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President's Report to Board of Trustees, 1989

Clemson University

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Our founder’s vision of a more prosperous state through education and the establishment of “a high seminary of learning” is proudly carried forward, and enhanced, by those here today. We celebrate a Centennial of dreams fulfilled and a promising future. As Clemson and others who began the nation’s land-grant movement established institutions of higher learning in every state, they created a uniquely American model, a revolution in educational philosophy.

The official opening of the Centennial was held on Founder’s Day, April 6, 1988, and began with a statewide ceremony to raise Clemson’s new flag. The first phase of the celebration, “the University and the Arts,” featured opera star Beverly Sills. The theme of the second phase was “the University and the Sciences” with chemical engineer John J. McKetta sharing his insights. Lectures and films focused on the University’s land-grant mission and the state of our nation’s environment and natural resources.

On January 25, 1989, the third phase, “the University and the Economic World,” began with a governmental appreciation dinner and a report to the people on the University’s 100-year impact on South Carolina’s growth and development. On April 1, Cornerstone Weekend, the Tillman Hall cornerstone was replaced with a new capsule containing articles to be opened on Clemson’s bicentennial in 2088. Nobel Prize-winning economist George Stigler was the featured speaker.

The fourth and final phase, “the University and the Political World,” featured columnist and political commentator William F. Buckley, Jr. on September 20 as speaker. The celebration culminated on the 100th anniversary of Acceptance Day on November 27, when the faculty, staff, students, and alumni wished the University “happy birthday” in a variety of ways, including a community birthday party and a special student birthday dinner.

"Science will open up new avenues for profitable occupation to individuals, which will redound to the power of the state. Resources now lying dormant will give occupation and wealth to unborn millions."
"...develop a wild, crazy, impossible dream for your future.... Nothing much happens without a dream...."

Les McCraw '56
speaking to new Clemson graduates at the August 1989 Commencement.
Clemson University is at a pivotal moment in its history. It has a rich tradition, great pride, and a remarkable president in Dr. Max Lennon. Its academic and scientific strength has never been greater. And South Carolina and the entire South need a superb university more than ever. If the faculty and campus leaders think boldly and plan wisely, I see a bright future.

George Keller, Author
Academic Strategy: The Management Revolution in American Higher Education
Senior Fellow, University of Pennsylvania

Clemson University will find it hard to match 1988-89 in terms of excitement and achievement. There's a sense of energy...a sense we share that the whole institution is pulling together as never before.

Celebrating our Centennial at such a time has given us a chance to reflect on how dramatically this institution has changed. Thanks to the visions and dreams of all who have passed through here before us and made Clemson stronger, we feel a keen sense of responsibility to ensure that our own vision of the future adequately prepares the University for the 1990s and the turn of the century.

To help us develop our planning process, in the spring we brought the noted expert in strategic planning for higher education, George Keller, to campus to work with us. As a result, our Second Century plan is being updated and improved. We're working at finding the important balance between established excellence in undergraduate education and national prominence in research.

In other highlights, research and sponsored program expenditures grew to $66.3 million, positioning Clemson among the top 80 research universities in the nation. Clemson's endowment reached a record $45 million. The largest cash gift in University history, $1.5 million, was given by the R. Roy Pearce family to establish a unique professional communications center. Clemson's partnership with the W.K. Kellogg Foundation, through a $1.1 million grant, provided leadership training for rural communities in South Carolina. Having established the environment as a top research priority, the University created the Archbold Tropical Research Center in Dominica through a $2 million gift of 250 acres of tropical rain forest property in the Caribbean...and a consortium was formed including Yale University, Syracuse University, the Smithsonian Institution, and others.

Increasingly in the future, the United States' strength in science and technology will determine its economic strength and its national security. New, emerging technologies, such as composite materials and advances in telecommunications, information technology, biotechnology, and superconductivity, will drive the industries of the future. As the United States seeks to ensure its place of leadership in world markets, the role of the research university will be more important than ever before.

In the pages that follow, come take a look at some of the reasons why we've celebrated so enthusiastically what is happening at Clemson University.

President Max Lennon and Les McCraw, PAC Chairman

President's Advisory Council (PAC) members, leaders from industry and government, met on campus in October with the Strategic Planning Committee to discuss their vision for Clemson's future.

Max Lennon
President
Moving up in rank and stature as a research university does put pressure on teaching. In addition, our teaching functions are spreading across the state through the Greenville Higher Education Center, Telecampus, and other programs designed to meet the growing demands of adults and non-traditional students. Finding the balance is the key.

David Maxwell
Provost and
Vice President
Academic Affairs

Information technology and education will continue to transform our lives. The long-term goals of education in a democratic society — mass education, lifelong education, and individually tailored education — will only increase the need for effective teaching.

Alumni Professor of Architecture Peter Lee with graduate student Karen Daisley. Recognized nationally for excellence in teaching, Lee was selected as "Distinguished Professor" by the National Association of Collegiate Schools of Architecture.
As part of the national movement to improve quality in education begun in the early eighties following the report, "A Nation at Risk," higher education institutions are examining their teaching programs and methods to respond to the criticisms about graduates who leave school unprepared to cope with the demands of industry, the workplace, and contemporary society.

In March, the University launched its self study for reaccreditation—a two-year institution-wide review of all programs— with a focus on students and how they learn. In line with the new, more stringent 1984 Southern Association for Colleges and Schools (SACS) criteria, the University has also created a permanent faculty committee on assessment of institutional effectiveness with a focus on student learning and development. Faculty have attended state and national professional development meetings on assessment, and some lively discussions are taking place throughout the campus about the meaning of effective teaching, student outcomes, critical thinking skills, general education requirements, and the like. Working together—on self study, on assessment, and on planning for the future—the faculty, students, and administrators are gaining new insights and understanding about the importance and definition of effective teaching.

Other faculty highlights in undergraduate and graduate teaching include:

A number of faculty won outstanding teaching awards in recognition of excellence and innovative teaching methods. These are discussed under each college area.

The faculty created a new Centennial Professorship by matching $100,000 with state funds to recognize faculty excellence. The first recipient will be named in the near future.

With a four-year, $1 million grant, Clemson's Center of Excellence in Mathematics and Science Education has already touched the lives of school children throughout South Carolina. Under a mandate from the Education Improvement Act, the center was formed to help state school teachers improve the methods used to teach math and science in elementary and secondary schools.

In June 1989, Clemson became the first site in the nation, outside Princeton, New Jersey, to host readings of the College Board's Advanced Placement exams. Clemson now ranks 29th in the nation in the number of AP grades received from students to qualify for credit. Clemson faculty have served as chief readers nationally for the Educational Testing Service, the Princeton firm that administers the AP exams, as well as the Scholastic Aptitude Test and the Graduate Record Exam.

Since 1987-88, $1.8 million has been set aside by the administration for faculty salary adjustments to recognize and reward teaching and research and to bring salaries in line with regional averages.

In graduate teaching, two new programs were approved by the Commission on Higher Education: an M.S. degree in architecture and an M.S. in animal physiology. More than 700 graduate degrees were awarded from August 1988 through May 1989, including 77 doctorates.
The lush tropical rain forest on the island of Dominica in the Caribbean is the location of Clemson's new Archbold Tropical Research Center, created to study the environment.

Dr. Ron Kendall brought with him from the state of Washington Clemson's new Institute of Wildlife and Environmental Toxicology, an educational and research program with $5 million in grant support, working to protect our precious natural resources.

