

THE Georgia Tech

ALUMNI MAGAZINE • SPRING 1977



Campus Life Today

The 1977 SGF Prize has been awarded to Kevin Cantley for his high achievement in architecture.

This year's project was the redevelopment of the Memorial Arts Center/MARTA Station area.

Sponsored by Southern GF Company, the annual competition of fifth and sixth year architectural students is held in cooperation with the College of Architecture, Georgia Institute of Technology and the Atlanta Chapter, American Institute of Architects.

Kiyokazu Hosokawa has been named runner-up in the competition.

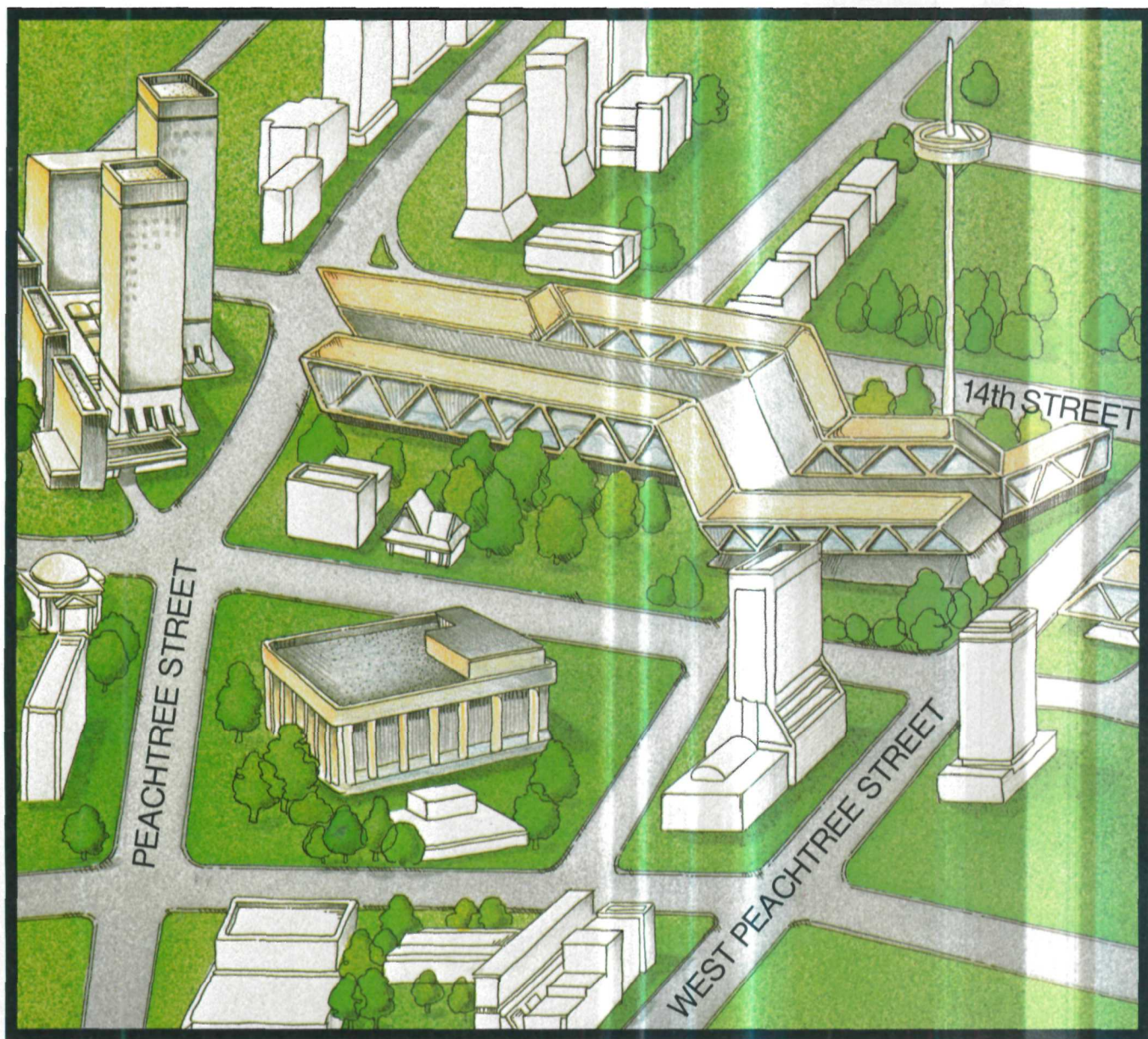
The SGF Prize Jury consists of members of the Faculty and the

following architects from the Profession: James H. Finch FAIA, Finch Alexander Barnes Rothschild and Paschal Architects; Joseph Amisano FAIA, Toombs Amisano and Wells Architects/Planners; Thomas W. Ventulett, III AIA, Thompson Ventulett & Stainback Architects; Pershing Wong AIA, I.M. Pei & Partners, New York.

The SGF Prize Advisory Board includes: Jerome M. Cooper FAIA, Cooper Carry Associates; Joseph N. Smith FAIA, Assistant Director, College of Architecture, Georgia Institute of Technology; Herbert Cohen, President, Southern GF Company.



An apex in architecture: The SGF Prize.



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Bob Rice Takes Over

Dear Fellow Alumni:

As has been reported to you earlier, an active search has been taking place for a logical successor to Roane Beard. Roane, incidentally, will be retiring within a week after this article appears.

As previously reported, our first thought in this endeavor was to seek the aid and advice of everyone with whom we could talk about the subject. After having finalized our criteria about the type person for whom we were looking, we immediately set the wheels in motion by placing an advertisement not only in *TECH TOPICS*, but also in *THE CHRONICLE OF HIGHER LEARNING*. In addition, we placed an ad in our own *PLACEMENT BULLETIN*.

While the applications were coming in, the thought occurred to your Officers that we should, because this was obviously the most logical time, undertake a study to see how our organization could be streamlined and if, in fact, it could be reorganized in such a way as to be more efficient. Assignments to make this study were made and the results did show that, by making certain reassignments of duties and realignment of responsibilities, we could, in effect, operate without the necessity of bringing someone else in at this time. Or, conversely, if we were to bring someone else in, we would have to logically let them be a replacement of someone whom we already had on board.

Of necessity, this new set of facts tightened the parameters of our search. Our next step, therefore, was to review all of the 70 plus applications which had come in from outside sources and to compare them very carefully with the applicants we had from inside our own organization. This was done and the net result is that we could find no one, taking everything into account, who could better fill the job requirements than our own Bob Rice.

We compared each and every applicant on all of the criteria that we felt to be important. After having done this, Bob Rice stood tall and thereby made our decision much easier than otherwise it might have been.

I don't mind telling you, also, that we had some first class applicants and many of whom, under different circumstances, would have been a welcome addition to our group. The decision was not an easy one, it was not taken lightly, but, we believe, the right one has been made.

Let me tell you a little bit about Bob. He is 52 years of age and joined us



Bob Rice, '49, is busy reviewing alumni programs in his new role as Executive Secretary of the National Alumni Association.

after a successful career in the military. He now has a son attending Georgia Tech, and another who is a recent graduate. Bob has been with our Association now for seven years, and has, during that time, exercised a multitude of the responsibilities connected with the activity. He has, for all practical purposes, been the back-up during Roane's absence as well as being in charge of the programs of the Association.

His day to day activities have put him in contact with literally thousands of alumni across the country in working with the various clubs and also in scheduling and producing the "Tech Today" programs with which many of you are familiar.

He has had the faculty over the years of staying in the background while supporting Roane in every way to accomplish the objectives set forth not only by the Staff, but by your Officers and Trustees. He has conducted his activities many times under less than ideal circumstances, but, to our knowledge, has come through in every case.

From my own personal experience, I can tell you that anytime anything has been asked of him, it has been done in short order and done well. Anytime a new program or new idea was needed, these, too, were forthcoming in an orderly, logical, and timely basis.

Finally, I had the privilege of visiting

his home during the Christmas season when he was hosting a party for the staff personnel. I don't mind telling you, his home was Georgia Tech from the front mailbox to the rear porch steps—a silent indication of complete dedication.

One of the final arrangements which we have made with Roane is that he has been offered an emeritus status for two years. This would be a part-time arrangement as far as he and we are concerned and would accomplish several things in our opinion. It will:

1. Help bridge the gap over the next two years,
2. Provide Roane with supplementary income,
3. Permit Roane to continue doing those things which he does so well in keeping the Association in close contact with literally thousands of Alumni, and
4. Permit your Officers to monitor the situation and to make sure that the organizational decisions which have been made are correct ones from everyone's standpoint.

Your Officers believe that we can now look forward to continued successful Alumni activities. We are dedicated to that end and, with your support, will make it.

There you have it, the King has retired—long live the King! ▲

John E. Aderhold

Employment Opportunities

We are an established recruiting and consulting firm managed by a TECH engineer ('62). Our client companies have exceptional line management and engineering staff positions for professionals with ChE, ME, EE, CE, IE, and Computer Science backgrounds. Most positions are for new or expanding divisions, plants, engineering/consulting offices, edp systems depts, etc, with companies having impressive growth and profitability records within the oil, gas, chemical, fertilizer, power, fiber, electronics, and equip. mfg. industries. Each contact is made selectively (you are in control) and held in strict confidence. Our client companies assume all placement fees and relocation expenses for both domestic and international locations. Send resume or handwritten experience outline in confidence and our Houston director, J. L. Gresham, BChE, MBA—will contact you at home to discuss your interests. Est. 1966, member AICHE.

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The basis for our success has been our ability to provide well qualified candidates for our position openings. The reason for bringing this information to your attention is that engineering backgrounds are frequently an excellent part of a needed combination of job requirements. Since I am also a Tech graduate (EE 1949), we have the additional incentive of extending our service to you. If you are planning a career change, feel free to contact me. I would be glad to review your experience in relation to our current openings. Our fees are paid by Company clients and, therefore, the Candidate incurs no financial obligation.

Joseph A. Torcassi, Director
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Suite 1001, Carew Tower
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(L-R) Roane Beard accepts a farewell gift presented by John Aderhold, on behalf of Georgia Tech alumni. The van was presented as a gift of gratitude and appreciation, expressing the esteem in which Roane is held.

Best Wishes, Roane

A RESOLUTION BY THE BOARD OF TRUSTEES OF THE GEORGIA TECH NATIONAL ALUMNI ASSOCIATION

WHEREAS, Mr. William Roane Beard began his affiliation with the Georgia Institute of Technology as a freshman student in the fall of 1936, and

WHEREAS, Mr. Beard graduated from the Georgia Institute of Technology in 1940 with a B.S. degree in Industrial Management, and

WHEREAS, Mr. Beard has served his country as an ROTC student while at Georgia Tech and in the United States Army from September 1941 until he was discharged as a major in the Coast Artillery in December 1945, and

WHEREAS, Mr. Beard joined the Georgia Tech National Alumni Association as assistant secretary in 1947 and served until 1950 before moving to a position with Jefferson Mills, Inc., and

WHEREAS, in 1951 Mr. Beard returned to the Georgia Institute of Technology as executive secretary of the Alumni Association and has served in that capacity until his retirement on April 1, 1977, and

WHEREAS, Mr. Beard has served the American Alumni Council as chairman of District III in 1957-58, and as director of the annual giving programs and member of the Board of Directors of the American Alumni Council 1965-66. In this capacity, he has participated in more than twenty programs dealing with alumni organization, fund-raising, alumni administration and others, and

WHEREAS, Mr. Beard has made more than 250 visits to Tech alumni

clubs from New York to Puerto Rico and from San Francisco to Norfolk during his more than twenty-seven years of service to the Georgia Tech National Alumni Association and the Georgia Institute of Technology, and

WHEREAS, Mr. Beard has seen the award-winning Roll Call go from 1,356 donors and \$22,550 contributed in 1947 to 17,576 donors and \$900,143 contributed in 1976, and

WHEREAS, Mr. Beard has also served the religious community by being a member and on the Board of Directors of the Unitarian-Universalist Congregation of Atlanta and the Northwest Unitarian Church, and

WHEREAS, he has served the civic community by being affiliated with the North DeKalb Little League and a charter member of the Cross Keys Kiwanis Club,

THEREFORE, BE IT RESOLVED, that the Board of Trustees of the Georgia Tech Foundation, Inc., does through this resolution commend and congratulate Roane Beard for his outstanding service to the Georgia Institute of Technology, and

BE IT FURTHER RESOLVED, that through this resolution, the Board of Trustees of the Georgia Tech Foundation, Inc., does wish for Roane, his wife Peggy, his daughter and three sons, continued health, happiness, and prosperity in the years ahead. ▲

Charles R. Yates, President
March 1, 1977

THE Georgia Tech

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ALUMNI MAGAZINE



Although campus activities are more varied and sophisticated than in the past, the basic goals and characteristics of Tech students have not changed drastically. (L-R) Bill Propp, Student Government Presidential Candidate; Hamilton Barksdale, Vice President of Student Government; Teri Rogers, President of the Senior Class; Randy Poliner, Student Government Presidential Candidate; and Mark Beshears, President of the Student Center Governing Board pose in front of the fountain at the Price Gilbert Memorial Library.

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Traditions Make a Comeback

By KAREN BUTTERMORE

THE "T" IS MISSING from two sides of the Tech tower. More than 200 students attended a birthday party for George P. Burdell last month. Intramural programs are more popular than ever before, and a student energy team at Tech is hoping to win a national competition on alternative energy sources.

Life on the Georgia Tech campus has not changed drastically over the years, but the quality and variety of student life programs has steadily improved. The opening of the Student Center in 1970 brought a new dimension to campus life, and the opening of the Fuller E. Callaway III Student Athletic Complex this spring will make Tech even more attractive to current and prospective students.

There are obvious changes: a woman is president of the senior class; a black is vice president of the Student Government; a bus named "the Stinger" transports students to class; and students sleep on "sky racks" in dormitory rooms.

Dean of Students James Dull says that "Tech students today are really no different than their predecessors through the years. They have the same career concerns, they are pragmatic, and believe that there is an 'on-paper formula solution' to everything." Dean Dull continued, "Tech students are still conservative, although not as much so as in the past. There is little difference in the counseling problems they present."

"We are entering into an 'age of elegance' on campus," Dean Dull remarked. "Students are dressing better and wearing their hair much shorter. We see cycles repeating themselves. Current hair lengths and styles are comparable to those seen in 1964."

"Tech students have never gone to the extremes that their counterparts on liberal campuses did," Dean Dull observed. "However, today's Tech student seems to be much more aware of and interested in national politics than his predecessors were. While interest in national politics has increased, interest in campus politics seems to have declined somewhat."

