would be Lillie.

Lillie and his assistant Jerry Cloninger inhabit a small, rectangular room in the basement of the Boggs Chemistry Building. Together they make all the specialized one-of-a-kind glassware that is needed by every on-going research project on campus. Lillie may do more to influence research on campus than anyone in the academic community simply because without a glassblower some projects could be delayed for weeks at a time and others could probably not be performed at all.

"We are torch workers and our work is precise, intricate and detailed," Lillie says. "Our projects are like putting together a big puzzle from directions given to us by the people who order the glassware. What excites me is that in our operation we are using old techniques to produce vital research apparatus. This operation is probably more important than the mass spectrometer or many of the expensive techniques to produce vital research apparatus. This operation is probably more important than the mass spectrometer or many of the expensive machines because we serve virtually every department on campus. A lot of the things we make, you can't buy anywhere. Not many people can make them."

Lillie says his most remarkable achievement in scientific glassware was the production of a three-stage mercury diffusion pump. The pump had four tubes sealed one inside the other. Lillie admits, though, that part of the fun he used to have in the job is gone.

"When I first started here, I used to be able to go and see the finished products in actual use, but I stopped that a while ago," Lillie says. "We haven't been caught up here in the last three or four years."

Lillie first became entranced with glassblowing in high school in Rochester, N.Y. (Actually, the word "glassblowing" is somewhat anachronistic. Very little work is done by blowing through a tube to shape the glass. Lillie has a machine that resembles a lathe with torches, and other fire-breathing instruments to melt and shape the glass.) He got to know this glassblower from the Mayo Clinic and from 1949-55 served as his apprentice.

"I cut and burned my hands constantly," Lillie recalls. "You learn real quickly when you find out how much it hurts. You work with temperatures around 585 degrees centigrade."

After a six-year apprenticeship, Lillie came to Tech as a part-time student and part-time glassblower funded by the Engineering Experiment Station. He eventually earned his degree in physics, but his degree has done little more than gather dust since then.

In the early days, his work area was in the sanitary engineering building. He used the ovens in the ceramic engineering building and occasionally some of the precision saws in the physics building. He finally moved the whole operation over to Boggs in 1972 into a room that he designed.

Don Lillie

"The only thing that's not right is everything should have been tilted 15 degrees so the torch on the table right behind me doesn't point directly at the back of my head. Occasionally it gets a little hot," Lillie says.

Now Cloninger has the role of apprentice that Lillie occupied for so long.

"Glassblowing is one of those professions that you can't go to school to learn," Lillie says. He later qualified his statement with the fact that you can learn scientific glassblowing at Salem County Technological Institute in New England.

"You almost have to find a place with an opening for a beginning glassblower. When I hired someone for a job, I look for someone who is a musician, a model builder, or likes to build things with the hands. You have to have a certain amount of finesse and dexterity, and you've got to have perseverance and do things over and over until you get them right. My son is starting to take it up now and I realize now that there are so many things I do that are terribly difficult to try to explain to somebody.

The old glassblower I used to work with told me you've got to think the glass together. Now I know what he meant. Another problem is that you can't pick up and leave and look for another job in your field. Generally, you've got to be willing to stay in one place for a while."

Lillie estimates that there are probably 500 glassblowers in the entire country and most of them do one particular job for one particular company. He says there are only eight to ten in the Southeast, mostly at the bigger universities.

What all this has meant to Lillie goes beyond his work for Tech, however. He owns a six-person shop in Smyrna that does all the scientific glassware for every college in Atlanta, including Emory University and the Atlanta University Center. He also does the same work for Coca-Cola, the Center for Disease Control and other research firms in Savannah.

His Smyrna shop also contains a glass-art studio and his work has found its way to some of the most distinguished homes in the world. When then-president Richard Nixon visited Atlanta a few years ago, Lillie was commissioned... 

