The
Clemson Agricultural College
FIFTY-NINTH ANNUAL REPORT

of the

BOARD OF TRUSTEES

of

The Clemson Agricultural College

to the

General Assembly of South Carolina

1948
LETTER OF TRANSMITTAL

To the Members of the General Assembly
Columbia, South Carolina

Gentlemen:

The trustees of The Clemson Agricultural College are pleased to transmit herewith for your thoughtful consideration the Report of President R. F. Poole, for the fiscal year July 1, 1947 to June 30, 1948.

Members of the Board have reviewed the affairs of the several agencies of the college on three occasions during the past year and have found them entirely satisfactory.

Respectfully submitted,

W. W. BRADLEY,
President, Board of Trustees

November 1, 1948.
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</tbody>
</table>
WHERE THE CLEMSON STUDENTS COME FROM
FIRST SEMESTER 1948 - 1949

SOUTH CAROLINA 2715
NORTH CAR. & GEORGIA 303
OTHER SOU. STATES 137
OTHER STATES 122
TOTAL ENROLLMENT 3277

SOUTH CAROLINA 82.9 %
OTHER SOU. STATES 13.4 %
OTHER SECTIONS 3.7 %
I have the honor to present to you the fifty-ninth report of the President of Clemson College. In addition to reports of the public service activities of the college, I am including information concerning the various schools of the college. More and more these schools add materially to the achievements of the college and thereby function to foster the needs of the state.

Post-war problems are giving way to stable values in all divisions of the college and I believe that Clemson College through its many organizations is meeting the needs of the agricultural and industrial development of the state.

For the ten year period from 1937-1938 to 1947-1948, the quantity of instruction being undertaken by Clemson College increased ninety-three percent. This is based upon a comparison of the teaching load for 1937-1938 session with the teaching load for 1947-1948. Further comparisons indicate that the School of Arts and Sciences is now undertaking as much teaching as the entire institution in 1933-1934. The same is largely true of the School of Engineering.

The above comparisons are based upon the teaching load which is calculated to include both the number of hours of class work as well as the number of students in each class. Thus the teaching load of a class meeting three hours a week for a semester with thirty students in the section amounts to ninety student hour enrollments. If the same class met again for the second semester it would make an additional ninety student hour enrollments or a total of 180 student hour enrollments including both semesters. On this basis the following figures have been compiled showing a comparison between the student hour enrollments for the 1937-1938 session and the equivalent figures for 1947-1948.
Teaching Load — Student-Hour Enrollments for Both Semesters

<table>
<thead>
<tr>
<th>School</th>
<th>Student-Hour Enrollments 1937-1938</th>
<th>1947-1948</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>16,742</td>
<td>27,406</td>
</tr>
<tr>
<td>Arts and Sciences</td>
<td>28,328</td>
<td>53,479</td>
</tr>
<tr>
<td>Chemistry and Geology</td>
<td>12,021</td>
<td>17,584</td>
</tr>
<tr>
<td>Engineering</td>
<td>19,916</td>
<td>47,273</td>
</tr>
<tr>
<td>Textiles</td>
<td>6,744</td>
<td>17,084</td>
</tr>
<tr>
<td>Vocational Education</td>
<td>2,976</td>
<td>3,315</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>86,727</strong></td>
<td><strong>166,141</strong></td>
</tr>
</tbody>
</table>

The above comparison is more revealing when it is realized that the last addition to the physical plant in the way of permanent type classroom and laboratory structures occurred in 1938. Thus, in the post-war years, the college has operated at least twenty-five to fifty percent beyond any reasonable capacity for the institution. The larger enrollments were accommodated with the feeling that there was a state of emergency. But the 1948-1949 session is the third year of this “emergency” and there is hardly any indication that the demand for enrollment will decrease in the years ahead.

Except for a few depression periods and a relatively stable enrollment from 1911 to 1921, the enrollment of Clemson College has shown a rapid, steady growth. An accelerated growth began in 1934, and during the seven-year period from 1933-1934 to 1940-1941, the enrollment grew from 1,108 to a pre-war peak of 2,381. During the post-war period it became necessary to control the enrollment at approximately 3,200 students. In controlling the enrollment at approximately 3,200 students, it became necessary to refuse the admission, of 1,800 applicants in September 1947. In September 1948, even though there were very few high school graduates in South Carolina in the spring of 1948, it was again necessary to turn away several hundred applicants.