Back-to-nature groups, outdoor recreational programs, and activities which don't require a lot of commitment are most popular right now, according to

Dean Dull. "Students are interested in things that don't have a vestige of responsibility to one group. They prefer one-time events or more casual activities which they can enjoy, then go home and forget about them."

Religious groups are especially active on campus in the last two years, according to the dean. "It seems that more students openly profess religious beliefs," Dean Dull said.

"There is no end in sight, in terms of increasing female enrollment," said the dean who has seen the number of women students increase from 11 in 1957 to 1,350 today. "I don't think that the increase in women students will slack off in the foreseeable future. As we continue to have more women students, our outlook will become more diversified."

Like everyone else interviewed, Dean Dull is looking forward to the opening of the Student Athletic Complex this spring. "This facility has been desper-

ately needed," he said. "Now, students will be able to participate in sports easily and conveniently. We are big on non-varsity athletics already, and this will increase competitiveness even more. This facility will change the whole outlook of the campus, just as the opening of the Student Center did. Today's student would not believe how different student life was before the opening of the Student Center."

"Generally, I would characterize today's student as creative, as one who wants the opportunity to do things that have relevance and show a final product," Dean Dull concluded.

The Georgia Institute of Technology Student Energy Team (GITSET) is a perfect example of the creativeness of today's Tech students. Nearly 70 students are working on four projects which will be entered in a national competition on alternative energy sources this summer.

They are seeking new solutions to the energy problem through the design and production of innovative energy hardware capable of producing electric power for homes, farms and light industry. The Tech entries approach the problem in four distinct ways: one system employs the wind; another is solar-thermal; the third uses bioconversion (methane conversion); and the final project uses photovoltaics (solar cells).

The students will transport their entries to Richland, Washington in June for the week-long national competition. Tech has the largest number of entries in the competition, and expects to do well.

On the lighter side, Tech students went all out in their celebration of George P. Burdell's birthday last month. The "Great Pie Fight" between Coach Whack Hyder and Coach David Houser was the highlight of the evening of indoor field competitions. Thirteen students with a combined weight of 2,200 pounds won the phone booth stuffing competition. Winners in various events were selected on the basis of numbers, weight, density, and other appropriate technical factors. A paper airplane flying contest, a cigar-smoking contest, and a rootbeer-chugging competition were featured attractions, in addition to sev-



A phone booth stuffing was one of the events at George P. Burdell's 1977 birthday party.

eral relays. A slide show on the current antics of the legendary Burdell, along with birthday cake and ice cream for the 300 students who attended the party, rounded out the evening. The 1977 bash was the third annual Burdell Birthday Party, sponsored by the Co-op Club.

Membership in fraternities at Tech has been increasing since 1971, according to fraternity adviser Jerry Gallups. He thinks that there are several reasons for the increase. "Today's students are more concerned with getting along in society and learning to live with people," said Gallups. "They feel a fraternity can give them valuable interpersonal experiences. They are also very job-conscious, and think they need more than grades to compete in today's job market. Since there is no national trauma this year (such as Watergate or Vietnam), they are enjoying fraternity life. There is a spirit of self-reappraisal, a feeling that they are not going to change the world, so they concentrate on expanding their own experiences."

Gallups said that fraternities provide many services to charitable organizations and needy individuals. Last year, 38 different projects raised funds for charities. Some fraternities do repairs on homes or perform necessary services for elderly or infirm residents.

"Fraternity members are also leadership-oriented," Gallups remarked. "We conduct workshops throughout the year for members. We offer six week-end seminars: finance, developing leadership potential, rush, managing the house kitchen, public relations, and

printing. In addition, the Interfraternity Council officers go on an annual retreat."

The pledgship period has changed considerably. Many fraternities now refer to their newest members as "associate members" rather than "pledges." There is less degradation during pledgship. It is viewed as a constructive time, and brothers try to let the associate members know that they are glad to have them as potential brothers. There are some features of the former type of pledgship, namely the pledge paddle and work projects. But "Hell Week" is now called "Pre-Initiation Week."

Traditional pranks, such as stealing another fraternity's composite, or painting the SAE lion or the Kappa Sigma rock, continue. There is still a high level of competition, a healthy rivalry between the groups.

Teri Rogers, president of the senior class, says that "Tech is a good place to be if you are a girl. Now, you are accepted for what you are, which might not have been the case in the past."

Outdoor Recreation Georgia Tech (ORGT) programs such as back packing, rock climbing, and white water canoeing, were consistently listed as favorite pasttimes of students. Student Center programs, such as movies, lectures and the "Take A Professor To Lunch" program are also very popular. Participation in intramural athletics continues to increase each year.

Student Body President Mitchell Abrams lists the main issues on campus as: lack of adequate parking, the

registration system, how the student activity fee money is spent, and funding of faculty pay raises by the state legislature.

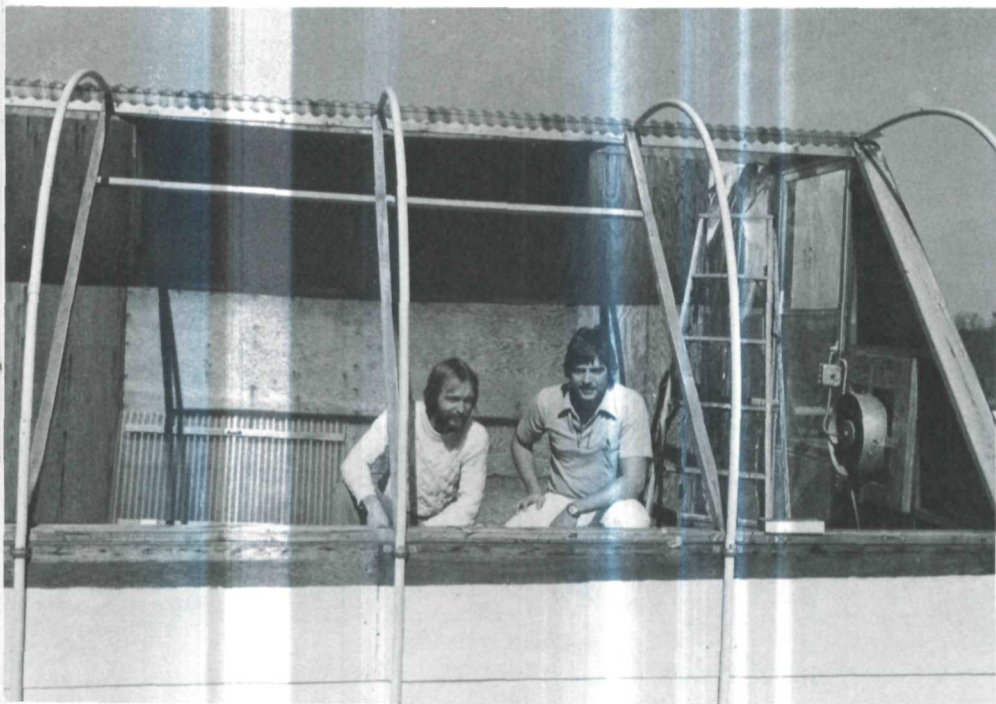
Currently, students pay a \$24 per quarter student activity fee. The fee was formerly \$18 per quarter, but a \$6 per quarter increase was implemented fall quarter 1976, with the new funds designated for the Student Athletic Complex. The fee is administered by an Institute committee composed of half students and half faculty. Organizations submit budget proposals to the Student Government's Finance Committee, which forwards its recommendation to the Student Council and Graduate Senate for a vote. After approval by these bodies, budget allocations are submitted to the Institute's Student Activity Fee Committee.

Abrams feels that Student Government is a very responsible organization, and is encouraged to be so by the positive attitude of the Institute's administrators. Sixteen Institute committees have at least one student member, appointed by the Student Body President. These committees are: Faculty Benefits, Faculty Honors, Statutes, Academic Services, Public Relations, Welfare and Security, Undergraduate Curriculum, Student Regulations, Student Academic & Financial Affairs, Student Grievance and Appeal, Student Honors, Student Activities, Computer Advisory Board, Radio Communications Board, Publications Board, the Student Athletic Complex Board, and the Student Activity Fee Committee.

The Executive Branch of Student Government has 18 divisions, ranging from Academic Improvement and Athletic Seating to Parking and Transportation or Campus Beautification. The Personal Welfare Department includes committees on general welfare, grievance, legal assistance, and rules and regulations. During the past year, Student Government has provided a tenant's handbook for students who live in off-campus apartments, a legal manual for students, free legal services one day a week, health clinics and an apartment locator service when dorms filled up last fall.

Abrams said that there was great interest in the fall 1976 national and local elections. Student Government brought Fulton County registrars on campus and deputized student registrars in a voter registration drive. More than 1,000 students registered to vote during the drive. "Campaign Day" featured speakers for all candidates, debates between candidates were sponsored, and a presidential preference poll conducted (Jimmy Carter won).

Abrams, who hopes to attend law school next year, calls his term as
(Continued on next page)



The Georgia Tech Student Energy Team is preparing entries for a national competition on alternative energy sources.

Campus Life Today

(continued)



The root beer-chugging contest at Burdell's party was observed by several onlookers.

president "an excellent management experience. You learn to deal with problems, motivate students to take on projects, and carry out programs."

Student Center Governing Board President Mark Beshears says that movies, outdoor recreation, and lectures are the most popular Student Center programs. Homecoming Week 1976 had the best attendance and participation level since 1972. Popular lecturers during the past year have included Eric Von Daniken, Dr. Buckminster Fuller, Dr. Carl Sagan and Shana Alexander.

The Student Center's Student/Faculty Relations programs have met with great success this year. During fall quarter, weekly "Wednesday Huddles" review the past week's football game; during winter quarter, more than 100 students took a professor to lunch; and the spring quarter student/faculty barbecue is well-attended. Beshears said that freshman orientation picnics in the summer are very popular, and the Tech 200 go-kart race is a success each spring.

Beshears is concerned about state support of the University System and the lack of pay raises for professors in recent years. "There is a lack of parity between industry and academic salaries,

as well as the salary level of Tech professors, compared to other colleges," Beshears points out. "We also need some new buildings on campus, namely for freshman chemistry, Industrial Management, and Architecture. Beshears is a senior in Chemical Engineering, and plans to attend graduate school at the Technological University of Loughborough in England next year.

Steve Branscombe, editor of the student newspaper, the *Technique*, says that he is concerned about getting a job after graduation, and about pay raises for faculty members. He says that there has been a lack of major issues on campus this year.

"We have tried to emphasize news-feature articles, giving more in-depth coverage to events, rather than just serving as a factual record of what has happened," the editor explains. "We have published the largest weekly papers ever, running from 28 to 32 pages per week. Today's staff not only writes the stories and takes photographs, but is responsible for the entire production process, except for the run on the printing press. Students do the typesetting, screen pictures, do layouts and paste-ups." Branscombe said that they have expanded the editorial pages, and do movie and dinner reviews for

Atlanta establishments.

Jeff Lane, editor of the yearbook, the *Blueprint*, characterizes the current student body as "pretty serious and job-conscious." He says that most students spend their leisure time in outdoor recreational activities, drinking beer, or sleeping. He has noticed an increased interest in crafts, such as pottery and photography. Lane's philosophy for this year's yearbook: "it should not only be an official history of what happened this year, but when students read it in the future, it should remind them of what it *felt* like here. We plan to emphasize Tech's personalities, in architecture, faces, and other aspects of the campus."

Placement Director Dr. Michael Donahue confirms that today's students are more career-conscious. "This year's juniors and seniors entered Tech during a national economic and employment slump. I think they realized early that just because you have a degree, you aren't guaranteed a job. They seem to have a stronger sense of purpose, to realize that their career is a major part of what college is all about."

Donahue says that the employment market is more comfortable now. "We have had more recruiters on campus this year than in any year since 1968. By the end of February 1977, we were already at 50 percent of last year's total number of offers made, with several months of activity to go."

James Strickland, director of the Counseling Center, hasn't noticed any significant changes in the types or numbers of problems that Tech students experience. During fall quarter 1976, statistics show that 160 students used the Counseling Center's services because they were unsure of career goals or what major to pursue; 184 turned to the Center for help with personal problems. Strickland said that currently, the main concerns of female students are establishment of their identities on campus, and becoming more assertive. Women's counseling groups were established to deal with these concerns.

Tech's dormitories have always had a high occupancy rate, but this year they were filled to capacity, with a waiting list of 500 students. Dean Dull thinks this is because students like the convenience and accessibility to campus events. He also points out that those who live in dorms do better academically than their counterparts who live in apartments or at home with their families. Also, dormitory living is a lot less expensive than maintaining an apartment.

Assistant Housing Director John Martone attributes the popularity of dorm-living to several factors. "We have made the dorms more attractive with

physical improvements and with more permissive, but reasonable, regulations. The large number of out-of-state students, and the variety of living conditions which we offer are other factors. Also, our rates are very reasonable."

"Students appear to be pleased with their housing," Martone said. "The return rate for each dormitory is very high. Area I used to be designated as freshman housing, but so many students have chosen to remain in their original rooms that this year there are more upperclassmen in Area I dorms than freshmen. Freshmen are located in all dorm areas."

"Our room personalization program is extremely successful," Martone continues. "We allow students to paint their rooms and install sky racks, which can contain beds up close to the ceiling. We supply the paint, drop cloths, and construction materials. We also enforce strict safety requirements, such as flame retardant wood and paint."

Martone said that a number of physical improvements have been made in the last five years. "All Area I dorms now have fluorescent lighting so that area lamps are not necessary. We have painted the hallways in bright colors and installed new draperies in all the rooms. All dorms have study lounges with carrels, and many have drafting tables."

There are no curfews in dormitories. Each dorm votes separately on "open

house hours" during which members of the opposite sex may visit in rooms. In the women's dorms, males cannot enter the living area unless escorted by a female resident. There are phones in the lobby, which male students use to call women in their rooms to announce their arrival. Women's dorms include: Brown, Howell, Hopkins, Fitten, Fulmer and Armstrong. There are no "coed" dorms at Tech.

Because dormitory life is thriving, President J. M. Pettit has proposed a new dorm for Area III. He will seek funding from the Board of Regents for a 500-bed facility which will cost about \$1.2 million. The proposed dorm would house both married and single students. Dr. Pettit feels that the future is bright for on-campus housing at Tech. "This year, we turned away 500 students who applied for dormitory space. The type of degrees we offer at Tech will continue to be in demand. If our total enrollment should begin to level off around 1985, we hope to close Techwood Dorm."