Advances being made in the fields of high technology, medicine, and genetic engineering are changing the course of human history and transforming the way Americans live.

The protection of the environment on planet Earth is a major concern.
Consider the humble beginnings of the nation’s land-grant institutions—many created following the crises of the Civil War. Researchers at state and land-grant campuses have made discoveries that have expanded the frontiers of knowledge, including insights about ourselves, our planet, and the universe. They created the “wonder drugs,” the pioneering antibiotics, blood-thinners, antihistamines, and cancer and polio fighting vaccines. They have pioneered the development of artificial organs and implants and were present at the birth of America’s space program, building instruments for America’s first satellite, Explorer I, which discovered the radiation belts around the earth. They helped develop our first space shuttle...our first atom smasher...and first digital computer. In agriculture, the research conducted...applied by America’s farmers...made the United States the breadbasket of the world. What is truly amazing is that all of this work—and much, much more—has been done in relatively few years.

Ira M. Heyman
Chancellor, University of California, Berkeley
Past Chairman, National Association of State Universities and Land-Grant Colleges

Clemson’s Centennial celebrates a century of discovery and achievement by our faculty and students which has profoundly affected the lives and progress of the state. Marking the Centennial of the Morrill Land-Grant Act in 1962, U.S. House Representative W.J. Bryan Dorn cited some of Clemson’s historic accomplishments in an address to the U.S. House:

Clemson met the challenge of the boll weevil which threatened to wreck the economy of the state. Clemson led in diversification of agriculture, enabling many family-size farmers to remain on the land and become self-reliant and independent. Agricultural science at Clemson met the supreme challenge of soil erosion. Clemson is located in the red hills and cotton area where the land is subject to erosion. Farms that formerly were clay hillsides and red gullies are now green with grass and reforestation. The livestock industry, particularly beef cattle, is being pioneered by Clemson. Clemson is looking ahead in the field of forestry to the time when the greatest single crop in the South will be pine trees. Industrialization has developed at a fantastic rate throughout South Carolina. Clemson is pointing the way with its research labs and close cooperation with business. Clemson is literally the capital of a great and growing industrial empire.

In the ensuing years, Clemson has emerged as one of the top-ranked research universities in the nation, with research and scholarship conducted in all nine academic colleges and the South Carolina Agricultural Experiment Station at locations throughout the state.

The diversity of faculty achievement and recognition ranges—just this year—from nominees for the prestigious National Book Award and the Pulitzer Prize to patents for original inventions and a recipient of West Germany’s most prestigious award for achievement in science. Creative ideas come from all areas, in all disciplines, with faculty working together on joint projects between disciplines and other institutions. It is often difficult to distinguish where teaching and research and service leave off and begin: Most often, new ideas and discoveries are integrated within all three and enhance them all.

Today there are more than 800 research projects under way at Clemson. Topics include research on the superconductivity of electricity, advanced materials for medical implants and prosthetic devices, composite materials, acid rain, robotics, and ozone layer depletion. From 1986 to 1988, the number of proposals submitted by the faculty doubled, from 524 in 1986 to more than 1,000 in 1988. In 1988-89, an additional 4 percent increase was achieved over 1987-88. Clemson received $66.3 million during the year in grants from government and industry, a $2.5 million annual increase. Of that total, $4 million came from competitive grants and contracts, a 7.7 percent increase over the $20.8 million awarded during 1987-88. Slightly more than $14 million of the 1988-89 total came from the federal government. Nearly 23 percent of the funding came from industry, an amount considerably higher than the national average of 5 percent for land-grant universities. This support is a good indication of the confidence in Clemson University’s innovations and achievements in applied research and technology transfer.

The latest National Science Foundation information ranks Clemson among the top 80 research universities in the nation.

Still, such comparisons warrant adjustments since many of the higher-ranking universities boast facilities at least twice the size of Clemson’s. If rankings are further adjusted on a per-faculty-member basis, Clemson’s rank climbs to 46th. And, among land-grant universities, the ranking can be adjusted to 17th in research and development expenditures.

Boasting some of the finest facilities and equipment in the region, and in many cases the nation, Clemson’s research program is propelling the University into its Second Century at an exciting, challenging rate of speed. Highlights of specific projects and progress during the year are found in the individual college sections which follow.

RESEARCH

Through its affiliation with the National Center for Super Computing Applications, the Division of Computing and Information Technology at the Clemson Research Park has access to a Cray II Supercomputer and to remote networks worldwide.
The legacy of land-grant universities is service — helping people not only through classroom teaching but also by taking new knowledge directly to them, showing them how to enrich their lives and livelihoods.

Service at a land-grant university can mean any number of things: faculty members who serve on a college, department, or University committee; who give speeches or performances at local service clubs or community groups; who advise government officials on improving policies and procedures; who consult with industry leaders on new technologies and new management methods; who create films, theater productions or lecture series to enrich audiences' understanding of the world; who hold special camps for senior citizens, the handicapped, and the disadvantaged; who teach professional development seminars, and who organize community self-help groups. The benefits of the service component of the University mission return many times over, especially to the students back in the classrooms.

In 1914 the Smith-Lever Act established the Cooperative Extension Service; Clemson was the first land-grant college in the nation to form the new agricultural agency. In addition to taking research discoveries to the farmers, Clemson began special training for the textile industry soon after a textile department was established in 1897. Today, continuing education for business people, and for teachers, engineers, nurses, foresters, and parks and tourism administrators is a large source of activity both on and off campus.

In terms of the state's economic development and progress, a research university's ties to government and industry have proven to develop into some of the most profitable partnerships ever created. M.I.T., Silicon Valley, the Research Triangle, the Ben Franklin Partnership in Pennsylvania all reflect the results—a potential return on investment of up to 10:1. Clemson's Emerging Technology Development and Marketing Center is working now, for example, with about 30 clients to develop ideas that could produce new companies to invest in South Carolina and create jobs.

Using the impressive resources of facilities such as Clemson's regionally recognized Division of Computing and Information Technology, a $5.5 million facility with more than $7 million worth of state-of-the-art equipment, Clemson has formed partnerships with more than 60 industrial firms and with leading federal and state government research sponsors.
Access and Equity
Clemson's commitment to its land-grant heritage of providing access to a college career resulted in its most successful year ever in recruiting minority students. The primary reason for this success was the implementation of the Clemson Scholars Program, which was announced in the spring of 1988. Under this program, the top college-bound senior in every public high school in South Carolina is now guaranteed admission to Clemson with academic fees "paid in full"—a full, four-year, renewable scholarship worth $2,100 a year based on current costs. Further, if a high school's top senior is not a black student, a similar scholarship is also given to that school's top ranking black senior. This fall, in its first year, 151 top South Carolina high school graduates entered Clemson in this program. Of the 151, 98 were black, increasing black freshman enrollment in 1989 to 177, compared to 161 in 1988.

In addition, as part of its commitment to these efforts, Clemson allocates approximately $350,000 in University funds for a summer Clemson Career Workshop program for high school minority students. During the year, a new national Center for the Study of the Black Experience in Higher Education was created at Clemson to conduct research and programs to increase black participation in higher education. And, the National Dropout Prevention Center at Clemson serves as a clearinghouse for information on how to help high school students stay in school.