The institution has gone through several crucial periods when the growth of the staff and the expansion of physical facilities have lagged behind the increase in enrollment. This lag has been due largely to a lag in financial support. Needs had to become pressing
before financial relief became available. The college has not been able to expand fast enough. In the post-war years the college is facing another and very likely the worst crucial period of growth. Since numerous applicants have been turned away there is hardly any evidence to indicate that in the years ahead the enrollment will decrease. As a matter of fact, the reverse will likely be true since the demand for educational facilities in the state will probably increase with the industrialization of the state.

The School of Agriculture is organized to train students in the arts and sciences necessary to success in a well-developed agricultural industry. The program of courses for the first two years is very similar for all students specializing in the fields of plant and animal or social and economic sciences, whereas the curriculum for those students specializing in agricultural engineering subjects includes more mathematics and physics, necessary as foundation courses in an engineering educational program.

During the junior and senior years the students specialize in the social, economic, plant, animal and agricultural engineering sciences. Courses in the social and economic sciences are included in the curriculum of the Agricultural Economics Department. The plant science subjects are included in the Botany, Agronomy and Horticultural Departments. Animal science subjects constitute the curricula of the Entomology and Zoology, Animal Husbandry, Dairy, and Poultry Departments. All of the agricultural engineering courses are included in the curriculum of the Agricultural Engineering Department.

The primary objectives of the School are to train men for (1) farm production enterprises, (2) teaching of agricultural subjects, (3) business enterprises related to agriculture, (4) administration of national, state and local agricultural programs, and (5) scientific research work in all the fields of agriculture at the graduate level.

There is need for strengthening the agricultural teaching program at the graduate level. There would be a great advantage in having, in the South, more agricultural scientists who have done their graduate work in institutions in this region where emphasis is placed on the environmental conditions which determine the success of production enterprises and where the prevailing social and economic conditions receive adequate consideration.
Because each year the School of Arts and Sciences is serving almost all students enrolled, it has the majority of teacher-student contact hours in the college. The principal function of the School of Arts and Sciences is to teach all Clemson students mathematics, physics, English, foreign languages, and the social sciences. Training in these fields is needed by students as the basic foundation for specializing in various professional fields and as broadening general education which is essential for the educated man.

Besides teaching nearly all students in the college, the School of Arts and Sciences sponsors three major courses, utilizing facilities already necessarily established at the college.

The course in pre-medicine at Clemson is particularly fortunate in having available work in the natural sciences necessarily provided for other fields here but not generally found at other institutions in the state.

The course in Industrial Physics, inaugurated shortly before World War II, is training students for service in the industrial world in this field in which the national supply is very limited and especially needed because of important developments in atomic and nuclear physics.

The course in Arts and Sciences is provided for the accommodation of those students who wish to attend Clemson and who want a good general education rather than specialized training in a technical field.

In the Physics Department addition of some modern equipment and acquisition of a considerable volume of war surplus equipment has made possible participation of individuals in research activities as well as improved teaching facilities. Several members of the Physics staff are engaged in research problems in such time as they can find from their teaching duties. Most of this research is connected directly with research problems in agriculture or textiles; e.g., the physicists have used the electron microscope in research on soils in cooperation with studies in progress in the Agricultural Experimental Station.

The employment of sufficient and adequately qualified staff personnel in the School of Arts and Sciences has been exceedingly difficult particularly because of salary competition with other
institutions, the government, and industry in the face of an inadequate supply. Fortunately, in spite of the loss of a number of men to higher salaried positions, the School of Arts and Sciences is presently better staffed than at any time since prewar; however, there remains the perennial problem cycle of employing promising inexperienced young men, training and losing them, and having to replace them with other inexperienced men.

One serious handicap of the School of Arts and Sciences in performing its proper function is the woeful lack of building space. We are utilizing our classrooms and laboratories to the utmost, using them much more than what was set in the rigid scale of the army contracts as one-hundred percent use during the war. Not a single member of the staff of the School of Arts and Sciences, dean, department head, or instructor, has a private office. Most of our men have no place where they can have conferences with students, and there is practically no provision for instructors even to have desks at which to work while other instructors are using the available classrooms. This condition definitely is not conducive to good work. In the face of these adverse conditions the staff continues to exert its best efforts to give a good quality education to the big numbers of young men who crowd the institution.