How do students get around campus nowadays? They have it a lot easier than their predecessors. The "Stinger" system provides four buses which transport students from their dormitories to classes, or other functions on campus. The students pay a "transportation" fee at registration, which funds the bus system. The "Stinger" operates from 7:05 a.m. until shortly after midnight five days a week, and on Sunday evenings. The

popular service began operating in 1974.

The campus radio station, WREK, began broadcasting in 1968. The FM station is one of Atlanta's most powerful (40,000 watts). Students describe the programming as "the FM alternative" to top-forty stations in the area. WREK plays bluegrass, jazz, blues, classical, or progressive rock. The station is 90 percent automated, with programs all on tapes. The station can operate with only one person in the studio. There are no deejays, or on-the-air personalities. Students explain that they do not have time to work regular on-the-air shifts, so they came up with the idea of automated programming.

What about the most famous of all Georgia Tech traditions, the rat hat? Alumni will be glad to hear that it is back in vogue. In the early 1970's, the rat hat was made optional. For a couple of years, they were not as visible on campus or at football games. But, they have made a strong comeback with the last two freshmen classes, which have welcomed this traditional symbol. Teri Rogers says that current freshmen like the sense of identity, and she knows many freshmen who proudly wear their rat hats everywhere.

The "whistle" still announces class changes and sports victories. Campus police are trying to figure out who stole the "T" from two sides of the Tech tower during final exams last quarter. So, maybe times haven't changed very much after all. ▲

Coach "Whack" Hyder and Coach David Houser engaged in the "Great Pie Fight" at Burdell's party, after which Coach Hyder was declared the winner of the battle.



RESEARCH

Has a Dynamic Role in Tech's Future

By KAREN BUTTERMORE

RESEARCH IS CURRENTLY the fastest growing and most dynamic activity at Georgia Tech. It is expected that the trend will continue to bring even more prestige to the Institute, with no adverse effect on the existing programs. Consider these facts:

- 600 contracts bring \$18 million annually to Georgia Tech.
- Within one or two years, research contract income will be greater than the State appropriation.
- About 400 of 1,000 faculty are fully financially supported by research contract funds. In addition, 300 of 1,000 support staff are fully financially supported by research contract funds.
- About 600 of the 1,600 graduate students at Tech are fully financed by research contract funds.
- About 400 of 7,400 undergraduate students receive financial support from research contract funds.
- Contract research funds provided more than \$1.4 million for new research equipment in FY 76.
- The \$18 million annually that Tech brings to Georgia has a direct economic impact on the State. Georgia Tech is the largest center for technology in the Southeast.

How did these dramatic changes come about? Dr. Thomas E. Stelson, Vice President for Research, said that a change in the leadership of Tech from 1970-72 is largely responsible. During this two-year period, Dr. J. M. Pettit became president of Georgia Tech; Dr. Stelson was named Dean of the College of Engineering; Dr. F. K. Levy was hired as Dean of the College of Industrial Management; and Dr. H. S. Valk became Dean of the College of Sciences and Liberal Studies. Each of these men was more research-oriented than his predecessor. A new stage in the development of Georgia Tech began, as graduate programs received increased attention.

However, this new emphasis on research has not had a negative effect on undergraduate programs, according to Dr. Stelson. "One of the great misconceptions is that we are taking money away from undergraduate programs,

and giving it to graduate programs," Dr. Stelson said. "This is not true; there is no data to support these fears. On the contrary, in many ways, the graduate program helps carry the undergraduate. When the graduate program becomes stronger, the undergraduate curriculum and activities are strengthened with it."

Dr. Stelson went on to explain that there is not a separate undergraduate and graduate faculty. "Typically, all of our instructors teach both undergraduate and graduate classes, in addition to research activities. Since 1971, we have been hiring a different type of faculty member. We feel that a professor's outside research can bring new dimensions to classroom teaching, and students can keep abreast of and sometimes have a part in new discoveries. Student involvement in research makes them more valuable to potential employers."

"In private institutions, the relationship between undergraduate programs and graduate research programs might be a different story," Dr. Stelson continued. "Private colleges would have limited financial resources, and might have to take an endowment away from one program to continue another one."

"Since Georgia Tech is a publicly-supported institution, we do not have that problem. Our graduate program is intentionally funded by the State, and if the money were used for any other purpose, we would lose the funding. Graduate studies is designated as one of the primary missions of the Institute, as is a high-quality undergraduate program," Dr. Stelson pointed out.

Dr. Stelson was named Vice President for Research in early 1974. "Formerly, we did not have a central administrative office that looked after research activities. Our research activities vary so widely at Tech, that we might have a dozen different units working on solar research, for example. We need a central administration to enable them to work together, and be aware of each other's activities. In new research areas, institutional organization and commitment are often vital in obtaining funding from outside sources."

Georgia Tech is recognized nationally for its research leadership in the follow-

ing fields: solar energy, waste recycling, electronics, flammability and fire safety, textiles, high-temperature materials, high-energy plasmas, material properties, fertilizers, nuclear energy, and environmental conditions.

Perhaps Tech's most significant and unique research contribution is applied research that supports new and existing industry. In Georgia alone, several thousand new jobs are created and several thousand old jobs saved each year by Tech research.

Half of Tech's research activities are carried out at the Engineering Experiment Station. "The Station is very healthy right now," Dr. Stelson reports. "It is operating with almost no state funds, and the volume of research has enabled us to add 200 people to the staff there since 1974."

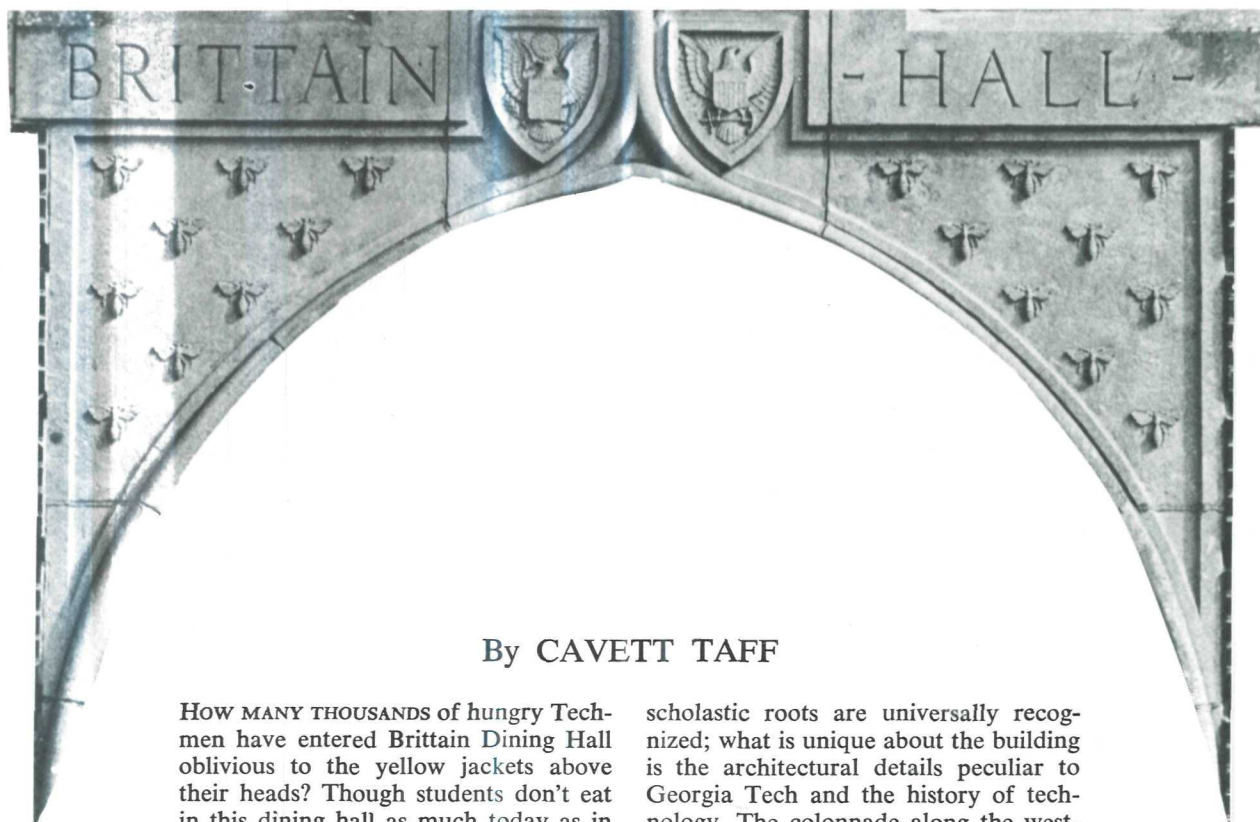
Dr. Stelson feels that research enriches the educational programs at both the undergraduate and graduate levels. Students are in contact with more and better faculty. They use more and better equipment. Their first-hand experiences with new developments increase their value as professionals.

Potential for future growth in this area is excellent, according to Dr. Stelson. He said that contract research funding of \$50 million per year could develop in five to ten years if modest additional support is provided.

Tech's research programs are most similar to those at Illinois University or Berkeley, according to this vice president. "People tend to compare us to MIT," Dr. Stelson said, "but this is not accurate. MIT is a private institution, and has become too research-oriented, when compared to our expectations here. We have a unique role to play, since we are a state-supported institution. Other state-supported technological universities such as Purdue, Texas Tech and Auburn, have expanded their overall programs to the point where they are no longer predominantly technological."

"This is one of Georgia Tech's assets: because we have a more narrow mission, we can concentrate on what we do well. As a result, we will achieve even more national recognition for our technological expertise," Dr. Stelson concluded. ▲

18 Yellow Jackets Preserved at Brittain



By CAVETT TAFF

HOW MANY THOUSANDS of hungry Techmen have entered Brittain Dining Hall oblivious to the yellow jackets above their heads? Though students don't eat in this dining hall as much today as in the past, the yellow jackets are still there, a distinctively Georgia Tech detail in a popular architectural style.

Collegiate Gothic, English Collegiate, or Gothic Revival, whatever the label, the architectural style of red brick and limestone, bay windows, pointed arches and ivy-covered towers so often associated with university campuses is well represented at Georgia Tech. The Gothic style became fashionable on this campus during the Roaring Twenties when Ramblin Wrecks won national respect in the Rose Bowl victory, as well as recognition for academic excellence. It was a period of great aspirations and accomplishments. Marion Luther Brittain was the college president and he saw an average of one building per year built on the campus, most of them Gothic.

The campus' finest example of this style is Brittain Dining Hall, built in 1928. It is said that the architect, Harold Bush-Brown, modeled the building after a church he had admired in England. The structure's Oxford-Cambridge-

scholastic roots are universally recognized; what is unique about the building is the architectural details peculiar to Georgia Tech and the history of technology. The colonnade along the western facade has ten pairs of Gothic arches carrying busts of great men of science and technology: Aristotle, Archimedes, Darwin, daVinci, Della Robbia, Edison, Lavoisier, Michelangelo, Newton, and Whitney. The President's Dining Room breaks the facade in the center of the tower with a bay window, adorned above by the official Georgia Tech seal in stone, and below by two shields bearing eagles, probably representing the Army and Navy ROTC programs. The great terra-cotta emblem that lies in the entrance to the dining hall is worn nearly smooth and the granite steps are scooped out in two distinct footpaths. Over the entrance arch, where fleurons may adorn some more ancient edifice, are eighteen yellow jackets, frozen in the limestone like fossils. Inside the dining hall, at the south end, is the most colorful and least noticed scene on campus: the stained glass window. Given to the school by the classes of 1927, '28, '29 and '30, and designed by student competition, this window colorfully depicts Georgia Tech's herit-

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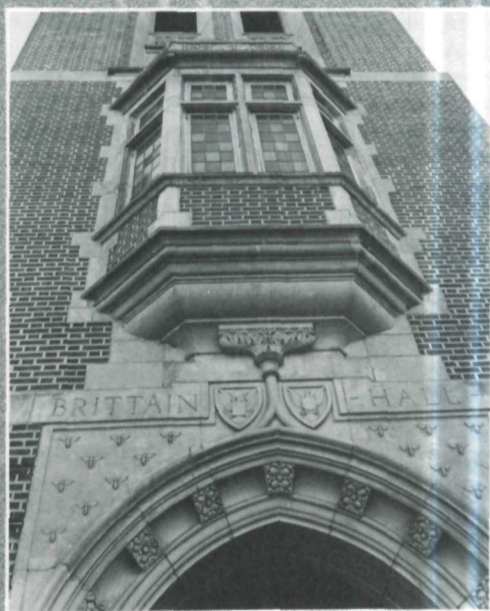
Photos by Cavett Taff

Brittain Dining Hall is still used daily, although its unique architectural features often go unnoticed by students.



Each panel of the magnificent stained glass window represents some aspect of Georgia Tech history.

The President's Dining Room is located behind this bay window on the center tower. The official Georgia Tech seal is carved in stone above the bay window.



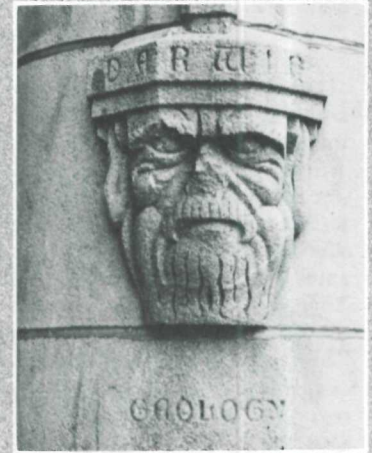
18 Yellow Jackets Preserved at Brittain

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age. The stained glass, though ancient in appearance, is modern in its symbolism. Where else among the splendors of art and architecture can one find such images as mechanical tools and gears, electrical motors and lamps, civil engineering transits, Army and Navy paraphernalia, books, sports equipment and the Tech Tower gathered together in a comprehensive design?