Retention of black students attending Clemson continued to be a high priority, with the administration and faculty working to ensure that students receive adequate and effective counseling. An example is the College of Engineering's highly successful Program for Engineering Enrichment and Retention (PEER), which began in 1987. Acting as mentors, junior and senior black engineering students provide academic and emotional support to their freshman and sophomore counterparts. In March, for the first time, retention rates for black freshman engineering students passed the rates for overall freshman engineering students. Seventy-three percent of the 60 black freshmen who entered the engineering program in 1987 are continuing to pursue engineering degrees, compared to 67 percent of the overall freshman engineering student population.

Financial Aid
Financial aid for students gave an important boost to meeting costs, with 68 percent of Clemson students receiving some form of aid, surpassing the rate for most other schools. Scholarships grew from 1,135 and $1 million in 1987-88 to 1,333 totaling $1.3 million in 1988-89.
The Dreams of Our Students

Both the Traditional...

The American dream of creating a better life and career through higher education is alive and well at Clemson. Applications from highly qualified students continue to increase beyond the University's ability to accommodate them. As the University's self-study process proceeds, with faculty and students exploring together ways to ensure the most effective experiences for the student, the University remains dedicated to its top commitment: providing a high quality educational experience for its students.

Total enrollment reached a record 16,072 during the Fall 1989 semester, with engineering, business, liberal arts, and sciences still top career choices.

A few of the highlights of the year include:

Calhoun College, the oldest and largest honors program in the state, reached record enrollment levels, with 592 students from all nine colleges in May 1989. The average entering SAT score was 1233.

The Fall 1988 freshman class included 15 of the 45 Palmetto Fellows named by the S.C. Commission on Higher Education as part of the state's Cutting Edge initiative. Clemson was the school selected by the largest number of Palmetto Fellows. For Fall 1989, 18 of the 54 Palmetto Fellows selected Clemson.

Clemson's Student Symphonic Band began its 1989 season with a performance in New York's Lincoln Center in February, a prestigious debut for an outstanding group of students.

Two graduate students received Fulbright awards for study in West Germany in engineering and biology.

An economics major with a 3.8 grade point average and member of the cross country track team, Henrik Skov won the Atlantic Coast Conference Jim Weaver Award, a post-graduate scholarship given to the top male athlete who exhibits success in athletics, academics, and community leadership.

Four Clemson athletes competed in the 1988 Summer Olympics in Seoul, Korea. Mitzi Kremer won the bronze medal as a member of the women's 4x100 meter freestyle relay team to become the first Clemson athlete in history to win an Olympic medal. In addition Clemson sophomore Mike Milcher on the U.S. baseball squad won the gold medal. Bruce Murray and Eric Eichmann competed in soccer events.

Clemson biochemistry major Jennifer Frick, a senior from Florence, was the only South Carolina college student to present a research paper at the prestigious American Association for the Advancement of Science Conference in January in San Francisco. Her paper won the S.C. Academy of Science's Award for undergraduate research last year and qualified her to present the paper at the national conference.

Expanding on its liaison role with the student body, faculty, and the administration, student government has changed over the years as the University and student body have grown. Representatives now serve on a broad cross section of University committees and contribute important perspectives to the faculty and administration as they participate in the decision-making process campus-wide. The new Commission on the Undergraduate Experience, composed of twenty student leaders and three administrators, for example, is providing students opportunities to enhance Clemson's mission and institutional effectiveness by contributing to the University's planning, self-study, and assessment processes.

ELEVEN

Better-educated workers who can adapt to new technologies will discover many new jobs awaiting them in the next decade. People will change careers, on average, every 10 years.

...and the Non-traditional

In response to the growing demand for non-traditional education, adults in the nearby city of Greenville are attending classes at the Greenville Higher Education Center, which opened in September. Clemson shares the center with a consortium of seven other institutions serving the area. More than 100 courses in both graduate and undergraduate programs are offered during the evening hours. In addition, many courses are offered to accommodate these students through Telecampus, the live broadcast of courses via television network.
Second Century Plans...
Carried Out by the Academic Colleges and Public Service Activities (PSA)

Each of the nine academic colleges is guided both by the University's Second Century strategic plan and by their individual departmental and college operational plans. Five broad areas were originally identified in the Second Century Plan: Agriculture, Engineering and Basic Science, Marketing and Management, Quality of Life, and Textiles. The Strategic Planning Committee has added a sixth broad area for task force examination, Undergraduate Education, in line with the University's top goal of providing a high quality undergraduate experience and in seeking an appropriate balance between the growing research function and teaching.

In addition, some of the original land-grant components of the institution: the South Carolina Agricultural Experiment Station, the Clemson Cooperative Extension Service, the Division of Regulatory and Public Service Programs, and the Livestock and Poultry Health Division — also known as Clemson's Public Service Activities (PSA) — are an important component of Second Century planning for the University.

Hailed "a new industrial revolution" by President George Bush, the new science of biotechnology is changing the way scientists address problems in human health care and in agriculture.

The future of agriculture includes exploring alternatives to traditional farming. Aquaculture is an exciting growth industry in South Carolina supported by Clemson research and extension expertise and a new $250,000 Aquaculture Demonstration Center.
Agriculture and Natural Resources

The Centennial celebration holds great meaning for us in this division. It takes us back to our land-grant beginnings and to the service component so important to us and to the people of South Carolina.

Milton Wise
Vice President and Vice Provost

Second Century - Agriculture

Agriculture is one important component of the Second Century strategic plan identified by the President’s Advisory Council, the faculty, and administration. With an emphasis on returning profitability to agriculture, forest, and marine enterprises while maintaining a healthy agro-ecosystem, a new branch of science, biotechnology, has emerged to promise revolutionary breakthroughs for farmers and agribusinesses. In addition to biotechnology, important programs in which Clemson has some unique advantages are in food packaging and alternative crops. Among the highlights for the year of this complex division, which is separately funded by the State Legislature and backed by federal and private funds, are:

College of Agricultural Sciences - Resident Instruction

The freshman class for the Fall 1988 semester doubled in size compared to 1987. The Fall 1989 semester continues the upward increase in students. A new program to recruit quality students and keep them informed about professional career opportunities began.

The South Carolina Agricultural Experiment Station

An important component of the Division of Agriculture and Natural Resources, the South Carolina Agricultural Experiment Station conducts a number of leading-edge research projects. Highlights include:

- In November 1988, an interdisciplinary team of researchers, with Monsanto Company, took the lead for the nation in field testing a genetically engineered bacterium to measure its effectiveness against wheat take-all, a fungus that decimates wheat crops. Test results from the study have proven the ability to keep the microorganism where applied.

- Biotechnology
  In addition to Clemson’s landmark field test with Monsanto, the S.C. Experiment Station is contributing to the immune-enhancement of the embryo to improve the immune system of newborn farm animals, helping them fight diseases; strengthening the natural disease-fighting elements in plants; and improving food safety through microbiology techniques.

- Ornamental Horticulture
  Ornamental horticulture is one of the fastest growing industries in the state, typically generating $278 million annually for South Carolina. The Experiment Station sponsors a competitive grants program to expand and enhance research in this field.

- Low-Input Sustainable Agriculture (LISA)
  In line with the mounting concern for the environment, Clemson shares a grant with the University of Georgia to develop low-input, reduced-tillage systems for producing crops, using the Clemson Interseeder, a planter developed by Clemson agricultural engineers.

