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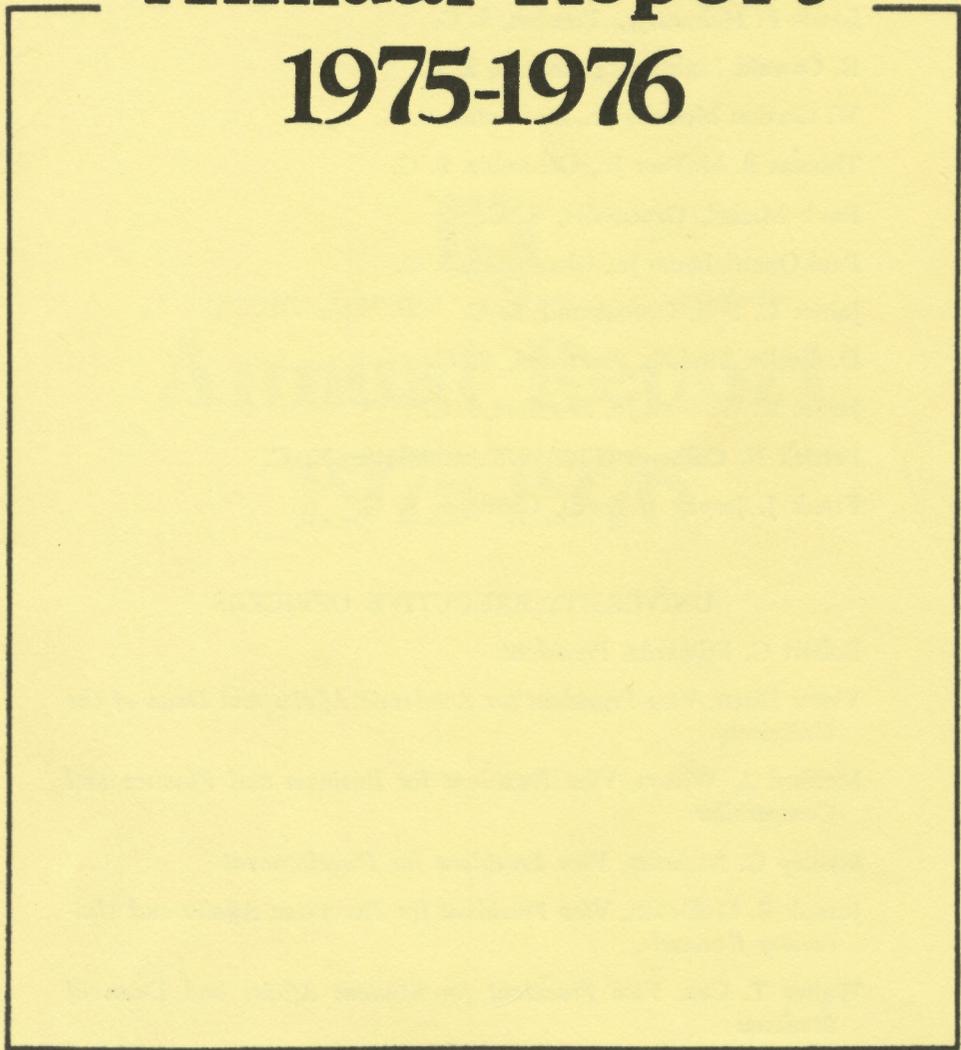
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CLEMSON UNIVERSITY

Annual Report

1975-1976



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PREFACE

Because of one man's dream of a better life for South Carolinians, Clemson University was established to respond to people's needs. Throughout its history, the University has remained a "people oriented" institution. Its teaching, research and public service activities touch people's lives every day.

As a state land grant institution, Clemson's original commitments were to the "study of agriculture and mechanic arts" and later to the expansion of education to include agricultural and mechanical fields. Today, Clemson is responding to a wide range of needs affecting South Carolinians and people everywhere by offering new food sources and better food production systems, looking for ways to improve the lives of people, and developing new techniques for better living.



CLEMSON UNIVERSITY

Annual Report 1975-1976

In 1881, following Mr. Clemson's death, the South Carolina General Assembly accepted the terms of his will, and the United States Supreme Court upheld the will of the State of South Carolina and the full Board

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PREFACE

Because of one man's dream of a better life for South Carolinians, Clemson University was established to respond to people's needs. Throughout its 83 years of service to the State and nation, Clemson has remained a "people oriented" institution. Its teaching, research and public service activities touch people's lives every day.

As a state land-grant institution, Clemson's earliest commitments were to the "study of agriculture and natural science," and later to the expansion of industrial growth. These early commitments continue, but they expand as mankind's needs change. Today, Clemson is responding to a wide range of problems affecting South Carolinians and people everywhere: developing new food sources and better food production and delivery systems; seeking a safer, better quality environment; improving health care delivery; creating innovative education programs; developing new industrial technology; broadening recreational and other opportunities for self-enrichment; and seeking to improve man's other basic needs, clothing and shelter.

Through these and other commitments, the University's nine colleges and Graduate School are exploring all fields of knowledge to improve the quality of life.

Clemson began this commitment to people when its doors opened in 1893. That day was the realization of a dream come true for Thomas Green Clemson, a man of wisdom and courage who saw the great need in South Carolina for a scientifically oriented institution of higher learning to provide the state's young people with the training needed to build a better society.

So strongly was he committed to the establishment of such an institution that he bequeathed his land and other real and personal property to the State for use in creating the "high seminary of learning" he envisioned.

Mr. Clemson was a scientist and agriculturalist who came to South Carolina from Pennsylvania in the 1830s and married a daughter of John C. Calhoun, foremost statesman in South Carolina history and vice president of the United States from 1825-32.

In 1889, the year following Mr. Clemson's death, the South Carolina General Assembly accepted the terms of his will, and, following the decision of the United States Supreme Court to uphold the will, the State of South Carolina and the full Board

of Trustees proceeded to convert the dream of Thomas Green Clemson into the reality of Clemson Agricultural College.

The College also was established under the Morrill Land-Grant Act passed by Congress in 1862. Clemson, therefore, is a member of the national system of state universities and land-grant colleges.

In 1964, in recognition of expanded offerings of the institution, not only in the areas of agricultural and mechanical arts, but also in the sciences and arts, the name of the institution was changed to Clemson University.

The University now has nine colleges and the Graduate School. The colleges are Agricultural Sciences, Architecture, Education, Engineering, Forest and Recreation Resources, Industrial Management and Textile Science, Liberal Arts, Nursing and Sciences.

This report presents a comprehensive look at Clemson University, its programs and activities during the 1975-76 academic year.

ACADEMICS

Graduate Studies and University Research

Arnold E. Schwartz, Dean

Undergraduate Studies

Claud B. Green, Dean

University Extension

Samuel M. Willis, Dean

College of Agricultural Sciences

Luther P. Anderson, Dean

College of Architecture

Harlan E. McClure, Dean

College of Education

Harold F. Landrith, Dean

College of Engineering

Lyle C. Wilcox, Dean

College of Forest and Recreation Resources

W. H. Davis McGregor, Dean

College of Industrial Management and Textile Science

Wallace D. Trevillian, Dean

College of Liberal Arts

H. Morris Cox, Dean

College of Nursing

Geraldine Labecki, Dean

College of Sciences

Henry E. Vogel, Dean

COLLEGE OF AGRICULTURAL SCIENCES

Office of Resident Instruction

Instruction in agriculture basic to the needs of South Carolina and the nation is completely in conformance with a major purpose of Clemson University as outlined in the will of Thomas G. Clemson and in the Morrill Act of 1862, which established land-grant colleges.

The population of this nation and of the world continues to increase, requiring ever-increasing quantities of food and fiber. In order to meet this demand, a larger number of college agricultural graduates will be needed.

The total agricultural industry is becoming more and more dynamic and complex. The College of Agricultural Sciences continuously modernizes its educational program to ensure that graduates will be properly prepared for current and future employer demands. During the past year, as in previous years, changes in curriculum direction and content have been made in response to constantly changing needs and areas of emphasis. Changes made during 1975-76 include the development of new and revised courses in the areas of ornamental horticulture, animal science, food science and dairy science; in addition an Ad Hoc Curriculum Study Committee has examined in depth current curriculum content of the college and has suggested numerous curriculum changes in order to meet changing needs for specific skills of graduates.

The college recognizes and accepts the responsibility of disseminating factual information about career opportunities in agriculture. To assist in discharging this responsibility, a Public Relations Committee for the Office of Resident Instruction was recently organized. Members of this committee and other faculty members and students visited approximately 80 high schools during the year. They met with guidance counselors, science teachers, students and others as appropriate. Included in the visits was the showing of a 10-minute slide-tape presentation on career opportunities in the agricultural sciences. Experience indicates this service is needed and is appreciated.

The relative importance of agriculture in South Carolina, the nation and world is becoming better understood and appreciated by students entering Clemson. First semester undergraduate enrollment in the College of Agricultural Sciences was significantly higher than that of prior years.

Agricultural Technology Programs

Since 1966-67 the college has cooperated with the State Board for Technical and Comprehensive Education and the State Department of Education in conducting programs in agricultural technology at selected technical education colleges in the State. The college's role in this special instructional program primarily involves curriculum planning and development and program evaluation. In addition, the college assists in program operation by making available the research programs and facilities at Clemson and the branch experiment stations for class field trips, laboratory sessions and demonstration purposes, and by providing instructional staff at cost as necessary and feasible for successful program operation.

Currently nine two-year programs and two one-year programs in agricultural technology are offered at eight technical education colleges in the State.

Enrollment in the agricultural technology programs has been increasing—from 371 in 1974-75 to 558 in 1975-76. Job opportunities and salary levels for graduates of the technology curricula have been very good.

Continuing Education

Modern agriculture is a rapidly changing industry. The fast pace of both the adoption of new technology and the application of new research results in modern agriculture. It is necessary for rural living that programs of continuing education for professional educators and for other agricultural workers are relevant and utilize the latest research and information.

In-service training programs in agriculture were expanded significantly in 1968-69 as a result of a special state appropriation for this purpose. Interest in in-service training programs continued at a high level in 1975-76. Continuing education activities of this college currently encompass special in-service training programs for Cooperative Extension Service personnel, vocational agriculture teachers and veterinarians in subject areas considered to be of greatest current importance. During the year programs were conducted in such areas as 4-H work, general agriculture, horticulture and artificial insemination.

In addition this college conducted many other types of continuing education activities—such as seminars, conferences and workshops—for a wide variety of professional personnel.

COLLEGE OF ARCHITECTURE

The College of Architecture continued and strengthened its mission of education for the physical design and building science professions during the academic year 1975-76. These fields include city and regional planning, architecture, visual design and building construction. Efforts are being made to add a professional program in landscape architecture and in construction management. Use of research and public service as vehicles for academic study was continued and strengthened. The entire state of South Carolina served as a laboratory during the year for these educational efforts in the public interest.

In spite of constrained economic resources, the college maintained its high standards in professional education by limiting undergraduate and graduate admissions. As a part of these measures, a careful study was made of the present and imminent staffing needs in South Carolina for architects, planners, building constructors, and environmental designers. The object has been to balance state needs with an enrollment consistent with the limitations of budget.

In the realms of innovative education and research, the following projects were accomplished. Fifth-year graduate students in the college made an exhaustive study of downtown Greenville at the request of the mayor and city council. These studies were continued for the entire year. A careful study of the deteriorating urban core of Greenville was followed by proposed phased physical redevelopment to counter these trends. The proposals gave special attention to major activity generators, and to the development of commercial and pedestrian link between points in the central business district.

The study results were presented only to civic leaders, consultants, and potential entrepreneurs at this stage of development because of the "real world" implications of the projects, and the present need for some confidentiality relative to prospective developers.

The College of Architecture was a partner in the Clemson University Solar Housing Research Project with the United States Department of Agriculture's Rural Housing Research Unit as the collaborating agency in the project, which is financed by the Energy Research and Development Administration. This important research project has served as an avenue for study in the areas of both energy conservation and housing, and will continue for as long a time as funding is available.

Graduate students in the health care facilities curriculum continued the sequential research projects which have been a joint activity of the College of Architecture and the State Department of Mental Health for the past eight years. Earlier phases of these studies had developed "The Village Concept" which has become the model for mental health care delivery in the State. Every effort is made to change and update programmatic assumptions as each new effort is designed, with the advantage of assessing earlier mental health center outcomes. This studio has also collaborated with other health care projects such as general hospitals and progressive patient care problems.

The College of Architecture, through the Department of Planning Studies, worked with Pickens County on three projects during 1975-76, thus enabling the graduate planning students to have a broader range of experiences. A required summer internship in a planning agency placed students in Charleston County, Pendelton, Seneca, Rock Hill, Clemson, Columbia, Greenville, Beaufort, Brunswick, Ga., and Greensboro, N. C., during the summer of 1976.

Two grants from the American Iron and Steel Institute enabled undergraduate architectural students to develop applied research projects. These also provided, as end results, a decorative piece of tensile sculpture for the school, and a removable exterior sunscreen to be used in the courtyard on Honors Day.

Graduate theses provided many additional opportunities for public service projects, and these were well received in the State.

Finally, the school hosted a number of conferences and short courses for interested professionals from the State and region including a notable Conference on the Preservation and Adaptation of Historic Architecture.

COLLEGE OF EDUCATION

The College of Education redefined its goals and reevaluated its programs and services in order to make maximum use of available resources. Curricula were reviewed and reorganized to give prospective teachers more insight into the changing role of the teacher. Programs of field experiences included increased opportunities to evaluate the role of the teacher and to acquire more experience in dealing with the various problems in public education.

In-Service and Continuing Education

Almost 50,000 persons are employed as teachers and professional personnel in South Carolina schools and colleges. The rapid ex-

pansion of knowledge and advances in instructional technology require continuous retraining of all personnel.

Effective staff development begins with an assessment of the strengths and weaknesses of individual members and planning effective programs based upon these predetermined needs.

The College of Education provided assistance to school districts in developing evaluation programs, assisting individual needs and in organizing training programs.

During the year the college provided services to public schools, vocational and technical centers and to nonschool agencies in the private sector.

The college conducted 127 off-campus courses at 43 different locations in the State, with more than 3,000 students taking courses. Cooperating private colleges (Columbia, Erskine, Newberry, Presbyterian and Wofford) taught 22 courses and 85 educators received graduate credit at Clemson.

The college also conducted noncredit workshops and training sessions. Almost 300 teachers were enrolled in agricultural education workshops held at various locations. The Department of Industrial Education conducted off-campus training sessions for teachers and vocational directors. The vocational training was made possible by more than \$50,000 in grants from the Education Professions Development Act.

Curriculum Development Research

Enormous involvement with vocational education curriculum projects underscored the college's far-reaching services to the State and its citizens. The Department of Industrial Education received \$30,000 from the Printing Industries of the Carolinas for continuation of its graphic arts curriculum projects. The Department of Agricultural Education prepared video tape programs which were presented at the South Carolina Young Farmers Association and to vocational educators.

The Vocational Education Media center continued to increase its production of instructional materials for the state's greatly-expanded vocational program. The Media Center supplemented the instructional materials needs of more than 2,200 vocational programs.

The center completed 120 different instructional materials projects which will assist in the support of vocational programs in local schools and the teacher education programs at Clemson and other South Carolina universities. The projects involved the de-

velopment of more than 3,900 pages of content reproduced in the form of 129,000 volumes. More than 11,000 media packages were prepared.

Instructional materials also were selected, collected and organized for the establishment of 31 demonstration centers which utilize individual instruction keyed to performance-based criterion referenced measures. The centers are located throughout the State and include nine different trades and industrial educational subjects.

Special Activities and Services

Air Force ROTC cadets visited the Air Force Museum in Dayton, Ohio, with the Military Airlift Command providing transportation.

The Department of Military Science hosted the Fourth Annual Tiger Rifle Meet for high school rifle teams from various South Carolina high schools.

The Departments of Aerospace Studies and Military Science sponsored the Fourth Annual Tiger Drill Meet which provided competition for Junior ROTC drill teams from high schools throughout the State.

More than 1,000 educators from a 20-state area attended the Annual Reading Conference.

COLLEGE OF ENGINEERING

The College of Engineering continued to grow in its instruction, research and public service programs. The nationwide economic recovery created increased demands for engineers at all levels. These demands have stimulated student engineer enrollments, increased funded research and expanded activities in public service.

This year 50 per cent of all industrial jobs offered were in engineering fields. Recruiting visits by business and industrial firms reached an alltime high, and starting salaries for 1975 Clemson engineering undergraduates averaged more than \$14,000 per year.

Freshman enrollment increased 12 per cent from 1974-75, setting the total college enrollment at more than 1,500. Accepted freshman and transfer applications for 1976-77 continue the pattern of 10 per cent per year increases. Of the 1976-77 applicants, 54 are women, representing 9 per cent of the total applications, a 100 per cent increase over last year.

High school guidance counselor workshops were held in two cities during the year. Sponsored in part by the South Carolina Society of Professional Engineers, they provided valuable guidance

information to more than 50 high school counselors. Two additional workshops are planned next year.

The College of Engineering also initiated its Distinguished Lecturer Series which will bring two internationally prominent engineers to campus each year. Dr. Edward Cole, chairman of the Board of International Husky, Inc., former president of General Motors, and Dr. Simon Ramo, chairman of the Executive Committee of TRW Systems, Inc., spoke this year.

The second annual College Open House was held on the weekend of the Clemson/Maryland football game. More than 5,000 people attended, including about 2,500 junior high and high school students from 50 schools throughout the State. Student design projects, faculty/staff research projects, exhibits and demonstrations were open to the visitors. The third Open House is scheduled for the Spring of 1977.

Formed in 1974-75, the Joint Engineering Council has made progress in coordinating the activities of student chapters of the professional engineering societies, including the design and construction of a winning homecoming display this year.

Some of the College of Engineering's more significant accomplishments and activities in instruction, research and public service highlight the remainder of this college's report.

Academic Report

Instruction

The College of Engineering's teaching laboratories for graduates and undergraduates improved with the acquisition of new equipment and renovation of college facilities to accommodate the new equipment. Replacement, renovation and/or redesign of instructional laboratory facilities, equipment and techniques are required to reinforce classroom teaching and maintain quality engineering education.

For example, the Department of Mechanical Engineering now has strong laboratory programs in the thermal sciences and in mechanical systems. National Science Foundation instructional scientific equipment grants were awarded to the Department of Mechanical Engineering and to the Department of Electrical and Computer Engineering. Mechanical engineering equipment to be purchased will provide industrial orientation for the students in energy conversion, combustion, air conditioning and efficiency and performance of thermal components. Microprocessor and microcom-

puter devices, based on large scale integrated circuit components, have been acquired by electrical and computer engineering. Through such grants Clemson will maintain its position as a recognized leader in the application of computers and computer techniques in engineering. The college has an extremely powerful complement of computers totaling more than 20 in number and valued in excess of \$1 million. Included in this complement are digital micro- and mini-computers, analog computers, a real-time/hybrid computer, an interactive conversational computer and a time-shared computer system. Essentially all of these devices have been acquired from federal and private grants and contracts.

Another example of laboratory improvement is the design, fabrication and installation in the Department of Chemical Engineering of sophisticated instrumentation and computer control systems to simulate a complete chemical process control system. Not only can a student model and simulate a system using software computer methods, but can run comparative studies on an actual laboratory scale system to verify the result of the model. This reinforcement aids the student in understanding the validity as well as the problems associated with modeling and simulation.

Student design projects help students learn to formulate and solve engineering problems. These real world problems are defined by industry engineers and/or Clemson faculty and are addressed and solved as an individual activity or by teams of undergraduate engineers.

The Clemson student chapter of the American Society of Mechanical Engineers won the Bendix Award as the best Southeastern Region chapter for the third straight year, partly on the basis of student design projects. Students in the Department of Electrical and Computer Engineering also won a Bendix grant for a design project in satellite communication.

In addition, engineering students won academic honors. College baccalaureate degree recipients in 1975-76 included 19 graduates with high honors and seven with highest honors. Fifty-four engineering students participated in the University Honors Program. A total of 62 college and departmental scholarships and awards were given during the year. Four of the University's 16 R. F. Poole Alumni Scholars are enrolled in the College of Engineering.

The third annual Alumni Master Teacher Award went to civil engineering professor Robert Nowack, the first college faculty member so honored. This \$1,200 award is given annually by the

Alumni Association to the Clemson faculty member deemed most outstanding by the Student Alumni Council.

To recognize outstanding faculty achievement, the college has established an annual Faculty Achievement award under a gift from Mr. and Mrs. A. M. Quattlebaum of Florence in honor of Mr. Quattlebaum's father, McQueen Quattlebaum, a 1909 Clemson graduate. Recipients will receive a \$1,000 award and another \$1,000 will be used as they wish by the University in support of programs of their choice. The first winner will be named in April 1977 by the Dean of Engineering from faculty recommendations.

College programs in biomaterials and dental implants were significantly augmented by visiting professor David Williams, a lecturer in materials at the University of Liverpool's School of Dental Surgery.

Degree Program

There are seven undergraduate degree programs in the college including engineering analysis and engineering technology. The professional master of engineering degree is available in eight fields while the master of science degree is offered in 12 fields and the doctor of philosophy degree in nine.

External Master of Engineering Program

An off-campus option, the external master of engineering, was initiated in the fall of 1975. This program provides professional engineering study beyond the four-year baccalaureate degree and leads to the master of engineering degree in electrical and computer engineering or mechanical engineering. Courses in systems engineering are also available. More than 60 engineers were enrolled in the external program in 1975-76.

Research

The college's strong research program augments and complements its instructional programs and provides a unique technical resource to cope with South Carolina's problems in seeking energy independence, increasing productivity, improving the environment, offering better health care and, in general, increasing the quality of life of all citizens.

The college research expenditure level of more than \$1.2 million indicates a strong research program. Total research and grants-in-force exceeded \$3.8 million in 1975-76, and new research awarded

during the year included 49 grants and contracts valued at more than \$1.2 million.

Energy

Although the national energy crisis of 1973-75 has eased somewhat, there is serious and legitimate concern over supplying the energy needed to sustain and create jobs, to heat homes and to support all the other activities of human existence which have become dependent upon energy. College faculty are actively researching ways to achieve energy independence and also are examining alternatives to the conventional energy sources which rely on nonrenewable natural resources. Two alternatives are the heating of homes, businesses and industries by solar energy, and the generation of electricity using nuclear energy.