The days of romanticism and inspiration in architecture, especially at a public college, have given way to function and efficiency. Today we can rarely afford such unique expressions of pride and thus we appreciate even more what artists and architects have created at Georgia Tech. ▲

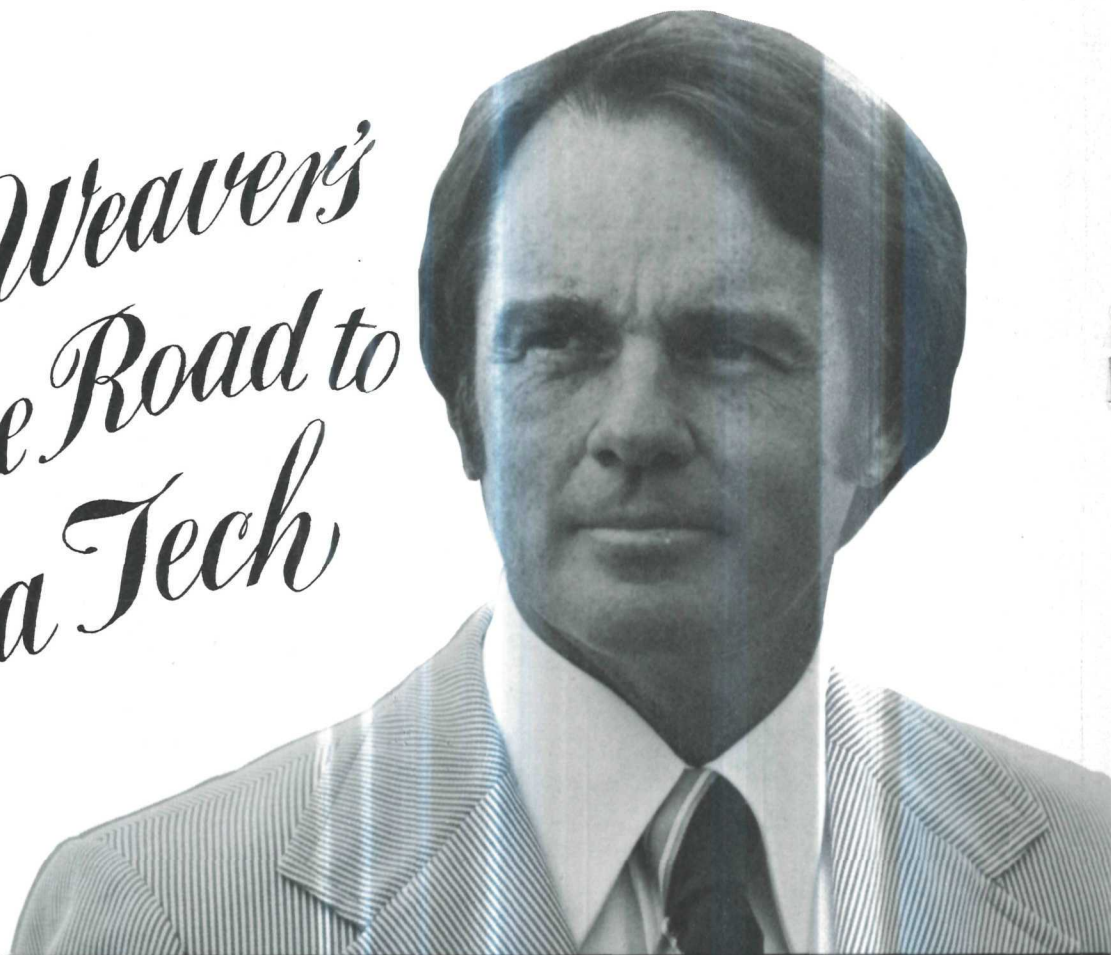
(L-R) Aristotle and Darwin are two famous scientists immortalized on the colonnade at Brittain.



Busts of (L-R) Michaelangelo and Thomas Edison are carved on two of Brittain's columns.



Doug Weaver's Unique Road to Georgia Tech



By CHARLES STARRATT

DOUG WEAVER laughs easily and heartily. Perhaps no other fact about the man can describe him as well; he enjoys life and seems to care about your happiness. While happiness and caring about others are important assets for anyone, for an Athletic Director they are an absolute necessity, especially in today's world of intercollegiate athletics. Athletic departments across the country face the traditional problems of winning and keeping fans and alumni happy; but now they must do it in an atmosphere of increased cost, questions about the traditional role of college athletics, increased competition, and a state of confusion about the future of the standard organizing bodies and rules that colleges have lived with for decades.

Because the Athletic Director is the one man who must deal with everybody — students, athletes, coaches, fans, alumni, administrators, contractors, and other schools — he must be someone who not only represents his school well but enjoys doing it. Otherwise it could be a miserable job. Doug Weaver is far from miserable. "I feel as if I have been at Tech all my life," he says. "I seem to have had a life and career that aimed at this job, and I enjoy it. The people at Tech have the best attitude possible for

intercollegiate sports. They feel that sports are important to the school and its students and want sports to be done with the same excellence that characterizes the rest of the school. There is no shame here about sports; it is an integral part of the school.

"Moreover, while alumni everywhere want to help their school, I have never been anyplace where the spirit of giving was based on so much love for the school. People are always telling me that they want to repay Tech for the wonderful years they spent here. It makes my job pleasant and easier."

The Athletic Director's personality sets the tone for the entire department. He deals with everyone, makes both short and long-range decisions, and can control staff contentedness by how much or how little he guides the coaches and other experts it takes to run a department with a multi-million dollar budget. Everything from tickets, uniforms and publicity, to stadiums, concessions, and public relations comes within his purview.

When you add together the duties and people he must supervise, the people he must deal with, throw in the people he must please, and consider the sum in light of the fact that often schools are judged not on their academic reputa-

tion but by their athletic success, then it becomes legitimate to ask just who Doug Weaver is. The answer is sometimes surprising and always interesting.

Weaver had two distinct sections in his childhood, one urban and one country. He spent the first twelve years of his life in Chicago. "I can still name the starting line-up for the White Sox in the late thirties and early forties. The Bears had Sid Luckman and Bulldog Turner and were coached by Papa Bear George Halas. I have never forgotten the thrill of entering a big stadium as a youngster; the size, the noise, even the smell are special things. I still feel that way at Grant Field. Sports should be enjoyed; they are in large measure a link with our youth and that sense of awe and wonder should never be entirely lost.

"Most of my early heroes were pro stars because of where I lived, but I remember seeing the University of Chicago play football. In addition to sports I was fascinated by music and, just like so many others at that time, Benny Goodman was one of my heroes. I played the clarinet and the baritone sax. Today I play the guitar; the times have indeed changed."

It is often difficult to share experiences, especially youthful ones, but

Weaver is an effective speaker. When he talks about the pace of city life for a young boy you can picture the scene easily. "We really took advantage of what Chicago had to offer, the museums and concerts, the sports and the lake. I was in the choir and the glee club at church and school; it was a busy life.

"Then we moved to the exact opposite, Goshen, Indiana. We were a few miles from South Bend in a small town and life became very different. For one thing I became involved in organized sports for the first time." Weaver's views of organized sports for children are somewhat surprising considering his position.

"I never played on an adult-organized team as a child. We would just find an empty lot or sneak into a high school field and play. It was terrific fun. There were no pressures, no fancy uniforms, and no interference. We got our discipline from home and school and athletics was just a part of being a child. It was no more important than music or fishing. It would be nice if that approach were more widespread today, but the kids need to do what their peers are doing, so Little Leagues of all sorts are hard to avoid."

By the time high school years rolled around though, Weaver was ready for the challenge of sports on a highly competitive level. For one thing, Notre Dame was right down the road. "We used to try to sneak into the games or talk someone into buying us tickets. We would drive all over the state to play ball and end up at Notre Dame to see Johnny Lujack. Lenny Ford was playing at Michigan and the Big Ten was strong. It was an exciting area for a sports fan.

"I met Bill Walsh, who is an assistant with the Falcons now, when he played center at Notre Dame. I wanted to be a center too, but I was a quarterback my freshman year and a guard my sophomore season. I finally was moved to center my junior year. I also played more B-level basketball games than anyone else in history. I was a starter for about five games in my senior year, but all the rest of the time I just didn't have the talent. It seems odd, but you can go further with less talent in football than any other sport at that level—as long as you have good coaching and a great deal of desire.

"Sports still did not occupy all my time though. The glee club, swimming and fishing, and studies were still important." Even this early, Weaver was not afraid to be different. "I was the only boy in the Spanish club; I liked it and the thought of being different from the other boys never entered my mind."

He was successful enough in the classroom and on the playing field to be accepted to Yale University after high school. "I was miserable there. It was a good school, and I liked the people, but I was homesick. It was just not for me." He feels that he learned much from his experience there. "I have always learned as much from adversity and failure as I have from success. I hope I understand what our young players are going through when they come to Tech and are faced with the rigors of



academic work and the sport they play. It is a challenge for a young man, a challenge that can be a humbling and exhilarating process at the same time."

Weaver left Yale after one semester and visited some schools closer to home. But the more established schools like Purdue and Indiana did not appeal to him. "Then I visited Michigan State. It had just entered the Big Ten and was dedicated to being the best in everything. I signed up the day I visited. It was an exciting place to be. I lived in a quonset hut and worked in a cafeteria that was also in a quonset hut. Biggie Munn was the head coach and Duffy Daugherty was an assistant. I got to play a lot and we were national champions my senior year." He won't mention it, but among other honors he was twice awarded the "Oil Can" award as the most spirited player by his teammates. Talent alone can be an inherited attribute, but talent and spirit have to come from within. His teammates recognized Weaver's real abilities. His college career also included an event that is indicative of his determination and which makes him sympathetic to the plight of many athletes. He was injured. In the Notre Dame game his sophomore year—he can quote the scores of all

his games—he hurt a knee cartilage. It required an operation and months of reconditioning to play again. The "Oil Can" was well-deserved.

One other thing happened at Michigan State. He met Nancy Doty, soon to become Nancy Weaver. "I was taking a sophomore level course in my senior year so I could fulfill all the requirements for my degree in English Literature. Nancy was in the class and after working up my courage and older man's knowledge, I approached her with some great line like 'Can I borrow a pencil?' Fortunately, Nancy has always been able to cope with me and with our life."

She certainly had the chance to exhibit that ability during the next few years. "I had taken ROTC and was waiting for my orders for six months. I worked as a delivery boy and played semi-pro football for the Detroit Tires for \$50 a game. Finally, the Air Force assigned me to be a radar officer on the early warning line. We were supposed to spot, track, and intercept incoming enemy planes. The biggest problem was that all the stations for that duty were in remote areas. I was sent to Opheim, Montana, a town of about 100 people. We were just below the Canadian border, and the biggest town of any size was Glasgow, Montana. It had 2,000 people. I was the happiest man on earth when Nancy joined me. It was difficult for her; we lived in a one room hut between a bar and a jail. It was possible to get snowed-in in June. Our first baby was born in Glasgow after we had traveled 50 miles."

When he was released from the service, football entered his life again. "I was offered a job as freshman coach at Michigan State. A year later I became an assistant varsity coach." A career in college coaching often involves many moves and Weaver's career was no exception. In 1958 he became the first assistant and head line coach for Dan Devine at Missouri. Finally, he was appointed as head coach at Kansas State, a position he held for seven years.

At the tender age of 36, with a wife and three children, Weaver entered law school at the University of Kansas. It was a family decision, one that he feels helped the family to draw even closer together. "Everyone had to work at it; it was not easy, but it was fun and taught me how valuable, capable, and wonderful my family is." It also taught him to understand the new generation of students better. "I feel that I am more liberal now, more able to understand the students we see today. It was the middle of the sixties and schools were in turmoil all over the country. I was right in the middle of it."

Another thing happened at Kansas. To help keep bread on the table he took

(Continued on page 19)

Viewpoint by Dr. Melvin Kranzberg

Dr. Melvin Kranzberg has been the Callaway Professor of the History of Technology at Georgia Tech since 1972. He is the founder of the Society for the History of Technology and editor of its quarterly journal. A nationally-known lecturer, he is the author of several books and numerous articles.

Viewpoint is a continuing feature of this magazine. Opinions expressed in Viewpoint are not necessarily shared by the Georgia Tech National Alumni Association or the editor. Your opinions and comments are invited.



Must Technology and the Social Environment Conflict?

THE MODERN NOVEL, the contemporary drama, and today's poetry have as one of their most insistent themes the fear that technology is taking over from man. And, in this current literature of anti-technology, two metaphors constantly appear: Frankenstein's monster, from the 19th-century thriller by Mary Wollstonecraft Shelley, and the robots from Karel Capek's play of the 1920s, *R.U.R.* Both these metaphors engulf us in the blood-chilling speculation that man has created the mechanical means of his own annihilation, either literally or figuratively.

These metaphors are more apt than the critics who use them realize. For one thing, the Monster of Frankenstein and Rossum's Universal Robots were created by men who sought to do good for mankind. To quote Dr. Frankenstein, "I thought that if I could bestow animation upon lifeless matter, I might in process of time . . . renew life where death had apparently devoted the body to corruption." Frankenstein thus conceives of himself as man's benefactor, as one who will "pour a torrent of light into our dark world."

The engineers who manufactured Rossum's Universal Robots were also motivated by altruism. As Harry Domin, General Manager of the robot plant, states, "In ten years time Rossum's Robots will produce so much corn, so much cloth, so much everything, that things will cost practically nothing. There will be no poverty. All work will be done by living machines. Everybody will be free from worry and liberated from the degradation of labor. Everybody will live only to perfect himself."

At this point, our anti-technologists go off track. While willing to admit that technologists are motivated by altruism, they imply that the creations

turned against their creators because there is something wrong with technology. If they would remain true to the letter and spirit of their metaphors, they would discover that it was man himself who was responsible for turning these technical creations against humanity.

The Monster of Frankenstein — and I am speaking here about the original novel — sought only warmth, understanding, and sympathy. Yet his gruesome form and appearance turned people against him, until finally, out of despair, he turned against mankind.

In the case of Frankenstein's monster, it was not the machine which failed, but human beings, including Dr. Frankenstein himself. By indicating the monster's responsiveness to music and human friendship, Mel Brooks' comic masterpiece, "Young Frankenstein," is truer to Ms. Shelley's novel than was Boris Karloff in the older movie version which you can see on the late, late movies on television.

In the play *R.U.R.* it is also a human rather than a technological defect which creates problems. The trouble is caused, we learn, by Dr. Gall, Head of the Physiological and Experimental Department of *R.U.R.*, who changed the composition of the robots and sought to make them more human — by making them more irritable. Only when the robots ceased to be machines and became more human did they become dangerous.

The story of Frankenstein is a psychological thriller; the fault is not in the monster created by man but in man himself. *R.U.R.* is a modern parable, an indictment of selfish materialism, not of the machine. It is important that we remember this distinction, and that we do not allow our modern literary

Luddites to stampede us into unthinking criticism of technology by literary allusions that are incorrect.