The past year has been a very successful one for the School of Chemistry and it is anticipated that the year 1948-1949 will be even better.

The most vital need of the School of Chemistry at the present time is more space. During the past year a Naval Research Contract was consummated. This has worked out very successfully, serving as a stimulus to both faculty and students. During the past fiscal year only one student has been working under this contract but two students will be so employed during the coming year. In order to provide space for the work this year a stock room had to be taken over. Since this is an expanding program, more space will be necessary for the coming year and where to find it is a major problem.

Starting in September, 1948, a graduate program is being instituted leading to the degree of Master of Science in Chemistry. Under ordinary circumstances it would probably have seemed more
sensible to defer this program until a new building was available but circumstances have made it virtually impossible to delay any longer. The problem is to secure temporary instructors for instructing in General Chemistry, a course required of all Clemson students. Institutions offering graduate work are able to attract B.S. graduates as part-time instructors while they take graduate courses themselves. Without such a program Clemson cannot attract these men with present high living costs and the low salaries available for young instructors, which practically forces us to introduce a graduate program. Furthermore, the draft will probably reduce markedly the supply of recent chemistry graduates available as instructors and competition will be very keen among all institutions for the services of these few men available.

The situation is not without its bright side, however, as this state definitely needs more chemists with advanced training, especially with the current industrial expansion in the state, and it seems only reasonable that these men should be able to get the necessary advanced training in South Carolina rather than be forced to go to other sections of the country to secure such instruction.

The introduction of graduate work once more presents the problem of additional space for research and advanced laboratory fac-

Students working in the qualitative analysis laboratory of the School of Chemistry.
ilities as well as more space for an expanded library of technical journals vital to any graduate research.

The plans for a new Chemistry building to provide the space necessary for the program just outlined have already been drawn. However, the estimated cost for a building of sufficient size is over a million dollars and the money available to date is only about half that amount.

In spite of the crowded condition in the School of Engineering the past year was satisfactory. A large number graduated in all the curricula except Chemical Engineering, this being the first class to receive the degree of Bachelor of Chemical Engineering since the change in Curriculum from Chemistry-Engineering. Practically all of the graduates were employed before graduation at good salaries. On the whole married students preferred to stay in the South as did many others.

It was difficult to obtain properly qualified personnel for the faculty. A few positions were never filled and it was necessary to resort to the use of seniors, some of whom had light schedules. Seniors were used for laboratory and drawing teachers and as a whole did a very creditable job.

During the year much of the surplus equipment received from the government was put into service. The shops, with the exception of welding, are well equipped. New equipment has been installed in the Chemical Engineering laboratory and a good start made toward an excellent laboratory.

Much new equipment has been added to the Electrical laboratory and also to the Mechanical laboratory. The equipment is very modern and quite flexible and not every engineering school has such excellent equipment.

The Ceramics Department has been moved into new quarters in the basement of the shop building and now has in use most of the new equipment purchased or obtained from surplus. This laboratory is probably the equal, if not the best equipped, of any in the South. Professor Robinson has continued his cooperation with the State Planning Board and collected and tested many samples of clay and non-metallic minerals from this and other sections of
the state. He has also worked on siliminit in cooperation with the T.V.A. and has obtained some interesting results which may prove valuable later. It is planned to continue this and other research on the natural resources of the state.

Research in Chemical Engineering and Civil Engineering is being planned. There is much along these lines which may prove of great value to the state.

A two-stage evaporator in the new chemical engineering laboratory of Clemson College.

The greatest need at the present time is space. Some new equipment cannot be installed because of lack of space. Not only is space needed for laboratories but it is needed for classrooms also. In addition to space needed for undergraduate work there is pressing need for space for graduate work and research.
The School of Textiles during the past year has made real progress. The enrollment was the highest ever, reaching 710 during the second semester, making the school second only to the School of Engineering. It is expected that between 750 and 800 students will be in the textile courses this year. There were 116 graduates for the year, counting the summer school group. All these who sought positions were readily placed in industry mostly in the southern states which would gladly have taken four or five times as many.