For example, college researchers are studying the feasibility of solar pre-heating for process chemicals and process water in the textile industry under an Energy Research and Development Administration contract. Mechanical, chemical and systems engineers are pooling their talents to study this alternative. Potential applications of new energy concepts are extremely important to the South Carolina textile industry which uses large quantities of energy in heating process water and process chemicals.

The development of techniques for the synthesis and analysis of solar energy computations as applied to combination greenhouse-living areas is being researched by Clemson electrical engineers supported by the U. S. Department of Agriculture. Results of this work will lead to better methods of evaluating and a better understanding of solar energy uses in homes.

Energy conservation by industry is being addressed by mechanical engineering and chemical engineering researchers. The Environmental Protection Agency is sponsoring research by mechanical engineers in energy conservation through point source recycling using high temperature hyperfiltration techniques. This research, valued at more than \$175,000, will lead to the development of a hyperfiltration system to recover quality process and/or cooling water retaining most of the heat energy contained in the water. This represents a substantial potential savings to the textile industry. A privately sponsored energy conservation effort is developing an energy use profile for a typical textile finishing plant in South Carolina. The energy model being developed will permit researchers to identify areas where energy savings can be obtained with no loss in product quality or efficiency of production. Other examples

of energy research include the study of hydroelectric pump storage as an efficient means of load peaking for utilities.

Environment

College researchers continue to provide leadership in the maintenance of a high quality environment in South Carolina. Faculty are active in many studies to come up with better processes to minimize pollution at the source, improve natural or base-line quality assessments for the environment and develop control equipment to assure quality plant effluents.

Ceramic engineers are continuing to examine the use of waste materials to manufacture ceramic products. Specifically, a study of the feasibility of using tailings muds to manufacture brick is sponsored by the Lithium Corporation of America.

Civil engineers are characterizing the ecosystem response in a reservoir influenced by heated discharges and a pump storage operation. This is particularly important to the South Carolina Piedmont region, site of a large scale nuclear power facility and its associated storage operation.

Electrical engineers spent three years developing mechanisms to help U. S. Army environmental engineers structure and analyze the results of water quality surveys. This \$270,000 project was successfully completed during 1975-76. Environmental systems engineers continue to maintain a very high level of research activity in an internationally-recognized program. Current activities include:

- the development of a program for educating the public to participate in land-use decisions
- the determination of surface water contamination by heavy metals, including mercury
- a design of low maintenance, technologically simple waste treatment systems
- a preoperational aquatic field monitoring program for a proposed Anderson County plant.

Sponsors of the 13 environmental projects include the Environmental Protection Agency, The Water Resources Research Institute, Westinghouse and Duke Power Company.

Mechanical engineers continue to develop and improve hyperfiltration techniques under a contract from the South Carolina Textile Manufacturers Association. This program is demonstrating the feasibility of using hyperfiltration techniques in reducing pol-

lutant levels in plant effluents and recovering valuable chemicals and heated process water for plant reuse.

Other research efforts to improve the environment include:

- the training of wastewater treatment plant operators and the development of individualized material for this training
- the development of coastal beach stabilization techniques to prevent erosion
- the use of aerial remote sensing techniques to assess erosion and to locate areas of high ground water potential.

Total grants for environmental research projects exceed \$900,000.

Quality of Life

College researchers are as concerned as anyone with the quality of life South Carolinians enjoy. Rising energy costs in particular affect how much we pay for food, clothing, medical care and shelter, the basic needs. Engineers are examining ways to reduce inflation in these areas to help people satisfy their basic needs more comfortably.

For example, they are studying the application of engineering design methodology to agricultural harvesting and processing to increase yields and reduce costs. Expanding the supply of shrimp and creating a new source of farm income is the object of shrimp mariculture research being conducted by civil and mechanical engineers under sponsorship from the Sea Grant program. This effort may result in shrimp farms similar to the fish farms which are commercially successful in certain areas.

Engineering studies applied to medical research have developed artificial teeth implants, artificial elbows, bone endcap devices for juvenile amputees and porous high-density polyethylene as a tissue interface material between physiological tissue and a prosthetic device. The South Carolina Heart Association is sponsoring a design project to develop a portable cardiac monitoring system. Other medical engineering research includes the development of:

- an improved orthopedic surgical saw
- a vibrating eye surgery knife
- a rotating cutter to remove cataracts
- a color evaluation system to determine the suitability of a cataract for removal by ultrasonic means.

College faculty are involved in research in collaboration with more than 25 medical and dental institutions throughout the nation. Medically related engineering grants-in-force exceed \$300,000.

The college's basic homes research program continues to be recognized as a national leader in the field. Clemson hosted the 1976 International Association for Housing Science symposium on lower cost housing problems which was attended by about 250 professionals. Eight low cost modular homes were built during 1974-76 in Beaufort, Camden, Moncks Corner, St. George and Walterboro. College civil engineering researchers designed and supervised construction of the housing under a South Carolina State Housing Authority contract. Less expensive than conventional homes, these modular units are attractive and space efficient.

Improving quality control in the textile industry results in increased product yields and reduced cost to the consumer while maintaining acceptable profit levels. Textile systems engineering studies by electrical engineers in the college have produced new quality control systems for the production of yarn, fabric, and in the dyeing and finishing of fabric. Basic textile quality control systems research has totaled more than \$1,100,000 the past 12 years.

Transportation

Transportation research efforts are improving mass transportation systems, highway construction procedures and traffic control. Mechanical engineers, under sponsorship of the Department of Transportation, have been investigating rail vehicle suspension systems which will lead to better vehicle and rail design for mass transit systems.

Highway research is improving bituminous surface treatments on secondary highways and preparing a highway drainage design manual. Other transportation studies include fundamental research into highway construction materials, highway design and effective traffic control through uniform traffic control devices. Total transportation research efforts exceeded \$250,000 during 1975-76.

Public Service

Professional Support

South Carolina industries are increasingly aware of the technical resources existing in the college. As individual industrial firms benefit from faculty expertise, the College of Engineering's reputation grows and additional requests for assistance follow. College faculty provided more than 300 man-days of professional service to state industries in 1975-76. An equivalent or greater amount of service was provided through student design projects which benefit industry in solving many of their problems. Additionally, the faculty

provided direct assistance to more than 50 local, state and Federal agencies, exceeding 400 man-days of professional consultation in various activities.

Project Outreach, a pilot program developed in 1974, is dedicated to identifying public needs and problems and then focusing the college's technological know-how on the search for solutions. The pilot study's preliminary phase, developed with the assistance of Alumni Visiting Professor Dr. Thomas Burke, focused on the region around Charleston. College personnel talked to key people in industry, government and other academic institutions, setting priorities for active programs, and communicating the region's needs to the University. Specific proposals for engineering service activities in the region will be developed during 1976-77.

A series of refresher courses given by the college throughout the State in 1975-76 enabled practicing engineers to update themselves in their fields. A summer computer workshop program introduced 130 junior high and high school students to computers and computer techniques for solving real problems in physics, chemistry and mathematics.

Continuing Engineering Education

After launching a pilot program in 1974, Continuing Engineering Education has within the past two years brought 17 cities into its "statewide campus" concept. This has made it possible to teach most of the short courses and seminars sponsored by the College of Engineering at many locations. Therefore, these educational services are far more convenient and accessible to the practicing engineers of South Carolina. During the year the College of Engineering sponsored 326 Continuing Engineering Education Programs which received a registration of 9,010. This brings to 29,504 the total number of special students who have participated since 1967. The demand continues to grow.

COLLEGE OF FOREST AND RECREATION RESOURCES

Purpose

The teaching, research and public service programs of the College of Forest and Recreation Resources are strongly oriented toward the historic mission of Clemson University as a land-grant institution.

Both of this college's departments—forestry and recreation and park administration—fall within this mission of providing professional education in fields that serve people's needs.

Goals

The goals of the college follow directly from the evaluation of our purpose and the rightful expectation of our citizens based on that purpose. They are:

1. To provide educational programs at the undergraduate and graduate level which produce foresters and recreation-park management and wood utilization specialists of the highest professional competence and integrity to serve the needs of forest and recreation industries and activities of the State.

These specializations require that both technical and intellectual vision be imparted. Therefore, the college draws on the resources of the entire University to provide the philosophical, theoretical, technical and practical basis of the forest and recreation professions. The college offers the only programs in South Carolina educating professionals for service in these fields.

2. To conduct imaginative and creative research, basic and applied, of the highest caliber, directed at expanding knowledge and solving problems confronting the people of this State.

This is related to the educational function. Research involves graduate students directly and keeps faculty members abreast of latest developments and progress in their field of specialization. This current awareness can be carried directly into the classroom.

3. To carry out extension programs that assist the landowner, practitioner and individual citizen in putting into practice research findings and to provide needed services within the forestry and recreation fields to those segments of the population most needful of them.

This goal also is directly related to the primarily educational function. Research serves little purpose if its beneficial findings are not put into practice. Many segments of our population need to be served through special programs if they are to make their maximum contribution and receive maximum personal satisfaction.

Following is how accomplishments during 1975-76 have measured up in progress toward this purpose and these goals.

Teaching

Education is our reason for existence as a university, and our most important function. An increasing number of students is selecting the forestry and recreation fields for career goals. Enrollment in the college was 838 in fall of 1975, an increase of 9.5 per cent over 1974 and a growth of 83.8 per cent since the col-

lege was established in 1970. The growth rate since 1970 has averaged 12.9 per cent.

Superlative education, not numbers, is the goal, however. Both departments continued to assess and refine curricula, course content and teaching methods. The quality of incoming students continues to improve. The depressed economy in South Carolina and nationally has made job placement after graduation difficult, but our graduates are better equipped than ever to compete for available jobs, and the proven performance of our past students gives current graduates an advantage over those from other schools.

Research

Based on carefully projected needs, research continues. Research teams have been formed to give common direction to research among faculty scientists knowledgeable in specific problem areas. Cooperation with various governmental agencies as well as with other units within the University is vigorously pursued to obtain maximum results at minimum expense to the State. The Department of Forestry has more than 45 research projects, among them a substantial grant from the Water Resources Research Institute to study the effect of municipal sewage effluent on forested lands.

The Department of Recreation and Park Administration completed comprehensive studies of the demographic characteristics and recreational aspirations of Lake Hartwell and Chattooga River visitors. Another cooperative study dealt with the causes of accidents in the Great Smoky Mountains National Park.

Coordinated research toward optimizing biological potential in the coastal plain was enhanced by completing the research team at Clemson's Belle W. Baruch Forest Science Institute on Hobcaw Barony at Georgetown.

Extension

The Department of Recreation and Park Administration provided park plans and consultations to a number of local governmental units. Using graduate assistants, several interpretive plans for state parks were completed. One project was undertaken with the National Park Service at the Petersburg (Virginia) National Military Park.

The College Week for Senior Citizens continued to be very popular and valuable, serving more than 500 elderly South Carolinians.

The special group camping programs, such as Camp Hope, Camp Logan, Camp Sertoma and others have benefited from camping facilities of our new Recreation-Outdoor Education Research Laboratory on Lake Hartwell near the campus. Two units of the camp are complete. Plans are for a central dining-administrative facility and a third camp unit to be constructed soon. Completion of the camp has been aided by a \$100,000 grant from the Kresge Foundation and a \$125,000 project funded through the federal Title X (manpower) program.

Extension forestry activities were directed at several areas during the year. A newsletter was initiated for people in forest harvesting. The newsletter is designed to help this group deal with increasingly complex regulations and environmental concerns. Another type of information release is the "Forest and Shade Tree Report." The reports planned in this service are designed to become a reference source for public service agencies. In addition, each report will serve as an information sheet which can be distributed to people who have the particular problems that are covered. Two major publications were written during the year: "Herbicides for Forestry" and "Growing and Marketing Christmas Trees in South Carolina."

Short courses, demonstrations and training sessions were conducted throughout South Carolina. Examples are: a forestry pesticide training course in Columbia, a pulpwood production course in Clemson, an environmental education Workshop in Newberry, a prescribed burning demonstration in Darlington, plant problem clinics in Charleston, Columbia, Greenville and Lancaster and a log and lumber grading workshop in Clemson. Youth program examples are: a weekly summer program for Boy Scouts in western South Carolina and weekly environmental study sessions at the two 4-H camps and a statewide conservation camp.

The need for reliable and realistic forestry data is being re-emphasized during this period of environmental awareness and resource planning. Extension forestry has worked diligently in this area the past year. With cooperation from state and Federal agencies, forest industries and private firms, new types of data are available.

Facilities

One milestone which has strengthened our capability in teaching, research and extension was the dedication on October 30, 1975, of the new Forest and Recreation Resources Building. This

facility is well-equipped for all phases of teaching, and will provide impetus for new and more sophisticated research than has been possible. Already it has had a decided impact on the graduate program. Especially in forestry, graduate enrollment has increased appreciably over the curtailed program in former quarters. We are most appreciative to the people of South Carolina for providing this fine facility through the General Assembly. This building, along with the Clemson Experimental Forest, the Recreation-Outdoor Education Research Laboratory and facilities at The Belle W. Baruch Forest Science Institute, combined with an outstanding faculty and staff, give Clemson University the potential for one of the finest teaching-research-extension programs in forest and recreation resources in the nation. Substantial progress has been made this year toward meeting the potential.

COLLEGE OF INDUSTRIAL MANAGEMENT AND TEXTILE SCIENCE

This college began the academic year with the accent on its teaching mission. This was accelerated and at year's end the focus was on its research and public service activities.

The popularity of curriculums in the college was underscored by fall 1975 enrollment which showed Industrial Management and Textile Science the largest at the University in undergraduate majors—1,523 compared with 1,327 the previous year.

Although all departments had some enrollment growth, a 21 per cent increase in the number of students with majors in the Department of Accounting and Finance was primarily responsible for the overall 15 per cent growth college-wide.

Attention turned to different figures at year's end with the announcement by the Professional Development Office of a new attendance record for its series of public service programs for business and industry.

And in research, the Department of Textiles was completing plans for a major symposium to present results of a two-year term project to develop commercial flame retardants for polyester/cotton blend fabrics.

Following is a look at the four departments and the Office of Professional Development.

Department of Textiles

Enrollment and the recruitment of students with high academic potential continued to be this department's primary concern. Since 1973-74, the number of textile students, both undergraduate and graduate, has increased 69 per cent (from 112 to 189). The department offers three undergraduate and three graduate programs. Bachelor of science degrees can be earned in textile chemistry, textile science and textile technology.

All textile graduates are familiar with textile operations and are prepared to contribute to a textile business with a minimum of plant training.

The textile technology curriculum has grown rapidly since its introduction in 1973-74. It has 64 students, making it the department's most popular program.

The master's degree is offered in textile chemistry and in textile science, and the Ph.D. in textile and polymer science. A total of 27 graduate students was enrolled in 1975-76.

Department of Industrial Management

Emphasis in this department continued to be on quality instruction and updating of curricula. Enrollment increased in all areas, with undergraduate enrollment growing by 12 per cent and graduate enrollment by 11 per cent. There was also a 15 per cent increase in degrees awarded including the first Ph.D. in management science.

Departmental faculty have been very actively involved with local chapters of professional associations and with applied research.

Second semester enrollment included 881 undergraduates, 68 graduate students (residents), and 152 in the Clemson-Furman MBA program. Degrees awarded numbered 250, including 212 undergraduate and 38 graduate degrees.

Department of Economics

Student interest in economics reached new heights, with enrollment in undergraduate classes climbing to 1,800 per semester. The 17 students in the master's program set another record.

More faculty continued to participate in continuing education courses, research and writing.

In undergraduate teaching, special attention was given to improvement of classroom work. Tests designed to measure a student's level of economic understanding were given to every stu-

dent the first week of classes. A final test was given at the end of the semester, and appropriate analyses made. Based on the results, steps were taken to improve productivity.

A key element in this effort to improve the learning of economics is provided by special learning lab equipment from the J. E. Sirrione Foundation. This equipment is used each week to augment regular classroom lectures.

The department sponsored or co-sponsored four special conferences which brought nationally recognized specialists to campus. Also, the department sponsored forums on economic recovery from the recession and on labor markets.

Efforts by the S. C. Council on Economic Education provided the framework and funds for special summer courses for public school teachers. The department organized and offered four separate courses, three in Greenville and one in Greenwood, during the summer 1976.

A total of 130 teachers attended the three-week intensive courses in economic concepts. A continuing effort is planned in this area with special projects underway to provide classroom materials for teaching economics in the public schools.

Department of Accounting and Finance

This department continued to deal with the pleasant problem of growth, enjoying a 21 per cent increase over the previous year in the number of undergraduate majors. This growth is representative of the increasing numbers of students seeking enrollment in courses in accounting and finance both as majors and non-majors.

Five hundred students majored in accounting or in financial management. Additionally, a larger number of students takes substantial credits in accounting as required courses, electives or minors. During the year 82 degrees were awarded, 32 in accounting and 50 in financial management.

The quality of the students entering the departmental degree programs is high. Based on a survey of 1975 freshmen, the average student graduated from high school with a rank of 14th when stated in terms of a high school class of 100. To temper the rate of growth and to improve the quality of graduates, those students who now enter the degree programs in accounting or in financial management must earn the letter grade of "C" or higher in each prerequisite course in accounting to be eligible for enrollment in the next higher accounting course.

To serve the approximately 3,600 students expected to enroll in courses in 1976-77, the department has acquired a faculty of 18 highly-qualified educators, eight of whom have doctorates and 10 with master's degrees. These same faculty members hold 12 CPA certificates and two Certified Management Accountant certificates.

Office of Professional Development

Business and industry sent their professional employees back to school in record numbers during the year, giving this office an all-time high attendance of 3,230 in its series of continuing education courses.

A total of 112 courses was offered in the academic areas embraced by the College of Industrial Management and Textile Science: textiles (25 courses), economics (10), management (73) and accounting (4).

Seven Professional Development programs were presented in-house for the J. E. Serrine Company, the Rock Hill Printing and Finishing Company, and the State of South Carolina.

Also, new programs on color sorting, high-speed spinning, first-line management, sales and purchasing were developed.

COLLEGE OF LIBERAL ARTS

A self-governing society requires of its citizens a basic general education which may enable them, regardless of their occupational or professional interests, to lead full and useful lives and to contribute to the general welfare. An acquaintance with the humanities and the social sciences is a necessary part of the education of all who expect to play an intelligent and meaningful role in society.

Clemson University recognizes that a great educational institution must have a strong program in the humanities and the social sciences. From its inception in 1969 the College of Liberal Arts has enjoyed the strong support of all branches of the University.

Organization and Influence

The college includes departments of English, history, languages, music, political science, psychology, and sociology. All departments except music offer an undergraduate major concentration, and English and history offer the master's degree.

Though only some 15 per cent of Clemson undergraduates major in liberal arts, the influence of the college is great, for approximately one-third of the teaching of the entire University is done by liberal arts faculty.

Sixty per cent of the faculty hold the doctorate; qualified graduates of the college readily enter outstanding graduate, medical, law and other professional schools.

Education and Campus-Community Service

One of the most important contributions of the college is sponsorship of student and University organizations and extracurricular activities, most of them open to the public without charge.

The Department of English sponsors the Clemson Players, the Debating Team, and assists with management of *The Tiger* and *The Chronicle*. The department also sponsored the highly successful "Why Can't They Write?" symposium; a Children's Literature Symposium, attended by 200 persons; a Writing Laboratory to provide tutorial service to students with writing deficiencies; and workshops throughout the State for public school teachers, and for industrialists and businessmen interested in business and technical writing.

The Department of Music sponsors the Marching Band, Concert Band, University Chorus, Chamber Music Series, and manages the University Concert Series. The Department of Languages sponsored the Dionysia foreign language and drama festival, with 31 casts from Georgia, the Carolinas and Virginia competing in four languages; held its annual Declamation Contest, drawing 130 contestants from 27 schools in three states; and conducted the first South Carolina Organization of German Students Convention.

The Department of Political Science sponsored the University's Model United Nations Representation Team. It also ran the fourth Robert A. Taft Institute in Government and Practical Politics for public school teachers. The Psychology Department sponsors a popular club for its major students and provides extensive consulting services to mental health centers in South Carolina. The History Department conducted its first "History Day," attracting about 150 high school students enrolled in advanced placement history classes in Greenville County Schools. It also inaugurated a weekly book review column service for South Carolina newspapers.

Professional Scholarship

"The South Carolina Review," a journal publishing distinguished literary scholarship and original fiction and poetry, continues to be edited by members of the English faculty. During the past year a short story and a poem first published in the journal were honored nationally by being selected for inclusion in anthologies devoted to publishing the "best of the year." The "Journal of Political Science," sponsored by the Department of Political Science, and the "Southeastern Latin Americanist," sponsored by the Department of History, likewise continued their successful careers.

Members of the English faculty were active professionally by publishing two books (one novel and one anthology coedited with a member of the history faculty), publishing 10 articles, reading more than 20 papers at professional meetings, and by serving in numerous key capacities in professional organizations and societies. The Language Department was also well represented as officers of organizations and as speakers at various meetings. During the year one liberal arts professor served as a Fulbright Lecturer in American studies at the universities of Aarhus and Odense in Denmark.

The encouragement of scholarship and the education of responsible citizens are the guiding principles of this college. All indications point to continued growth in the quality and scope of programs in the humanities and the social sciences, as well as to a greater consciousness of cultural matters in the general university life. Research, teaching and public service activities of the social science units will be directed more and more to a search for solutions to problems of poverty, pollution, population growth, mental health and public administration. Clemson's College of Liberal Arts is a community of scholars and students for the study of man's basic needs and drives—intellectual, emotional, cultural and social.

COLLEGE OF NURSING

Student body growth continued to be the pattern in the College of Nursing, with major emphasis on the baccalaureate program. The limit on the number of students enrolled in the associate degree program is still in effect. A master's degree program in family health nursing was initiated, with an enrollment of seven students. This program has elicited much interest within the

community and an increased enrollment is anticipated; however, this will be dependent upon budgetary concerns since the employment of additional faculty with terminal degrees is necessary.

Several faculty, two undertaking doctoral study, were on leave of absence.