The Clemson Cooperative Extension Service

Working directly with people in every county of the state, the Clemson Cooperative Extension Service had many notable accomplishments in 1988-89, a few of which are:

- Child and Adult Resource Express (CARE)
  Clemson has established a statewide database and referral system to distribute information about dependent care of the young and elderly in South Carolina, including information about licensed day care and other services for children and adults.

- The Expanded Food and Nutrition Education Program (EFNEP)
  With federal funds, Clemson reached 4,124 homemakers and 5,638 youths in South Carolina during the year to improve the diets of limited resource families and youths.

- Agromedicine
  Faculty and students from Clemson, MUSC, Winthrop College, and S.C. State College are collaborating in studies of health issues in rural communities through a $787,000 W.K. Kellogg Foundation grant.

- Community and Economic Development Program
  Together with the Experiment Station and the Strom Thurmond Institute, Extension is helping Clemson be more responsive to communities, agencies, and groups in need of public policy assistance.

- Division of Regulatory and Public Service Programs
  Unlike most other land-grant universities, Clemson also has responsibility for various state certification and regulatory programs through the Department of Fertilizer and Pesticide Control, the Department of Plant Industry, the Department of Seed Certification, and a portion of Agricultural Chemical Services.

Regulation in 1988 included the Chemigation Law, which mandates safeguards to prevent backflow of agricultural chemicals into surface or groundwater. Also, in late 1988 and early 1989, Clemson helped four counties detect and confirm the Varroa mite, a new pest of the honey bee. All hives were treated and removed as soon as possible, and South Carolina was declared a non-infested state.

Livestock-Poultry Health Division

Presently major livestock health programs are aimed at the eradication of pulmonitis in poultry, brucellosis, and tuberculosis in cattle, and pseudorabies in swine. During 1988-89, the Legislature appropriated monies to monitor herd testing and to institute the Pseudorabies ELISA test in the laboratory.
One of the most important trends projected for the turn of the 21st century is the breaking down of barriers — learning to work together to solve mutual problems such as the study and protection of the environment.

To study the effects of acid rain on pine trees, researchers use 24 specially equipped environmental chambers on a 3.8-acre site in the Clemson Experimental Forest.
With an important component of the University's Second Century plan identified as Quality of Life, 1988-89 may be the year that Clemson launched programs with the potential of making major contributions to the quality of life on a state, national, and global scale. Acid rain and ozone pollution are direct threats to the beauty and production of the state's 12.5 million acres of forest lands. These lands provide for recreation, wildlife, and quality water, as well as $4 billion in annual sales of forest products.

Clemson's curricula in forest management and forest products emphasize the role of the forester as a steward of our forest resources. In one of five testing sites in the South, researchers in the College of Forest and Recreation Resources are conducting the first comprehensive, controlled study of the effects of pollutants on important Southern forest species. Sponsored by the Environmental Protection Agency, researchers are using 24 specially equipped environmental chambers on a 3.8-acre research site in the Clemson Experimental Forest to study pine seedlings for growth rates and possible damage.

In keeping with the public's interest in redefining "quality of life," the Department of Parks, Recreation, and Tourism Management is studying the role of leisure services in human and community development. Also, using the college's unique Outdoor Laboratory, the University has been instrumental in providing quality leisure experiences to disabled and disadvantaged residents of the state.

Other college highlights of the year include:

A major development was completed with the acquisition of the Springfield Plantation. The plantation encompasses a 250-acre tropical rain forest on the island of Dominica and has been named the Archbold Tropical Research Center. This site affords researchers at Clemson and a consortium of other institutions, including the Smithsonian Institution and Yale University, an opportunity to do research on a vital global issue — the long-term effects of continued deforestation of the planet.

Studies on wood chemistry continue. For example, work is being conducted on the conversion of cellulose as styrofoam substitutes and to determine if sawdust can be converted to plastics. This work is being conducted by Dr. David Hon.

Tourism is South Carolina's second largest industry, with more than $4.6 billion spent by visitors annually. Faculty in the Department of Parks, Recreation, and Tourism Management are working on recreation site planning, developing guides for marketing plans in state tourist regions, and expanding tourism enterprises in small towns throughout the state.

In one of many examples of service, Dr. Robert Becker, director of the Regional Resources Development Institute, has created an innovative program to help disadvantaged children develop entrepreneurial skills, expertise, and self esteem by showing them how to develop products for sale. Working with faculty and students from four colleges and the John De La Howe Center in McCormick County, an old barn has been converted using designs from Clemson's Architecture College students. Faculty plan to extend the De La Howe model to storefront enterprise programs in small towns throughout South Carolina.
With a nationally renowned architecture program, the only one in South Carolina, Clemson's College of Architecture plays an important role in developing the Quality of Life component in the University's Second Century plan. Selected from schools across the country for excellence in the August 1989 edition of the magazine of the profession, Architecture, the college is called "A School in Balance."

Genoa, Italy, is the site of Clemson's graduate center, the Charles E. Daniel Center for Building Research and Urban Studies.
As we plan for the future, the tremendous creativity of the faculty and students in the college—added to the faculty's commitment to teaching excellence and to their students—is our greatest advantage.

James Barker
Dean

The August 1989 edition of *Architecture* describes the college:

"...where a strong tradition coexists with innovation, where the campuses are both small-town and urban, where faculty and students share mutual respect, where architectural education is valued but considerate of the total development of the individual, where a strong sense of identity frees faculty and students to explore, where student work ranges from traditional solutions to spiritual pilgrimage...." The author asks, "Would such a school be an architectural Eden? Visit Clemson University and see."

In 1988-89, the college celebrated, in addition to the University's Centennial, its own anniversary of 30 years of service to the state. Strategic planning is very much a part of the college's thinking and dreams of the future. George Keller, in his visit to campus in March to advise the University about strategic planning, remarked on this college's ability to focus on moving the program to national prominence. The college's plan is so focused it is outlined very clearly and succinctly on one page. A unique feature of the program is its nationally prominent position in off-campus programs. In addition to the main campus in Clemson, the college's graduate center, the Charles E. Daniel Center for Building Research and Urban Studies in Genoa, Italy, and an undergraduate study center, The Clemson University College of Architecture Center at the College of Charleston, provide students exposure to broadened and enriched educational experiences.

A few of the year's highlights include:

The tradition of teaching excellence continued with the selection of Dr. Roger Liska as recipient of the John Trimmer Award for Teaching Excellence. This annual national award is given to America's finest teacher in building science. In addition, Alumni Professor Peter Lee was selected as one of five National Association of Collegiate Schools of Architecture (ACSA) Distinguished Professors. This award is evidence of Professor Lee's remarkable teaching skills and commitment. He joins Alumni Professor Emeritus Harold Cooledge and Dean Emeritus Harlan McClure as college faculty who have received this special national recognition. Clemson's College of Architecture has more National ACSA Distinguished Professors than any other school of architecture in North America.

In a unique graduate program designed to respond to needs of non-traditional students, the Master of Building Science and Management degree program added a University Telecampus feature, providing opportunities statewide for students to remain full-time construction professionals and still pursue a graduate degree.

During the year, a fourth new degree program was approved by the Commission on Higher Education. The Master of Science in Architecture enables the Department of Architectural Studies to focus its graduate level research efforts in health care, energy, lighting and acoustics, computer color graphics, and architectural theory.

Assistant Professor Matt Rice uses creative teaching methods to enhance student learning. After reading Thornton Wilder's *Our Town*, students were assigned to build a small-scale town with buildings to fit the town's center and write a history of the town.
J.E. Sirrine Professor of Textiles Christine Jarvis, whose initial $3.5 million U.S. Defense Logistics Agency grant spearheaded the creation of the CAR facility.