Fortunately the school has been able to employ an ample number of well-trained staff so that classes have not been overcrowded.

Clemson textile students studying weaving technique on a Jacquard loom as part of an advanced weaving course.
nor instructors overloaded. There were 26 members on the teaching staff last year and there will be 30 this year.

The J. E. Sirrine Foundation was put in operation during the year to enhance retirement allowances for Associate and Full Professors and to provide funds for extra professors to carry on classes during visits of the faculty members to the industry. Travel funds were also increased to facilitate these contacts between the textile faculty and the mill personnel.

The equipment of the school has been greatly increased since the war and though more should be provided the teaching efficiency has been considerably improved. The equipment we got both from the industry and state funds was most timely to help with our one hundred percent more students than before the war.

The courses in knitting are to be greatly expanded and the knitting machinery companies are cooperating by placing equipment here on consignment. It is hoped that increased emphasis in this field will bring much new industry to the State.

Plans are being made for graduate work which should accelerate the research program that has been underway the past two years.

Summing up it is believed the continued development of the present plans and our superior plant should keep Clemson at the top in textile education.

Plans are developing toward having the Textile School serve the Agricultural Experiment Station and manufacturers of the state in studying cotton from the raw state to the finished product.

Interest in Education as a career seems to be appealing to more young men, as evidenced by the fact that in the summer commencement in 1948 the second largest number of graduates from the different schools at Clemson was from the School of Vocational Education. These young men were preparing for work in agricultural education, science, mathematics, and administering schools; others will teach industrial education.

Industry and business as well as agriculture are looking to Education. The trend of young men to the challenging opportunities is being helped by the gradual improvement of the teachers’ salar-
ies. School systems are calling for better preparation, and graduate work is receiving more attention by teachers.

Over 700 teachers of some 5000 veterans training for farming under the G.I. Bill were given a short course to learn the most modern findings of the agricultural experiments and how to interpret and teach these to adults.

Some 40 teachers enrolled in courses for graduate students only. This included principals, teachers of vocational agriculture, and teachers of industrial arts. They desire to know how to do their job better; and they also desire to meet teacher certification requirements to advantage to their schools and to themselves.

The curriculum is being studied very carefully. The needs of the schools for teachers trained in the fields of learning covered by Clemson are being coordinated with the program. This work involves the following: (a) pre-employment training—regular four year program; (b) graduate training as mentioned above; (c) in-service training through visits, conferences, and extension courses. Work has been done in a few centers for industrial education teachers. Two agricultural teacher trainers spent most of their time last year giving in-service training here and out in the state for teachers of veterans. Other teacher trainers and state supervisors of the State Department of Education have worked together in other sections of the state. In order to keep abreast of the times in this work, several members of the faculty have visited other institutions and attended conferences with leaders in other states.

Conclusion

Demands for public service activities come from people in all sections of the state. The problems of the agricultural and other industries seem to resort to constant changes which require study. Also, people demand that they be kept up to date on new methods and it is our plan to meet these demands. Members of our staff realize the importance of the public service needs of the state and their interests are devoted to successful efforts along these lines.

President
REPORT OF THE TREASURER

Dr. R. F. Poole, President
The Clemson Agricultural College
Clemson, South Carolina

Dear Dr. Poole:

I have the honor of transmitting herewith the annual report of the financial affairs of the Clemson Agricultural College of South Carolina for the fiscal year July 1, 1947 to June 30, 1948 in accordance with an act of the General Assembly.

Respectfully submitted,

A. J. BROWN, Secretary-Treasurer

THE CLEMSON AGRICULTURAL COLLEGE
COLLEGIATE ACTIVITIES
Fiscal Year — July 1, 1947 to June 30, 1948

INCOME

Legislative Appropriation:
(Revenue from Operation of Clemson College transmitted to State of South Carolina)

Student Living Expense Fees:
Subsistence $726,457.82
Laundry 95,468.40
Room 81,182.57 $903,108.79