The college's public service contributions were reflected by two continuing education programs. These were the Emergency and Critical Care programs funded by Appalachian Regional Commission and staffed by two clinical nurse specialists who work directly with practicing nurses in hospitals in the seven-county area; and the Pediatric Nurse Practitioner program funded through the Appalachian Health Education Council. Fifteen nurses have completed the program and were granted certificates issued jointly by Clemson University College of Nursing, the Medical University of South Carolina College of Medicine and the Greenville Hospital System.

Believing that instructional technology is a powerful means of improving both instruction and actual learning, the College of Nursing continued to emphasize the mediated approach to education. The self-study laboratory enjoys increased usage with each semester as more teaching materials are obtained. Through broadening the acquisition of the self-study laboratory, focus is placed on students who can now set their own rate of learning.

This same philosophy of mediated curriculum is being incorporated into plans for the new nursing building. Equipment now being purchased is bought as additions to those being supplied in the new facility. The acquisition of audiovisual equipment was assured with the approval of funding by the National Institute of Health and by the Appalachian Regional Commission. As a supplement to University funds, the grants will help furnish the second floor of the new building which is devoted to self-study and consists of an audiovisual suite, a nursing laboratory and a television studio.

To organize audiovisual activities, the college has acquired Deborah Moore as the self-study laboratory coordinator. Miss Moore received a bachelor of arts degree from Wake Forest University and her master's degree in educational media from Western Carolina University. Her duties include maintaining smooth operation of the audiovisual laboratory and the nursing laboratory by assessing student needs and fulfilling those needs.

In addition the coordinator acts as a media consultant to faculty in planning a stimulating instructional environment for students.

The nursing skills laboratory also has had increased usage. When not in use for one of the skills classes, the laboratory is staffed by a registered nurse so that students may practice nursing techniques under qualified supervision.

During the year Dr. Arline M. Duvall and Mrs. Cynthia L. Belcher were appointed to serve on the South Carolina's Nurses' Association Council on Education.

Dr. Geraldine Labecki, dean of the college, was appointed as a regular member of the Board of Review for Accreditation of the Department of Baccalaureate and Higher Degree Programs of the National League for Nursing.

COLLEGE OF SCIENCES

The College of Sciences continued to carry one-third of the teaching load of the University. Construction of Jordan Hall, a facility to provide a much-needed 90,000-square feet for laboratories and research in the biological sciences, progressed ahead of schedule with occupancy anticipated in early January 1977. There has been a noticeable trend recently for college students to move into the sciences in selection of a major field of study. Undoubtedly, their concern over the environment, pollution, energy and health affairs has led to heightened interest in the sciences where the capability exists for the solution to these major problems.

Department of Biochemistry

A B.S. degree in biochemistry was approved by the South Carolina Commission on Higher Education July 10, 1975. Twenty-one students majored in biochemistry, and their cumulative grade-point-ratio at the end of the academic year was 3.4. In addition to the undergraduate majors, 21 students were enrolled in the graduate program. Five M.S. degrees and one B.S. degree were awarded. Seven hundred seventy-three students were enrolled in biochemistry courses.

The undergraduate majors established a Biochemistry Club and during the year toured the Pharmacology Department of the Medical University of South Carolina and the Oak Ridge National Laboratory. Two members were chosen to participate in the summer undergraduate training program at Oak Ridge.

The department also hosted the 18th Southeastern Developmental Biology Conference, attended by 150 persons who heard 32 papers. The conference was partially supported by a grant obtained from The National Science Foundation.

Seven outside grants were received by the faculty: three from The National Institute of Health and one each from NSF, NATO and the Muscular Dystrophy Association of America. Five papers were given at national meetings and eight at regional meetings, the department conducted nine outside invited seminars and produced six publications. Three of the faculty were invited to different sessions of the prestigious Gordon Conferences.

The faculty exchange program of minicourses with the Biochemistry Department of the Medical University of South Carolina continues to be strong.

Department of Botany

The undergraduate curriculum in botany has been reviewed and studied during the past two years. As a result, a totally revised curriculum is being implemented which comprises two programs, one offering two options. The Pre-Graduate School program provides strong botanical, biological and related scientific backgrounds designed to prepare students for advanced work in the molecular aspects of botany and biology generally (first option), or for graduate work with organismal orientation, including ecologic and environmental considerations (second option). The Pre-Vocational program is designed to give students great latitude in selecting elective courses in botany and other interest areas at the University to enable them to prepare better for employment directly upon graduation. Additionally, the selection of appropriate elective courses might reduce the degree of specific training required for the job, a potential benefit to both student and employer.

The department contributed significantly to the development of an inter-departmental freshman biology course to replace conventional freshman courses in botany and zoology. It is anticipated that this new course will permit more efficient use of resources, both professorial and material.

Research efforts of three faculty members were supported by nondepartmental agencies. The projects ranged from studies of biological control of mosquitoes, and the effects of thermal stress and nutrients on plant growth in reservoirs, to investigations of the interrelationships of various kinds of plants.

Several professors attended professional meetings at state, regional and national levels and presented papers on their research. Additionally, several faculty members presented seminars and talks to other departments on campus and at other institutions; one professor conducted sessions of an annual wildflower foray in the State; and the department's plant identification service continued to be most active.

Department of Chemistry and Geology

Enrollments in chemistry and geology courses remained high. The significant increase in the introductory geology course necessitated the addition of another faculty member.

The M.S. degree has become the preferred degree for practicing geologists. To meet this need, a proposal to establish this degree program has been submitted.

Through continued faculty development—fostered by sabbatical leaves, participation in conferences and symposia, and cooperative research programs—and by filling faculty vacancies with able young scientists, the department's research effort increased in productivity and quality. This was the faculty's most active year reporting results at professional meetings and in the leading scientific journals. In addition, two research proposals submitted to Federal agencies are being funded. The research continued to emphasize fundamental advances in chemistry and geology.

The Student Affiliate Chapter of the American Chemical Society, an organization for developing professional attitudes in undergraduate chemistry students, received national recognition by the society for the fourth consecutive year.

Department of Mathematical Sciences

The department continued to offer a comprehensive approach to statistics, computer sciences, operations research and core mathematics. The unit has a national role in developing this integration of several disciplines into a comprehensive response to the impact of computing and quantitative methods on today's problems. Under a major three-year grant to Clemson and Washington State University from the National Science Foundation, these two universities are developing a basic revision of graduate education in mathematical sciences. Already graduates within advanced programs in the department are achieving recognition through the success they have in finding high-paying professional positions. In particular, numbers of students have changed their employment posi-

tions from undesirable prospects to ones with significant professional opportunities. In response to the question "What does a mathematician do besides teach?" our alumni, approximately 25 M.S. degree candidates a year, indicate "they serve industry and the nation in significant industrial and government positions." Correspondingly, the 300 undergraduate majors look forward to attracting job prospects in computing, statistics and the insurance industries.

Computing plays a key role in the department's program. The Martin Hall remote computer center is one of the most active student facilities on campus, and approximately 66 per cent of the student jobs are generated in this area by students in mathematical science classes. Over 900 times a day, mathematics students use the computer to solve problems.

The department received approximately \$247,500 during the year to support various projects. The faculty continued to identify the department nationally by appointments in major positions. Three members serve as visiting lecturers for the Mathematical Association of America, the Society for Industrial and Applied Mathematics, and the Mathematical Association of America's Committee of Undergraduate Programs in Mathematics. One faculty member served as the section lecturer for the southeastern section of the Mathematical Association of America. The Society for Industrial and Applied Mathematics Visiting Lecturer Program for the Southeast is coordinated by a departmental professor, while another serves as chief reader for the Educational Testing Services in the College Board's Advanced Placement Program in Mathematics.

Department of Microbiology

The number of students majoring in microbiology continued to increase, and this year they represented 21 per cent of all majors in the College of Sciences. Furthermore, 62 students obtained degrees in microbiology, and many graduates continued their education in medical, dental, pharmacy and graduate science programs, while others obtained positions with food and pharmaceutical industries, hospital-diagnostic laboratories and state agricultural and health and environmental agencies. The vast majority were employed in South Carolina.

Among departmental research projects, one study dealing with the communicable disease gonorrhea indicates it is becoming more difficult to control in the Piedmont area because the causative

agent is becoming more resistant to antibiotics employed in its treatment.

Another project involves a study of the properties of enzymes that can decompose cellulose and starch. The long-range objective is to improve methods of disposing of and utilizing organic solid wastes.

Results of another project suggest the biological indicator currently used to determine the degree of sewage contamination of natural waters should probably be re-evaluated in areas that are also receiving certain kinds of industrial waste discharges.

One researcher is investigating the role of bacteria in decomposing organic matter in salt marsh sediments. Results from this study will help better understand the ecology of salt marshes, an important natural and economic resource in South Carolina.

In cooperation with the Department of Physics, two professors are investigating how living cells can repair genes that have suffered radiation damage. Such studies are important to an understanding of genetics and also to the understanding of certain kinds of cancer.

Other researchers are studying bacteria that can produce methane gas from organic matter. This process has the potential of providing man with an energy supply. An understanding of how these organisms work will aid in the development of large scale reactors for the biological generation of methane from waste organic matter.

Department of Zoology

During the year three faculty members were recruited to fill vacancies, and one will join the department in a temporary capacity. These additions mark a significant improvement in instructional capacity in the environmental area, and a step toward implementation of the general biology program.

Several faculty members were engaged in sponsored research. Continuing projects included studies of bird-aircraft collisions and related problems, and water quality and lake ecology. A new project involved testing local drinking water supplies for nematodes under a grant from the Environmental Protection Agency. One professor was named to the board of directors of the Highlands Biological Station, reflecting the department's interests in mountain research.

Department of Physics and Astronomy

In January 1975 the department was host for the winter meeting of the American Crystallographic Association. The conference, or-

ganized by members of the department, was attended by about 350 crystallographers from all parts of the country. Topics included computer analysis of X-ray scattering data to determine the internal arrangement of atoms and molecules in crystals, the determination of the molecular structure of biological molecules, and crystallographic data retrieval and display. The meeting was followed by a National Academy of Sciences-National Research Council symposium on the application of current advances in computer science to crystallography. A total 126 research papers were presented. The conference was one of the largest technical gatherings ever held at the University and was the first meeting at Clemson of a member society of the American Institute of Physics. The event indicates the growing national recognition of Clemson's physics programs.

A two-year grant from the Science Education Division of the National Science Foundation was obtained for the study of restructuring the undergraduate learning environment. The grant will enable the department to investigate the feasibility of conducting intermediate level undergraduate physics instruction on an individualized basis, in which students proceed at their own pace and take examinations as need arises.

The department's planetarium continued to operate at a high level to provide astronomy instruction for students, public school children and as a continuing education service for the general public. Apart from its use as a University instructional service, its presentations were attended by over 4,500 school children and adults, a significant increase over attendance the preceding year.

GRADUATE STUDIES AND UNIVERSITY RESEARCH

The Graduate School

Graduate student enrollment maintained a consistently high number during the fall semester. Total enrollment was 2,379, of which 208 were Ph.D. students. In addition, 147 students were enrolled in the Clemson-Furman Master of Business Administration program.

A total of 773 advanced degrees were awarded during the year, 42 of which were doctor of philosophy degrees.

Two new graduate programs are pending approval by the Commission on Higher Education: a doctor of education degree program in vocational and technical education and a master of science degree in animal and food industries. The latter resulted from a

review of graduate programs and is an interdepartmental program designed to consolidate and strengthen the existing master of science programs in animal science, dairy science, food science and poultry science.

A significant accomplishment by the Graduate Council was the study and approval of guidelines for graduate admission. This criteria will enable the departments and the Graduate School to have documented information with which to evaluate applicants, and thus allow more accurate and expeditious turn-around time in graduate admission procedures.

Office of University Research

The primary mission of this office is to assist faculty, departments and colleges with all aspects of University research. Assistance ranges from review of proposals seeking sponsored support to award and administration of Faculty Research Committee grants.

The office serves as University liaison from the Oak Ridge Associated Universities; the Department of Health, Education and Welfare Office of Protection from Research Risk; the DHEW Laboratory Animal Welfare Office; and the South Carolina Sea Grant Program. It serves as the executive arm of the University Research Council, the University Committee for Laboratory Animal Welfare, the Faculty Research Committee and the University Committee for the Protection of Human Subjects.

Major efforts during the year included a complete revision of the University General Assurance of Compliance with DHEW regulations for the Protection of Human Subjects; submission of a University copyright policy for administrative approval; development of an initial draft of a University animal facility policy; and publication of the biennial compilation of faculty publications.

Computer Center

The Computer Center has the reputation of being among the best computer installations in the Southeast. The key to its success is a balance of talent, management and machinery. Sound management and a capable staff have created the highly productive atmosphere necessary to support the many diverse activities and requirements of a large university.

The center has structured a strong organization to meet the expanding needs of the University. Two new areas have been organized to enhance the effectiveness of the center: Production Services and Academic User Services.

Production Services provides the scheduling and coordination of computer runs and the delivery of the runs' production. Production Services is the first contact for the users who have problems with computer-related work and assists in correcting those problems, including liaison with Computer Operations, the division of Information Systems Development and the Department of Administrative Programming. An integral part of Production Services is the Keypunch Services which has been relocated in Martin Hall for user convenience. Keypunch Services provides production users and academic users with keypunch and verification facilities.

Academic User Services, established in September, provides technical support for the academic community. Academic User Services assists in the use of Computer Center facilities and promotes a general awareness of available resources and efficient means for their utilization. Implementation of these goals has brought involvement in several areas. The center provides consulting and educational services. A library of documentation for the most commonly used systems is being assembled and made available. A comprehensive software management system has been implemented to provide for the acquisition, installation and maintenance of the program products required for instructional and research purposes.

The Computer Center has committed its resources to providing better time sharing and batch processing facilities at the University. A campus-wide terminal network has been installed and maintained by the center to provide increased accessibility to users. At present 52 terminals, seven printers and four readers are supported by this system. Software and hardware maintenance are provided solely by the center staff.

Two additional Remote Job Entry stations have been provided to meet the increasing needs of academic users. One RJE station is located in the basement of Riggs Hall to serve the College of Engineering and another is in Sistine Hall for the College of Industrial Management and Textile Science.

Perhaps the most dramatic improvement of service is the increase in system availability. Many factors contribute to the availability of the system and require constant monitoring to achieve the high per cent of availability required. In 1973 when time sharing was in its infancy at Clemson, availability averaged 80-85 per cent. System availability now averages between 98-100 per cent on a weekly basis.

System stability is at an all-time high. For the first time in the history of the center, systems software down-time compares favorably with hardware down-time. This is directly related to the efforts of center personnel to provide the latest releases of software available to the computer and to the expertise involved in quick determination and resolution of "bugs" in the system.

In addition to providing adequate time sharing and batch processing on campus, the center continued to participate with other educational institutions. School systems relying on the Clemson Computer Center for leadership and services include Furman University, Lander College, Converse College, Central Wesleyan College, Tri-County Technical College, Greenville County high schools and Oconee County high schools.

State and local agencies also participate with the center for solving data processing needs. The following reflects the involvement of the center with off-campus agencies:

Central Wesleyan College—Remote job entry terminal for both academic and administrative requirements.

Converse College—Support for academic program with anticipated growth to administrative areas. Developmental support in future probable.

Furman University—Support for MBA program. Access primarily to Clemson software packages for educational and research projects.

Oconee County School District—Support for three high schools using time sharing system for instruction in programming and mathematics.

Greenville County School District—Support for six high schools using time sharing system for instruction in programming and mathematics.

U. S. Department of Agriculture—Cotton fibers and processing reports, strength survey reports, quality reports.

Greenville Technical College—Evaluations and class rolls.

Tri-County Technical College—Registration, Administrative support.

American Enka Co.—Payroll backup program.

Clemson Engineering Service—Land surveying computations.

Enwright Associates, Inc.—Engineering design projects.

Bailey & Associates—Civil engineering calculations.

Jacobs Mfg. Co.—Computation of actual hours spent on each cost lot.

S. C. Wildlife & Marine Research Department—Fisheries data analysis.

U. S. Department of Interior, Southeastern Power Administration—Customer billing system.

Perry Electronics, Inc.—Demonstration of data terminal to prospective customers who might use Clemson University computing services.

J. E. Serrine Co.—Engineering Calculations.

S. C. Governor's Office, Division of Administration—

(a) Comprehensive Manpower Program: Client & Financial records.

(b) Employee time sheets and labor cards.

Greenville County Schools—Item analysis data for academic test items.

Dow Badische—Statistical analysis of polyester project.

U. S. Department of Interior, Fish & Wildlife Service—Statistical study of effects of heated effluents.

Piedmont Engineers—Flood investigation.

State Department of Health & Environmental Control—Client information system.

Lander College—Accounting, registration, grades, etc.

Department of Social Services—Title XX.

The Computer Center will continue its leadership role in data processing for the University, the community and the State.

Division of Information Systems Development

Since the founding of the institution, Clemson has been a strong and valuable public service contributor to the State and its citizens, and has provided consistent back-up support for state government. In this same spirit of service, the Division of Information Systems Development was established at the University in 1974 to provide skilled assistance to governmental agencies in the design, implementation and production maintenance of computerized information systems.

Since its inception, this division has provided vigorous assistance and support in meeting the special needs of the University and other agencies. Significant among contracts received during the year were:

Appalachia II District Health Department—Performed maintenance on the system developed to handle the health care and appointment requirements of the department.

Division of Administration—Office of the Governor—Continued refinement of the system which maintains records for persons trained under the Comprehensive Manpower Programs; began conversion of the Grants Management System to generalized software; made refinements to the reporting system at General Services.

Department of Social Services—Designed and implemented a major system designed to (1) handle the records of the Title XX division of DSS and (2) meet federal reporting requirements; assisted in the conversion of DSS's financial system, allowing the department to release its machine, and began studying existing DSS systems for conversion to Clemson; began participation in the planning of future systems for DSS information needs, eventually leading to the development of a DSS integrated database management system.

Energy Management Office—Developed a reporting system for maintaining records on natural gas users and suppliers in the State.

Mental Health Centers—In addition to maintaining the current system for Greenville and Anderson Mental Health Centers, an inquiry system was designed and implemented to maintain patient and staff records.

Greenville County Planning Commission—Completed the design and implementation of a system for land use and soil data which will aid Greenville in city and county planning.

Lander College—Continued development and support of Lander's data processing needs in student and alumni records, payroll and course-load prediction.

Clemson University Department of Forestry—Designed and implemented a system which maintains stand inventory and activity information needed in the management of Clemson forests.

Plant Pesticides Regulatory Service—Designed and implemented a system which maintains records of plant pesticides and applicators who are licensed to use them.

Additional contractual arrangements which will be in operation during 1976-77 were developed and negotiated this fiscal year. These associations with other state agencies will further strengthen this division's contributions to the University and to the State.

Division of Administrative Programming Services

The Division of Administrative Programming Services (DAPS) is responsible for the development and maintenance of such operational information systems as are necessary to support the routine

operation of the University. DAPS is further charged with the design and implementation of a comprehensive Management Information System which is supportive of executive decision-making processes. Since its creation two years ago, DAPS has been engaged in a three-phase, long-range plan to accomplish these objectives. These phases are:

1. Get all existing administrative systems under control.
2. Develop necessary new operational information systems, creating an accurate, up-to-date university data base as a natural by-product of the routine operation of these systems.
3. Develop a university-wide management information system as a super-structure built upon the data base as a foundation.

During the year phase one was essentially completed, phase two was well under way and the analysis leading to phase three was begun.

The results of completing phase one can best be illustrated by the reduction in the number of production reruns. Early in the year a rerun rate as high as 50 per cent was required to recover from problems which developed while running production jobs. Now the rate is typically under 5 per cent and is falling. In addition, the recovery process when a job does fail is much easier and quicker due to the detailed documentation which exists for these production systems.

Another result is that programmers spend less time recovering from problems in existing systems and are free to concentrate on enhancements and new work. In January there was a backlog of about 100 requests for services. There now are typically 10 to 15 outstanding requests.

The result of completing phase one is a better capability to manage and plan the systems development process while providing users with more reliable operational systems.

In phase two DAPS implemented 11 new operational information systems during the year.

In phase three, DAPS is currently working to implement program-costing software which has been acquired from the National Center for Higher Education Systems. Analysis has begun on how this software should be modified and augmented to meet management information needs at Clemson. As the major operational information systems now planned for 1976-77 become a reality, Clemson will begin to have the data base necessary to support more sophisticated management systems.

ROBERT MULDROW COOPER LIBRARY

The Robert Muldrow Cooper Library plays a vital part in the education, research and public service roles of Clemson University.

The library contains 618,131 volumes, 41,453 of them added within the past year. In addition, there are 231,681 units of microfiche, 14,514 reels of microfilm and 31,468 microcards.

In Clemson's library the serials collection—including journals, transactions and proceedings in English and many foreign languages—is extremely important for research needs. Clemson now receives 11,288 serials, 546 more than a year ago.

To supplement its holdings, the library borrowed 2,244 items, and to assist other libraries, it loaned 2,021.

The library circulated 204,695 items, three per cent more than in the previous year. An idea of the library's use also can be seen in the results of a daily count of people going past the exit desk. The year's tally was 409,043.

The Document Delivery Service, a cooperative program with the National Agricultural Library, provides U. S. Department of Agriculture personnel within South Carolina with publications. Clemson filled 67.7 per cent of the requests received. The others provided by the National Agricultural Library and the regional center at the University of Georgia.

During the year, the South Carolina Commission on Higher Education prepared a questionnaire "as an essential first step in the study of library resources available to students in post-secondary educational institutions." The library used the occasion to review accomplishments since the visitation in 1971 by a committee from the Southern Association of Colleges and Schools, and to project goals for the next one to five years. Excellent progress had been made in all areas of library activity—growth in collections, addition of staff members and an increase in stack capacity.

The application of computer technology to the acquisition and cataloging of books through the Southeastern Library Network was an innovation during the year resulting in much greater efficiency in many library technical operations.

STUDENTS

The 1975-76 academic year marked the 21st of uninterrupted growth in Clemson enrollment, with a total 11,361 students registered for classes—9,109 full-time and 1,138 part-time, students on-campus and the remaining 1,114 in various off-campus programs. In the past seven years total enrollment has jumped 62 per cent. The University's long-standing goal of limiting full-time students on-campus to 10,000 was achieved, and President Robert C. Edwards reaffirmed the Board of Trustees' determination to maintain that goal. He noted that physical limitations are involved, along with the need to uphold the quality of Clemson education and the person-to-person character of the University.