Susan Sumner at Clemson’s Apparel Research (CAR) Facility. The facility is one of only three in the nation providing faculty and students an opportunity to use state-of-the-art manufacturing technology and equipment. Land’s End, a U.S. catalog retailer noted for high quality products, has joined with Clemson to demonstrate high-tech production of ultra-high quality men’s dress shirts.
The fundamental reason enrollments have been high and growing is that college and university degrees have been excellent investments. Despite the enormous growth in the number of graduates of these institutions, the returns to the investment in these degrees have not been falling. Recently a college graduate earned about 50 percent more per year than a high school graduate, yielding a return of about 15 percent on the costs of the higher degree. George J. Stigler Nobel Prize Economist, Centennial Lecturer - on the future of higher education.

Faculty and students in the college had an extremely productive year. Highlights include:

Accountancy
In April the school joined only 78 schools nationally in receiving separate accounting accreditation from the American Assembly of Collegiate Schools of Business. Faculty had 25 journal articles and three books published or accepted for publication and presented 13 papers at professional meetings. An article submitted by the internal auditing program to the leading management accounting journal received the Lybrand Silver Medal as the second best manuscript submitted. Students in the national honorary and professional accounting fraternity earned, for the third consecutive year, a superior chapter award and two $500 scholarships in the national competition.

Economics
A $250,000 gift from the Harris Family Endowment will bring in a nationally known economist to give a series of lectures and to interact with students and faculty. More than 70 articles and books were published or accepted for publication during the year, many in the leading economics journals.

Finance
The financial management degree program grew to more than 900 majors and became the third largest major at the University, as large as finance programs at universities twice the size of Clemson. An example of faculty engaging in relevant research to enrich classroom teaching is Mark Mitchell. He is on leave to the Securities and Exchange Commission in Washington and has written two papers which have drawn worldwide attention to his expertise and insights on the 1987 stock market crash and on the phenomenon of firms poorly executing takeovers and becoming takeover targets themselves.

Management
The Expert Systems Laboratory upgraded its equipment with an IBM 9370 mid-range mainframe computer. Hands-on experience in artificial intelligence and expert systems has been included in both undergraduate and graduate courses in information technology. The award-winning IBM Manufacturing Management Laboratory continues to support teaching and research in information technology and manufacturing management.

Marketing
The newest department in the college enjoyed a 90-percent increase in enrollment during the year. A new department head, Dr. Norman Kangun from the University of Houston, joined the college. Professor Jacqueta McClung received a third year of funding for her research on improving retention rates for minority students at Clemson University. Faculty research was published in 12 marketing journals.

Textiles
A new director, Dr. Douglas Rippy, was hired. Student enrollment in Textiles reached a three-decade record with 200 students. Three new professorships were announced: to Drs. Michael Drews and Christine Jarvis, J.E. Sirrine Professors of Textiles; and to Dr. Clarence Rogers, the J.W. Swetenburg Professor of Textiles.

Professional Development
Some 19,500 business men and women attended seminars, conferences, workshops, and in-plant training courses offered to keep adults professionals current with the new technologies in the Information Age. The department is one of the Southeast's primary providers of high quality learning experiences for adults and non-traditional students.

Small Business Development Center
Assisting more clients than during any other one-year period in its history, the center serves communities in 11 northwestern counties of the state. More than 20 seminars were held. Through the center, faculty have been actively involved in the W.K. Kellogg Foundation grant for rural leadership education and with the University's new Emerging Technology Center.

Peat Marwick executive Judy Alexander in Greenville, S.C. Alexander is the first female graduate from Clemson to join a big eight firm in South Carolina.

In line with trends in student interests nationally, enrollment in the college's degree programs has experienced phenomenal growth in the past five years - by 41 percent; 52 percent enrolled are women. The problem is attracting and retaining faculty to teach them. With unbelievable salary offers from industry and from other academic institutions (Wharton recently paid $250,000 to a business school professor, for example), competing for top teachers and scholars is our toughest challenge.
Very much in line with the University’s Quality of Life component of the Second Century strategic plan, the College of Education continued to address two of the state and nation’s most serious challenges — providing quality teacher education and meeting education and training needs.

To address predicted teacher shortages as well as societal education and training deficiencies and the declining interest of students in math and science, the college created, with the College of Sciences, a Center of Excellence in Math and Science Education. Approved last year by the Commission on Higher Education, the center continues to help produce public school teachers who are certified to teach math and science and to upgrade teachers’ skills in these disciplines.

The highlights of the year for the college, in addition to the Centennial lecture by Ernest Boyer, include:

The college produced more certified educators than any other undergraduate program in South Carolina. The college this year continued to be the state’s leading provider of math, science, and vocational/industrial technology teachers.

The Graphic Arts Communication Program continues to be regarded as one of the top three in the nation in preparing students for professional careers in the printing, publishing, and packaging industries.

Plans were developed to form a Business Advisory Board to advise the college on the education and training needs and concerns of industry.

A proposal was initiated with the W.K. Kellogg Foundation to develop a model “Schools of the Future” project to strengthen the ties and effectiveness in creating more responsive and successful public school systems.

A proposal was submitted to the Kellogg Foundation to address the needs of at-risk youth. With an unacceptably high percentage of young people dropping out of school before graduation, the state stands to profit not only educationally but economically, socially, and culturally.

The National Dropout Prevention Center, while no longer affiliated solely with the college, works with faculty to address one of the state’s most critical challenges in improving economic development and overall quality of life.

In response to the growing demand for advanced courses of study and more teacher preparation options, the college’s continuing education program provides the largest new programs in the state in science education, education administration, curriculum and instruction, and special education.

Work with other colleges and faculty on the W.K. Kellogg Palmetto Leadership project helped the development of rural communities in South Carolina.

Army and Air Force ROTC awards include the Army ROTC Society of American Military Engineers, Best in the Nation; the Arnold Air Society, second place in the yearly Best in the Nation competition.

The number one question we face as a nation is whether we can attract and hold outstanding teachers.”

Ernest L. Boyer
Clemson Centennial Lecturer and President of the Carnegie Foundation for the Advancement of Teaching
The United States is facing a growing shortage of trained scientific workers with advanced degrees. Barely half of the 18,000 Ph.D.s the United States needs in engineering each year is being supplied by its universities. Further, there are now about 1,800 vacancies in university engineering departments and even more unfilled advanced engineering positions in U.S. industry. Shortages are expected to grow still more severe in the 1990s with a wave of expected faculty retirements and as population growth slows. Meanwhile, international competition and advances in technology keep accelerating. Today, the half-life of an engineer’s knowledge is only five years. The top future challenge: providing faculty to meet the needs for engineering education at all levels.

With the engineering program in place since the University’s founding in 1889, the college is celebrating its own Centennial with an outstanding year of achievement. Faculty and students, with a rich and diverse set of interests and talents, achieved numerous honors and recognition for their work...and the pursuit of their dreams.

Highlights of the year include:

Dr. Jonathan Black, internationally renowned scholar in orthopedic biomaterials, author of five patents and numerous books, was appointed to the Hunter Endowed Chair in Bioengineering established with a gift of $1 million. It is the first chair in the world devoted to biomaterials engineering and science.