Student Other Fees:
Student Activities 59,380.61
Hospital 54,931.92 114,312.53

Tuition, Matriculation, Lab Fees:
Regular Session 779,317.18
Summer School — 1947-48 65,210.00
Summer School — 1948-49 18,594.58 863,121.76
### The Clemson Agricultural College

#### Other Revenue:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent</td>
<td>21,354.53</td>
</tr>
<tr>
<td>Electric Current &amp; Water Sales</td>
<td>58,471.45</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>10,690.18</td>
</tr>
</tbody>
</table>

**Total from Operation of Clemson College** $1,971,059.24

- Privilege Fertilizer Tag Tax paid to State of South Carolina: $249,970.84
- From Other State Funds: $345,799.92

**Total Legislative Appropriation** $2,566,830.00

- Refunds to Appropriation: $473,210.03
- Federal Funds: $45,841.20
- Endowment Funds: $9,266.36
- Miscellaneous: $18,509.28

**Total Income Collegiate Activities** $3,113,656.87

#### EXPENDITURES

*July 1, 1947 — June 30, 1948*

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>A-1 Salaries</td>
<td>$1,109,965.95</td>
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<td>A-2 Wages</td>
<td>381,625.00</td>
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<td>B-2 Travel</td>
<td>21,534.21</td>
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<tr>
<td>B-3 Telephone and Telegraph</td>
<td>6,029.36</td>
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<tr>
<td>B-4 Repairs</td>
<td>133,439.55</td>
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<tr>
<td>B-6 Heat, Light, Water, Coal &amp; Power</td>
<td>167,294.84</td>
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<td>B Contractual Services</td>
<td>10,935.75</td>
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<tr>
<td>C Supplies</td>
<td>829,098.82</td>
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<tr>
<td>D Other Charges</td>
<td>277,687.96</td>
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<tr>
<td>G-7 Equipment</td>
<td>175,755.63</td>
</tr>
<tr>
<td>H-3 Improvements</td>
<td>289.80</td>
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**Total Expenditures** $3,113,656.87

*Includes $50,122.15 for Fertilizer Inspection and Analysis and $1,328,561.88 for Student Subsistence, Room, Laundry, etc.

#### Smith-Lever Agricultural Extension Work

**Receipts:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriations: Federal</td>
<td>$833,565.54</td>
</tr>
<tr>
<td>State</td>
<td>532,800.00</td>
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</tbody>
</table>

**Total** $1,366,365.54
### MISCELLANEOUS STATE APPROPRIATIONS
#### EXTENSION SERVICE

**Receipts:**
- Camp Long Appropriation $2,000.00
- Camp Cooper Appropriation 5,000.00
- State Soil Conservation Committee 3,833.69

**Expenditures:**
- A-2 Wages 2,795.60
- B-2 Travel 3,176.97
- B-4 Repairs 8.00
- B-6 Heat, Light, Water & Power 108.93
- B Other Services 2,780.75
- C Supplies 1,683.29
- D Fixed Charges 258.15
- G Equipment 22.00

#### SOUTH CAROLINA EXPERIMENT STATION
##### Federal Funds

**Receipts:**
- Adams Fund $15,000.00
- Hatch Fund 15,000.00
- Purnell Fund 60,000.00
- Bankhead-Jones Fund 64,344.59
- Research & Marketing (Regional) Fund 22,200.00
- Research & Marketing (Non-Regional) Fund 44,427.92

**Expenditures:**
- A-1 Salaries $1,048,553.85
- A-2 Wages 8,876.56
- B-2 Travel 188,997.25
- B-3 Telephone & Telegraph 11,495.66
- B-4 Repairs 2,943.14
- B-6 Heat, Light, Water, & Power 568.28
- B Other Services 27,521.59
- C Supplies 49,788.01
- D Fixed Charges 1,181.86
- G Equipment 14,235.87

**Total Expenses:** $1,354,162.09
### THE CLEMSON AGRICULTURAL COLLEGE

<table>
<thead>
<tr>
<th>Expenditures:</th>
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<tbody>
<tr>
<td>A-1 Salaries</td>
<td>154,485.78</td>
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<td>B-2 Travel</td>
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<tr>
<td>B-3 Telephone &amp; Telegraph</td>
<td>1,564.11</td>
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<td>B-4 Repairs</td>
<td>3,563.13</td>
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<td>B-6 Heat, Light, Water &amp; Power</td>
<td>1,463.40</td>
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<td>B Other Services</td>
<td>3,251.14</td>
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<td>C Supplies</td>
<td>17,177.57</td>
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<td>D Fixed Charges</td>
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<td>G Equipment</td>
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<tr>
<td>H-2 Building</td>
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<td></td>
<td><strong>213,024.22</strong></td>
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### SOUTH CAROLINA EXPERIMENT STATION