Even so, space remained a problem. By January 1975 the University had already committed all its housing for women for the fall semester. When school began, there were 204 more students in on-campus housing than there were permanent spaces for them (they stayed temporarily in converted study rooms and lounges), and there were some 300 students living off-campus waiting for either temporary or permanent quarters on-campus to become vacant.

Despite the enrollment crunch, the fall term got off to an extremely smooth start, with 94 per cent of the students preregistered and their course schedules completed during the summer. The Board of Trustees heard reports from the vice president for student affairs and the student body president that the unity and spirit of the 1975-76 student body were strong, and that the opening of Fike Recreation Center and the new Edgar A. Brown Student Union had proven to be great unifying factors for the campus.

The caliber of the student body is shown, in part, by extracurricular accomplishments. At the National Student Congress of Delta Sigma Rho-Tau Kappa Alpha, the Clemson delegation won half the awards for excellence. During the awards ceremony one of the coordinators of the congress said: "Believe it or not, there were other schools here besides Clemson." Clemson students also won six key appointments to executive posts at the South Carolina State Student Legislature.

For the third straight year the student section of the American Society of Mechanical Engineers won the Bendix award as the outstanding section in the Carolinas, Tennessee and Virginia. The student chapter of the American Institute of Chemical Engineers

was selected the most outstanding chapter in the Southern Conference and named one of the top 11 in the nation. The campus newspaper, *The Tiger*, again won All-American honors at the Associated Collegiate Press Convention, and two psychology seniors won Psi Chi Awards for undergraduate research presented at the Southeastern Psychological Association meeting.

During the year the first woman was elected in the 18-year history of the student senate to serve as president of the student legislature; the student-run University Speakers Bureau brought to campus such lecturers as author Truman Capote, former UCLA basketball coach John Wooden and "Candid Camera" creator Allen Funt; the Clemson Players performed before packed houses the plays "Promises, Promises," "The Merry Wives of Windsor," "Woyzeck" and "Three Men on a Horse"; sign-in, sign-out rules were abolished by referendum in five of ten women's dormitories in compliance with Title IX regulations of the Education Amendments Act of 1972; and student volunteers coordinated a Hike-Bike for retarded citizens that raised about \$8,000.

Academic excellence also continued to characterize the Clemson student body. More than 91 per cent of entering freshmen in 1975 graduated in the upper half of their high school class. More than 32 per cent were in the top 10 per cent. More than 2,400 students were recognized at Honors and Awards Day ceremonies in April.

Total enrollment was up 7.3 per cent in the 1975 fall semester, when a record 11,361 students registered for classes. The on-campus enrollment of 10,247 in 1975 represented a 5 per cent increase over the previous year, while graduate enrollment (2,785) was up 15.3 per cent.

Fall 1976 enrollment figures were not available as this report was written, but the on-campus total was expected to be roughly 10,500 (9,350 full-time and 1,150 part-time). In round figures, 5,300 new freshmen and transfer students applied for fall 1976, 3,600 were accepted and about 2,400 were expected to attend. A freshman class of 1,850 was anticipated.

The University awarded 2,559 degrees during academic year 1975-76. Fall semester enrollment comparisons for recent years are shown on the next page.

Fall Semester Enrollment Comparisons

<i>Year</i>	<i>Undergraduate</i>	<i>Graduate and others</i>	<i>Total</i>
1968-69	6,165	674	6,839
1969-70	6,203	818	7,021
1970-71	6,679	1,359	8,038
1971-72	7,300	1,590	8,890
1972-73	7,686	2,071	9,757
1973-74	7,910	2,202	10,112
1974-75	8,171	2,415	10,586
1975-76	8,576	2,785	11,361

The 1975-76 figures include 966 students attending off-campus institutes and 148 in the Clemson-Furman University Master of Business Administration degree program.

Clemson students come from all 46 South Carolina counties, 44 states, Puerto Rico and the District of Columbia, and 39 foreign countries (157 students). The Admissions Office processed 4,998 applications and more than 12,000 College Board scores for 1975-76. Out of 3,520 students accepted for admission, 69 per cent actually enrolled.

Enrollment of women reached an all-time high during the 1975 fall semester with 4,238, of which 2,924 were undergraduates on the campus. Enrollment of undergraduate coeds increased about 6 per cent over last year. Women students now constitute 35 per cent of on-campus enrollment and about 37 per cent of total enrollment, reflecting a rapid growth trend which is now stabilizing. For 1975 there was a slight decrease in new freshmen and an increase in new transfer students compared with 1974.

The Clemson student body continues to be a working group of men and women who also receive significant loan, scholarship and other financial assistance. In 1975-76 approximately 2,325 students earned an estimated \$3,177,000, a figure which does not include substantial earnings from off-campus employment. Clemson awarded 286 long-term loans. The University also approved and certified 430 guaranteed student loans from a variety of lending institutions. Exclusive of athletic grants-in-aid and donor-selected scholarships, 645 scholarships and grants, valued at \$461,364 were awarded. In all, approximately 40 per cent of the student body received financial assistance administered by Clem-

**Fall Semester 1975 Enrollment by Colleges, and Degrees Awarded
December 1974-August 1975**

	<i>Main Campus</i>		<i>Degrees</i>					
	<i>Enrollment</i>		<i>Associate</i>	<i>Bachelor's</i>	<i>Master's</i>	<i>Specialist</i>	<i>Doctorates</i>	<i>Total</i>
	<i>Fall Semester</i>							
Agricultural Sciences	921	0	93	34	0	11	138	
Architecture	583	0	93	24	0	0	123	
Education	1,763	0	314	427	22	0	763	
Engineering	1,503	0	207	55	0	15	277	
Forest & Rec. Resources	838	0	126	13	0	0	139	
Ind. Mgt. & Text. Science	1,635	0	241	13	0	4	258	
Liberal Arts	1,067	0	213	11	0	0	224	
Nursing	504	32	55	0	0	0	87	
Sciences	1,416	0	198	48	0	17	263	
Non-degree	44	
TOTALS	10,247	32	1,546	625	22	47	2,272	

Degrees awarded since 1896 total 32,386 of which 195 have been associate degrees; 27,780 bachelor degrees; 3,996 master degrees; 22 education specialist degrees; and 393 doctorates.

Number and Per Cent of Black Students

<i>Year</i>	<i>Number</i>	<i>Per Cent</i>
1972	179	2
1973	211	2
1974	216	2
1975	338	3

Student-Faculty Ratio (Full-Time Equivalent)

<i>Year</i>	<i>Ratio</i>
1969	12.6 : 1
1970	13.1 : 1
1971	14.6 : 1
1972	14.6 : 1
1973	16.8 : 1
1974	17.9 : 1
1975	18.3 : 1

Average College Board Score of Freshman

<i>Year</i>	<i>Score</i>
1960	998
1965	1003
1966	995
1967	1005
1968	1005
1969	1015
1970	1005
1971	997
1972	995
1973	982
1974	984
1975	983

**Number of Teachers
(Full-Time Equivalent Teaching Faculty)**

<i>Year</i>	<i>Teachers</i>
1970	571.2
1971	580.1
1972	614.8
1973	578.4
1974	591.8
1975	602.5

**Number In Freshman Class
(New Students)**

<i>Year</i>	<i>Number</i>
1950	640
1960	1,363
1965	1,479
1966	1,388
1967	1,559
1968	1,632
1969	1,468
1970	1,774
1971	1,853
1972	1,919
1973	2,034
1974	1,949
1975	1,901

Acceptance Rate of Applicants

<i>Year</i>	<i>Rate</i>
1967	79%
1968	79
1969	79
1970	87
1971	87
1972	83
1973	83
1974	84
1975	77

**Retention Rate of Students
(Freshman Class)**

Year	Score
1965	77%
1966	79
1967	76
1968	80
1969	82
1970	78
1971	84
1972	82
1974	83
1975	83

Number of On-Campus Students in Summer School

Year	Number
1950	948
1960	1,015
1965	3,216
1966	3,539
1967	3,980
1968	4,820
1969	4,472
1970	4,428
1971	4,692
1972	5,232
1973	6,267
1974	5,997
1975	6,886
1976	6,287

**Number of Dorm Beds and
Per Cent Being Utilized**

<i>Year</i>	<i>Beds</i>	<i>Per Cent Utilization</i>
1960	2,900	100
1965	3,624	97
1966	3,920	99
1967	4,348	97
1968	4,780	95
1969	4,764	94
1970	5,190	93
1971	5,174	97
1972	5,174	100
1973	5,330	102
1974	5,592*	101
1975	5,616**	103
1976	5,625***	103

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- * Includes 252 beds in the Clemson House.
 - ** Includes 262 beds in the Clemson House.
 - *** Includes 271 beds in the Clemson House.

CURRENT OPERATING FUNDS

Revenues and Additions by Source

Students Fees	\$ 4,607,170	6.49%
State Appropriations:		
Educational and General	24,850,780	35.03%
Agricultural Research and Public Service	12,151,711	17.13%
Federal Appropriations:		
Educational and General (Morrill-Nelson)	108,801	.15%
Agricultural Research and Public Service	6,559,231	9.25%
Sales and Services of Educational Depts.	1,154,118	1.63%
Miscellaneous Sources	2,623,103	3.70%
Endowment Income	79,211	.11%
Sales and Services of Auxiliary Enterprises	11,877,049	16.74%
Federal Grants and Contracts	3,458,350	4.87%
State Grants and Contracts	749,550	1.06%
Local Grants and Contracts	238,011	.34%
Private Gifts, Grants, and Contracts	2,487,309	3.50%
	<hr/>	<hr/>
TOTAL REVENUES AND ADDITIONS	\$70,944,394	100.00%
Brought forward from 1974-75 for:		
Encumbrances and Restricted Funds Balance	4,379,336	
	<hr/>	
TOTAL FUNDS AVAILABLE	\$75,323,730	
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Expenditures by Function

Instruction	\$14,777,263	21.84%
Research—Departmental	4,099,762	5.92%
Research—Agricultural Experiment Station	3,330,721	12.03%
Extension and Public Service	2,349,716	3.39%
Extension and Public Service—Cooperative		
Agricultural Extension Service	10,827,286	15.64%
Extension and Public Service—Regulatory Service	2,643,612	3.82%
Academic Support	2,984,496	4.31%
Student Services	2,215,223	3.20%
Institutional Support	2,972,707	4.29%
Operation and Maintenance of Plant	6,793,772	9.81%
Auxiliary Enterprises	10,495,977	15.16%
Scholarships and Fellowships	756,133	1.09%
	<hr/>	<hr/>
TOTAL EXPENDITURES	\$69,246,668	100.00%
Transfers and Other Deductions	1,540,439	
	<hr/>	
TOTAL EXPENDITURES, TRANSFERS AND		
OTHER DEDUCTIONS	\$70,787,107	
Balance, 6/30/76 for Encumbrances and Restricted Funds Balance	4,536,623	
	<hr/>	
TOTAL EXPENDITURES AND BALANCE	\$75,323,730	
	<hr/> <hr/>	

PUBLIC SERVICE PROGRAMS OF THE COLLEGE OF AGRICULTURAL SCIENCES

L. P. Anderson, Dean

The College of Agricultural Sciences administers state-wide public service programs in addition to its program for Resident Instruction. Among its public service functions are administration and coordination of the varied activities and services of the South Carolina Agricultural Experiment Station, the Cooperative Extension Service, the Division of Regulatory and Public Service Programs, and the Livestock-Poultry Health Department. Reports for these divisions follow.

SOUTH CAROLINA AGRICULTURAL EXPERIMENT STATION

W. Cecil Godley, Director

The South Carolina Agricultural Experiment Station conducts the only program of agricultural research funded by the State. Its unique operations are administered through the College of Agricultural Sciences at Clemson University.

The current world emphasis on increased production of food and fiber is a major challenge to agricultural researchers today. They are entrusted, now more than ever before, with the well-being of future generations. S. C. Experiment Station researchers are responding with research projects geared toward helping farmers, agribusiness and consumers to produce and receive better and more abundant goods and services.

Station scientists take an interdisciplinary approach to problem-solving in agriculture and related fields. They cooperate with other state and Federal agencies in sharing and disseminating information. The Station operates under state control with annual state appropriations supplemented by Federal appropriations. It has a counterpart in every state in the Union.

Ten departments are involved in work at the main Simpson Station at Clemson and the five branch stations over the State. Home economics research is conducted at Winthrop College. Branch stations include the Sandhill Station at Pontiac, the Pee Dee Station at Florence, the Edisto Station at Blackville, the Truck Station at Charleston and the Coast Station at Summerville.

Since its establishment at Clemson in 1889 under Federal laws (Morrill Act of 1862, Hatch Act of 1887 and subsequent acts), the S. C. Experiment Station has developed a program of basic and applied research that is meaningful to all residents of the State.

Highlights and Accomplishments

The following summary is meant to serve simply as a microcosm of the extensive research program of the S. C. Agricultural Experiment Station during the period July 1, 1975, to June 30, 1976. A few highlights and accomplishments are presented by each of the eleven subject matter departments and the branch stations.

Agricultural Economics and Rural Sociology

Better management and understanding in developing and using human and natural resources are the goals of agricultural economists and rural sociologists. They undertake research that relates to real problems South Carolinians face now and those they may meet in the future.

In farm management and marketing, emphasis is on least cost and/or most profitable systems of producing and marketing products. In resource and regional economics, emphasis is on costs and benefits associated with the use and location of resources such as land and water. The community is the focal point for research in rural sociology. Demographic, educational, attitudinal and leadership relationships are being reported for selected rural areas.

Agricultural economists were responsible for a Symposium on the Future of the Savannah River, providing a forum to fulfill important public education responsibilities. Another timely research report quantifying the costs and benefits of the proposed Richard B. Russell Dam received considerable public attention. A third water-related research effort provided information on municipal waste treatment plant user charges in South Carolina.

Researchers found that the State experienced in-migration in 1975 for the first time in several decades. They indicate that this is a trend the South Carolinians can expect to see continue.

Agricultural Engineering

Significant milestones have occurred this year in the mechanization of the harvest of apples, peaches, tomatoes, okra, tobacco and oysters. Machines for incorporating pesticides in the soil and for preparing seedbeds have also made advances.

In the area of waste disposal, scientists have been studying rates and application of spreading wastes on land areas, investigating possible pollution of groundwater from lagoons and assessing the potential for production of methane gas from farm waste.

Engineering researchers are looking at the effectiveness of practicing water table control on relatively flat land for both drainage and irrigation. They are also using systems engineering approaches to develop models for predicting plant growth and production under various environmental conditions. These are being investigated for the production of cotton and soybeans.

Modifications and research on future improvements in the station-developed tobacco harvester, now being sold commercially, were undertaken during the year. These included a commercially developed toppler and electrical sensing devices which were used with the harvester this year.

The first prototype model of an oyster harvester was completed and fieldtested several times in the coastal area of the State. The harvester performed well under all conditions. This is considered a potential boost for the oyster business in the State.

The over-the-row peach harvester was completely redesigned and rebuilt during the year. The unit was widened and mechanisms for collapsing the harvester for transport purposes were redesigned. Engineers are optimistic about its performance in the orchard and see it as a possibility for alleviating the drudgery of harvest time.

Animal Science

Swine and beef research emphasizes producing quality animals at the least cost. A limited program of horse nutrition research is also conducted.

To fulfill their research goals, scientists look for new ways to wean larger litters of pigs, finish hogs more efficiently, and produce a quality product for the consumer to buy. They have found that barley-roasted rations may be used successfully to replace standard corn-soybean rations for either growing or finishing pigs.

Beef cattle researchers work toward weaning a high percentage of the calves born and raising them on roughages, especially forages, to the maximum extent. In this way, they attempt to produce an acceptable carcass as economically as possible.

Roughages being fed include ensiled broiler litter, corrugated boxes, hay, corn silage and various pasture mixtures. Broiler litter

stored in an oxygen-limiting structure is being fed to steers at various levels. One year's preliminary research indicates that 30 per cent of the total ration can be fed as ensiled broiler litter.

To improve efficiency in fattening cattle, Rumensin, a commercial product, is being included in finishing cattle rations. After 140 days, the cattle on Rumensin were gaining approximately three-tenths of a pound faster than cattle without Rumensin. The feed required to produce 100 pounds of gain was reduced by about 13 per cent.

The following sire breeds are being used to see if total calf weaning weights can be increased: Angus, Polled Hereford, Charolais, Limousin, Maine Anjou, Chianina and Holstein. The steers from these various crosses are being finished for carcass evaluation.

Agronomy and Soils

Improving the production of field crops such as tobacco, soybeans, corn, small grains, cotton, forage grasses and legumes is the goal of agronomists. Researchers are interested in the best methods of weed control, development of new varieties and breeding lines, improved fertilization and cultural practices, and efficient management of pasture lands.

Research on chemical weed control in agronomic crops is statewide. Experimental and commercially available herbicides are being evaluated on different soil types using various application techniques, herbicide combinations and timing of treatments.

Excellent control of rhizome johnsongrass in corn has resulted from a soil-incorporated treatment with Eradicane at one and one-half times the normal rate for annual weed control. Herbicides that provide better control of cocklebur and other broadleaf weeds in soybeans are in developmental stages.

Developing improved cotton varieties suitable for South Carolina is a continuing effort. Breeders look for high yielding and superior fiber characteristics and try to incorporate resistance to prevalent disease and insects into promising lines.

Research on grazing systems, or combinations of pasture species, for cow-calf herds has been under way for several years at the Simpson Station at Clemson. An interdisciplinary program of research to determine the most productive and economical combinations of forages for Piedmont cow-calf herds has been developed.

Dairy Science

The future of the dairy industry depends on breeding, successful calving, rearing of calves and heifers, management of dry and lactating cows, and quality control of the subsequent product, milk. Within this broad scope, research investigations are being conducted to improve reproductive efficiency, to maximize animal response to various feeding programs, and to enhance the keeping qualities and consumer acceptance of milk and dairy products.

The rate of embryonic death for most mammals has been estimated to be 25 to 35 per cent. Animal and dairy science research at Clemson has shown the fertilization rate in beef cattle following natural service is approximately 95 per cent; yet the percentage of cows is at best 60 to 65 per cent. Most embryonic deaths occur during the first few days following mating.

Although several possibilities exist as reasons for embryonic deaths, one possibility is a malfunction with the embryo itself. Therefore, station scientists are growing embryos in the laboratory where they can be observed and studied. Using sheep and cow embryos, a system has been devised whereby the embryos can be grown from the one-cell stage to an equivalent of nine days in the uterus. The scientists are trying to determine, using this culture method, if certain embryos have abnormal chromosomes or abnormal metabolism.

Another experiment involves the production of colostrum milk, which is the milk produced by the cow during the first five days after calving. It has been known for many years that calves fed colostrum will be healthier and have greater daily gains than those fed whole milk. Methods for preserving the 200 pounds or more of colostrum produced by many cows are being studied.

Fermented colostrum seems to be an efficient and economically feasible possibility. Colostrum from the first six to eight milks after calving is fermented naturally for seven to 10 days. This material is diluted with water at the time of feeding.

Calves receiving the fermented colostrum mixture have shown significant benefits. Guidelines for use of the mixture are being formulated and may soon be distributed to South Carolina dairy-men.

Entomology and Economic Zoology

Insect pest management research has been given major emphasis in 1975-76. This comprehensive approach to insect control takes into account all control methods, the role of the pest itself, and the various interrelationships of the pest in the environment and with the crop.

A complex mix of methods for control may consist of two or more of the following: natural control agents, cultural methods, pest-specific diseases, augmentation of parasites and predators, resistant crop varieties, attractants, repellents and chemical pesticides.

Basic and applied research continues for most major crop and animal areas. New research has been initiated in the area of urban entomology.

Sex attractants of the peach tree borer and lesser peach tree borer have been tested, and the information will be used to time insecticide applications for more economical control. In addition, tests are being conducted to determine the use of sex attractants for control without insecticides.

Identifying the diseases of pest insects is a step toward a valuable means of control. Many insect diseases occur naturally each year and serve as regulating agents for pest species. For example, the fungus *Nomuraea rileyi* has been found to reduce populations of several soybean pests. Encouragement of the fungus will significantly reduce the insects.

Wildlife management research began this year. This involves management of quail for hunting.

Wetlands game research included an evaluation of the beaver problem in the State. Emphasis was set on management and utilization of beaver ponds by other wildlife.

The hard-shelled clam, a native to South Carolina estuaries, is being studied cooperatively with the S. C. Wildlife and Marine Resources Department with an eye toward the commercial possibilities of growing the clams. This study is part of the ultimate goal of increasing the productivity of our aquatic resources for food. Clam meat contains approximately 60 per cent protein (dry weight) with some of the highest yields recorded per unit for animal protein.

Food Science

Learning more about the ways food affects physical well-being is a part of food science research. Determining the effects of food processing chemicals on the human being and measuring the residues of hormones fed to animals in the tissue of other animals is of growing importance on a national scale.

Station researchers are trying to learn more about the effect a pregnant female's nutritional status has on the behavior and learning abilities of her offspring. They are looking at the effects of cholesterol and dietary fat intake and the incidence of heart disease; attempting to clarify the effects of prescription drugs, particularly oral contraceptives, on nutritional status; and observing the interplay of certain parasite infections and nutrients.

Other areas receiving special attention include the effect of light and chemical treatments on the ripening and quality of fruits and vegetables; the use of nitrates and nitrites in the curing of meat products; and the effect of selected treatments on the survival and growth rate of food poisoning bacteria.

Learning more and better uses for oilseed proteins in processed meat products and further development of the patented peanut flake process are other goals of station food scientists.

Concern has developed about the effect of oral contraceptives on a woman's nutritional well-being. Scientists have found that elevations occur in the level of packed red blood cell volume and hemoglobin. Serum iron, total iron binding capacity and copper levels are also elevated. Serum vitamin B₁₂ and folic acid concentrations were lower in users although none of the subjects studied were thought to be deficient.

These studies suggest that users of oral contraceptives should be advised of possible adverse effects and should take necessary steps to insure adequate nutrient intake.