Several faculty won recognition for outstanding teaching:

Drs. Lewis T. Fitch (1988) and Eugene H. Bishop (1989) were nominated by the University for the Governor’s Professor of the Year Award, sponsored by the Commission on Higher Education and the Governor. Drs. Fitch, Robert W. Snelsire, and David W. Tipper received NCR Outstanding Educator Awards for 1988. Dr. Cecil O. Huey, Jr. received the 1989 Engineering Educator of the Year Award from the Piedmont Chapter of the S.C. Society of Professional Engineers. Dr. Earl J. Hayter received the 1989 Byars Prize for Excellence in Teaching. Dr. Donald E. Beasley was recognized for his outstanding classroom teaching by Pi Tau Sigma by being selected as recipient of the Eugene H. Bishop Award.

Patents granted to faculty for research:

Dr. Adly Girgis and Robert Brown of Ames, Iowa, were granted a patent in March entitled “Adaptive Kalman Filtering in Fault Classification.”

Dr. Frank W. Paul, McQueen-Quattlebaum Professor, and Joey K. Parker, former Ph.D. student, were recipients of a U.S. patent for robotics.

In other honors, recognition, and service:

Dr. Christian E.G. Przirembel was elected a Fellow of the American Association for the Advancement of Science for his leadership in mechanical engineering education and for his outstanding research. Dr. Henry J. Rack was elected a Fellow of the American Society of Materials International in recognition of distinguished contributions in the field of materials. Drs. Robert Davis and W.J. Kennedy were elected to the rank of Fellow in the Institute of Electrical Engineers, the highest rank awarded for outstanding achievement over a long term of service. Dr. Delbert Kimbler received the Manufacturing Systems Award from the Institute of Industrial Engineers for service and achievement in manufacturing. Dr. Benjamin Dysart, professor of environmental systems engineering, was invited by South Carolina Governor Carroll Campbell to serve on the newly created Fresh-
water Wetlands Forum, which is charged with the adoption of a comprehensive wetlands policy for the state. Dr. Steve Melsheimer was selected to chair the University's self study for reaccreditation.

Highlights of student accomplishments include:

Clemson's student chapter of AIChE (chemical engineering) received the National Outstanding Chapter Award for the seventh time in the past 10 years and was voted best chapter in the Southeast Region. The Clemson Chapter of the Institute of Industrial Engineers received its fourth consecutive Award of Excellence, part of a national competition presented for the breadth and quality of professional activities.

Todd Stevens won second place for a student paper presented at the Carolinas Conference of the American Society of Civil Engineers.

Meredith Neuman, graduate student in environmental systems engineering, was named winner of the Graduate Student Paper Award given by the Division of Environmental Chemistry of the American Chemical Society. Her paper was presented at the national meeting in Miami in September 1989.

Highlights in advancing overall college programs:

Innovative, thoughtful changes were made in undergraduate curricula to adapt and respond to student needs for effective instruction.

Industry support of research increased to $12 million. Clemson's College of Engineering generally attracts a greater percentage of research funds from industries than do engineering schools at other universities nationally — 38 percent compared to approximately 5 percent.

A record was set in gifts and grants received for the college. Southern Bell donated $250,000 to Electrical and Computer Engineering to establish a Telecommunications Laboratory. Two $500,000 professorships were sponsored by Duke Power. The Engineering Graphics program received a $54,186 donation from the National Science Foundation to conduct a national workshop on “Computer Graphics in Undergraduate Engineering Design.” Major equipment donations from corporations and industries for the year totaled $266,822.

The Electrical and Computer Engineering Microstructures Laboratory was dedicated in November, with Dr. Jack Kilby, renowned for inventing the integrated circuit, as guest speaker. A class 100 cleanroom, one of the few in operation in the United States, is part of the lab.

Centers of Excellence in the college help establish the University as a major research institution nationally. During the year the S.C. Commission on Higher Education established the Center for Advanced Engineering Fibers and Their Composites used both by engineering and textiles. Other centers include those for Semiconductor Device Reliability Research, Advanced Manufacturing, Computer Communications Systems, Engineering Ceramic Materials, and the South Carolina Energy Research and Development Center.

Clemson produces up to 80 percent of the engineers South Carolina needs, and projections show an increasing demand for engineers here and in the region. Yet we've had to cap undergraduate enrollment because we've simply run out of space for students. It has been 20 years since a new engineering building was built at Clemson, yet during that time, undergraduate engineering enrollment has risen from 1,294 to more than 3,000 — a 132 percent increase. Of the $6.1 million spent on new engineering buildings at Clemson since 1926, only $2.14 million has been provided by the state. We're having some success in raising some of the funds for a building ourselves, but we need help.

Charles Jennett
Dean
Ray Sawyer, director, with Jimmy Morton and Diane Egan rehearsing lines from True West by Sam Shepard. A group from Clemson’s Performing Arts Department was invited to perform the play at Piccolo Spoleto in Charleston after being selected from among a number of outstanding national entries. Income from the production was used to create a $10,000 Centennial Theatre Scholarship Fund at Clemson.

At a time when the national movement to assess student learning and institutional effectiveness is well underway — including the University’s own self study and assessment process begun in March — it is startling to read such headlines as those in the September 6, 1989, Wall Street Journal: “Where Liberal Arts Starve Amid Federal Plenty...” By shifting the focus of higher education from undergraduate to graduate education and from teaching to research, federal money reshaped academic priorities.

Increasingly, our awareness of our needs as a nation is showing us that no university can achieve stature and prominence unless its students are graduated with — at the very least — the ability to read, write, and speak well, to make connections and synthesize from the massive amounts of material in “the Information Age,” to understand and lead others in business, government, and industry, and to do all this with a sense of ethics and responsibility. Likewise, the United States is becoming aware that no nation can maintain its leadership role and remain competitive without an understanding and appreciation of the role and importance of leaders and individuals with at least a solid foundation in the arts, humanities, and social sciences.

Clemson’s College of Liberal Arts has taken a leadership role in demonstrating how the foundation and study of liberal arts can become a necessary, practical part of higher education, particularly at an engineering and science oriented land-grant university such as Clemson. Examples and highlights during the year include:

The R. Roy Pearce Center for Professional Communication was created with the largest cash gift in the University’s history, $1.5 million, to provide on-campus programs for undergraduates and graduate students and off-campus programs for business professionals.

English Professor Jack McLaughlin was one of five nominees in the country for the prestigious National Book Award for his book Jefferson and Monticello: The Biography of a Builder. He was also winner of the University’s Alumni Research Achievement Award.
The nationally acclaimed Bread Loaf Rural Writing Network is a partnership with teachers and students in public schools to improve writing skills. Piloted by the Network, Project REACH (Rural Education Alliance for Collaborative Humanities) is funded by the Rockefeller Foundation. Operated from Clemson’s Department of English and through the South Carolina Humanities Council, the REACH program this year received a major grant from the Bell South Foundation to establish a telecommunication network.

The Palmetto Humanities Program, with leadership by faculty in the Department of History, brings together faculty from various disciplines in the college and on the campus to present programs for local senior citizens in communities such as Keowee Key and Hilton Head.

A Scholar-in-Residence program this spring allowed an English Department faculty member to spend three weeks in residence at each of Pickens County’s four high schools, conducting classes, directing student performances, holding workshops for teachers, and meeting with parents.

A Model United Nations Program sponsored by the Department of Political Science annually wins awards at national conferences in Washington, Boston, St. Louis, and other cities.

The Symphonic Band was invited to perform this year at Lincoln Center in New York City.