Yet there is something even more disturbing about such literary swipes at technology, which have become almost a ritual among today's bleeding-heart humanists. For they posit some sort of conflict between man and his technology, as if the two were somehow opposed to each other and locked in mortal combat.

I find this somewhat strange because the historical facts indicate quite the opposite: that man and his technology are inextricably intertwined, that technology has served as one of man's chief tools as he sought to achieve his goals, both glorious and ignoble. Indeed, man and his technology form part of a dynamic ecological system.

Although some people think of ecology in narrow terms of the physical environment, it is much broader in its scope than that. According to its Greek root, ecology means the study of "houses," so that Xenophon entitled his study of the management of households the *Oeconomicus*. Since the household is regarded as a "living environment," ecology gradually came to mean "the study of the structure and function of nature," with the further understanding that "nature" includes man and the entire living world. Ecology thus became a science concerned with the dynamics of interrelationships in the physical environment. Here I extend ecology to include the social environment, for man with the aid of technology has created his own physical and social environment which has thus become part of the larger ecological system.

Our ecologists and environmentalists think only of the natural environment,

and then only in terms of a static state of nature. But that is scientifically inaccurate, as any climatologist or geologist can attest. It is also historically inaccurate. The natural habitat of civilized man is the city. The physical environment of civilized man includes his own artifacts as well as the handiwork of nature.

The environment of 20th-century *Homo Americanus* includes elevators, telephones, electric ovens, air-conditioners, TV sets, automobiles, vacuum cleaners, central heating, refrigerators and umpteen other objects. If we are concerned about protecting our environment—and I think we should be—it is equally important that we protect our civilized, man-made environment as well as our natural environment. Indeed, a good portion of our social environment has come about because we used our technology to protect us against a natural environment which, except on the island of Tonga-Tonga or a few other remote spots, is

human mind, but also because it affects the course of human and societal development.

It is, of course, this impact of technology upon the social ecology that makes many sensitive individuals fear that this very human activity—technology—has grown so large and has presented mankind with such awful byproducts that it threatens to engulf man, making life uninhabitable on this planet. Technology, it has been said, might be a good thing—but it might be too much of a good thing. Look at the inhuman uses to which it has been put. What about the devastation wrought by wars during the 20th century, and the present possibility of destroying the human race through nuclear warfare? What about the deterioration of the environment, created by air and water pollution, the spoliation of the countryside, and the rot of our cities? Technology, it is claimed, has destroyed the ecological

product, and from work itself. Mass society provides bread, circuses, and technology. But the material plenty, according to Marcuse, yields no spiritual gratification and leads to social oppression. Marcuse holds these principles to be self-evident in both capitalist and communist societies. They characterize industrial civilization no matter what the socio-political arrangements might be.

Is technology really responsible for all these problems? Social thinkers like Mumford, Marcuse, and Ellul think so, as do the adherents of the counter-culture, such as Theodore Roszak and the late Paul Goodman. Theirs is a naive technological determinism, the notion that technology determines the pattern for our lives, actions, values, and institutions.

This is an old complaint. Over a century ago, Ralph Waldo Emerson made the same complaint when he said, "Things are in the saddle and ride mankind."

Not all scholars would accept this version of technological omnipotence. Lynn White, the great medievalist and president of the American Historical Association, has said: "Technology opens doors, it does not compel one to enter." In this view, technology is an enabling mechanism, a means which man is free to employ as he sees fit. But the question then arises as to whether we can distinguish between ends and means, and if the means do not sometimes determine the ends. True, man is not compelled to enter Professor White's open door, but an open door is an invitation. Besides, who decides which doors to open—and once men have entered the room, are not their future actions and directions perhaps guided by the contours of the chambers and corridors into which they have stepped? More importantly, once we have crossed the threshold, can we turn back?

Frankly, we historians of technology do not know the answer to this question of technological determinism; ours is a new discipline, and we are still working on the problem—and we might never reach agreement upon an answer. Yet, there are several things which we do know. One is that technology's interaction with the social environment is such that technical developments frequently have social and human consequences which go far beyond the immediate purposes of the technical devices and practices themselves.

Rather than retracing all history to make this point, I shall focus on two developments in the 20th century which have had—and continue to have—profound repercussions upon
(Continued on next page)

Man's material progress throughout the ages has been bound up with his technology.

pretty inhospitable and cruel to man—and let's not forget it.

From savagery to barbarism to civilization, man's material progress throughout the ages has been bound up with his technology. The story of how man has utilized technology in order to master his environment is part of the great drama of man fighting against the unknown; this is the continuation of the struggle of Prometheus who stole fire from the gods in order to bring it to mankind. Ever since that time, man has sought to use nature to his own ends, to control nature, and to master and establish his own environment. This is a very human activity—this is technology.

Technology is inseparable from men and communities. The technologist is concerned with the applications of science and other forms of knowledge to the needs of man in society; he is up to his neck in human problems whether he likes it or not. When our Peace Corps built a road in tropical Africa, that road was more than an exercise in civil engineering. It was, in fact, a major experiment in social anthropology, for it affected the primitive villages up-country and acted as a communication link which stimulated the acculturation of those people to modern Western society. Every technological activity has social consequences. Technology is thus of humanistic interest, not only because it is a product of the

balance between man and nature; not only that, but we are robbing future generations of their inheritance by plundering the earth of irreplaceable natural resources. Furthermore, technology has helped create the population explosion, and thereby produce a situation where the planet will soon become uninhabitable.

Is technology to blame for all the problems which beset us? Yes, say some of the most influential humanists of our time. Though willing to admit that technology has "raised the ceiling of human achievement," Lewis Mumford claims that modern technology has become authoritarian and is "transferring the attributes of life to the machine and the mechanical collective." Jacques Ellul, the French legal philosopher, has a similar apocalyptic view, feeling that technology has become the end of human life.

Fusing ideas borrowed from both Freud and Marx, Herbert Marcuse, the guru of the new left and the mentor of Angela Davis, attacks industrial civilization on the grounds that it has flattened man into a "one-dimensional" being. Even admitting that more men may be happier today than ever before, their happiness, he claims, is "a state of anesthesia." Though technology has done away with scarcities, it forces men, says Marcuse, to "exhausting, stupefying, inhuman slavery," alienating the workers from each other, from their

Viewpoint *(Continued)*

American society and which manifest my statement that technology has social ramifications which do not necessarily seem inherent in the technology itself.

Take women's rights, for instance. The emancipation of women is a recent phenomenon within Western society, dating back only some 50 years, and it can scarcely be said that engineers consciously sought to advance that cause. When we see old newsreels showing suffragettes marching down Fifth Avenue demanding equal rights for women, we assume that the pressures exerted by Susan B. Anthony and her followers were responsible for the freedom of women in the modern world. Don't you believe it!

Except at a few colleges, female emancipation never really moved forward until Charles Kettering came along with the self-starter for the automobile. Now the hand that rocked the cradle but could not turn a crank had only to turn a key. The cradle itself gave way to the kiddie-seat beside Mom, with both Mom and kiddie hellbent on seeing the world. The suffragettes won women the right to vote,

ciety; the intolerance, "racism," or just plain indifference of the white community; the lack of foresight and sensitivity on the part of the public officials; the failure of effective law enforcement; the presence of outside agitators, and so on and on. Yet the deeper causes of the Black Revolt have technological foundations. Let me show you.

Many historians claim that Negro slavery was languishing in this country near the close of the 18th century, when an ingenious innovation, Eli Whitney's cotton gin of 1793, lowered the price of upland cotton in the United States. The obvious economic advantages of this invention fastened the plantation system and the institution of slavery upon the American South. Within another half century, however, some historians claim, slave labor had proved itself so inefficient as to be technologically obsolete. This view has recently been challenged, but no matter. The fact is that slavery was both morally reprehensible and ideologically indefensible in a democratic society.

The movement toward its abolition cost us a civil war, and the South, being technologically underdeveloped, lost to the more industrialized North. Although the slaves were emancipated, they remained in economic poverty,

now, with the aid of machines, the same work is done with as little as 13½ hours of labor. In the Mississippi Delta, some 30,510 workers were employed in the back-breaking task of picking cotton in 1960; by 1967 the introduction of cotton-picking machinery had caused that number to dwindle to 7,225 to pick the same amount of cotton. There was no longer place or need for unskilled labor in the South. So, on or off relief, Blacks either died of malnutrition — the polite American term for starvation — or moved out. More moved than died because another marvel of technology emerged. The automobile gave mobility to the entire population of the United States, including even poverty-stricken Negroes and Whites in battered jalopies.

The urban industrial centers beckoned like promised lands flowing with machines and jobs which, unfortunately, were in the hands of the Canaanites and Philistines. Possessing mobility and no longer having even a minuscule economic stake in southern rural regions, a vast migration of Negroes flowed from southern farms to northern cities. Between 1940 and 1970, some 4.4 million blacks left the south, flooding the north with "unemployables," a term perhaps invented by those who wished to avoid doing anything about the problem.

This technologically-powered flight of the rural poor to the big cities had far-reaching consequences, none of which was avoidable by the invention of more new words like "in-migrant," "underprivileged," and "disadvantaged." These words, however, helped explain away the next cruel technological blow which fell upon the poor Southern Black migrating to the promised land, where the streets are paved with gold. The Black migrant could find no place in today's sophisticated technology. Perhaps for the first time in Western history we saw in the 1950s and 1960s the spectacle of large-scale unemployment while thousands of jobs went begging. There was no match between the openings, requiring highly skilled workmen, and the available labor supply.

Compounding the frustration was another miracle of modern technology, the television set. As a revolutionary instrument, TV must rank alongside the Declaration of Independence and the Rights of Man. Into the shabby living room of the Negro relief client were piped the dreams and sugarcoated realities of an affluent society. He was invited to spend hours watching how good life was for everybody else and hearing about products which everyone seemed able to buy, except him. For the first time in history, the disinherited could see the affluence of the wealthy

True emancipation of women came with the auto and technological devices which freed them from household chores.

but women were far too smart to use that club. Engineers were handing them much better ones. The true emancipation of women came when the auto gave them mobility and when technological devices within the home freed them from onerous household chores. When frozen foods came in, every woman became a great cook. Automated machines and detergents made her a great laundress. Supermarkets converted her into a canny purchasing agent. The pill allows her to have children, if, as, and when she wants them. The upshot is that, while we men still decide the really important questions of the world like stemming Communism in Angola, the women make all those unimportant decisions having to do with money, food, shelter, clothing, and the good life.

Let me take another example — the Black Revolution, manifested through violence, destruction, and death. We attribute this, perhaps rightly, to many different socio-cultural factors: the frustration of the Negro in white so-

social bondage, and political disenfranchisement for nearly another century. In the end, however, it was technological advance in the 20th century which finally delivered the Negro from southern to northern peonage.

In this connection, three advances are of special note. First was the industrialization of the South. Machines are color-blind; they do not know or care whether the hands which guide them are white, black, blue, purple, yellow, or green. And for this, among other reasons, the South resisted machines far into the 20th century. It was a hopeless cause.

Second was the development of new agricultural techniques and products. They ended the reign of King Cotton and the dependence of the South on one crop.

Third was the development of the mechanical cottonpicker which deprived the Negro field-hand of his livelihood. Only a quarter of a century ago it took a man with a mule 160 hours to plant, cultivate, and pick an acre of cotton;

intimately, with immediate perception of what they were missing. They wanted to partake of the great outpouring of goods which engineers had made possible, yet they were denied all legal and socially acceptable means to obtain them.

And so we packaged wealth and privilege for television. We displayed it publicly to the poor and nonprivileged whom we barred from the system. Then we wondered why they rioted and looted.

The sad history, whose social repercussions are still working themselves out, illustrates the wide-ranging interactions of technology with many different elements of our social environment.

Yet we take our technology for granted. Our daily lives have been so inextricably bound up with our technology, that we fail to realize how unique and significant it is, until we are faced with altering the patterns of our lives by a sudden energy crisis. I am reminded of the ninety-year-old woman who flinched from taking a ride in an airplane, one of the technical marvels of our time: "No siree," she said, "not for me. I'm going to sit right here at home and watch television, just the way the good Lord intended I should."

Many of our technology-related problems arise because of the unforeseen consequences when apparently benign technologies are employed on a massive scale. Hence many technical applications which seemed a boon to mankind when first introduced became threats when their use became widespread. For example, DDT was employed to raise agricultural productivity and to eliminate disease-carrying pests. Then we discovered that DDT not only did that but also threatened ecological systems, including man himself. So, we and many other industrialized nations banned it. We in the United States could afford to do so, because our high technological level enables us to use alternative means of pest control to achieve the same results at a slightly higher cost.

Other nations, however, are not so well placed: they must use any and every technological advance which they can afford in order to subsist, even if that technology might have harmful side effects. For example, India must have the insecticidal benefits from DDT despite its harmful effects, because it would not be economically feasible for India to change to an insecticide less persistent than DDT which would require spraying every few weeks instead of twice a year. According to the World Health Organization, the use of DDT in India cut down the incidence of malaria from 100 million cases a year to only 15,000 cases, and the death

rate from 750,000 to 1500 a year. Is it surprising that Indians might view DDT in a somewhat different light than Americans?

Let me take a case which is even closer to home and which shows how problems of scale can alter the beneficial aspects of technology. This is the case of the automobile.

At the turn of this century, automobiles were regarded as a solution to the pollution, congestion, and safety problems created by horse-drawn transportation. That was a time when in New York City alone horses deposited some 2½ million pounds of manure and 60,000 gallons of urine in one day. The automobile promised cleaner, quieter, and more rapid transportation—but as we know, pollution, congestion, and safety problems have returned in altered form as a result of the large-scale use of the automobile.

This is because pollution of the atmosphere by automobiles is what is known as a threshold phenomenon. That is, a small number of automobiles have little effect upon the salubrity of the air; however, when a sufficient number of automobiles emit noxious fumes, these reach a point where they can no longer be dissipated into the atmosphere and where they pose a

away with the dangerous exhaust. In other words, we rely upon the "technological fix," that is, remedying matters by the application of more or better technology rather than our own forbearance. We favor our own inhuman use of technology in order to suit our own comfort and convenience—and we ignore the health and safety of the community at large. If and when gasoline rationing comes upon us, we will blame the government, industry, oil potentates, and what have you—everybody but ourselves and our materialist values—and we will look to a technological fix to relieve us of the consequences of our own selfishness.

Technology sometimes obeys our commands, and when our successful technology brings problems in its wake, we ameliorate the situation by still more technology, which brings us again to catastrophe.