Home Economics

Home economists at Winthrop College have conducted textile studies on the wearability of girls' nightgowns and durability of flame retardant finishes. A project relating consumer acceptance of carpets to laboratory evaluation has been completed this year.

In the area of family and child development, researchers are examining the types of child care available in 12 small North and

South Carolina towns. They are evaluating the degree of satisfaction from the mother's viewpoint; the need for additional child care services and the types preferred; and the use to which released time would be put if such facilities were available. Between 500 and 600 mothers have been interviewed.

The educational and occupational hopes and expectations of youth from 12 to 18 years of age is a continuing study. Fairfield County students have been questioned at various stages of their elementary and high school years. This study is part of a seven-state regional project. A meeting of the representatives from the states met in fall 1976 to compare data.

Horticulture

Horticultural researchers look for better methods of producing fruits, vegetables, ornamentals and turfgrasses.

Fruit research with peaches, apples, grapes, pears and plums is designed to improve cultural and management practices. Breeding programs with peaches and grapes are yielding promising lines which will be released soon.

Two peach varieties, Camden and McNeely, were made available to growers this year and have been well-received. Other promising experimental lines, including a lemon-colored cling, fruited during the year and exhibited very good qualities.

Projects aimed at helping growers combat peach tree short life are extensive and include breeding, high density plantings, and evaluation studies.

Vegetable researchers direct their efforts toward production problems such as weed control, fertilization and varietal evaluation. The plug-mix vegetable planting technique was introduced to South Carolina growers and is being used successfully by commercial growers of processing and fall tomatoes.

Ornamental research included evaluation of woody ornamental plant material, physiological studies of plant growth regulators and production problems associated with floricultural crops.

Three years of lawngrass research have indicated that several bluegrasses will provide excellent year-round turf in the Piedmont section of the State. Of the cultivars evaluated, Adelphi, Baron and Vantage have proved most acceptable. The improved perennial ryegrass cultivars have consistently provided the best quality overseedings on dormant turf.

Plant Pathology

Scientists study plant diseases in order to learn ways to control them. This year plant pathologists have made progress in several areas.

In the past few years, researchers have learned that foliage diseases of pecans play a major role in early fall tree defoliation, reduction of the crop the following year, and alternate year bearing.

South Carolina researchers have identified the parts of this disease complex and have determined the relative effectiveness of several important fungicides. Based on station research, pecan growers have been advised to begin their spray programs earlier and continue them longer than has been recommended in the past.

Tobacco black shank disease has become widespread in recent years as the fungus which causes it spreads from farm to farm on plants, machinery or in infested soil. Station breeders have released tobacco varieties resistant to the disease, and the chemical industry has developed fungicidal chemicals for its control. The combination remedy of soil chemicals and resistant varieties has resulted in good yields of tobacco, even in highly infested soil.

In their search for resistance to lance nematode attacks in soybeans, breeders have found two cultivars with some degree of tolerance. These cultivars may be used as parental stock for developing adapted tolerant cultivars.

Adding copper sulfate to apple tree sites before the trees are set shows promise for controlling root rot of apples. The economic value of pre-plant and post-plant fumigation of peach tree soils has been clearly demonstrated by yields in the fifth year of growth.

While attempting to find ways to reduce field corn losses from production of aflatoxin in the ear prior to harvest, researchers found there is a high correlation between aflatoxin production and insect damage to the ear. They found that corn hybrids vary significantly in the amount of aflatoxin produced after they are invaded by fungi.

Poultry Science

Research emphasizes solving current problems in the commercial egg, broiler and turkey industries with limited attention to needs of hobby poultrymen and rabbit producers.

Continuing study of the effect of environment on reproduction of turkeys promises to reduce the cost of producing turkey hatching

eggs. Conventional production of toms is a costly venture as birds are fed to seven or eight months of age before semen can be collected for artificial insemination. Research shows that by using controlled light, toms can be brought into semen production at four or five months of age with at least as good performance as by conventional methods. This results in considerable savings in feed and permits use of toms that are lighter in weight and easier to handle for semen collection.

A one year study on energy conservation in production of commercial eggs in enclosed houses has been completed. Many new poultry houses are windowless and stimulatory light is provided by incandescent bulbs. The usual procedure is to provide 14 hours of continuous light during each day. Research with six, eight and 12 hours of light provided in two-hour segments through the day suggests six hours of light is sufficient when properly spaced. This results in a 57 per cent reduction in energy consumption for lights. (Unfortunately, lights account for a relatively small portion of the energy consumed in totally enclosed poultry houses.) A side benefit from the short light periods scattered throughout the day was improved egg shell quality, which is an important consideration in minimizing breakage.

Edisto Station

Soybean research received major emphasis during 1975-76. Progress was made in developing soybean lines with resistance to multiple insect pests such as the Mexican bean beetle, soybean looper, velvetbean caterpillar and Southern green stink bug. A cultivar from a USDA line which has resistance to both root knot nematodes affecting soybeans is being considered for release soon.

Under a cooperative sweet potato breeding program with the USDA's Southeastern Vegetable Breeding Laboratory at Charleston, 15,000 seedlings a year are being evaluated in five categories. The top 30 lines are retained for further evaluation and others are discarded.

Forage research also receives strong emphasis at Edisto. Data collected show that unsheltered storage of the large round bales of Coastal bermudagrass hay may not be economically feasible. Losses in nutritive value are substantially greater in field-stored hay compared to sheltered hay, as shown by a study conducted by station researchers.

Various annual plants, sorghums and small grain are being tested in small plots for their potential in silage production.

Efforts were made to encourage various groups to tour the Station this year. Several groups, including students from the Blackville, Williston and Denmark schools, South Carolina growers, and a group of 45 corn growers from Georgia, took advantage of this opportunity.

Sandhill Station

The major peach research in the station's overall program is done at the Sandhill Station. Horticulturists at Sandhill also work cooperatively with other station professionals in the areas of fruit, pecan and vegetable research.

For several years, South Carolina researchers and growers have recognized a need for improving the quality and reliability of peach nursery stock. In response to this need, certification standards have been drawn for South Carolina, and an initial planting of 170 trees was made in 1975 containing 25 cultivars. Additional cultivars will be added as they become available. These trees will provide virus-free, true-to-name buds and seeds for commercial nurseries.

Pecan plantings at Sandhill were increased this year. Evaluation of 48 herbicide systems on young trees was completed. There was an increase in the acreage of pecans being rejuvenated.

Vegetable research included nutrition experiments particularly relevant to the sandy soils of the Sandhill section of the State; cultural practices compatible with mechanical harvesting of tomatoes; and evaluations of new crops such as the Jerusalem artichoke, bulbing onions, irish potatoes and processing tomatoes.

Pee Dee Station

The Pee Dee branch of the S. C. Agricultural Experiment Station lies in the heart of the tobacco belt. Much work is done by researchers here on culture, management and mechanization of this crop.

Testing of a commercial tobacco topper which was modified and mounted on the Clemson Once-Over Tobacco Harvester took place at the Station this year. This topper demonstrated that it is possible to remove suckers, seed heads and other foreign material from the top of the plant during harvesting. Electrical devices for sensing

and indicating the location of the tobacco stalk were also mounted on the harvester. Preliminary observations indicate these aids will make it possible for a less skilled driver to operate the harvester successfully.

The southern corn billbug is the most destructive insect pest of corn in the State. Planting-time applications of Furadan have been shown by station researchers to provide good control in mineral soils. (In high-organic soils, post-emergence applications of liquid Furadan are effective against this insect but liquid Furadan has not yet been cleared for this use).

Truck Station

Researchers at the Charleston Truck Station center their investigations around a systemized approach to commercial vegetable production in the State.

Maximization of the use of resources comes with cooperative work with scientists at the USDA Southeastern Vegetable Breeding Laboratory, which is located next door.

New cultural procedures for growing tomatoes have been developed with other researchers. These include the use of black plastic mulch, short stakes and trickle irrigation.

Test plantings of tea have been made at selected inland sites on varying types of soil. Rice production has been re-examined with the ideas of using rice as a summer cover crop after vegetables; bringing former rice land back into production; expanding usage of marginal cropland; and broadening the state's base of diversified agriculture.

An urban research and demonstration garden has been established at the Charleston station. It includes a home vegetable garden, lawn grass test plots, an arboretum, and ornamental plantings in both sun and shade. An open house was held in June 1976 to coincide with the completion of the demonstration areas. It was considered highly successful, attracting several hundred visitors and helping the Station to better serve its increasingly urban clientele.

**Funds for the Experiment Station Other Than Those From
Federal Sources**

Classification of Expenditures and Receipts for 1975-76

	<i>State Appropriation and Operating Revenue</i>	
Classified Positions	\$	1,915,670
Faculty and Staff		1,760,060
Graduate Assistants		202,725
Students and Other Temporary Help		247,124
Travel		79,977
Contractual Services		452,426
Postage, Supplies and Materials		829,004
Rents and Fixed Charges		255,393
Equipment		323,633
Permanent Improvements		6,995
Expenditures	\$	6,073,007
Receipts from State Treasurer (Regular Appropriation)		4,817,047
Operating Revenue Receipts		944,616
Unexpended Balance Brought Forward from Previous Year		454,137
Balance Forward	\$	142,793

Federal Funds

South Carolina Agricultural Experiment Station 1975-76

	<i>Hatch</i>	<i>Regional Research Funds</i>
Classified Positions	\$ 361,160	\$ 52,991
Faculty and Staff	527,269	123,884
Graduate Assistants	61,729	645
Students and Temporary Help	45,985	18,990
Health Insurance	12,973	2,437
Travel	23,633	4,996
Contractual Services	67,902	8,666
Postage, Supplies and Materials	204,063	57,211
Rents and Fixed Charges	6,057	4,358
Equipment	36,479	20,814
Expenditures	\$ 1,347,250	\$ 294,992
Receipts for the Year from the Treasurer of the United States	\$ 1,347,250	\$ 294,992

Active Research Projects, 1975-76

Agricultural Economics and Rural Sociology

- Economic appraisal of potential technological and institutional changes in South Carolina agriculture.
- Market and production potential for South Carolina ornamental crops.
- Systems analysis of the vegetable subsector of the food industry of the South.
- Contract marketing of cotton.
- An economic analysis of adjustments in rural human resources as new technology is adapted.
- The economic and social effects of farm resource transfers out of the dairy industry in South Carolina.
- Analysis of opportunities to develop rural tidelands industries through improved financial management.
- Economic analysis of harvesting, handling and storing hay.
- An extension community resource development process: analysis and evaluation.
- Feed mill costs and returns in South Carolina.
- Implications of alternative Federal energy policies on South Carolina economy, with emphasis on agriculture.
- Consumer preference for beef cuts with varying degrees of marbling.
- Local factors affecting industrial plant location in rural communities of the South Carolina Coastal Plains.
- Marketing performance of selected milk pricing systems for the Southern region.
- Career orientation of college students in agriculture and home economics.
- Development and operation of an information filter center to aid in marketing.
- Evaluation of the beef production industry in the South.
- Providing basic agricultural marketing information for program and facility planning.
- Economic evaluation of alternative forms of vertical coordination in the livestock-meat industry.
- Predicted effects of selected policy and technology changes in the grain marketing system.
- Analysis of demographic data for the human resources of South Carolina.

- Development of human resource potential of rural youth in the South and their patterns of mobility.
- Effects of selected changes in the real property tax system on land use and tax revenues in South Carolina.
- Economic and sociological aspects of comprehensive land-use planning in South Carolina.

Agricultural Engineering

- Soil-water management decision making.
- Methods and equipment for optimum herbicide placement.
- Crop mechanization.
- Animal waste treatment and recycling systems.
- Root zone water management systems.
- Physical properties of fruits and vegetables relating to automatic sorting.
- Farm and gin community evaluations of machinery complements for harvesting and hauling seed cotton.
- Storage of baled coastal bermudagrass hay.
- Engineering systems for cotton production.
- Quality housing environment for low income families.
- Poultry farm waste management.
- Development and evaluation of mechanized production systems for fresh market peaches.
- Simulation of processes in the rhizosphere.
- Development and evaluation of oyster harvesting equipment and mariculture systems.
- Nutrient management of poultry waste with biological treatment processes.
- Decision making in crop water management.
- Mechanization of tobacco harvesting and curing systems.
- Utilization of cattle feedlot waste through land application.
- Soil and environmental factors affecting longevity and productivity of peach trees.
- Methods and equipment for optimum herbicide placement.
- Soybean production and management simulation models.
- Development of hydrologic/water quality models for agriculture and forestry.
- Hydrology of Piedmont agricultural watersheds.
- Feasibility of mechanizing the production of vegetables for fresh market and processing.
- Mechanization of okra harvesting.

Dairy farm waste-management characterization and disposal.
Dynamic modeling of weed control in cotton production.

Agronomy and Soils

Orchardgrass improvement.
Adaptation of perennial forage grass species.
Sulfur supply of air, rainwater and soil as related to agronomic and horticultural crop needs.
Adaptation and breeding of a cool-season forage grass species.
Plant analysis for complementing soil tests in evaluation of nutrient availability.
Weed control in permanent pastures and other forage crops in South Carolina.
Interaction of representative pesticides with dominant South Carolina soils and model soils.
Soil biological factors affecting nitrogen fixation by leguminous and nonleguminous associations.
Hybrid corn breeding.
Selection for heat-drought tolerance in agronomic crops and treatments to induce tolerances in white clover.
Sorghums for silage production.
Hybrids for supplementary summer pastures.
Soil-water and plant-water relations in soybeans as related to root growth.
Soil biophysical factors affecting soybean root growth, nitrogen fixation and yields.
Cytogenetic studies of white clover and related species.
Tobacco production.
Tobacco breeding and genetics.
Breeding fiber quality in cotton.
Mechanization of tobacco.
Surfactant's influence on herbicide effectiveness.
Cotton breeding.
Small grain breeding.
Soybean breeding.
Tobacco breeding and genetics.
Permanent pastures, with and without interseeded species, for beef cow-calf production.
Evaluation of selected varieties and advanced experimental strains of cotton.

- Evaluation of corn hybrids and advanced breeding lines.
- Evaluation of selected varieties and advanced experimental strains of soybeans.
- Evaluation of varieties and experimental strains of wheat, oats, barley and rye.
- Cytology of trifolium species in the section *Amoria* (Ascherson and Graebner).
- Minimum tillage and no tillage in production of corn and soybeans.
- Evaluation of the micronutrient status of soils and plant response to added micronutrients.
- South Carolina soybean yields as influenced by row spacing.
- Soil behavior under different levels of management and use.
- Herbicide movement for application sites and effects on nontarget species.
- Evaluation of new fertilizers as sources of plant nutrients for South Carolina crops.
- Evaluation of selected grain sorghum hybrids.
- Diagnosis and correction of zinc problems in corn and rice production.
- Development of weed control practices in corn, cotton and soybeans.
- Fertilizers and organic wastes applied to soils in relation to environmental quality.
- Animal Science*
- Protein and energy studies with early weaned pigs.
- Litter size as affected by nutrition and exogenous hormones (swine).
- Diets for artificially reared pigs.
- Control of estrus and parturition in the bovine using prostaglandin F_{2a}.
- Corn silage, additives and high or low moisture grains in beef cattle systems.
- Ration alternatives using cooked soybeans for growing-finishing swine.
- Genotypic and phenotypic response of crossbred cattle under different levels of management.
- Factors influencing nitrogen utilization in the equine.
- Comparison of methods of measuring composition in the live animal.
- Factors responsible for tenderness variations in meat.

Dairy Science

- Accuracy of milk production estimates by the use of the AM-PM method.
- The role of antibiotic therapy in the production of normal milk.
- Innovative materials handling for packaging and distributing milk.
- Ensiled complete rations for lactating cattle.
- Waste disposal management in the dairy industry and its relation to surface water quality.
- Feeding value of fermented colostrum for preruminant calves.
- The role of energy compounds and hormones in regulating lipid metabolism in ruminants.
- Effect of age and quality of raw milk on the shelf-life of the processed fluid product.
- Sex steroids and their relationship to fertility in bovine female.
- Role of methionine and sulfur in rations containing urea when fed to ruminants.
- Flavor quality and milk consumption.
- Improving reproduction efficiency in South Carolina dairy herds.
- Management factors and decisions that are different between high and low producing dairy herds as related to udder health.

Entomology and Economic Zoology

- Wildlife management research.
- Alfalfa insect pest management.
- Animal waste treatment and recycling systems.
- Bionomics and control of the pecan weevil.
- Insect pest management.
- Effect of infection by *Eimeria spp.* upon intestinal absorption of carbohydrates in chicks.
- Development and evaluation of insect resistant soybean cultivars.
- Development of pathogens for use in a pest management system for soybean insects.
- Biology, ecology and control of Simuliidae in South Carolina.
- Investigations of Leucocytozoonosis in poultry in South Carolina.
- Bionomics and control of insects in cotton.
- Southern pine beetle management.
- Distribution and biology of parasites in domestic animals.
- Insects as hosts and vectors of viruses.
- Biology, ecology and management of peach insects.
- Ectoparasites of poultry and synanthropic flies associated with poultry and livestock, their biology and control.

Culture of warm-water fish.

Studies of the economically important species: *Mercenaria mercenaria* and *Macrobrachium rosenbergii*.

Pathological relationships between insects and biological control agents.

An integrated system for the suppression of the boll weevil.

Control tactics and management systems for arthropod pests of soybeans.

Boll weevil investigations.

Tobacco insect investigations.

Insects on corn and miscellaneous field crops.

Bionomics of insects of forest trees and wood products in South Carolina.

Evaluation of selected anti-fertility compounds on certain species of insects.

Biology and control of insects affecting man and animals.

Control of arthropods on apples.

Control of vegetable insects in the Piedmont of South Carolina.

Biology and control of insects attacking ornamental plants.

Biology and control of arthropods on soybeans.

Identification and distribution of insects of economic importance in South Carolina.

Pond culture of warm-water fish.

Catfish breeding, production and marketing.

Food Science

Growth of and toxin production of *Clostridium perfringens* in food.

Pectin as an appetite depressant.

Oral contraceptives and nutritional status.

Composition, nutritive value and stability of poultry meat and egg products.

Quality of dried sausages.

Microbial injury and food quality.

Factors influencing nutrient absorption.

Relation of nutrition to porcine stress syndrome.

Zinc and cadmium status of children and adolescents in South Carolina.

Amino acid composition and protein quality of corn.

Influence of pectic changes on texture of vegetative tissue.

Zinc metabolism in poultry.

Utilization of oilseed materials as human food.

Effect of light on postharvest fruit.
Utilization of dietary fats from various sources.
Intestinal parasitism and nutrient absorption in poultry.
Behavior of offspring as influenced by nutritional aberration and ethanol.
Quality of bound poultry and red meat products.
Broiler carcass character and processing quality.

Home Economics

Patterns of food intake and nutritional health of girls.
Investigation of consumer acceptance of flame retardant infant's sleepwear.
Comparison of consumer and laboratory evaluation of carpets.
Needs for child care and potential for rural family and community development.
A model system to determine the role of molecular sizes of carbohydrates on mouth sensations.
Effects of laundering temperature and agitation speed on fire resistant finishes.
Influences on occupational goals of young people.

Horticulture

Relationship of fruit characteristics and quality to location and environmental factors.
Cultural management of centipede grass.
Cultural and management practices for peaches and small fruits.
Therapeutic, physical, psychological and rehabilitated responses to certain aspects of horticulture.
Use of chemical preservatives in extending the vase life of cut snapdragons.
Detection and evaluation of plant growth-environment relationships.
Physiological study of plant growth regulators on woody ornamental plants.
Breeding edible Southern peas.
Growth regulators in peach production.
Mineral nutrition of peaches and grapes.
New or special crops.
Cultural and management practices for pecans.
Development and evaluation of rootstocks for peach.
Breeding bunch grapes for the Southeast.

Influence of environmental factors and chemical growth regulators on growth and development of floricultural crops.
Evaluation of woody ornamental plant material with respect to variety, production, propagation and marketing techniques.
Factors affecting the purchase and use of sweet potatoes.
Cultural studies and functional uses of woody ornamental landscape plants.
Uses of seaweed and other organic materials in economically important horticultural crops.
Delayed ripening and senescence in peaches and other fruits.
Establishment and maintenance of scionwood and seed increase blocks for peach tree certification.
Vegetable culture.
Coastal lawn grasses, fruits and ornamentals.
Evaluation, improvement, horticultural crops and varieties.
Nutrition, management, horticultural crops and varieties.
Development of plum varieties for coastal plains.
Improving cultural and management practices for tree and small fruits.
Evaluation of fruit varieties and rootstocks.
Vegetable variety testing and improvement.
Disease resistant cantaloupe varieties.
Quality maintenance of mechanically harvested horticultural crops for fresh market.
Plant growth regulators on physiological changes.
Influence of post-harvest treatments on quality and shelf life of horticultural crops.
Processing fruits and vegetables.
Evaluation and improvement of flowering plants with relation to variety and productive techniques.
Development of weed control practices for vegetable crops.
Growth, yield, fruit quality of pears, commercial cultural practices.
Identification and behavior of the pigments which cause discoloration in canned peaches.
Development, production, management of turfgrasses.
Peach breeding.
Sweet potato breeding.
New equipment and techniques to handle, package, transport and store peaches.
Apple production.
Evaluation of vegetable varieties and cultural practices.

Plant Pathology and Physiology

Integrated plant disease control and farming systems with field and vegetable crops.

Etiology, epidemiology and control of pecan diseases.

Bacterial canker and other factors associated with peach tree short life.

Tobacco production.

Hoploaimus columbus (lance nematode): population management, crop damage and control.

Peach tree short life: a physiological approach.

Ecology and control of fusiform rust on Southern pines.

Disease control on vegetables.

Nature and extent of variation in rootknot and cyst nematodes.

Epidemiology of the *Aspergillus flavus* group of fungi and control of aflatoxin in corn.

Tobacco disease control in South Carolina.

Rhizosphere ecology as related to plant health and vigor.

Seed and seedling diseases of cotton and their control.

Diseases of soybean and their control.

Causes and control of diseases of ornamental crops.

Physiological and biochemical mechanism of herbicidal action.

Development of integrated fruit disease control programs in South Carolina.

Biological determination of performance for planting seed.

White clover pathology, virus and other diseases.

Diseases of cantaloupes and watermelons and their control.

Viruses and mycoplasma-like organisms causing diseases of corn and sorghum.