Interdisciplinary research on the aging process and its effects on individuals and society involves faculty from the humanities, architecture, engineering, and nursing.

Language and International Trade, in its second year as an undergraduate major, now enrolls 200 students and graduated its first students in May 1989. This new degree program represents one of the bridges erected by the college to span the gap between the liberal arts and the scientific and technological disciplines on campus. The program joins the College of Liberal Arts with the Colleges of Agricultural Sciences, Commerce and Industry, and Forest and Recreation Resources and has been an extremely successful interdisciplinary effort.

A few faculty achievements this year include:

Tony Evans, in the Department of Performing Arts, secured roles in three nationally televised programs. Ed Freeman’s concert composition, “Hymn to Intellectual Beauty,” was performed by the Symphonic Band and Clemson University Chorus as part of the Centennial Concert Series. Carol Bleser, Lemon Professor of History, was nominated for the Pulitzer Prize and coordinated a national Conference on Southern Culture. Charles Dunn, Political Science Department head, was named Vice Chairman of the U.S. Board of Foreign Scholarships, which administers Fulbright awards nationally. Chip Egan, Performing Arts Department head, holds a similar position in the American College Theatre Festival. Don McKale, Class of 1941 Memorial Professor, in the History Department, had three books published during the year. A psychology faculty member, Patty Connor-Greene, was this year’s recipient of the Alumni Master Teacher Award. English Department head Bill Koon and George Lucas, in Philosophy and Religion, received respectively a Senior Fulbright Lectureship to Austria and a Fulbright Research Award to Belgium.

In the spring, two language students were selected for national Fulbright Scholarships to study for a year in Germany.

Nine psychology majors were invited to present papers at the annual meeting of the Southeastern Psychological Association.

A national design competition for the new Student Performance Center was completed.

Increasingly, placement officers speak of the Fortune 500 companies who come to campus looking for liberal arts majors because they have found them to be some of the best prospects for management positions. Reflecting that growing understanding, 12 percent of the undergraduates at the University now major in liberal arts, up from only 7 percent six years ago. The faculty of the college teach as many as one-quarter of the credit hours taken by Clemson students.

Highlights illustrate the college’s important role in and emphasis on improving and contributing to Quality of Life issues identified in the Second Century plan.
According to Division of Research and Statistical Services predictions, by October 1993, the state of South Carolina will experience a shortage of 2,175 registered nurses in health care settings. Access to health care for elderly and rural populations will be provided by professional nurses through home health, community health, hospice, and similar programs. These opportunities in non-traditional settings should prove attractive to many prospective nurses.

In line with Second Century planning and Quality of Life issues, the college has decided that it has some distinct advantages in being able to address, for the University and the state of South Carolina, rural community health care issues including infant mortality, farm accidents, and risks for heart disease. College curricula continue to reflect that focus at both the undergraduate and graduate levels. Highlights of the year include:

Jeri Milstead was named the first South Carolina recipient of the 1989 "Search for Excellence" Award of the American Nurses' Association and had been named a Fellow of the American Academy of Nursing. In March, Dr. Pam Kline was elected chairperson of the Alzheimer's Advisory Committee for the South Carolina Commission on Aging. Dr. Gloria Tanner is serving on the Board of Review of the National League for Nursing's Council of Baccalaureate and Higher Degree Programs. Dean Opal Hipps is serving on the Executive Committee of the National League for Nursing's Council of Baccalaureate and Higher Degree Programs, which directs the council in its efforts. Dr. Betty Baines' study, "An Investigation of Stress in the Older Family Caregiver," is in its third year of funding by the National Center for Nursing Research. Dr. Baines has presented her research at national and international meetings. Janet Timms, director of Community Nursing Services, presented a paper at Cambridge University, Cambridge, England, at the "Focus on Function" Multidisciplinary Geriatric Conference. The paper was entitled "University/Community Partnerships: Development of a Faculty-Administered Community Nursing Service in a Retirement Community."

As part of the W. K. Kellogg Foundation-sponsored agromedicine program, research continues on farm accidents, cancer, and heart disease. The college also
participated in the Kellogg Foundation-sponsored Palmetto Leadership Program. Nursing faculty presented county-specific health data to leaders from selected counties to enable these leaders to identify health problems and develop workable solutions.

A combination of endowed and annual scholarships newly established during the year totaled $26,000. Gifts-in-kind totaling more than $65,000 included specialized equipment such as Flexicare and Clinitron special care beds and laboratory supplies to be used for clinical instruction. Additional gifts for college advancement and nursing professional development exceeded $26,000. Pat Padgett was named director of development in July 1989.

Based on an extensive recruitment plan, Fall 1989 enrollment increased by 50 percent over the last two years. The number of new master’s students has more than doubled in a year.

A donation from the Easley Baptist Medical Center doubled the size of the "Heart of Health" Summer Nursing Career Camp. Of the 40 participants, half were high ability minority junior and senior high school students.

In October 1988, the Commission on Higher Education approved the Nursing Outreach Project, which will expand the existing Master of Science Degree Program with a major in nursing through the addition of another education site at the Greenville Higher Education Center in Greenville, South Carolina. This program is designed to respond to the needs of the working nurse and to help address the shortage of master's-prepared nurses in the state. Telecampus courses also are offered and are being expanded to meet this need.

Since last year, the percent of faculty holding doctoral degrees has increased to 70 percent, with an additional 25 percent enrolled in doctoral study.

The Department of Professional Services provides health services through the Nursing Center, the Wellness Program, and Community Nursing Services. Professional development for nurses and other health professionals is offered through the Continuing Education Program.

An innovative program for international students was initiated by the Nursing Center in cooperation with the Office of International Health Programs and Services and Redfern Student Health Center. Health services, including screening and health histories for 75 international students, were offered.

As the population continues to age and the need for professional nurses and clinical nurse specialists escalates, the College of Nursing is aggressively responding by attempting to attract men and women who traditionally do not enter the profession of nursing: recent college graduates; workers displaced from other industries; health-care workers who are already employed by hospitals; and low-income and minority-group members. A graduate professional nurse is a commodity in great demand worldwide. This gives the College of Nursing a unique opportunity to produce professionals with a significant potential impact on the quality of life in the global community.

Opal Hipps Dean

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The centrality and dominance of technology in the economy and in society will increase throughout the next decade. Five of the ten fastest-growing careers between now and 2001 will be computer-related, with the demand for programmers and systems analysts growing by 70 percent. There will be a shortage in the United States of up to 200,000 scientists in the next few years and a declining interest in the teaching profession. With an aging faculty in the United States nearing retirement, the question is, who will teach the students?

Freshmen Winston Wu, Stan Rogers, and Carmenlita Sayles find using the computer a stimulating way to learn about scientific and investigative methods in Professor Jean Dickey's Biology Lab.

(Left to right) Dr. Gil Proctor (project leader), Renu Laskar, Robert Fennell, Belinda King, Tracy Bibelnieks, James Reneke, and Eric Bibelnieks were members of a Department of Mathematical Sciences research team which recently completed an important study on discrete mathematics and computational analysis for the Office of Naval Research through a $1.5 million grant.

Lab assistant Linda Eldredge works in the Biochemistry Laboratory on cutting-edge biotechnology research.
At the heart of Clemson's Second Century plan, the sciences cross over and construction in the sciences. Society's problems and in commerce and industries depend on educated people with a strong emphasis on interdisciplinary thinking. In the sciences, especially computer science, we've found some pretty creative ways to generate student interest in learning the sciences.