But catastrophe can be averted, if we use our technology with humane compassion and with some understanding and comprehension of the social ecology in which our technology will be employed. For one thing, we must understand that while technology has provided us with goods and services, food, shelter, and clothing, a better world has not yet come into being

We displayed wealth and privilege to the poor and wondered why they rioted and looted.

threat to the health of the entire community. For purpose of illustration, let us say that 100,000 automobiles can operate in Philadelphia without creating a health hazard, but the 100,001st automobile's exhaust fumes push the amount of noxious emissions beyond the threshold of safety. Now, who is responsible for the dangers created by the automobile smog? The 100,001st car or the other 100,000? Are any of us willing to forgo the convenience and pleasure of having our own individual transportation in order to reduce the smog level? No, it is always the other fellow who should leave his car at home and walk or use public transportation, not us. We are willing to accept the risks of a smog-laden atmosphere for the sake of our own comfort and convenience. We place the blame not on ourselves, and our own selfishness, but on Detroit for seducing us to buy vehicles which give off dangerous emissions. We continue to drive our cars and angrily demand that Detroit change the engine design in order to do

largely because we have not had the social innovations to accompany our technological advancement. Instead we have utilized our technical achievements in the service of values and institutions belonging to an earlier, more competitive society based on scarcity. We have allowed many of the benefits of an advancing technology to be appropriated by narrow interest groups, and we have ignored our own consciences and our own ideals. What should we do about it? And do we have enough time?

Within the past few years we have begun to develop mechanisms for directing our technology to serve the common weal rather than the interest of narrow interest groups. These new socio-political mechanisms go under the general heading of Technology Assessment, which attempts to evaluate the social and human consequences of the applications of science and technology—before these are applied. Man has always assessed the effectiveness of his

(Continued on next page)

Viewpoint (Continued)

technology, but his past assessments were confined to seeing if it would murder his enemies more effectively or bring him greater profits. Now we are trying to extend this assessment to second-order and third-order social and human consequences.

You are already familiar with some of the manifestations of this technology assessment movement, which was analyzed so brilliantly by Carroll Pursell in his Mellon Lectures of last year. These manifestations go under the headings of environmentalism, consumerism, and accountability. For example, the public is beginning to demand that scientists, engineers, business corporations, and government officials be held accountable for the environmental, human, and social consequences of their actions. The passage of the Environmental Quality Control Act and the establishment of the Environmental Protection Agency were demonstrations of the public's concern, as was the recent institution of the Office of Technology Assessment by the Congress. The simple fact is that the public has been aroused by the spectre of damage to the ecology and environment, it is frightened by the possibility of lowering our current standard of living, and it is furious about the shoddiness and inadequacy of the consumer products offered by American industry.

As Betty Furness, former consumer adviser to President Lyndon B. Johnson and later chairman of the New York State Consumer Protection Board, said in Washington at a Congressional hearing — and I quote — “If American industry continues to sow contempt for the consumer, it will reap contempt from the consumer. And from Congress it will reap statutes. This could be the most spectacular case of statutory reap in history.”

The point I am trying to make is that technology is not the sole cause of our troubles, nor is it the only solution to our problems. Technological applications are determined only partly by the technology itself; they are also determined by businessmen, government officials, soldiers, and others whose chief concerns might be self-serving rather than conformity with a democratic social ethic. Furthermore, there are social technologies as well as physical technologies. Whenever a technological change is introduced, we must also develop appropriate software — a social technology — in order to use it most effectively.

Some recent history demonstrates how a combination of social and physical technologies can be extremely effective in undoing some of the past

problems created by technology, thereby contradicting the gloomy predictions of our contemporary doomsayers. For example, our limited historical experience with environmental legislation, demonstrates that the environment can be cleaned up without sacrificing the economy or standard of living, and without bringing the last judgment one day closer.

Many technological impacts which were considered irreversible a few years ago have lately been reversed. Part of it is due to the toughness and adaptability of nature itself. But it has been nature aided by technology — and by protective legislation — which has reversed past damage to the environment.

An example of how environmental pollution can give way to determined attack is provided by London and the Thames River.

Since the beginnings of the Industrial Revolution, London has probably been subjected to more pollution than any other city in the world, but the pollution of the Thames antedated the Industrial Revolution. When Henry VI died in 1471 and his coffin was brought to Windsor Castle from the Tower of London, the attending monks on the funeral barge held their nostrils because of the stench from the river's sewage. Because the river reeked so much at ebb tide, James I, some 150 years later, threatened to move his court to Windsor, and a century later Queen Anne toyed with the idea of transferring Parliament to Oxford. In the 19th century, when the situation had worsened due to industrial and urban

past half-dozen years, and in 1970 there was 50% more sunshine than ten years earlier. Today some seventy species of fish are swimming in the Thames, and commercial fishing fleets are working the estuary. Birds have returned, including some thousands of ducks and wading birds from Russia and Northern Europe wintering along the Thames River — some of them not seen in England in the 20th century. The Thames is now said to be the cleanest river in Europe.

The history of the Thames shows us several things: how man created pollution long before industrialization began; how technology added to the pollution to create a dead river; how technology was called upon to cleanse the sewage before it reached the river; and how the public's will to establish laws and enforce them helped restore the Thames to a purity which it has not had for some 500 years. Amazingly, this task was accomplished within some 15 years. And the same thing is happening with the Rhine River, where the simple imposition of an effluent tax is already producing a cleaner river.

Although this is very recent, it is still history nonetheless. It shows us how by better use of existing technology we can, if we possess the strength of will, undo the ecological consequences of our heedless applications of technology in the past and can avoid the doomsday outcome of the systems analysts who are so enamored of their computerized projections that they forget to look at what is actually happening in the world.

Autos were once regarded as the solution to the pollution, congestion, and safety problems created by horse-drawn transportation.

growth, porters hung sheets dipped in chlorine from the tall windows of the Houses of Parliament in order to keep out the smell of the river.

These dreadful conditions prevailed until little more than a decade ago. By that time the tidal reaches of the Thames were so polluted that no fish, except eels, could survive in them. Birds had deserted the banks, and in the dry summer months scientists failed to detect any dissolved oxygen in the river water. To all intents and purposes, the Thames was a dead river.

Within the past decade the passage and strict enforcement of antipollution laws and the application of environmental technologies have changed the situation remarkably. London's pea-soup fogs have been absent for the

Yet such limited victories should not lull us into the false belief that all our troubles are behind us and that we can therefore ignore the warnings of doomsday. There is still much to be done, but we can take heart by seeing how so-called “irreversible” impacts of technology upon the physical environment can be reversed. If we can do that with the physical environment, can we not attempt the same with the social environment?

After all, if ours is a man-made world, cannot man remake it? Technology Assessment might provide us with a powerful tool to that end. I am in favor of Technology Assessment because it reaffirms my faith in man and in democracy. Let me explain.

At a time when many nay-sayers

deprecate American culture, saying that we have become a nation of hedonistic materialists and that we have allowed technology to rule our lives, Technology Assessment insists that man is still in control of his destiny. Technology Assessment says that man can control the use of his own technology; that human skill, imagination, and creativity can help bring man a better life; that we are not the playthings of a mindless technology which crunches us underfoot; and that man can use his machines to serve all mankind rather than the narrow interests of a special few.

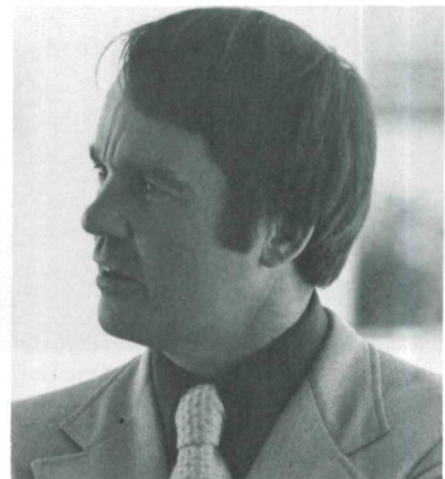
Technology Assessment is also democratic. It does *not* mean that a group of technocrats, or a scientific and technological elite, will make decisions for us. These will be made by the political process, and that, in a democratic sys-

tem, is where those decisions belong. Democracy allows us the privilege of making mistakes. Technology Assessment merely tells us the options open to us and their possible and probably consequences. So, even if we have highly skilled Technology Assessment, we are still likely to make mistakes in our use of technology. But we will make our mistakes through choice, not through ignorance of the consequences.

Ours is a society of so-called "high" technology. We may be no more happy nor more secure than our ancestors, but ours is an exciting age in which to live, and we must prepare students to live in a world of continuous and rapid change. "It is the business of the future," said Alfred North Whitehead, "to be dangerous." But we can accept the risks with composure and confi-

dence if we set ourselves to the task of educating our future citizens to understand the social forces accompanying technological change and to play a meaningful part in the social process itself.

If we professors do our jobs properly, I think students will be able to do theirs. I think they can solve the problems of our social environment. I am sure that, in so doing, their success will be only partial. They will create more problems for their successors even as my generation has done. I think their successors will also solve those problems, and in turn create new ones and so history will be made. And, as a historian of technology, let me conclude by reminding you that the lesson of that history is hope: H-O-P-E. ▲



Doug Weaver

(Continued from page 13)

a job as "the oldest graduate assistant in the country." He became an assistant football coach for head coach Pepper Rodgers. During those three years, Kansas won a Big Eight title and a trip to the Orange Bowl. Weaver spent a year practicing law in Lawrence, Kansas before football and Pepper Rodgers called him back. He became assistant head coach at UCLA.

In 1973, he was appointed Athletic Director at Southern Illinois University. One year later he also became head football coach. He had turned down an offer to be an athletic director at a Big Eight school while working for Pepper in Los Angeles, but had decided that he was needed at Southern Illinois. He directed the drive to build a new football stadium while he was there.

Finally, thus far, Pepper Rodgers offered his name for consideration when Tech was looking for a new athletic director. His qualifications were obvious. A former player, head coach, and lawyer, he could deal with different functions and problems with a great reserve of knowledge and experience. As Pepper says, "If I were to leave Tech tomorrow, my greatest accomplishment would be that I helped bring Doug Weaver here."

Now the future is what concerns Doug Weaver. Both his future and Tech's. He cares deeply about the school and his players. "I have spent most of my life with young men. I have taught, coached, and ordered them. They are always challenging; they are so full of life that their spirit is infectious. I respect them and their innocence, talent, and ambition. The students here at Tech are producers. They have a certain style that comes from talent and confidence. I know that they and the other students who came before them and who will come in the future

are the real Tech. I am important only as I can help to maintain that tradition and style. To be sure, time necessitates some changes, but the spirit of Tech must be preserved.

"We need some physical renovation. A new athletic building and new locker rooms, for instance. We joined the Metro-7 last year and I think that it has already paid dividends in fan interest and in building our basketball team. We experimented with night football and will play at night once next year. We need to increase attendance at all our sports. But most of all, we want our fans and alumni to be proud of us."

Weaver seems especially able to impart his excitement about Tech and sports. It is probably because he has never lost the excitement he felt as a child. "I like the changing seasons and the sports they bring. I love each sport as it is renewed each year. If I ever lose that love, I'll probably go somewhere and open a bait shop; I'll sit and fish and reminisce. But I think I love Tech too much for that to be anytime soon."▲

BEN ZINN:



"MY WORK IS MY HOBBY," explains a Georgia Tech Regents' Professor who is currently responsible for eight research projects totalling \$362,000 annually in addition to his teaching, lecturing, and consulting responsibilities.

Dr. Ben T. Zinn, Regents' Professor of Aerospace Engineering, concentrates on three main research areas: fire safety, combustion instability and acoustics. In addition, he is an internationally-known lecturer and serves on the editorial board of several professional journals. He is the author of 85 publications and has participated in more than 100 seminars or technical presentations.

When asked how he finds time to teach, travel for speaking engagements, and conduct several research projects on campus, Dr. Zinn concedes that his work consumes most of the time that others spend on hobbies. The former international soccer star does find time for daily exercise, however. He jogs or plays tennis.

A native of Israel, Zinn played on Israel's national soccer team, then moved to America where he was an All-American soccer player at New York University and played for the

U.S. National Soccer team. After moving to Atlanta, he was approached by the Atlanta Chiefs professional soccer team, but declined because of his academic responsibilities.

"I have been very happy at Georgia Tech," Zinn commented. "I have had offers from other prestigious schools, but I prefer to stay here." Zinn says that he likes the freedom and variety of his work, in addition to the opportunity to meet people and solve contemporary problems through research.

Dr. Zinn came to Tech in 1965 after receiving his undergraduate degree from New York University, masters degrees from Stanford and Princeton Universities, and his doctorate from Princeton. He spent a minimal amount of time at each academic rank at Tech, becoming a full professor at 33 and a Regents' Professor at 36.

Zinn is currently editing two volumes to be published by the American Institute of Aeronautics and Astronautics under the title *Diagnostics In Combustion Systems*. It is a collection of papers presented a year ago at an International Colloquium on Combustion Diagnosis. He serves on the editorial boards of the following journals: "Fire

Research," "Combustion Science and Technology," and "Progress in Energy and Combustion."

This month, Dr. Zinn is in Brazil serving as a consultant to the Brazilian government as they set up a National Combustion Lab. In 1971, he toured several European countries, on a NATO Advisory Group for Aerospace Research and Development (AGARD) speaking tour. He is chairman and a member of the Board of Directors of the Eastern Section (U.S. and Canada) of the Combustion Institute. In 1976, he was the recipient of Georgia Tech's Sigma Xi Sustained Research Award.

Dr. Zinn heads a Tech research team which is studying the properties of the smoke produced during the burning and smoldering of building materials and furnishings, especially new materials, such as plastics. This project, which could save lives and reduce property losses due to smoke produced during fires, is funded by both governmental and industrial sponsors. This research program is currently sponsored by the National Bureau of Standards, the Products Research Committee (which is financially supported by the plastics industry) and the Olin Corporation.

According to Dr. Zinn, available data indicates that fires result in annual property losses valued in the billions and in 12,000 deaths. The latter statistic is even more tragic when one realizes that the 12,000 lives represent a higher per capita fire death rate than any other nation on earth. More than half of these deaths can be attributed to causes other than burns; namely, smoke, heat, poisonous gases, or oxygen deficiency. Smoke and toxic gases produced in building fires often result in the incapacitation of the occupants who are later burned by the spreading flames. In other instances, smoke obscures the vision of the occupants, preventing them from finding and using available escape routes. These victims soon succumb to either toxic effects of the combustion products, heat, oxygen deficiency or the ensuing flames.