Cause and control of diseases of shade and ornamental trees.

Poultry Science

Effects of Polychlorinated-bi phenyls (PCB) in poultry diets.

Artificial insemination and fertility studies with caged breeder chicks.

Recycling of turkey litter into ruminant diets.

Reproduction characteristics and nutritional requirements of minor poultry groups.

Marketing potential of white leghorn cockerels and other minor poultry groups.

Rabbit Coccidiosis and nutrition.

In Vitro cultivation of the chick embryo.

Improvement of egg shell quality through nutrition and management.

Improving production efficiency of meat type poultry.

Immunological response in turkeys vaccinated against fowl cholera.

Turkey reproduction-physiological, nutritional and environmental interactions.

Biology and control of poultry coccidia using *In Vitro* methods.

Transmission, pathology and control of Leucocytozoon disease in turkeys.

Photoperiods for layers.

Effects of environment on reproduction of chickens and turkeys.

Experiment Station Publications, 1975-76

Bulletins

SB 584—Inspection and Analysis of Commercial Fertilizers in South Carolina. H. V. Rogers.

SB 585—Comparative Economic Analysis of Alternative Flue-Cured Tobacco Harvesting Systems. C. Stassen Thompson, Johnny W. Jordan and Raleigh O. Ward.

SB 586—Wintering Cows on Natural and Synthetic Protein Supplements. J. N. Williams II and R. F. Wheeler.

SB 587—Farming in the Upper Coastal Plain of South Carolina and Georgia. Charles P. Butler.

SB 588—The Probabilities of Spring and Fall Freezing Temperatures in South Carolina. Alex J. Kish.

SB 589—Low-Profile Once-Over Harvested Tobacco as Affected by Selected Cultural Practices. R. E. Currin III and John B. Pitner.

SB 590—A Computer Simulation Model for Populations of Mexican Bean Beetles on Soybeans. V. H. Waddill, B. M. Shepard, J. R. Lambert, G. R. Carner and D. N. Baker.

SB 591—Limiting Agronomic Factors in Corn Production. T. C. Peele and R. F. Suman.

Circulars

SC 174—Comparisons Among Beef Carcass Grades, Loineye Marbling and Palatability Scores. G. C. Skelly, N. J. Van Dyke, R. L. Edwards and E. J. Evans.

SC 173—Field Drying, Storage and Feeding of Coastal Bermudagrass. William A. Balk.

SC 172—Performance of Field Crops Varieties in South Carolina, 1975. E. B. Eskew.

Research Series

Agricultural Economics and Rural Sociology

- 385—South Carolina Cash Receipts from Farm Marketings. Roger M. Foster.
- 386—Estimating Costs of Rural Water Systems. D. L. McLemore and R. E. McCormick.
- 387—S. C. Crop Statistics State and County Data, 1974 Revised, 1975 Preliminary. Roger M. Foster.
- 388—S. C. Livestock and Poultry Statistics. Roger M. Foster.
- 389—Fruit Survey. Roger M. Foster.
- 390—Selected Vegetables Budgets, S. C. 1976. D. B. Smith, G. A. King and D. O. Ezell.
- 391—A Bibliography of Rural Development: Listings by Topic. Carrie Parker, H. W. Ladewig and E. L. McLean.
- 392—Reference Tables: Net Migration 1960-1970, by Age, Sex and Race for S. C. Counties. E. L. McLean.

Agricultural Engineering

- 19—Simulation of Grass Growth, Water Movement and Soil Temperature Over High Water Table. Wenanty Olszta.
- 20—A Portable Tomato Sizer. Larry E. Watts and C. E. Hood.

Agronomy and Soils

- 95—Growing Cool Season Annuals in Association with Coastal Bermudagrass in the Upper Coastal Plain of South Carolina. L. R. Allen.
- 96—Progress Report on Grazing Systems Research. B. C. Morton and M. W. Jutras.

Animal Science

- 30—Beef Cattle Research Highlights. R. F. Wheeler.
- 31—Swine Field Day. Dale L. Handlin, J. C. McConnell, Jr., G. C. Skelley, D. M. Hendricks and Gerald L. Morris.

Dairy Science

- 64—Management Factors and Decisions that Are Different Between High and Low Producing Dairy Herds as Related to Udder Health. W. L. Northern, G. W. Brandt and W. E. Johnston.

- 65—Effect of the Level of Milk Production on AFM₁ Excretion Rate in the Dairy Cow. A. B. Bodine, G. D. O'Dell and J. J. Janzen.

Horticulture

- 158—Effects of Ascophyllum Nodosum Extracts and Meal on Insect and Mite Populations and Plant Quality of Several Plants in the Greenhouse. A. R. Kingman and J. A. Lewis III.
- 159—Flowering Annuals, Variety Trials—1974. A. J. Pertuit, Jr., J. H. Crawford, S. N. Fox and D. A. Ferguson.
- 160—Weed Control Investigations with Vegetable Crops in 1975. W. L. Ogle and J. P. Gilreath.
- 162—A Report of Seaweed Research 1974-75. T. L. Senn and A. R. Kingman.
- 163—A Report of Erth-Rite Research 1974-75. T. L. Senn and A. R. Kingman.
- 164—A Report of Ferma-Lizer Research 1974-75. T. L. Senn and A. R. Kingman.
- 165—A Report of Humate Research 1974-75. T. L. Senn and A. R. Kingman.
- 166—Influence of Soil Application of Insecticides and Nematicides on Insect Injury and Yield of Sweet Potatoes. Max G. Hamilton and Randall P. Griffith.
- 167—Herbicide Studies with Sweet Corn, Watermelons and Sweet Potatoes during 1975. Max G. Hamilton.
- 168—Hortitherapy Van—Design, Equipment and Use. Phyllis Gilreath and Adele Olson.
- 169—A Mocup Rate Formulation and Time of Application Study with Sweet Potatoes. Max G. Hamilton.

Poultry Science

- 34—The effect of Feeding Mash vs. Pellets on Pigeon Body Weight, Feed Consumption and Squab Production. J. E. Jones and J. B. Cooper.
- 35—Prepotency for Males in One Strain of White Plymouth Rocks. B. L. Hughes and M. A. Boone.

Technical Bulletins

- TB 1054—Distribution of Black Fly Vectors of Leucocytozoon smithi of Turkeys in the Sandhills and Coastal Plains of South Carolina. David C. Arnold and Raymond Noblet.

- TB 1055—Migration Into and Out of South Carolina. Thales Parker and Edward L. McLean.
- TB 1056—Investigations on Black Flies in Chesterfield County, South Carolina, an Area Equizootic for *Leucocytozoon smithi* of Turkeys. Glen I. Garris and Raymond Noblet.
- TB 1057—Identification of the Immature Black Flies (Diptera: Simuliidae) of the Southeastern U. S., with Some Aspects of the Adult Role in Transmission of *Leucocytozoon smithi* to Turkeys. Edward L. Snoddy and Raymond Noblet.

Miscellaneous

- South Carolina Agricultural Experiment Station Publication: An Index, 1975. Patricia W. Branham.
 Edisto Experiment Station.
 Truck Experiment Station.
 A Better Future Through Research.
 Pee Dee Experiment Station.
 Sandhill Experiment Station.

Technical Contributions

July 1, 1975-June 30, 1976

- 1281—Distribution of Insects in Soybean Fields. Merle Shepard and G. R. Carner.
- 1282—Estrogen Concentrations in Bovine and Porcine Tissues. D. M. Hendricks.
- 1283—Light Intensity and Housing for Pigeons. J. B. Cooper.
- 1284—Adenovirus Respiratory Infection in Turkey Poults. H. G. Blalock, D. G. Simmons, K. E. Muse, J. C. Gray and W. T. Derieux.
- 1285—Compositions of Some Commercial Dry Sausages. J. C. Acton and R. L. Dick.
- 1286—Predatory Activity, Reproductive Potential and Longevity of *Geocoris* spp. Affected by Insecticides. J. T. Walker and S. G. Turnipseed.
- 1287—A Two-Dimensional Shaker for Harvesting Fresh Market Tomatoes. C. E. Hood, Yekutiel Alper and B. K. Webb.
- 1288—Observations on the Biology of the Grape Root Borer, *Vitacea polistiformis* in South Carolina. T. E. Skelton and Toney Boozer.

- 1289—Pathogenicity and Histopathology of *Hoplolaimus columbus* Infection on Cotton and Soybeans. Stephen A. Lewis, F. H. Smith and W. M. Powell.
- 1290—Soil Fumigation and Peach Rootstocks for Protection Against Peach Tree Short Life. Eldon I. Zehr, R. Walker Miller and F. H. Smith.
- None—Studies on Two Factors Influencing the Fermentation of *Camellia sansanqua* Seedlings. L. W. Baxter, Jr., Wesley Witcher, Mary Owen and Jim Jackson.
- 1291—Soybean Cyst Nematode Survey in South Carolina. J. D. Arnett, Jr.
- 1292—Effect of Some Freezing Treatments on the Properties of Poultry Meal Loaves. J. C. Acton and J. E. Keller.
- 1293—Seasonal Abundance and Activity of Indigenous Hymenopterous Parasitoids Attacking the House Fly. J. R. Ables and M. Shepard.
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COOPERATIVE EXTENSION SERVICE

Wayne T. O'Dell, Director

The Cooperative Extension Service is Clemson University's outreach educational program for the people of South Carolina.

Funded on a joint federal-state basis, it was established as a part of the nationwide system in the early 1900's in recognition of a need for trained field workers to carry education to the people.

This program enables Clemson University through its Extension Service to maintain an outreach office in each county seat of South Carolina, staffed by county agent personnel and extension home economists. The nerve center for this "off-campus" faculty is the university. There a professional staff of extension subject matter specialists compiles information through research results, translating this into usable data for the people of South Carolina.

From the practical standpoint, this means a pipeline of information is continually going out to the individual counties and their residents.

In agriculture, the soybean producer, the cotton farmer, the beef cattleman, the dairy operator—producers of all commodities and products—are being constantly updated on ways to combat problems, increase production, or help control expenses.

It's the same for the homemakers and youth. Through the county extension home economists and the Clemson specialist staff, homemakers are counseled on new developments in the food field, invited to sewing classes, organized into groups for weight control, given guidelines for budget-making, and helped on any of a hundred other fronts dealing with modern homemaking and family living.

Extension's unique 4-H program offers the same broad programs for youth development, challenging them to progress along the realistic road of personal achievement through doing.

Extension began as an organization to help rural people, but in fulfilling its commitments—based on needs and demands of the public—it has had to expand to include many problems of urban and suburban areas. This expansion was brought about largely by a changing social structure, the economics of modern living, rapid expansion of communication and transportation systems.

Today, as rural and urban areas of South Carolina merge in a common main street of the State, people everywhere face about the same problems and have similar hopes and aspirations.

The Clemson University Cooperative Extension Service joins with these people in the development of educational programs which people themselves feel will help them increase incomes and maintain levels of living in communities where they live. Today's extension staff members are at home in any classroom, be it tobacco field, dairy barn, homemaker's kitchen or agribusiness office.

The total effort of Extension is organized into six broad program areas in order to intensify assistance and gain greatest utilization of special skills. These areas cover: agricultural programs, 4-H and youth development; home economics; community and resource development; special programs; and 1890 programs.

Agricultural Programs

Scope of Activity

The relentless pressures continue for South Carolina's farm producers. Uncertainty in the marketplace, acceleration of input costs, rising capital needs, and capricious weather conditions are among formidable factors facing this vital segment of the economy.

But even as numbers of producers decline, those surviving are expanding operations and acreage. This is a must for increasing per-unit production and getting the maximum utilization of costly mechanized equipment. The fields get wider. Machines get bigger and more expensive.

The demanding situation brings new challenges and opportunities for agricultural programs of the Clemson University Cooperative Extension Service. Extension continues to respond. A staff of subject-matter specialists at the University works through personnel in the 46 county extension offices to provide farm producers with needed expertise to meet a rising wave of problems.

Together, Extension and agriculture are moving forward.

This basic industry, through its production, marketing and processing, continues to be a major employer of people, and a dominant force in South Carolina's economy. Despite the intensity of problems and pressures, agriculture is producing more than ever. Marketings from crops and livestock in the State are now at the \$1 billion mark for a single year.

And not only does Extension provide technological information and guidance for farm producers and the general agribusiness industry in the State, increasingly, information is being developed and disseminated for urban interests.

Home gardening has become a major pasttime; horticultural specialists, those in other disciplines, and county extension personnel are hard pressed to respond to the avalanche of requests for help on this front. The same is true in housing needs, in forestry management, and in other allied fields.

To meet these demands, extension forces are organized to provide information to all segments of the population wherever possible.

Expertise is concentrated in the disciplines of economics; agronomy and soils; animal science; dairy science; forestry; food science; horticulture; poultry science; agricultural engineering; pathology; and entomology and economic zoology. Wherever necessary, personnel from these divisions utilize a team approach in applying multiple skills to assist the people of South Carolina with problems.

These are some of the highlights of their activities for the year.

Agricultural Engineering

Energy continues to be an all-important topic in efficient production of crops and livestock. Much of the emphasis in extension agricultural engineering has been placed on helping producers conserve energy, keep down expenses and improve yields.

One activity of the year was a South Carolina Energy Conservation Conference in Florence, in which agricultural engineers participated.

Another meaningful program for producers relating to equipment and energy use was Electro Ag '76, a farm material handling show in Columbia. This department had an important role in recruiting exhibitors; and approximately 45 firms from all over the United States displayed latest equipment for handling farm materials.

In cooperation with agricultural economic and marketing specialists, extension agricultural engineers designed a large grain elevator to be erected in Aiken by business interests. The area has not had suitable outlets for grain, and the new facility is expected to be a significant addition to producers seeking marketing facilities for grain and other seed crops.

A hay day was held to demonstrate latest techniques in this vital production area. Machinery manufacturers demonstrated equipment for cutting, raking, stacking, transporting and storing bales weighing 1,200 to 1,500 pounds. The new levels of labor-saving equipment have renewed farmer interest in hay production in South Carolina.

Extension agricultural engineers also participated in four soybean clinics, and helped other disciplines conduct a series of statewide closed television workshops on corn and soybean production, harvesting, drying and marketing technology.

In the fall of 1975 and spring of 1976, personnel participated with herbicide manufacturing representatives and equipment dealers in three regional soil incorporation field days. Techniques were shown for minimizing weed problems with proper equipment and methods. More than 400 people attended.

The Sumter Demonstration Project continues to serve as a bridge between research demonstrations and field production.

Growers may visit the area near Sumter for first-hand views of ways new technology is working. An intensive irrigation and fertilization project is among new demonstrations there. It's scheduled to be carried out over several years.

Assistance in residential housing is a growing responsibility in the engineering area. Moisture control, a common problem in housing, is receiving emphasis. So is insulation, vital to energy consumption. In remodeling work, over 50 homeowners have received direct assistance from the Clemson staff. Numerous less complex situations have been handled through county extension offices.

These highlighted activities have been conducted as agricultural engineering has continued to serve all the traditional areas through field demonstrations, crop testing, improved production technology, livestock facilities, 4-H youth, and others.

There's also an increasing need for extension educational work in agricultural pollution control. Regulations continue to be implemented in this area. This has necessitated a continuing dialogue with key personnel of Federal, state, and local pollution control agencies, and with agricultural producers.

Agronomy and Soils

Extension agronomy is responsible for providing information on recommended cultural practices for field crops in South Carolina.

In February, Clemson extension agronomists assisted in conducting a two-day, statewide closed-circuit ETV meeting on soybean and corn production, harvesting, storage and marketing. Some 500 growers, agri-business personnel, county extension workers and others gathered at TEC facilities across the State. Following the meeting, a phone hook-up was utilized for questions and answers from program participants.

Forage educational programs continued to emphasize growing legumes to reduce nitrogen fertilizer requirements and improve forage quality. As a result, some growers are topseeding arrowleaf clover in grass pastures to obtain grazing during critical months along the coastal plain. This has reduced feed costs.

Alfalfa demonstrations initiated two years ago have stimulated renewed interest in this crop for dairy and beef cattle production. Alfalfa has proven to be excellent for hay as well as a high value crop.

During the past 12 months, the number of soil samples submitted to the soil-testing laboratory reached a record 75,000, 29 per cent higher than the 58,000 total of 1974-75. This increase came primarily from commercial farmers, reflecting an awareness of advantages gained from this soil management tool.

Agronomy specialists supervised more than 30 field demonstrations on proper use of herbicides in field crop production. These were conducted throughout the State in cooperation with county extension personnel and local farmers.

Animal Science

This unit is responsible for development and implementation of educational programs to teach efficient production and management of beef cattle and swine. It is also providing outreach information for the increasing ranks of horse owners and events.

A beef performance testing program continues to expand. Some 140 producers entered the program last year, with 4,985 calves weighed and graded. This work included farmers in 30 counties.

The fifteenth All-Breed Bull Sale in Orangeburg moved 87 bulls. More and more commercial breeders apparently are looking to this sale for their herd bulls.

There's significant interest and participation in horse events in the State, particularly in the 4-H program. The 1975 state 4-H horse show set a new record with over 400 entries. South Carolina also has had its first national 4-H horse winner in Adele McLaughlin of Kershaw County who finished among the elite group.

The seventh Southern Beef Conference was held in Greenville Dec. 10-11, 1975, with a record attendance of 700 people from 12 southeastern states. Extension animal science specialists were heavily involved in planning and carrying out details of the conference.

In 1975, the purebred swine industry under sponsorship of the extension unit organized the South Carolina Purebred Swine Breeders Association. An extension swine specialist serves as

secretary. The breeders and Clemson University have sponsored an All-Breed Swine Show and sale as a project. This is planned semi-annually in the spring in Orangeburg and in the fall in Florence.

The South Carolina Swine Evaluation Center is gaining in popularity with commercial hog men as the place to obtain high quality performance-tested breeding stock. Ninety-seven producers have purchased boars through the center. Sales in August 1975 and February 1976 ranked in the top four dollar average with test station sales in the United States.

Several swine improvement projects with low-income producers were started or expanded during the year. One project in Georgetown, Williamsburg and Lee counties in cooperation with OEO has 81 families involved. A second program working in the Estill feeder pig sales area was started in August 1976. Twenty-eight bred gilts were placed with producers selling low-quality pigs in the sale. These gilts are capable of producing number 1 and 2 grade feeder pigs.

During late winter, the animal science extension unit made plans for demonstrating the use of growth-promoting materials for suckling calves, and 24 demonstrations were implemented in 17 counties. Some 935 head of cattle are involved. Results will be available in summer and early fall of 1976.

Research has indicated profits are increased by use of growth-promoting materials. These on-farm demonstrations are designed to convince producers the use of such materials can help them make a profit.

Dairy Science

Extension specialists in dairy science continue to work with dairy interests throughout the State and provide consumer educational materials for this important agribusiness industry.

Among highlights of the year's activities conducted or coordinated by extension personnel was an inaugural South Carolina Feed Industry and Veterinarian Nutrition Conference. It was designed to provide a better understanding of problems facing feed manufacturers and point up ways manufacturers, veterinarians, and Clemson personnel may work together to help solve dairy nutritional problems.

Thirty-four people attended, representing a majority of the large feed companies manufacturing dairy feed for South Carolina dairymen. Also present were many veterinarians specializing in large animal practice.

A state 4-H dairy conference held at Camp Long was attended by some 130 boys and girls. Morning sessions emphasized 4-H training in dairy subject matter. Two of the highlights of the Monday-Friday conference were a talk by Sen. James Waddell Jr. on "Becoming a Leader" and "The Dairy Bowl."

Dairy science also provided valuable input for the economics formula adopted by the South Carolina Dairy Commission for establishing the price of milk in the State. Extension personnel in dairy science feel this is the most fair and equitable method for setting the producers' price of milk to maintain an adequate and stable supply for consumers.

The annual Dairy Production Conference was again conducted at Clemson to help update producers on trends and developments in the industry. Nearly 150 persons attended. An outstanding panel of speakers presented material on reproductive management, sire selection, and overcoming dairy reproductive problems.

Dairymen themselves participate in this subject matter presentation through panel discussions. Outstanding speakers also are obtained from Clemson and out of state.

Dairy science extension continued to provide throughout the year its outreach service to producers through county agent activities with individual problems, special help, and the established programs such as Dairy Herd Improvement Association work.

Entomology and Economic Zoology

An expanded cotton pest management program highlighted activities of extension entomology during the past year. A pest management specialist and four area entomologists were hired through special Federal funding to develop farmer-operated pest management programs.

Research has shown successful management of cotton pests can reduce cost of chemical materials for farmers through less usage, and result in improved cotton yields. These conclusions and conditions dictate a continued emphasis on such pest management programs. Extension specialists will continue to work with growers to achieve these ends.

Entomology also participated in three "plant problem clinics." These programs are held in urban areas, providing a badly-needed service for gardeners. Each clinic attracted thousands of persons who received information on insect control and other problems.

Two extension demonstrations are being conducted on tomatoes and watermelons. The tomato demonstration was directed toward

tomato fruitworm control. Several promising insecticides are being tested. The watermelon test was designed to find an effective seed treatment to repel rodents. Field mice often dig up seed before they germinate, resulting in reduced stands. Hopefully, this project will demonstrate a chemical treatment which will effectively repel these mice.

A tobacco pesticide residue sampling program was also initiated.

Germany has a highly-restrictive law regulating residues on imported tobacco. Since a high percentage of South Carolina tobacco is exported to Germany and other European common market countries, it is important that we learn the level of all pesticide residues on tobacco. This will enable us to conduct educational programs to correct any existing residue problems.

Entomology and wildlife extension personnel also provided much of the staff leadership for the pesticide applicator certification training program now under way in South Carolina to meet Federal and state requirements for applicator licensing.

A pesticide training coordinator was hired with state funding to assist the Extension Service in carrying out the mandate of the pesticide laws. Over 2,000 commercial applicators and 6,000 private applicators were trained during the year. Many thousands of private and commercial applicators will require training in the fall-winter of 1976-77.

A new extension wildlife program was initiated during the year with several comprehensive projects. The unit wildlife specialist worked closely with the South Carolina Wildlife and Marine Resources Department and other conservation agencies on beaver management, farm pond management and game management on private lands. A series of cooperative workshops also was conducted.