(Continued on page 24)
STAR WARS has planted the robot firmly in our imaginations, if it wasn't there to begin with. R2D2 and C3PO were capable of doing nearly anything the average human being can achieve. They walk, talk, think, feel and they even had life-of-the-party personalities. In fact, you probably wouldn't mind having one of them as your best friend.

However, the here-and-now robot is as close to R2D2 and C3PO as the slide rule is to today's sophisticated computers.

"I don't see any reason why a robot like them (R2D2 and C3PO) couldn't be evolved," says Dr. Wayne Book of Tech's School of Mechanical Engineering, who studies robot prototypes.

"Whether or not it'll be economically desirable is the question. I don't see any basic obstacle, but there are some problems such as what would be the power supply. Right now we don't have anything approaching humans in terms of energy efficiency. The only thing I can think of to power them would be nuclear-thermal power."

According to Book, robots now are primarily being used in hazardous or boring jobs such as those involving high temperatures, dirt or fumes. "You can't send a human in to clean up Three Mile Island," Book says. He says one of the most immediately promising areas for robots is in assembly line production.

"You can set a robot as you would a person and give it hands (end effectors) and special tools and program it," Book says. "Then when you finish one job, you can change end effectors and programs. This makes the robot very cost-effective since most of the capital investment is transferable from one job to another."

"We've been trying to get a version of an industrial robot here for some time," Book says. "Basically it would have to be the contribution of, or at least the rental of, one. We've talked with people at AMF, Unimate, Lockheeds and Cincinnati Milicron. At Cincinnati Milicron their production hasn't been able to keep up with the industrial demand for robots. Somebody is going to have to be convinced that it is to their advantage to have a school from which they can hire personnel experienced in working with their robot. The robot I'm talking about would probably run about $40,000 to $60,000."

The only robotics equipment Tech has is a master-slave manipulator. It is a computerized mechanical arm that operates in a plane and follows the movements of its master (a human) who sits beside it. Book and his students use the arm to find out how specific characteristics of a manipulator affect its performance. It is a prototype of such things that might be used to clean up Three Mile Island or do other hazardous work.

Another area for the study of robotics is in prosthetics. Prosthetics is basically the replacement of an arm or leg on a human. But the problem here is in bridging the gap between the brain and the limb. You don't want a person to have to go to a computer terminal and punch in a bunch of commands.

"The mechanical equivalent to a muscle would be a revolution in robotics," Book says. "New robot intelligence is outstripping the mechanical capabilities to perform the task. We have found nothing that comes close to duplicating what a human muscle can do. It can stretch and bend and return again. It can react quickly to a stimulus."

According to Book, some experiments have produced robots with the beginnings of artificial intelligence. He says some have hand-eye systems, which means they could perform such rudimentary tasks as sensing a wooden block and moving it.

"Eventually the limit of the robot will be the capability of the human to program it. A robot could go out and experiment on its own like an infant that moves around, senses and learns. But eventually the complexity is going to get to the point that we won't be able to extend it any further. I certainly don't think a robot would ever turn into a HAL (the computer brain of the spaceship in the movie 2001: Space Odyssey that eventually took over the craft and killed the crew)."

Book points out that as robots gradually displace humans on the job, a whole new set of social questions will arise. How do you keep people gainfully employed as society becomes more fully automated? When does artificial intelligence become more or less desirable than human intelligence? How important are emotions in performing a certain task? Are economy and efficiency more important than human well-being? Admittedly those problems are down the road a way, but Book says they certainly merit consideration.

Book's personal research has led him in several directions. He has worked in trying to predict the behavior of the remote manipulator arm of the Space Shuttle for NASA.

"Since the arm is going to be working with no gravity, it is impossible to test it on earth," Book says. "My work is largely with computer simulation."

One of the most fascinating and concrete areas of Book's work outside Tech involves athletics, exercise and rehabilitation. He and Tech's Russ Polhemus of Physical Education and a graduate student named David Ruis have founded Optimal Athletics, Inc. to market a robotics exercise machine. The three developed a robotics exercise machine, which in some ways, would put a nautilus machine to shame.