In addition to being a critical factor in fatal fires in homes, dormitories, apartments, hospitals, nursing homes, prisons, offices, stores and aircraft, smoke also interferes with firemen in rescue operations, in pinpointing the location of fire, and in extinguishing the fire. Thus, smoke results in greater overall fire damage. Smoke can also cause direct physical damage to parts of the building not actually involved in the fire.

MAN ON THE MOVE

According to Dr. Zinn, the smoke hazard is related to the fact that during the initial phases of most fires, the rate of spread of smoke and toxic gases from the fire site to nearby locations is considerably faster than the spread of the fire itself. Hence, the hazards associated with exposure to combustion products are ever increasing as new materials, such as plastics, with unknown combustion products, are coming into use as building and furnishing materials.

Another significant factor in the increased smoke hazard is the ever increasing numbers of highrise buildings. Smoke produced by fire in a localized area of a multi-story building is often transported by natural and fire-induced air currents as well as heating, ventilating, and air-conditioning systems, to parts of the building remote from the fire. Victims become trapped when stairwells and elevator shafts fill with smoke. Thus, means for keeping these vertical shafts smoke-free during fires must be developed and incorporated into multi-story building designs.

Smoke consists of a complex mixture of solid and liquid particles such as soot, tar droplets, mists, etc. in addition to the gaseous combustion products. Dr. Zinn's group is currently concerned with the determination of both the physical and chemical properties of the smoke produced by burning different natural and synthetic materials under different conditions simulating real fire situations. To be able to perform the needed measurements, a unique research facility has been developed by Dr. Zinn's group on the Georgia Tech campus. Materials currently under study in this facility include wood, various polyvinyl chlorides, polyurethanes and so on. Since most of these smoke particles are as small as one micron (a millionth of a meter) in diameter and some consist of more than two hundred chemical compounds, one can appreciate the complexities and difficulties associated with the measurements performed.

This fire safety research facility is unique in the sense that it can test the "smoking capabilities" of materials under a variety of real fire situations and it can simultaneously measure more properties than any other facility in existence. Research plans for the near future call for the use of this facility as a screening device that will be used to determine the relative hazards of the smoke produced by different materials currently in use by various industries.

Data generated in these tests will hopefully be used by governments, building code officials, and aircraft manufacturers in the determination of what materials will or will not be allowed in the construction of buildings, furnishings, and aircrafts. Hopefully, such restrictions will eliminate the future use of materials that have been shown to produce highly toxic smoke.

Much of the data and know-how developed in the course of the present research is directly applicable to air pollution studies where scientists and engineers are concerned with the reduction of the amount of particulates generated by various stationary and moving power generating devices that are polluting our environment.

Over the past several years Dr. Zinn has been heavily engaged in research in the area of combustion instability in propulsion systems. The problem of combustion instability has plagued many propulsion systems, such as airbreathing engines and liquid and solid rocket motors, that have been developed to date. Combustion instability manifests itself as organized, periodic, high amplitude pressure oscillations that are supported by energy derived from the combustion process. In most instances, the presence of combustion instability leads to the destruction of the propulsive device and failure of the mission. Hence, there is considerable incentive for developing design procedures that will result in stable engine operation. The attainment of this goal is the primary objective of Dr. Zinn's research in this area.

One phase of Dr. Zinn's combustion instability research activities is the development of theoretical approaches that would enable engine designers to apriori determine whether a proposed engine design would be stable or unstable. It involves the solution of the complex system of equations that describe the flow and combustion dynamics inside rocket motors. To date, novel approaches for the solution of these equations have been developed by Dr. Zinn's group, and some of these approaches are currently being used by various government agencies in their evaluation of the stability of rocket motors. The experimental phase of the combustion instability research program is concerned with the evaluation of the contribution of various rocket motor processes and components to the amplification and damping of the pressure oscillations generated during combustion instability.

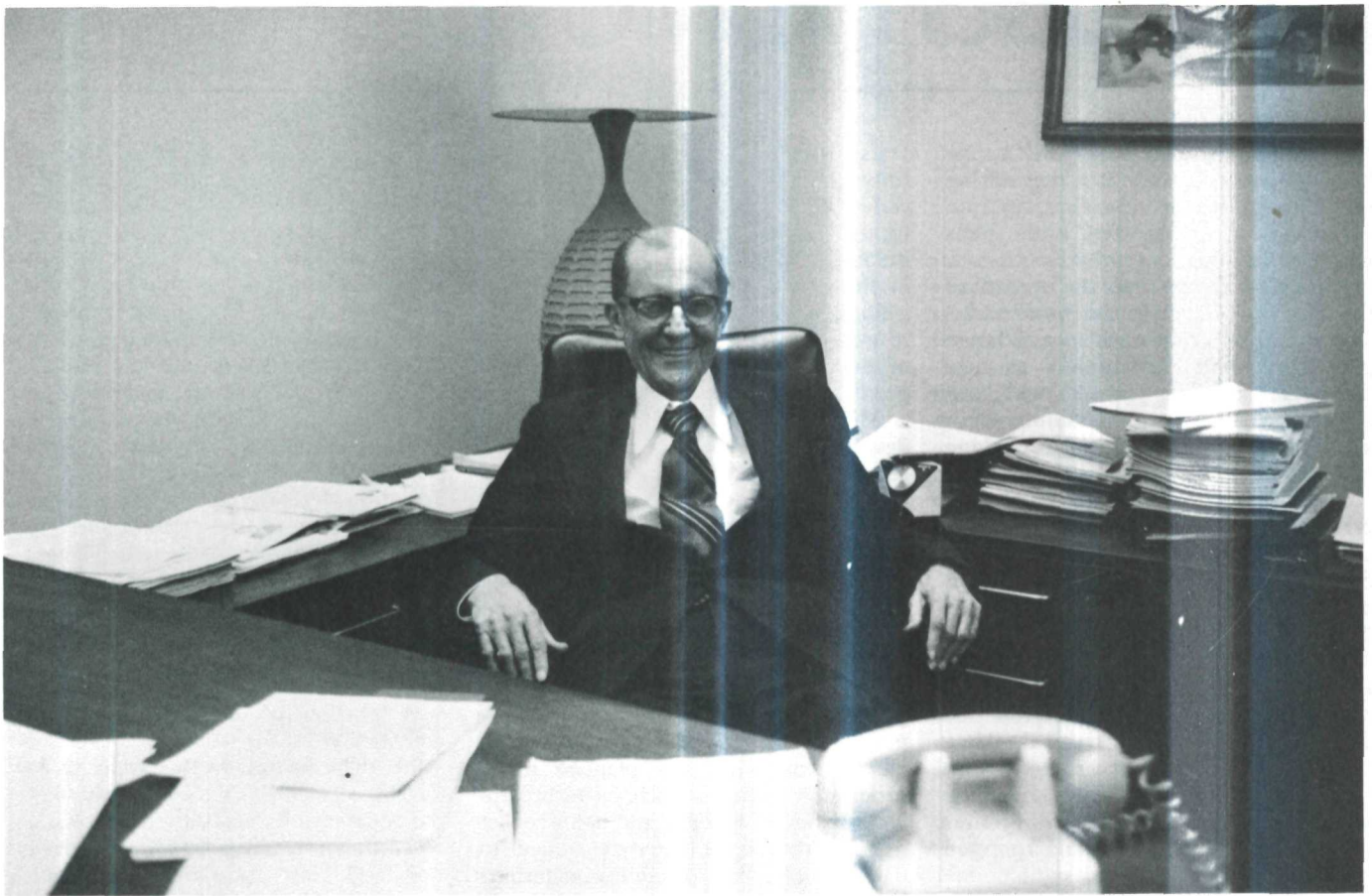
Dr. Zinn's group is one of the few university research groups that are concerned with the problem of combustion instability in propulsive devices. Over the years, this research has been supported by NASA and the Air Force. Currently Dr. Zinn has three sponsors: namely, a \$100,000 contract from the Air Force Rocket Propulsion Laboratory for development of theoretical approaches for predicting the stability of solid propellant rocket motors; \$53,000 grant from the Air Force Office of Scientific Research for the experimental determination of the "capabilities" of different solid propellants to drive combustion instabilities; and a \$55,000 grant, provided by NASA, for the investigation of the driving of combustion instabilities by various gaseous rocket injectors.

A portion of Dr. Zinn's research activities over the years has been devoted to acoustics. In this area, he has developed theoretical models to describe the behavior of sound-absorbing devices when they are exposed to high intensity noise. He has also developed experimental facilities for the evaluation of the performance of sound-absorbing devices under conditions similar to those experienced in rocket motors and jet engines.

Currently, Dr. Zinn is the principal researcher for two acoustics projects. One, supported by the Air Force Office of Scientific Research, is investigating sound propagation within and outside practical geometries found in engines. Results of this study will be used to predict the characteristics of the pressure oscillations inside unstable solid propellant rocket motors having complex geometries, as well as predict the pattern of the sound radiated from jet engines.

The second grant, supported by NASA, will develop analytical means that could be used by acousticians in optimizing the acoustic treatments that are used to quiet turbofan engines. In the absence of such techniques, current engine development programs must resort to the use of costly and cut-and-try methods in an effort to quiet jet engines. Hopefully, Zinn's research results will reduce the cost of quieting jet engines.

As far as future research plans are concerned, Dr. Zinn hopes to find time to do research on energy-related problems. He also would like to use results of his past and current research to solve air pollution problems associated with power generating devices. ▲



Ewell Barnes & Georgia Tech: 30 Years of Service

By JOSEPH BEACH

FOR 30 YEARS, Ewell Barnes has served Georgia Tech, and on July 1, 1977 will retire as vice-president of business and finance.

As a student, teacher and administrator, Barnes has spent his entire life in the academic world.

Upon graduation from Berry College, Barnes began his career as an educator, teaching accounting at his alma mater. After teaching at Berry College, it was on to Georgia Southwestern, the University of Georgia and the University of Tampa before he joined the staff of Georgia Tech in 1947.

How have things changed at Georgia Tech in that time? "The biggest change, and the most noticeable, is the size of the campus," he says. "It's been a long growth process. We have bought up lots adjacent to campus one at a time. It is certainly a slow way to build a campus." Barnes explained that some of Tech's growth came in two plots of ground from urban renewal. "If we weren't able to grow in acreage, the only other alternative was to grow up into the air," he says.

But Tech has grown in more than just size. "We have fine new buildings, labs and classrooms which are well equipped for their purposes. This is a great benefit for both students and faculty."

Another area in which Tech has expanded is its graduate school. When Barnes came to Tech in 1947, the undergraduate program was very good, but there was practically no graduate program. The graduate program, and with it the research program, have both been developed during his tenure, mainly in the past few years. Barnes feels that the dedication of Tech's current president, Dr. Joseph M. Pettit, is the main factor behind this positive growth.

In his 30 years at Tech, Barnes has seen the school grow from a pre-war size of 2,000 to the current enrollment of over 9,000. Although the campus and student body have grown dramatically, there has been little change in the student body, says Barnes. "We have and always have had a work-oriented student body. That is the heart of this whole institution. Along with the stu-

dents, we have a faculty with a good work attitude. That is what makes Tech a quality institution in my opinion," he says.

Although the student body hasn't changed much over the years, Barnes feels that the direction of the school has changed somewhat. "Back then, the school was more practically oriented. Now it is more theoretical, much more complex. The demands of society are different now than they were 30 years ago. Tech has changed to meet the needs of a changing society," he says.

One of the best things to happen to Georgia Tech since he arrived, Barnes feels, is the admission of women. "Having women on campus helps Tech provide a well balanced education for everyone."

Much of the change which has taken place at Tech in the last 30 years has been because of strong leadership, according to Barnes. "In my years at Tech, I have served under four presidents and four acting presidents. We've been going through a continuous chang-

ing process since I've been here. There have been no sudden changes, though, it is more like a healthy evolution, the kind of change that alumni like to see."

"The presidents I have served under have all been good, strong men who have used their resources very well. The fact that we've had more hard times than good times in the last 30 years, and Tech has still grown, indicates that we've had good leadership," he says. "Any organization is only as good as the man in charge, and I wouldn't have changed a single one of them," he says.

During his tenure at Georgia Tech, Ewell Barnes has seen the Institute's budget grow with its enrollment. "A technological education by nature costs more to provide than a liberal arts education, simply because of the scientific equipment and laboratories which are necessary," he says. "But we've had a fair cut of the state allocation since I've been at Tech." According to Barnes, the state allocations to the University System have reflected the economy of the state. "In 1947 it was a different world, Atlanta was a different city then. The economy of the state has developed tremendously since those days," he says. "The state of Georgia has always done the best it could do in regard to the University System," says Barnes.

But Barnes feels that things are looking bright for the future of the Institute. "The economic situation we have now just can't continue," he says. "There has been a definite improvement in the economy. The state revenues are increasing and the allocation to the University System will increase, too. But there will be no big change in a short period of time," according to Barnes, who foresees no drastic change in student fees or other costs in the near future.

In addition to financial support from the state, Barnes points out that the support the institute receives from the Georgia Tech Foundation is invaluable. "The Foundation is vital. If the institution didn't have support from the Foundation, including the annual Roll Call, Tech could not be what it is today," he says.

"The Georgia Tech Foundation helps out with things we cannot spend state money for, such as paying a professor's salary supplement or moving expenses to Atlanta. Salary supplements are especially important in bringing in and keeping the top bright young people. I'd hate to think of getting along without the Georgia Tech Foundation," he says.

After 30 years of dedicated service to Georgia Tech and a lifetime spent in service to education in Georgia, Ewell Barnes is retiring. He will take with him the best wishes of the entire Tech community that he has served so long and so well. ▲

EES Designs Radiometer for NASA

ONE OF THE MOST ADVANCED millimeter wave radiometers in the country, designed by Georgia Tech's Engineering Experiment Station (EES), is ready for high altitude atmospheric measurements aboard a NASA Convair 990 jet aircraft.

The radiometer was developed for NASA's Goddard Space Flight Center for use in testing atmospheric water vapor concentrations and collecting storm research data.

In mid-February the radiometer was installed aboard the Convair 990 by EES engineers, John Langley and Jim Stratigos. A total of 15 six-hour non-stop flights have been scheduled by NASA over a four-week period.

The testing will be conducted over the Pacific Ocean and over land, with flights originating from San Francisco, Seattle and Anchorage.