Food Science

An extension seafood processing specialist was added to the Food Science Department extension faculty through funds provided by the Coastal Plains Commission.

This additional position has made possible assistance to seafood processors pertaining to: quantifying seafood processing waste discharges and providing technical assistance for compliance with EPA waste discharge limits; and developing understandable interpretations of existing food regulations pertaining to seafood manufacturing procedures, sanitation, labeling and packaging.

Eight one and two-day sanitation education workshops were conducted on site for employees of food processing companies.

Six commercial processing demonstrations utilizing the most recent food processing technology available were conducted on: extending the shelf-life of cut and ground fresh meats; improving the market acceptability of fried potato snack foods; establishing thermo-pressure conditions for the preservation of tomatoes in glass containers; and utilizing waste discharges from the soft drink and shrimp processing industries.

The Institute of Food Technologists designated Clemson University's food science extension project as South Carolina's "communicator" for mass media distribution of expert panel consumer education reports covering such topics as naturally occurring toxicants in food, nutritional labeling, mercury in food, botulism, organic foods and related subjects.

Continued strengthening of the state's food related processing and professional associations was achieved through leadership participation, coordination, organization of technical meetings and the distribution of newsletters.

A revised product recall instruction manual was distributed to food processors, providing instruction on ways to minimize costs and deal with misleading publicity often associated with recalling defective or potentially health hazardous food products from the market.

In addition, over 800 South Carolina food related companies were provided information on the training and applicator license requirements prescribed by the South Carolina Pesticide Control Act of 1975.

Forestry

Extension forestry activities were directed at several areas during the past year.

A newsletter was initiated for persons involved in forest harvesting. It is designed to help this group deal with increasingly complex regulations and environmental concerns.

Another new information release is the "Forest and Shade Tree Report." It is designed to serve as a reference source for public service agencies as well as an information sheet which can be distributed to people who have problems in the area covered.

Shortcourses, demonstrations and training sessions were conducted throughout the State. Examples included a forestry pesticide training course in Columbia; pulpwood production course at Clemson; environmental education workshop in Newberry; prescribed burning demonstration in Darlington; plant problem clinics in

Charleston, Columbia, Greenville and Lancaster; and a log and lumber grading workshop at Clemson. Youth programs included a weekly summer program for Boy Scouts in western South Carolina, weekly environmental study sessions at the two 4-H camps and a statewide conservation camp.

The need for reliable and realistic forestry data was re-emphasized during this period of environmental awareness and resource planning. Extension forestry worked extensively in this area, cooperating with state and Federal agencies, forest industries and private firms to assemble accurate data now being made available.

Horticulture

Extension horticulture is responsible for disseminating information on fruit, vegetables and ornamental crops in South Carolina. While the unit is primarily production-oriented, it is also involved in post-harvest handling and marketing.

Commercial fruit production is of economic value in South Carolina. In 1975, Clemson University initiated a joint workshop agreement with Georgia to rotate annual apple production meetings. The first joint meeting was held in Georgia. Growers attending were instructed on the most up-to-date practices of fertilization, pest control and growth regulator application and handling.

Routine educational activities with peach growers (update meetings, newsletters and farm visits) were conducted in 1975-76. A publication was printed and distributed describing the cause of a severe post-harvest disorder. Growers participating in the pest management grant began receiving individual reports of aerial photographs and crop history in hopes of learning more about short-life of peach trees.

Variety evaluation for processing is a responsibility of extension staff members. South Carolina canners and freezing plants work closely with them in making these determinations.

Pecan technology in South Carolina is primarily involved with rejuvenation of old orchards. A grower demonstration at Horrell Hill is used as an outdoor classroom to promote effective procedures. Grower newsletters and agent training serve as follow-ups. Due to this program, many previously nonproductive orchards are yielding economical crops.

In 1975 and 1976, a large number of new vegetable growers began production. Considerable specialist consultation was required, and where grower density was high, production meetings were offered. This unit has been heavily involved in assistance to county workers

in Greenville, Pickens and Oconee counties where vegetable production is not historical and grower know-how is limited.

Through a joint 1862-1890 grant, specialists have provided training for vegetable production paraprofessionals in Anderson County. In addition, training literature, production guides and visuals have been formulated. This program has been successful in reaching more than 120 part-time farm families, providing a means for better nutrition as well as a market for excess produce.

Home vegetable gardening is at an all time high with an estimated 90,000 acres in South Carolina. Because many of these gardeners are new, they have demanded assistance. This unit has provided radio, TV, visual and instructional materials for use by county staff. In larger areas instructional classes have been taught by specialists. In Charleston, Extension cosponsors a demonstration vegetable garden for observation by the public.

A team approach was used by ornamental and vegetable specialists involving other support departments to offer three larger Plant Problem Clinics (a total of seven days per specialist.) More than 40,000 persons were instructed on plant problems and care. More were reached through educational display.

Separate commercial ornamental short courses for nurserymen, greenhouse operators, florists and turf specialists were conducted. These short courses cover a broad range of topics but center around providing recent research results. Attendance at each school included more than 75 per cent of the respective total industry.

Several commercial demonstration sites are used by ornamental specialists to show proper production practices. Home ornamental demonstration sites are located at Sumter and Charleston.

Horticulture extension staff has been involved in pesticide certification training. Members have presented numerous lectures in all categories. Subcommittee chairmen for categories 3 and 10 are within this division. They were responsible for organizing training and developing study materials for the respective categories.

Plant Pathology

Work in plant pathology has been a part of the extension program since 1914. The current Plant Pathology Unit includes four professional plant pathologists and a plant problem clinic manager.

The unit has the responsibility for all extension areas dealing with plant diseases and plant disease control. It also operates a plant problem clinic which examines and reports on plant speci-

mens sent to Clemson for problem diagnosis primarily by or through county extension personnel.

Last year, the Plant Problem Clinic processed 2,701 plant samples and 3,618 soil sample tests for nematodes. This program has not only diagnosed thousands of routine problems, but it has led to the identification of several plant diseases and pests not previously known to occur in South Carolina.

The 10-point program designed to eliminate or reduce premature death of peach trees continues to progress. Several orchards under this program have reached bearing age with little loss of trees, while comparable plantings in which one or more of the 10 points were not followed suffered severe losses.

A program involving the use of fungicides and nematocides for disease control in soybeans has resulted in widespread utilization of these pesticides. Refinements of this program will continue, but most growers have the knowledge and experience necessary to make sound decisions concerning pesticide use on their individual farms.

Poultry Science

Computer programs on cash flow for poultry farmers have been developed. Contract producers may determine profit potential along with monthly cash outlay and other needs. This joint program with extension agricultural economics has given our contract producers a much needed tool.

Due to recent South Carolina legislation providing for pullorum-typhoid free-state status, it has become necessary to train and certify additional blood-testing agents. Approximately 15 new agents have been trained to work with exhibition and game bird producers. Most of these are fanciers themselves and will test other producers' birds on a fee basis.

An ergonomics program, which allows junior and senior high students to compete for awards by preparing egg dishes, was started and eight counties had contests. This new program is jointly sponsored by Cooperative Extension, S. C. Egg Board and the S. C. Poultry Improvement Association.

The 4-H judging and barbecue programs reached new heights this year. The Laurens County 4-H Poultry Judging Team won the state contest in July 1975 and went on to become South Carolina's first National Champion 4-H Poultry Judging Team. Ten teams plan to compete during the 76-77 year.

Thirty-four counties competed in the district 4-H barbecue contests. This is the highest number of counties ever to compete in the state.

Poultry science extension's program of assistance to commercial and hobby producers continues. Through newsletters, radio programs, short courses, bulletin distribution and farm visits, hundreds of producers have been advised on management and health-related poultry, gamebird and rabbit problems.

Production-Marketing Economics

Providing a flow of updated information to farmers, extension agents, agribusiness interest and the public about the agricultural situation and outlook is a basic function of extension's production-marketing unit.

Outlook presentations were made over the State to meetings for producers, credit agencies, and agricultural organizations. A special outlook edition of "Palmetto Economics" was published and press releases and other media presentations prepared for extensive dissemination of outlook material.

Two new publications were introduced, "Marketing-Management Memo" and "Outlook Update." These concise reports present management and marketing tips as well as interpretations of economic trends. They are distributed to county extension agents to help them pass along current information to clientele.

Six county management-marketing workshops were held with emphasis on decision-making in production. Marketing alternatives were presented to help producers integrate the overall production-marketing decision process. Six county marketing management workshops also were conducted. These emphasized marketing decisions and included refresher training in production decisions.

Similar training was conducted for special groups such as Farm Bureau and the Society of Farm Managers and Rural Appraisers. Other programs were conducted over the State at the county level on production and marketing factors for farm interests.

Personnel also had a major role in extension's statewide closed-circuit ETV clinics presented for corn and soybean producers.

Tax management and tax preparation are two important activities. Income and estate taxes are particularly important to persons living in South Carolina. The agricultural economics extension group organized and helped present several tax schools. About 500 tax

preparers enrolled in the Farm and Small Business Income Tax School offered at four locations. In addition to meetings and workshops, staff members wrote several articles, leaflets and news releases dealing with taxes.

Better family money management has been crucial during recent periods of inflation and unemployment. We have offered computerized family budgeting assistance to South Carolina families to help them meet these economic pressures. Much of the computer work was conducted at shopping malls to take advantage of heavy consumer traffic. An estimated 2,000 families used this educational service, made possible through a grant from the Federal Extension Service.

Capital and credit considerations are now so important in today's agriculture that finance, along with production and marketing, is now a fertile area for management training. A specialist in financial management joined the staff during the year. Initial emphasis has been focused on borrower-lender relationships. Farmer-borrowers were reached mainly through county management-Marketing Workshops. Individuals with grave financial problems also have been counseled separately.

The Marketing Information Center, a division of extension production-marketing economics, provides marketing information to the fruit and vegetable industry through reports issued during harvest. Additionally, the staff has responsibility for coordinating a weekly fact sheet on marketing information concerning all crops and livestock.

With the increased emphasis on forward contracting and hedging in South Carolina, it was felt producers needed to be able to look logically at alternatives before making commitments. Programs dealing with cotton, corn, soybeans, wheat and livestock, the commodities most often contracted or hedged in South Carolina, have been written and are currently available to producers. These programs were used in conjunction with workshops in 1975.

The computerized budgeting system is a major asset of extension production-marketing economics. All field crop and vegetable budgets for the past year were published from this system. With rapidly changing input prices for agriculture, Clemson's budgets have been kept current and usable.

Extension Home Economics

Scope of Activity

The extension home economics program is designed and implemented to increase the effectiveness and quality of programs for all homemakers and volunteers and to develop their leadership abilities.

The modern family faces rapid changes in all facets of living. The role of extension home economics is to help prepare families and individuals for meeting problems and responsibilities and to take advantage of opportunities as they arise in family and community life.

Highlights of some of these programs include:

Child Development and Family Relations

This program area is widening its scope to serve more families and community programs. While maintaining programs for traditional groups, it is reaching a broader audience than in past years.

The newlywed and newcomer packet programs are being continued by many home economists to fill a basic need of these audiences. The packets serve as useful get-acquainted tools for Extension and usually lead to further clientele participation in programs.

Parents with young children and child-care workers are being involved in parent education through various means: Head Start parent groups, newsletters and group meetings. Many home economists are also developing letters for child-care workers, professional and volunteer.

Several family life seminars have been conducted. Death education, once an ignored topic, has become a concern of many people. Our home economists are responding by planning programs and seminars on this.

Youth with special needs are involved in classes for potential dropouts, in youth leadership workshops, preparation-for-marriage series of lessons, family relations group sessions, family life essay contests, and camp counselor training programs.

Extension home economists are continuing to help coordinate community agencies in assisting families through local resources. As a result, several interagency planning councils have been formed.

Newsletters and news columns in papers and industry newsletters with messages for different age groups are being used in all 46 counties.

Food and Nutrition

Extension home economists no longer need to seek an audience for nutrition education. Food prices are a concern to almost everyone. Nutrition is in the news; and interest in food preservation continues to mount. The main concern has been to provide county extension personnel with training and backup materials for a good educational job requested of them.

Many pounds have been lost in the SOS (Save Our Shapes) program. The series of 12 weight-control lessons designed by extension specialists, was used in nearly all counties last year, with two or more groups in many counties. This program teaches much nutrition information along with weight control.

The demand for information and publications in food preservation is still increasing. Through this and other programs, extension home economists have taught food safety and proper food handling.

Many young mothers have participated in the home study course on feeding the preschool child. Because of the success of this correspondence course, other home study courses are planned. They reach an audience that cannot easily come to meetings.

Expanded Food and Nutrition Education Program

More adequate diets, enjoyable meals, and a positive attitude toward life are recognized improvements of South Carolina families in extension's Expanded Food and Nutrition Education Program which began in 1969. It was conducted in 25 counties during 1975-76 and has continued to make a great impact on the nutritional status and food practices of low-income families.

A total of 49,446 homemakers—representing 224,000 family members—has benefited from the program since its inception in 1969. As of June 30, 1976, 5,564 homemakers were enrolled. During the past year, the youth phase section of the program reached 9,319 youths; 4,297 of whom were new. A total of 989 volunteer leaders worked with the Expanded Food and Nutrition Education Program during fiscal 1975-76.

Families are reached in working home visits and small group meetings through the efforts of extension nutrition program assistants who live in the communities in which they work. Their major objective is to assist the families in improving food practices and nutritional status. These program assistants are supervised by county extension home economists who provide basic inservice training, regular weekly training and counseling. Mem-

bers of the state extension faculty develop subject matter materials and provide inservice training and guidance to the county staffs.

The youths have bi-weekly or monthly meetings in which lessons on basic nutrition, meal planning, food preparation and buying are taught. Some groups have garden plots and preserve some of the food for future use. Special summer activities centered around nutrition are included in all county programs.

Clothing and Textiles

In the current economic situation, many clothing budgets are greatly reduced from previous years. Extension programs have been developed to provide alternate ways of extending budgets.

One of the most economical ways of extending the clothing budget is home sewing. In many communities, Extension is the only source available for learning construction skills. Extension home economists are getting more requests for construction classes than they can handle. To help alleviate the problem, a series was begun to teach sewing consultants. These individuals would then teach two classes as part of their training, and the sewing consultants could continue as extension volunteers or start their own classes and charge small fees.

Many individuals are capable of sewing for others and would like to use their talents to bring in additional income but do not know how to organize and get started. A series of extension classes was started, "Custom Dress-making—A Profession." The purpose was to teach individuals how to get into the business as well as provide an update on sewing techniques.

There is a need for individuals trained to alter and repair ready-to-wear. A program was initiated to train people in this. These individuals could get jobs in clothing stores or on their own start altering clothing as a source of additional income.

Family Resource Management

Requests have been received at all levels for information on money management. In the period July 1, 1975-June 30, 1976, nearly 10,000 people were contacted directly with money management information by state specialists and county staffs. This does not include all audiences who may have been influenced through mass media.

During 1974-76 a special program using computers was developed to teach money management. It involved portable terminals which were taken to shopping areas. Trained agents were on

hand to meet the public and talk with individuals about their financial concerns. Actual budgets can be processed in a matter of seconds.

Efforts are continuing to provide consumer financial education to low income families. Paraprofessionals working in the Expanded Food and Nutrition Education Program are kept abreast of such information through a monthly newsletter. They utilize this material in teaching low income families. Considerable success is noted as families improve their buying habits in all areas of consumption.

An interdisciplinary team including housing, home furnishings and family resource management personnel have worked in cooperation with the South Carolina State Housing Authority to provide training for counselors who will assist families participating in the Basic Homes Project. A manual has been produced to aid prospective buyers.

Housing

There has been an increased interest by family members in learning to do simple home repairs as well as home maintenance and care jobs. Moisture problems have increased. This year, many homeowners have learned to control or prevent moisture and make home repairs through extension's special interest meetings, club meetings, fair exhibits and mass media.

Increasing numbers of homemakers are becoming interested in furnishing their homes. This is evidenced by the popularity of the Interior Design Short Course, now being taught by more counties than at any previous time.

In an effort to teach low-income families ways to make their homes more attractive, "Operation Attractive Living" was begun. It's in cooperation with the Charleston City Housing Authority for residents of low-income subsidized rental housing. The Housing Authority supplied an apartment which has served as a teaching facility for the residents of certain housing developments. These families are being taught to improve their homes with human resources and little money. The second phase of this program is now being conducted in a similar housing development in the northern area of Charleston.

As a result of in-service training conducted last year, the interest in remodeling homes has greatly increased. The training has been successfully followed up with individual assistance and special interest programs.

4-H and Youth Development

Scope of Activity

Extension's 4-H programs direct work through the county offices with youth of the State, in urban centers as well as the rural areas and small towns.

In 1975-76, participation in regular organized 4-H clubs in the State was 69,000. Another 15,685 were reached through educational television. In April 1976, 8,651 additional boys and girls were enrolled in the youth phase of the Expanded Food and Nutrition Program conducted by Extension.

Emphasis in 4-H continues to be on the development of the individual and growth in human relationship skills.

Current 4-H projects or "learn-by-doing" experiences have taken on a new look. Along with the traditional livestock and cooking projects from the early days of 4-H, modern activities include: bicycle, small animal projects, veterinary science, small engines, consumer education, home environment, and child development. Program areas are geared to meet the needs and interests of youth with all socio-economic backgrounds.

Increasing numbers of volunteer adult and teen leaders are being recruited and trained to work directly with young people. In 1975, some 1,345 adult volunteers and 756 teen leaders served the 4-H program. A state 4-H Leadership Task Force has been organized to help promote 4-H leadership in the State.

4-H Camping

A statewide effort has been made to increase 4-H camp attendance, develop new programs, and improve camp facilities. In 1975, 4,784 4-H'ers attended camp for one week. Special interest camps were held in the areas of dairy, conservation, electric, horse, community resource development, and expanded food and nutrition.

Major improvements have been completed on physical facilities at Camp Long and Camp Bob Cooper. A new kitchen is under construction at Camp Long.

Citizenship Short Course

Thirty-six 4-H'ers from 15 counties participated July 17-24 in the Citizenship Short Course in Washington, D. C. Headquarters for the event was the National 4-H Center where the group from South Carolina participated with 4-H'ers from 12 other states.

During the week in Washington, the youths had a closeup view of government operations and democracy in action. They studied individual responsibility in citizenship, free enterprise, energy resources and use, and community development. The group visited Mount Vernon, Library of Congress, John F. Kennedy Center, Lincoln Memorial and spent a day on Capitol Hill for visits with members of the South Carolina congressional delegation.

State 4-H Teen Leader Retreat

The state 4-H Teen Leader Retreat held at Camp Bob Cooper the week of June 7 provided opportunities for 4-H teens to learn about career choices, citizenship responsibilities, and to further develop skills in arts and crafts. Some 270 teens from 44 counties attended. During the "career opportunity" session, more than 35 business representatives talked with teens about recommended high school courses, job competition, education and/or training required, and salary potential.

State 4-H Conference

The fourteenth annual State 4-H Conference was held at Clemson University July 27-30 with more than 550 4-H'ers and agents attending. The youths met with subject matter specialists for educational training in more than 40 program areas. They had an opportunity to see a bicentennial drama, participate in recreation programs and be recognized for outstanding accomplishments.

Their 4-H record books were judged and awards given for blue, red and white ribbon placings. State winners also were announced.

A 4-H Leader Forum was held during the week, with 66 volunteer leaders and 7 program assistants from 24 counties attending. Dr. Maurice Spencer, 4-H and youth development leader from the University of Georgia, talked on "Good Programs for 4-H."

Leaders were also given information on various project areas, low cost crafts and encouraged to attend the Southern Regional 4-H Leader Forum at Rock Eagle, Ga., in October.

Community and Resource Development

Scope of Activity

This work is designed to provide educational and technical assistance to groups interested in taking collective action to improve the level and quality of life in their communities.

Much of the CRD effort is devoted to identification and definition of problems, identification and evaluation of possible solutions, and development of leadership qualities in local citizens that will enable them to perform these functions in the absence of outside help.

Major Emphasis

Because of the numerous opportunities for people to join together for community improvements with common benefits, there is a wide diversity of community development efforts. However, identification of leaders, organizing action committees, education, leadership training and providing information and technical assistance represent extension support for community projects such as fire protection, water and sewer services, environmental improvements, recreation, health services, planning for appropriate land use, crime prevention, and others.

In community and resource development, major emphasis is placed on the initial steps of organizing community leaders and leadership development. Much of the development of leadership qualities is accomplished through the process of organizing people to act on local problems. Problem solving through the social action process provides valuable experience that can be used in dealing with a variety of community improvement opportunities.

Environmental Improvement

The awards program of the Governor's Beautification and Community Improvement Board has been changed to allow counties to compete against standards rather than against other counties. More counties have shown commitment to the program by participating in the awards competition. An even greater number of county committees has filed plans for litter clean-up campaigns, removal of abandoned cars and dilapidated buildings, beautification with plants and other environmental improvement projects to be conducted in FY 77.

State Rural Development Conference

In cooperation with other agencies represented on the State Rural Development Committee and with the governor, extension CRD personnel planned and conducted a statewide rural development conference for decision makers, both officials and nonprofessional leaders. More than 40 agencies provided resource personnel for the conference. Over 350 people participated.

Crime Prevention Conference

On July 7-9, the first statewide CRD Conference for Youth was held at Camp Bob Cooper. In addition to a state Supreme Court justice, participants heard presentations from the top administrator of both the Criminal Justice Academy and the Department of Corrections. More than 100 persons participated in the workshop and a tour of crime prevention facilities in Columbia.

Economic Analysis for Public Decisions

On August 10-11, extension CRD personnel held a workshop on the use of benefit cost analysis and economic base analysis in public decision-making. Teaching personnel in the Department of Agricultural Economics and Rural Sociology served as instructors. Participants included planners, developers, and managers in various community development programs in South Carolina, with a few from Georgia and North Carolina.

South Carolina Community Development Association

During the past year, CRD personnel have worked jointly with representatives of the S. C. Association of Counties, the Municipal Association of S. C., the Regional Councils of Government, the S. C. Electric and Gas Company, the S. C. Association of Electric Cooperatives, and other representatives of state and local agencies to form an organization to improve communications, cooperation, and effectiveness of community development programs in the State.