The idea of Book's machine is to individualize exercise to each person. The machine would measure the strengths and weaknesses of each person and use them to the person's advantage. First the person would move the machine in a regular cycle, such as a curl in a routine with weights. When the person stops, the machine would stop and remember the pattern it just finished. Then the person would go through the motion again, applying his maximum force and the computer would record that.

"A lot of force can be applied with the machine and the role of the computer is in supervising the entire operation," Book says. "For example, if a person wants to do endurance exercise, he might set the machine to a force of 60 percent of his maximum strength. And there are a lot of other potentials our prototype doesn't emphasize. For example, by recording the person's maximum strength, we can tell when he is fully recovered from an injury, which is useful in preventing further injury. And then there's the safety aspect. The computer can recognize a malfunction and stop the exercise."

—Brian Hamilton
Archives Preserves Tech's Past

By BRIAN HAMILTON

They house such seemingly endless mundane items as a registrar's list for 1925. They contain the virtual life history of the infamous George P. Burdell. They have a complete set of "Blueprint" yearbooks beginning in 1908, including the 1943 issue showing J. E. Carter of Plains, Ga. In essence they have the most complete colorful history of Georgia Tech. They're in the basement of the Price-Gilbert Library. They are the archives.

The archives have been at Tech since the 1920's with the arrival of an extremely foresighted lady named Mrs. Dorothy Crosland, who was Tech's librarian for 46 years. She began to gather, sort and file away the items that could not be replaced today.

"She (Crosland) retired in 1971 and it was too bad because she was such a good source of knowledge herself," said librarian Helen Citron who was completely in charge of the archives from 1968-73.

The archives are in a place known as the "cage" among library personnel. The term is descriptive. A fall, gray cage, which resembles a fence, with a lock, protects the thousands of priceless manuscripts and trinkets. Only a couple of people have keys to the cage and it takes special permission from Dr. Graham Roberts to enter the area. And even Roberts himself doesn't have access to certain information, such as past personnel and registrar files. Those offices have to grant permission.

Not just anyone can get permission to enter the cage. It is no place for people who want to browse.

"We've had certain research records subpoenaed for the purpose of showing that Tech did indeed complete some research projects it was supposed to have completed," Citron said.

"Some people in the Tech community who are doing historical research or have some special need can get in. The Atlanta Newspapers have come in to do research or look for an obscure photograph. But not just anyone can enter."

Citron and librarian Barbara Walker are the two people most deeply involved with the archives. Unlike many institutions, Tech does not have a full-time archivist. At Tech the archives are treated like another part of the library and are open from 8 a.m. to 5 p.m. Items are cataloged in a card catalog, which Walker says is "unusual but it works."

"We have discussed hiring a librarian whose main job would be care of the archives," Citron said. "But money for that will come from the next fiscal year's budget or the one after that."

Speaking of money, it costs between $10,000 and $15,000 for binding all documents accumulated in a year. However, it is hard to say with any accuracy how much is spent on the archives since it does not have a separate budget.

Student and faculty publications and anything bearing the Georgia Tech imprint form the bulk of the archives collection. The materials cover all aspects of the Institute, both serious and frivolous.

On the serious side are the complete files of Tech's master's and doctoral theses. There are college catalogs dating from the earliest in 1888 and back files of the President's Report, the Research Engineer and the Georgia Tech Alumnus. Also included are records of committee meetings, student meetings and conferences.

Of all the personnel folders on file, Tech alumnus astronaut John Young has the largest. Stored is a signed photograph of him and a copy of the Tech pennant he left on the moon.

A portion of the archives is composed of what might be called the lighter side of Tech.

There are football programs from 1932, the first year they were ever printed. There are back files of the Technique and its predecessor, the Yellow Jacket.