Designed by the Electromagnetics Laboratory of the Engineering Experiment Station, the radiometer is a highly sensitive receiver used to measure emissions from the atmosphere and the earth's surface. It operates at a frequency of 183.3 GHz.

Through precise on-board calibration, it is capable of measuring the extremely small amounts of electromagnetic energy radiated by any object with a temperature above absolute zero.

The radiometer has an antenna with a beam that can be moved to view certain ground or cloud scenes, or reference temperature structures used for calibration. In effect, it can measure the temperature of objects seen by its antenna from great distances.

Signals received by the radiometer's antenna are amplified and processed by an on-board microcomputer with the data stored on tape. In addition, measurements of air flow, precipitation, water vapor, cloud temperatures and atmospheric pressure readings are simultaneously recorded.

The radiometer utilizes two intermediate frequencies forming a dual-channel receiver. This allows detailed examination of the atmospheric radiations. "The two frequency bands in our measurements give simultaneous indications of water vapor concentration at various altitudes while the aircraft is flying a constant but much higher altitude," said John Langley, project director and research engineer with the Electromagnetics Laboratory.

"As far as we know," commented EES Senior Research Engineer James Schuchardt, "this is the first experimental flight of a radiometer system designed to measure water vapor concentrations simultaneously at different altitudes."

The radiometer, designed to fit into a passenger window of the Convair jet, will be tested at a flying altitude of 30,000 to 35,000 feet. "This will allow us to fly above most weather formations and give us better data on the atmosphere," said Jim Stratigos, assistant research engineer. Stratigos will be responsible for equipment maintenance and operation during the flight tests.

When the atmospheric storm environment tests are completed in late March, the radiometer equipment will be returned to Tech's Engineering Experiment Station. "We can expect to see this type of measuring equipment used on future meteorological satellites in the 1980's," Schuchardt said. ▲

Tech Team Captures College Bowl Competition

THE GEORGIA TECH TEAM captured first place honors at the Southeastern Region College Bowl competition held February 11-12 at Berry College. The Tech students finished undefeated, 13 wins and no losses.

Emory University was runner-up. This was Tech's fourth year of participation, with two first place finishes, one second and one third. Because of Tech's victory this year, Tech will host the event next year.

Although engineering, science and management are emphasized at Tech, questions for the competition are selected from the areas of history, literature, philosophy and mythology. A well-rounded educational background is essential.

The team members, under the faculty advisor Dr. Robert Meredith of the English Department, are Joe Owens, captain; Kili Gastfriend, John Cook, John Flynn and Mark Crawford. ▲

Ceramic Engineering Has More Jobs Than Graduates

DR. JOSEPH L. PENTECOST has a problem that is unique in today's economy. As the director of Georgia Tech's School of Ceramic Engineering, Dr. Pentecost is involved in job placement for his graduates. Unlike the difficulties that many schools are experiencing, his problem is that there are too many jobs for too few available graduates. He describes the problem this way.

"There are simply not enough ceramic engineers, for now or for the future. The profession has too low a profile among students to attract enough candidates. There are only 225 ceramic engineering graduates per year in the United States for entrance into a \$15 billion industry, and that money estimate is conservative."

How many potential jobs are there? Dr. Pentecost uses Japan as an example of an industrialized nation like the United States. "Japan graduates five times as many ceramic engineers, per capita, as we do. Considering the advances being made in ceramics that lead to a constantly increasing potential

for their use in almost every industry, we could probably use that ratio of graduates right now and need more in the future. Tech has one of the larger ceramic engineering departments in the country with only 55 students. We need to increase that."

What uses of ceramics are there in the future? Dr. Pentecost mentions "ceramic bones for medical use, or ceramic car engines, glass so strong it can be used to hammer nails, or ceramic houses that never wear out and use solar energy for heat and light. We can make ceramics that are stronger than steel. And that's just a brief overview of the possibilities."

Dr. Pentecost says that his situation is not unique. "We need engineers in petroleum, mining, and minerals. Unfortunately some of these are not glamorous jobs to students looking for a career, but they are areas that offer almost unlimited opportunities. We just need to make the students aware of America's future needs and how they can help meet them."▲

Letter to the Editor

To the Editors:

I take issue with Dr. Frederick W. Schutz' statements as reported in the article "No Grade Inflation" in the "Ramblin" section of the November 1976 *Alumni Magazine*. Although Dr. Schutz believes that Tech's low grades do not keep students from getting into graduate schools, my experience with law schools indicated just the opposite.

As research assistant to the director of admissions at Georgetown University Law Center (and before that as an applicant to several law schools), I was not surprised to learn that law schools give great weight to undergraduate grade-point averages (GPAs) in selecting their entering classes. What did surprise me was the discovery that most law schools — especially the larger ones — do not take into consideration the grading standard of the college at which the grades were earned. The reason is *volume*: faced with literally thousands of applications, admissions officers simply don't take the time to figure out whether the undergraduate college in question gives out high, medium, or low grades. Consider the student with a 3.1 in the top 10% of his class at College X, and the student with a 3.6 but in only the top 20% of his class at College Y. To the busy admissions officer,

the 3.6 simply *looks* better than the 3.1 — end of analysis — and the student from the college with low grades loses.

Furthermore, most law schools calculate an "admissions index" — a predictor of the applicant's performance at law school based on his Law School Aptitude Test (LSAT) score and his undergraduate GPA — and the index usually plays an important part in the selection process. To my knowledge there is only *one* law school in the country that bothers to first adjust the GPA to reflect the college's grading standard before calculating the index. (Georgetown University is that school, and under their system the GPAs from Tech get one of the largest upward adjustments of any school in the country.)

Dr. Schutz also said in the article that harder grading increases Tech's credibility with graduate schools. Once again I take issue; my research indicated that there is no correlation between a college's grades and the reputation it enjoys. To illustrate, Tech's average GPA is more than 0.4 below the average at M.I.T., yet I'm sure most people will agree that M.I.T. has just as fine a reputation as Georgia Tech. In fact, some people will argue that M.I.T.'s higher grades show that M.I.T.'s students are *better* than those at Tech (but statis-

Tournament Wins Finish Successful B-Ball Season

THE YELLOW JACKETS basketball team finished its best season since 1971 with an impressive showing in the Metro-Seven Tournament in Memphis March 3-5. The Jackets beat Florida State 72-67 in the opening round by playing controlled, come-from-behind ball. This victory pitted Tech against top-seeded and rested Louisville in the second round. Tech shocked ninth-ranked Louisville with an exciting 56-55 victory. The Jackets faced Cincinnati in the tournament championship game. Foul troubles early in the game led to a 74-61 defeat for Tech.

Tech players Jim Wood and Tico Brown were named to the All-Tournament team, Wood for the second time. Brown and Wood were second and third in scoring at the tournament. Wood, Brown, and Randy Foster were two, three and four in rebounds.

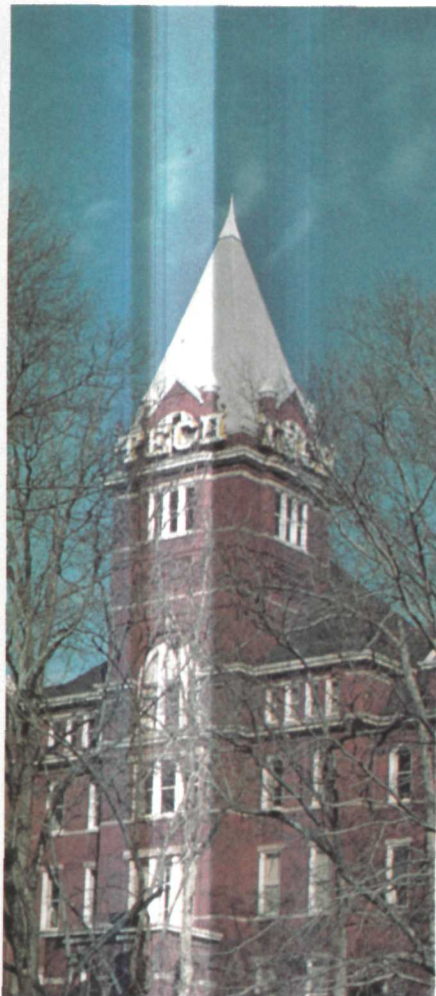
In other sports news, Tech will play only one football game at night this fall. The home opener against Miami on Sept. 17 will be played under lights. Remaining games against Clemson, Air Force, Auburn, Duke and Georgia will be played at 1:30 p.m. at Grant Field. The Tech-Navy game will be played in Annapolis on Nov. 12, although some published schedules have shown incorrectly that it is to be played in Atlanta.

Last year, Tech played four home games at night and one at twilight. ▲

tically this reasoning is incorrect also). At any rate, few law school admissions officers ever bother to evaluate a college's grading standard in the first place, and therefore low grading does nothing to affect a school's reputation one way or the other. As discussed earlier, the only effect of having attended a college that gives low grades is to make it tougher to compete against applicants from colleges that give higher grades.

This whole problem could be solved if Tech's faculty would agree to raise their grading curve. True, there would be a few more students at the 4.0 level, and thus it would be slightly less prestigious to be at the very top of the class. But these aren't the students now being hurt by Tech's low grades, and for the rest of the student body higher grading could mean the difference between acceptance and rejection at the graduate schools of their choice. Whatever the "cost" of raising grades may be, it undoubtedly would be small in relationship to the benefit that would accrue to a substantial number of Tech graduates. And serving the interests of its alumni is a large part of what Georgia Tech is all about.

Sincerely,
Richard Loftin
IM '64



Printing this magazine is just the final step in a long, complex process

The creative, production and pressroom people at Stein salute the editor of the Georgia Tech Alumni Magazine. We know, as she does, the long, hard hours it takes to assemble each issue. We've taken part in the creation of too many publications not to understand what pitfalls and frustrations await those who sell the ads, contact the class secretaries and gently prod the writers into meeting their deadlines. We're proud to be a part of it all.

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1976

Nov. 12-13 Atlanta
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1977

Jan. 20-21 Atlanta
Feb. 11-12 Cincinnati
Feb. 25-26 Atlanta

Mar. 25-26 Atlanta
Apr. 22-23 Atlanta

May 20-21 Atlanta
June 2-3 Cincinnati
June 24-25 Atlanta
July 14-15 Atlanta

July 29-30 Cincinnati
Aug. 19-20 Atlanta

Sept. 16-17 Cincinnati
Sept. 30/Oct. 1 Atlanta
Oct. 21-22 Cincinnati
Nov. 4-5 Atlanta
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For information about the Conferences, contact:

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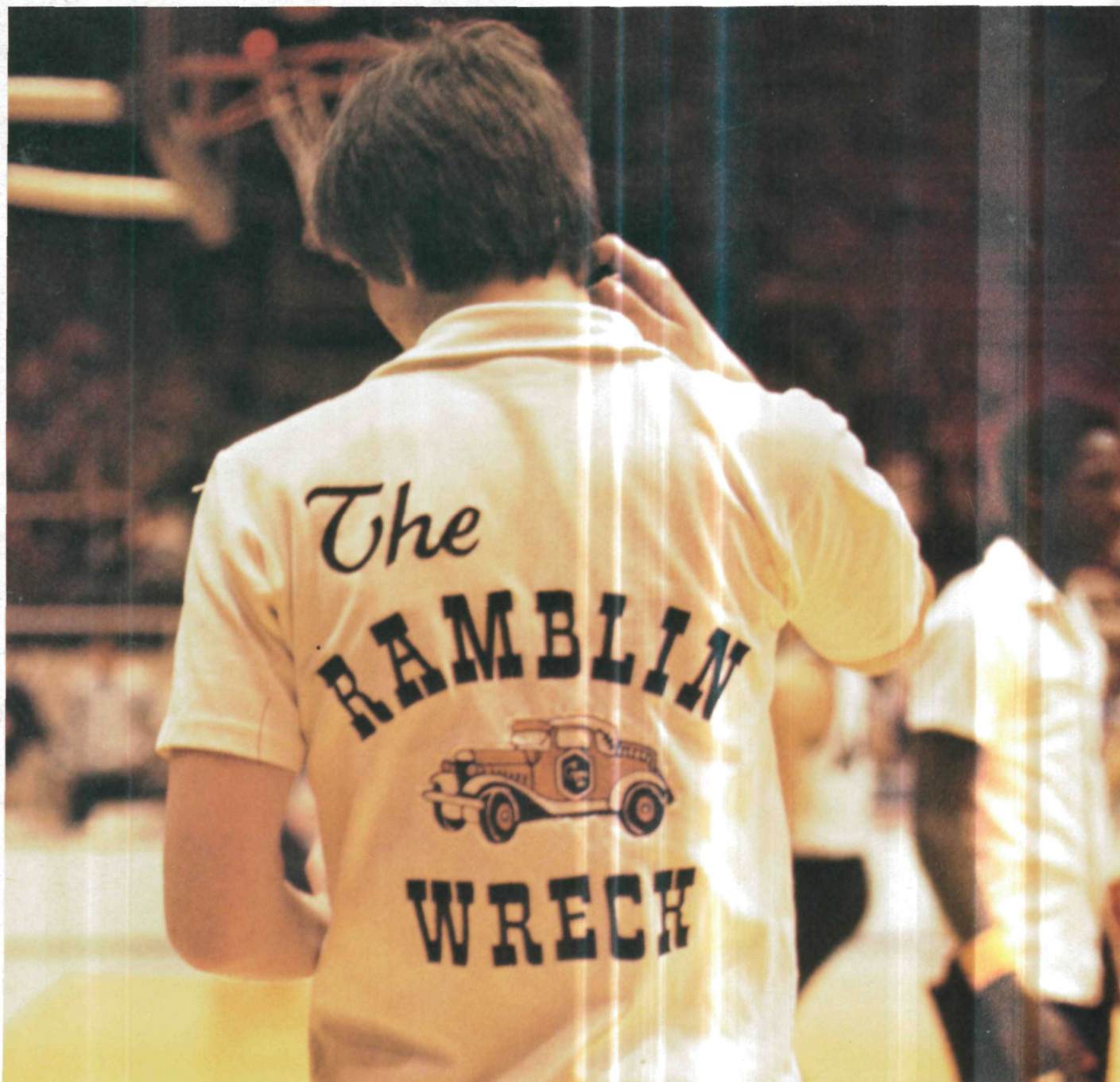


Photo by Robert Crawford

A Tech basketball player reflects on his team's most successful season since 1971. The Jackets posted an 18-10 record, and made it to the finals of the Metro-Seven Tournament.

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