The South Carolina Community Development Association was organized August 31, 1976. Advance registration indicated that approximately 100 people would become charter members of the organization.

1890 Extension Program

Scope of Activity

The primary aim of the 1890 Extension Program is to provide educational training for enrolled low-income families in youth development, family living and community resource development.

Work is conducted by South Carolina State College in cooperation with the Clemson University Extension Service, providing education and outreach to segments of the population not in touch with traditional uplift programs.

Gardening Project Initiated

In the project area of agriculture, a small farms and urban gardeners program was initiated in Anderson County. A sum of approximately \$56,000 was allocated for the program during 1976, and all funds have been designated to be used with limited resource families. Four agricultural technicians and one clerk have been employed to implement the program.

An increased number of 1890 program families are producing quality vegetables in excess of home consumption needs. They are utilizing a local community market to sell this excess and increase the family income.

Home Economics Program Extended

Home economists introduced and provided new educational training for hard-to-reach families which encouraged a willingness to improve the quality of life through creative and productive use of resources available to them.

Extension of the educational programs was accomplished through home visits by paraprofessionals, group meetings, leaflets, demonstrations, tours, exhibits and community projects.

Community projects provided new education opportunities for more than 300 limited resource families. These included bazaars, fair exhibits and quilting bees.

Rat Control Projects

In the area of community resource development, rat control projects are being conducted in three phases—a series of workshops to teach living habits of rats and mice, instruction in how to kill existing populations, and demonstrations on how to minimize the environmental conditions conducive to rat growth and development.

Through cooperation among county environmentalists and other officials in Chesterfield, Georgetown, Marlboro and Hampton counties, 1890 personnel successfully conducted four community-wide rat control programs.

Anti-coagulant poison bait was used to kill rats in homes of 1,112 families in 13 communities. Baiting began in early December 1975 and continued through mid-February 1976. Test results revealed rat populations were lowered to levels where their presence was not noticed.

The rat control program was initiated in 1973 in one community of each of the four counties. In 1975, the program was expanded to six communities in Hampton County, three in Georgetown, three in

Marlboro and one in Chesterfield. An adequate county-wide rat control program is established on a five-year goal (1973-1978).

Summer Camps Conducted

The fifth annual 1890 summer camping program was conducted at Camp Harry Daniels in Elloree. A total of 360 youths, ages 9-16, from limited resource families attended.

The camp was operated as a model community with each participant assuming the role of someone who provides a community service. Camp counselors served as advisors. This allowed the youths to become more familiar with the functions of a community.

Camp activities are designed to enhance behavioral goals among youths, both socially and psychologically. Realizing recognition is an incentive to promote ideals of youths. Ribbons and certificates were awarded for outstanding accomplishments.

Information Services

Scope of Activity

To fulfill its primary mission of disseminating "useful and practical information" to all citizens of the State, the Public Service Information division of Clemson's Public Relations Department conducts a continuing news program through media outlets.

Last year, emphasis was placed on increasing flow of news to media through increased utilization of county extension staffs. Special releases designed for use on county radio programs were initiated and expanded.

Daily articles and feature stories detailing new developments in recommended agricultural practices as well as homemaking news for the consumer front are prepared and mailed to newspapers and special interest publications. These are developed in collaboration with subject matter specialists, researchers and administrators of Clemson University.

First-hand coverage is also given on activities over the State, including producer problems and successes, field days, tours, workshops and other programs of special interest to the public.

Special Programs

Scope of Activity

In many areas of South Carolina, the small family farms or rural holdings continue to exist, despite the overall trend toward large mechanized operations.

Many of these people, some on very small acreages, lack knowledge of basic information in management, disease and pest control, soil preparation, fertilization, livestock management, harvesting and marketing.

They desperately need extension's help in ways to best utilize limited resources to continue to make a living in today's economy. These are the areas and the people which Special Programs are designed to help. It means tailoring extension programs and utilizing personnel to focus on small-scale activities, to go on a community basis in serving these limited-resource clientele.

Vance Project

One of these activities is the Vance Community project in Orangeburg County. The community represents an area of about 10 square miles where a special extension agent has been working with some 300 low income families for about three years. He visits the homes and families, assisting them in swine production, gardening, drainage problems, soil testing and fertility, and miscellaneous 4-H projects including pig and poultry chains.

Sumter Area Projects

A number of projects also are being conducted in the Sumter County area. The Clemson Extension office there, in cooperation with the Santee-Wateree Area Mental Health Center, initiated a cooperative program of helping outpatients on visits to the center. While patients are waiting for their appointments, extension agents conduct informal education programs, many of them method demonstrations on different subjects.

These programs have focused on nutrition, vegetable gardening, house plant management, clothing construction, interior design, home management, family life, personal grooming, and others. Classes are held three days a week for approximately two hours each. Attendance runs from 20 to 30 persons.

The programs are planned by a joint committee of professional mental health workers and Clemson Extension.

Farmers' Cooperative

The Good Hope Farmers' Cooperative was organized in the Sumter area several years ago for small farmers from four counties. Extension assisted the group in organizing and helped them pool resources to provide volume in producing and marketing seasonal vegetables. Work has been primarily with sweet potatoes.

County and area extension agents have assisted these producers on a one-to-one basis in all phases of production and marketing. One significant development was the organization of the families and individuals for volume purchasing of supplies at reduced cost. Major items were fertilizer and seed for the 1976 crop. About 15 families are active in the cooperative. Others take part in selective activities.

Work In Edgefield

Characteristic of the special programs designed for limited-resource clientele were some of the activities conducted by the extension staff in Edgefield County. One program was held to acquaint these families with services available to them through Extension. About 30 families were reached, and several of them contacted the county office for help with problems.

Demonstrations on winterizing homes and conserving energy were also conducted in three low-income communities and at one county-wide meeting. Emphasis was on ways to save on heating bills. Approximately 65 families were reached. Several of these reflected interest by installing plastic over windows, weather-stripping doors, or heating only portions of the home which were being used.

Bamberg Projects

One of the highlights of work with low-income families in Bamberg County was a gardening contest in two communities. Sixteen families responded to extension efforts by planting gardens and entering the contest. A field workshop was held to demonstrate soil sampling, disease, insect, and weed control, proper variety selections, and sound fertilization.

Professional staff members were assigned families to work with during the gardening season and to advise them on problems. At harvest time, extension home economists gave a demonstration on food preservation.

Individual gardens were judged during the growing season and a grand champion chosen on the basis of gardening efforts and final production.

Extension leaders believe that families who participated in the project were made more aware of what they could do with a limited land area and also benefited from the nutritional standpoint.

**Appropriations for Extension Service
1975-76**

State Appropriations	\$ 5,070,365
Federal Smith-Lever	3,594,316
Federal Resource Conservation and Development	13,964
Federal Nutrition Fund	1,642,500
Federal Smith-Lever 1890 College	420,635
Federal Smith-Lever Rural Development	37,105
Federal Smith-Lever Cotton Project	21,245
Federal Smith-Lever Peach Pest Management	75,000
Federal Smith-Lever Pesticide Applicator Training ...	32,370
Federal Rural Development—Title V	22,724
<hr/>	
Total Appropriations	\$10,930,224

**Expenditures by Object Classification
1975-76**

Classified Employees	\$ 4,595,963
Faculty and Staff	3,656,955
Graduate Assistants	21,795
Students and Part-time Temporary Help	94,962
Fringe Benefits	634,304
Travel	610,040
Contractual Services	412,504
Postage, Supplies and Materials	219,098
Rents and Fixed Charges	124,462
Equipment	33,362
Permanent Improvements	11,219
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Total Expenditures	\$10,414,664
Balance Carried Forward June 30, 1976	515,560
<hr/>	
	\$10,930,224

DIVISION OF REGULATORY & PUBLIC SERVICE PROGRAMS

L. H. Senn, Director

This division of Clemson University operates several consumer protection-type programs that are closely related to the agricultural sector. The philosophy for having some regulatory-type programs at Clemson is that certain regulations can be enforced more effectively when strong educational approaches are used. Regulatory and Public Service Division personnel use this technique as a normal procedure.

It maintains close coordination with the Cooperative Extension Service and the S. C. Agricultural Experiment Station and solicits their aid when additional educational and research efforts are needed. Strict enforcement is used only against recalcitrant offenders.

The major objective of this division is to ensure consumers buying lime, fertilizers, pesticides and seed get the qualities indicated on tags or labels. It also enforces regulations of the Crop Pest, Bee Diseases and Abandoned Orchards Acts and imposes quarantines when needed.

In legislation passed by the General Assembly and signed by the governor June 4, 1975, the division was also given the responsibility for enforcing the new South Carolina Pesticide Control Act. During 1976, the South Carolina Agricultural Liming Materials Act was passed and enforcement responsibilities were given to the division.

The following report highlights the activities of the division during 1975-76.

Plant Pest Regulatory Service

South Carolina Pesticide Control Act

The South Carolina Pesticide Control Act became law in 1975, repealing the Economic Poisons Law and the South Carolina Disinfectants Law. The law requires the registration of all pesticides sold, distributed or transported intrastate. It is also the first state law to govern the use and application of pesticides and provides for the certification of all applicators using pesticides classified for "restricted" use by the U. S. Environmental Protection Agency. All applicators must be certified by October 1977.

Four hundred ninety-five (495) companies registered 4,810 pesticide products for sale in South Carolina. The total number of

pesticide samples collected and analyzed was 1,523. Seventy-four (4.8 per cent) were deficient in one or more components. The department collected \$79,217 in registration fees.

South Carolina's plan for certification of pesticide applicators was developed and approved by the U. S. Environmental Protection Agency. Staff personnel spent considerable time preparing training manuals, examinations, proposed regulations and other literature pertinent to the new law. They assisted in applicator training schools conducted by the Clemson University Cooperative Extension Service relative to certification and administered examinations afterwards for certification.

Training and certification are currently proceeding according to the state plan. As of June 30, 1976, 4,795 private applicators have been certified and 1,550 commercial applicators are eligible for certification, having passed examinations. All of these applicators have been sent the necessary forms to apply for their applicator's license. Certification fees collected to date total \$4,576.

Nursery, Bee and Sweet Potato Inspection

Five hundred and eighty-eight (588) nurseries, greenhouses and vegetable transplant growers were inspected and certified to sell and ship plant materials. This comprised 1,727 acres of plant stock. Certified dealers, persons who buy from certified nurseries, total 700 in the State.

Less than half of one per cent of 2,350 bee colonies inspected were found infected with foulbrood disease. Terramycin was recommended to alleviate the problem.

Fifty-three sweet potato inspections—including storage, plant bed and field inspections—were performed for 34 growers in eight counties. The majority involved regular seed stock because only a few individuals were growing breeder, foundation or certified stock under the seed certification program.

Numerous other inspections of assorted house plants, nursery stock and agricultural commodities, destined out-of-state or to foreign countries, were made and proper certificates issued.

Phony Peach

During the 1975 survey season, approximately 2.3 million peach trees were inspected for phony peach disease. Six hundred sixty-four (664) trees were destroyed, compared to 1,024 last year.

The wild plum herbiciding program initiated last year was well received by the peach growers. This work is conducted from

October to March. The purpose is to complement our summer survey program by eliminating wild plums which serve as a source of inoculum associated with phony peach disease. Wild plums on the farms of 32 growers in Edgefield, Orangeburg and Sumter counties were sprayed with 2, 4, 5-T.

Cooperative State-Federal Programs

Imported Fire Ant: A total of 207,784 acres was aerially treated in Orangeburg and Calhoun counties for our fall control program. A 1,400-acre research block was also aerially treated with Mirex bait at the Webb Wildlife Research Center in Hampton County.

Plant Pest Regulatory Service personnel provided technical supervision on the aerial contract while the Department of Entomology and Economic Zoology at Clemson directed the research designed to determine if residues accumulated in quail and deer.

Ground control treatments, using Jeep-mounted electric cyclone seeders, were applied to 2,078 acres of pastures and other open land in five infested counties. Mirex bait was supplied to all County Extension Service offices for distribution to people on a request basis seeking relief from fire ants.

The Plant Pest Regulatory Service received a grant for approximately \$50,000 from the governor's office to conduct a ground-control program against fire ants in Orangeburg County. This was Title I money granted under the Comprehensive Employment Training Act of 1973 (CETA) which had to be used to hire unemployed and economically disadvantaged people. Eight people were employed under this grant and worked under the supervision of our personnel. Their work supplemented the fall aerial treatment program in Orangeburg County and should give a somewhat longer control than normally is expected.

Mirex bait applied under the CETA program, through this fiscal year, amounted to 9,950 pounds. Applied at the rate of one-half ounce per mound, this represents the treatment of 318,400 mounds.

Witchweed: Infestations, comprising 483 acres, were found on 17 new farms, all of which were within the current quarantine areas. A total of 7,254 acres received one or more herbicide applications for witchweed control for an aggregate of 20,363 acres treated.

Pest Detection: Thirty (30) new county records for the State were reported to the Cooperative Economic Insect Report.

Imported fire ants were found for the first time in Newberry and McCormick counties.

Dutch elm disease was confirmed in four new counties, bringing to 17 the number of counties in the State where the disease has been found. The majority of these confirmations has been from elms being used as ornamental shade trees.

Three adult male gypsy moths were trapped in single catches from three different campgrounds in Horry County. All campgrounds were along the grand strand in the vicinity of Myrtle Beach.

Department of Fertilizer Inspection and Analysis

The Department of Fertilizer Inspection and Analysis is responsible for enforcing the provisions of the South Carolina Fertilizer Law, 1954 and 1970, and the South Carolina Agricultural Liming Materials Act, 1976.

Some of the major activities of the department for the July 1, 1975-June 30, 1976, period follow:

Fertilizer usage data—tons	912,777
No. of fertilizer samples procured and analyzed ..	5,855*
Total number of samples not meeting guarantee ..	1,012
Per cent of samples deficient	17.3
Number of irregularities other than underweight ..	5
Number of irregularities for underweight at dealers' warehouses	4
Penalties collected, payable to state treasurer (Deficiencies where consumers not identifiable)	\$ 25,758.84
Fines collected, payable to state treasurer	325.00
Registration fees collected, payable to state treasurer	4,881.00
Fertilizer taxes turned over to state treasurer	235,096.11
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Total monies sent to state treasurer	\$266,060.95

Erratic Movement of Fertilizer

Fertilizer movement in 1975-76 ranged from very slow in the fall and winter to extremely rapid and hectic in the late winter and spring. Indecision in planned crops and balking at high fertilizer prices resulted in much below-normal movement through February.

With the lowering of prices, higher profit potential for cotton and corn, and clear, dry weather, rapid movement began in March and continued through June. Had dry weather not prevailed, it would not have been possible to manufacture and move enough fertilizer to meet the demand. Nitrogen materials became scarce in May, but all farmers managed to receive needed supplies with a short delay.

Total mixed fertilizer tonnage moved in June 1976 was 2.8 per cent more than that moved in June 1975. Tonnage of nitrogenous materials was 49.3 per cent more than June 1975. For the July 1975 to June 1976 year, the mixed fertilizer tonnage was 11.2 per cent more and the nitrogenous materials tonnage was 21.8 per cent more than for the previous year.

Total mixed fertilizer and materials tonnage was 14.3 per cent more than for the 1974-75 year, and 5.4 per cent less than for the 1973-74 year. Nitrogenous materials tonnage was 11.0 per cent more than for 1973-74.

New Agricultural Liming Materials Act

An Agricultural Liming Materials Act was passed by the Legislature and signed into law by the governor March 12, 1976. South Carolina was the only southeastern state that did not have regulations controlling the quality and weight of lime offered to farmers. Farmers and even dealers often did not know the type or quality of limestone being offered for sale. Actual weights of materials often did not accompany invoices.

The new law requires printed guarantees of calcium carbonate equivalent, calcium and magnesium guarantees if claimed, and specified particle sizes. All lime will be invoiced to farmers by net weight. The act named Clemson University and the Fertilizer Inspection and Analysis Department as the administering agency.

Groundwork has been laid for enforcement of the law which became effective July 1, 1976. All companies supplying agricultural liming material must be registered, and dealers handling bulk liming materials must have a permit.

Fertilizer Quality Control

In an effort to assist fertilizer manufacturers in maintaining better quality control and to assure farmers of dependable products, the Fertilizer Inspection and Analysis Department has changed procedures for sampling compartmental trucks.

Each compartment is sampled separately as an official sample. If a deficient analysis is found, the analysis is compared to the analyses of the other compartments to determine if segregation occurred or if the entire load was off-grade. Total samples for the 1975-76 year were 5,855, 14.2 per cent more than the number taken in 1974-75.

Companies were also furnished computer printouts with detailed analyses of the quality control factors as indicated by the analyses of samples drawn. For the 1975-76 year, a preliminary tally indicates 17.3 per cent of all official samples drawn in the State were deficient in one or more nutrients. This compares with 20.1 per cent in 1974-75, 17.9 per cent in 1973-74, 14.3 per cent in 1972-73, and 18.1 per cent in 1971-72.

Department of Seed Certification

Seed certification is a program of standards imposed on seed and plant production that insures varietal purity and good germination. Participation of farmers in the program is voluntary.

The Department of Seed Certification is designated by law as the official agency for certifying seed and plants in South Carolina. Standards of seed certifying agencies in the United States are required to meet standards for certification of seed in the Federal Seed Act.

Field work of the department in 1975 involved inspection of 52,098 acres of crops. This work included inspections of 64 varieties of 12 crops for the 311 South Carolina farmers and 25 seed-producing firms participating in the program. Each field was inspected to determine that the crop was true to variety and free of noxious weeds.

Major crops in the program with acreages inspected in 1975-76 were soybeans (32,027), small grains (11,554) and cotton (7,046). The acreage of cotton inspected was the smallest since certification began in South Carolina in 1947. On the other hand, the soybean acreage and wheat acreage (7,487) were the largest acreages of these crops ever inspected for certification in South Carolina.

In addition to field inspection work, the department issued certification tags for use on 786,268 bushels of certified seed in 1975-76.

A barley germination problem which caused concern in 1973 and 1974 occurred in a few samples from all areas of the State

in 1975. Dr. G. C. Kingsland of the Department of Plant Pathology and Physiology found the organism *Helminthosporium sorokinianum* in all problem samples examined. Barley producers were alerted to the buildup of this organism and encouraged to treat seed with recommended fungicides and rotate barley fields to control the disease.

Weather was unfavorable and to some extent reduced yields of most all crops for certification in 1975-76. Prolonged drought in August reduced yields of much of the cotton for certification from potential yields of one and a half bales per acre to a bale or less. This dry weather also reduced yields of early-maturing soybeans. However, rains in late August and September allowed mid and late-maturing soybeans to make excellent yields. Drought of 50-60 days in many areas in March and April reduced small grain yields considerably and undoubtedly reduced the acreage for certification.

The unfavorable weather had an adverse affect on the quality of certified cottonseed and soybeans. Virtually none of the cottonseed certified in South Carolina was salvaged because of low germinations. As of the end of January, 48 per cent of the certified soybean samples tested had germinated below the 80 per cent standard for certified seed. The certification standard was subsequently lowered to 70 per cent in order to increase the amount of seed available for planting the 1976 soybean crop.

In spite of seed quality problems, an adequate supply was available and virtually no complaints were received on stands. Even though very little cottonseed was salvaged in the fall of 1975, a large quantity of seed had been carried over from 1974 production. Germinations of this seed held up well, and there was more than enough to supply demands in South Carolina for 1976.

A few problems continue to plague certified seed producers. In addition to low germinations, many lots of soybeans for certification had to be rejected because of excessive amounts of other soybeans. Many growers apparently are not adequately cleaning equipment used for harvesting other varieties.

Wild onions continue to show up frequently in small grains, resulting in their rejection for certification. For the most part, applications of recommended herbicides in 1976 have failed to kill or suppress wild onions sufficiently to prevent their contaminating small grains.

LIVESTOCK-POULTRY HEALTH DIVISION

Carl Boyd, Director

The Livestock-Poultry Health Division has responsibilities for control and eradication of certain diseases which affect South Carolina livestock and for carrying out a consumer protection program to assure the wholesomeness of red meat and poultry produced in South Carolina slaughtering establishments.

The division originated in 1901 when the General Assembly authorized the Clemson Board of Trustees to employ a veterinarian for livestock disease investigational purposes.

Its three main areas of responsibility are: the State Meat Inspection Program, the Livestock Regulatory Programs and the Diagnostic Laboratory.

Highlights of the division's activities during 1975-76 follow.

Meat and Poultry Inspection

The division's responsibility covers the wholesomeness of meat and poultry and the food products slaughtered and processed at all processing plants in the State except seven plants that operate under Federal jurisdiction.

It provides trained inspectors and veterinarians to perform antemortem and postmortem inspection of all animals and poultry at the time of slaughter. Any meat or products that do not meet stringent standards are required to be tanked and properly disposed of.

A staff of 88 trained personnel are available to administer this program in 129 red meat plants and 48 poultry plants located throughout the State. More than 100 million pounds of red meat and poultry and 200 million pounds of processed meat and poultry products were inspected during the year.

Livestock Regulatory Programs

These programs are conducted in cooperation with the Federal government, which supplies personnel and funds on a 50-50 basis to administer them.

Brucellosis

This disease, also known as contagious abortion, has been practically eliminated from all areas of the United States except the southern states from Texas to Florida. South Carolina was declared "certified brucellosis-free" in March 1972, but must main-

tain a constant vigilance to prevent the introduction of infected cattle from neighboring southern states. Division employees continue to monitor dairy herds using the brucellosis ring test four times a year and by testing all replacement cattle at stockyards. All animals found to be reactors are required to be slaughtered immediately.

Hog Cholera

Several cases of hog cholera were diagnosed this year in New Jersey, Massachusetts, Rhode Island and New Hampshire. The last case reported in South Carolina occurred November 2, 1972. A surveillance program for South Carolina swine is being maintained by division employees to make sure the disease is not re-introduced into the State through infected or exposed imported swine.

Animal Disease Laboratory

The General Assembly appropriated funds this year which made it possible to begin construction on a new postmortem facility for the Animal Disease Laboratory. This will be added as a wing to the present laboratory building and will include a new incinerator.

A new position of histopathologist was also approved. This additional position should materially aid in providing faster diagnostic service for practicing veterinarians and livestock owners. During 1975 the laboratory conducted more than 200,000 tests and examinations.