The first Technique, in 1911, is just a couple pages long and is devoted almost entirely to football, specifically the Georgia game.

"The winning team is by all means entitled to the right of way," wrote the Technique editor. "If Tech wins, we certainly intend a celebration which will make Atlanta proud of us. If Georgia wins, it is no more than sportsmanlike that she be given the choice of celebrating as she chooses provided Tech don't (sic) suffer the dog being run over them. If anything ungentlemanly or unsportsmanlike happens we want to be able to say the mess had its origin elsewhere. No man can raise an argument against such a point."

Also included in the initial Technique, brown and crumbling with age, is a front-page editorial by Coach Heisman called "taking inventory." The coach was extremely prolific as his article consumed nearly an entire page, which was nearly twice the size of a Technique today.


A rare non-football article announced the first meeting of the Emerson Chemistry Society and another was entitled, "Mandolin Club is a Hummer."

The "B" section of the cage is an especially interesting area. That is where one of Tech's most famous students, George Percival Burdell, has his own folder. Included are engagement announcements, a telegram commending him for his meritorious service in World War II, and the only known photograph of him. The photo is taken from behind of a man running from the camera around a corner with books in hand.

"The earliest things we have on him (Burdell) are from the mid 1930's," Citron said.

(Continued on next page)
Alumni function better with a good night's sleep.

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(ask about meeting facilities for alumni functions)

Glass (Continued from page 21)

to make a phoenix. President Gerald Ford received a cross with dogwood blossoms when he came to Atlanta. Senator Robert Dole has a crystal elephant Lillie made, and the Canadian Consul received a dogwood branch. He has had orders from people in the Orient and the Near East. His art is so successful it is sold in a shop in the Omni International.

"Each Christmas I would make a few things for friends and family, but after a while that took up to two or three days," Lillie said of how he got into glass art. "When I got here, I was the only glassblower in the state except for the traveling glassblowers I used to see at shopping malls. I just thought I could do a better job than they did."

Lillie, indeed, has made some unusual pieces. He's made chandeliers for his home, sailboats, and probably the only glass yellow jacket sealed inside a glass football.

Archives (Continued from page 23)

"But there are reports of alumni having heard of him before that. My favorite is from the year Tech started computer registration and he had signed up for every course offered."

Don't get the idea that the archives only cater to written material. There are original rat caps, an original sample of gold yarn which established the Georgia Tech gold color, a 1902 class pin and a woven Tech seal. There is a Columbia recording of "I'm a Ramblin Wreck" by the "Yellow Jacket Four of 1925."

Elsewhere around the library are portraits of the past Tech presidents, which are also considered to be part of the archives. The original resolution to the Georgia legislature by Nat Harris in 1882 to create a committee to investigate establishing a technical school in Georgia, is in Roberts' office.

"We don't do active recruiting for these items," Citron said. "But we are always willing to accept donations. "We are always in need of photos, especially old photos. We use Dean George Griffin (dean of students emeritus) a lot to help us identify these old pictures."

Incidentally, there is a Dean Griffin file in the cage, with all the photos he used to hang on his wall. Included are the earliest known pictures of the football and baseball teams.

"Lots of people send things to us through Dean Griffin," Walker said. "I guess it's mostly because he's so well known."

Occasionally the archives get a donation they can't really use such as someone's class notes or an ROTC uniform.

The next step for the archives, Citron says, is a microfilm project in which the Technique and all the newspaper clippings will be stored. Citron estimates it will take $3,000 to get the project going and another $500 a year to maintain it.

"We are not out to expand the archives, but we have gotten into that with certain records we started saving. Sometime in the long-term future, we will need additional space. The archives have been moved four times in the last 15 years," Citron said.
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Alumnus Carl de Santos was the overall winner of the 1979 Griffin Road Race sponsored by the Georgia Tech National Alumni Association. de Santos ran the 3.14 mile course in 15:48.