Dean Bobby Wixson

Although our research program is strong and growing, we've decided to focus our efforts and attention on innovations and improvements in instruction. We've found some pretty creative ways to generate student interest in learning the sciences.

Bobby Wixson
Dean

At the heart of Clemson's mission and heritage is instruction in the sciences. Having entered the Information Age, today's society and industries depend on educated people with a strong foundation in the sciences. At the heart of the Second Century plan, the sciences cross over and through every area. With a philosophy, interest, and emphasis on interdisciplinary projects, sharing knowledge, and saving on costs, the college is removing barriers in solving society's problems and in communicating between disciplines.

A new, named professorship in chemistry, the Tobey-Beaudrot Professorship of Chemistry, was awarded, following a nationwide search, to the University's internationally renowned scholar in fluorine chemistry, Dr. Darryl DesMarteau. Dr. DesMarteau has conducted research and lectured in West Germany as an Alexander von Humboldt Fellow, a prestigious honor awarded by the West German government to top scientists and engineers.

Several college committees were formed to examine the quality of instruction: Recruiting and Retention, Graduate Student Affairs, Teaching Technologies, and Teaching Effectiveness. The goal is to improve instruction and student learning in the sciences, especially important since the college teaches students in every major in the University.

The Clemson Interactive Video Institute (CIVI) came to campus as a result of college efforts to develop modern, innovative teaching methods and tools and to interest and excite students in learning the sciences.

Faculty from the Department of Microbiology are working with faculty from the College of Nursing and members of CIVI to design interactive units for an introductory microbiology course particularly for nursing majors. The practical aspects and the relevance of microbiology to the nursing profession will be emphasized.

Dean Bobby Wixson was selected to chair a U.S. Task Force on Lead in Soil for the Society for Environmental Geochemistry and Health. The task force, composed of a group of internationally recognized authorities on the subject, met twice during the year.

The governing body of the university, the Board of Trustees, is responsible for the overall governance and direction of the university. The board is composed of 17 members, including the president of the university, who serve staggered terms of five years. The board meets twice a year to discuss major issues affecting the university.

The governor of the state visited the university to discuss the importance of higher education in the state and to recognize the university's contributions to the state and nation.

The Clemson Interactive Video Institute (CIVI) is a national leader in the development and delivery of interactive multimedia content to higher education. CIVI has developed a number of interactive multimedia courses and modules that are used by universities across the country.

The college's extensive research activity reached $13.6 million in externally funded support by the end of 1988-89.

Intex Scientific Computer, Inc. gave the Department of Computer Science a $550,000 parallel processing computer and $130,000 toward the purchase of a second one. With the addition of software donated with the computer, the gift is worth nearly $1 million. According to Dr. Roy Pargas, computer science, the computers will support Clemson's development of a computer program to simulate a large apparel manufacturing plant.

Students from the Department of Biological Sciences were recognized for their outstanding academic performance. Charles E. Hill is the first graduate from the department to be awarded the Norris Medal and the fifth biochemist to win the Faculty Scholarship Award for the outstanding student in the University. Mary Nan Ellenberg received a National Science Foundation Graduate Fellowship which pays tuition plus a $12,300 stipend for three years. She has been admitted to the College of Veterinary Medicine at both the University of Georgia and North Carolina State University.

Recently, investigators in the Departments of Microbiology and Biological Sciences and the College of Engineering received a $300,000 grant award from the Self Foundation for the purchase of equipment crucial to the developing programs in molecular biology and biochemistry.

In the Department of Mathematical Sciences, Dr. Vince Ervin is in West Germany, having been awarded a Von Humboldt fellowship to do studies in computational mathematics there. Dr. John Kenelly has been named National Director of the College Board. Dr. Richard Ringeisen chaired the national mathematics panel which recommended recipients of the $15 million National Defense Science and Technology Fellowship Program. Dr. William Ruckle is a visiting scientist with the National Disarmament Council in Washington, D.C. The department's calculus revitalization project was chosen by the Mathematical Association of America (MAA) as one of the top ten exemplary calculus reform projects in the country. The project integrates powerful new technology (microcomputers and graphics calculators) into basic mathematics courses for engineering and science undergraduates. Drs. Kostreva and Moss are conducting breakthrough fire research with the National Institute for Science and Technology. They are building mathematical models for fire retardation.
Financial Highlights

Clemson enters 1989-90 with a budget exceeding $300 million, an increase of $31.5 million, excluding capital items, over the previous year. For fiscal year 1988-89 higher education institutions received 93 percent of state formula funding. The state of South Carolina, with its commitment to the Cutting Edge initiative specifically for higher education, invested $5 million in research, scholarships, instruction, and special programs. During the year, the University strengthened its financial base by integrating long-range plans with annual budget priorities and by adopting innovative budget management systems. Block funding, a novel approach for allocating operating and equipment funds, was introduced at Clemson. This method shifts more fiscal responsibility to colleges and divisions, allowing them greater flexibility in the budget process.

The Clemson University Innovation Fund was established to finance unique new programs, including research and public service projects that might not be funded without it. It was created to provide incentives for the development of new initiatives and programs that could serve to promote Clemson and the state of South Carolina as regional and national leaders.

Campus construction and renovation projects continue in step with the six-year facilities plan approved in September 1987. Representing almost $300 million in projects, those completed or currently in progress include the Strom Thurmond Institute, the Student Performance Center, and the Clemson University Conference Center. Projects now in design include the $15 million Engineering Innovation Center, the University Academic Learning Center, the Johnstone Hall renovation, and an $8.4 million Animal Research Compliance Facility. Plans are also under way for an East Campus Activities Center, East Campus student housing, and a research building at the Clemson Research Park. New building and renovation projects in agriculture include the T. Ed Garrison Livestock Show and Sale Arena, the Edisto Center Laboratory Building, replacement of the fruit research station, and renovations to Newman Hall.

Private Support

In its Centennial year, the University's total endowment grew to a record $45 million, helped by a 25 percent return in 1988-89 on externally managed investments of private gifts received by the Clemson University Foundation. Foundation investments significantly out-performed national standards. The Foundation's combined return was 25.1 percent, while the Standard and Poor's 500 Index rose 20.5 percent and the Dow Jones Industrial Average rose 14.5 percent. The average return for investment pools similar to the Foundation's was 17.7 percent. Of the $45 million endowment, about $33 million is held by the Foundation, an independent, non-profit, tax-exempt organization that raises, receives, and manages private gifts for the University's benefit.

Private giving for Clemson University's academic programs totaled more than $12.5 million in 1988-89, a 21 percent increase over the previous year. The total of private gifts for the year ending June 30, 1989, was $12,522,303. This came from 21,339 gifts which averaged $587 each, an increase of 47 percent per gift from the previous year.

During the year, Clemson received $6.7 million in private gifts to academic programs from more than 16,300 individuals. About 28.5 percent of Clemson's 49,000 alumni of record donated to the University. Corporations, foundations, associations, and trusts gave an additional $5.8 million.

In addition, private gifts to IPTAY, Clemson's general athletic scholarship fund, topped $5 million during the year. IPTAY raised $5.2 million from its 20,456 members, an increase of 8 percent over the $4.8 million given in 1987-88.
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* As of November 21, 1989
** Deceased October 16, 1989
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Commercial Products and Systems Division  
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NCNB of South Carolina

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