#### State Fund

<table>
<thead>
<tr>
<th>Receipts:</th>
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<tbody>
<tr>
<td>Agricultural Research Work</td>
<td>467,603.77*</td>
</tr>
<tr>
<td>Crop Pests &amp; Diseases</td>
<td>15,000.00</td>
</tr>
<tr>
<td>Edisto Experiment Station</td>
<td>50,000.00</td>
</tr>
<tr>
<td>Farm Mechanization Research</td>
<td>25,000.00</td>
</tr>
<tr>
<td>Farm Mechanization Research (Edisto Experiment Station)</td>
<td>10,000.00</td>
</tr>
<tr>
<td>Horticultural Products Laboratory</td>
<td>10,000.00</td>
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<td>Land Use Project</td>
<td>10,000.00</td>
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<tr>
<td>Lime &amp; Forage Investigation</td>
<td>10,000.00</td>
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<tr>
<td>Pee Dee Experiment Station</td>
<td>30,000.00</td>
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<td>Truck Experiment Station</td>
<td>34,800.00</td>
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<tr>
<td>Research Fruits &amp; Nuts</td>
<td>30,000.00</td>
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*Includes $382,603.77 Sales Farm Products transmitted to State of South Carolina as Refund to Appropriation.

<table>
<thead>
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<tbody>
<tr>
<td>A-1 Salaries</td>
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<td>A-2 Wages</td>
<td>179,424.53</td>
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<td>B-2 Travel</td>
<td>10,952.36</td>
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<tr>
<td>B-3 Telephone &amp; Telegraph</td>
<td>2,525.05</td>
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<tr>
<td>B-4 Repairs</td>
<td>42,327.75</td>
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<td>B-6 Heat, Light, Water &amp; Power</td>
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<td>B Other Services</td>
<td>5,604.22</td>
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<tr>
<td>C Supplies</td>
<td>179,744.29</td>
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<td>D Fixed Charges</td>
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<td>G Equipment</td>
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<tr>
<td>H-3 Improvements</td>
<td>5,861.53</td>
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|                                   | **692,403.77** |
### LIVESTOCK SANITARY WORK DIVISION

**Receipts:**
- State Appropriation: $107,394.00
- Sales & Service: 39,806.54

**Expenditures:**
- A-1 Salaries: $61,548.90
- A-2 Wages: 9,814.75
- B-2 Travel: 14,410.31
- B-3 Telephone & Telegraph: 678.62
- B-4 Repairs: 218.61
- C Supplies: 52,444.73
- D Fixed Charges: 5,886.21
- G Equipment: 2,198.41

### STUDENT ACTIVITY FUNDS

**Receipts:**
- Athletic Association: $157,206.34
- Taps: 28,182.49
- Tiger: 14,612.48
- Y. M. C. A.: 126,018.06
- Concert Series: 23,355.47
- Clemson Alumni News: 3,009.30
- Student Parking Fines: 311.00

**Expenditures:**
- A-1 Salaries: $61,300.99
- A-2 Professional Services & Wages: 32,529.68
- B-2 Travel: 32,976.17
- B-3 Telephone & Telegraph: 1,272.49
- B-4 Repairs: 10,532.45
- B Other Services: 61,010.54
- C Supplies: 44,177.66
- D Fixed Charges: 60,606.80
- G Equipment: 42,000.00
- Investments Y. M. C. A.: 44,177.66

### STUDENT BANK ACCOUNT

- Balance on Hand July 1, 1947: $109,013.96
- Deposits Current Year: 571,357.31
- Checks Paid Current Year: 568,072.21
- Balance June 30, 1948: 112,299.06
The Board of Visitors, after three days at Clemson College, is conscious, first of all, of the necessity for increased revenue to support the educational, training, research and extension activities of the institution and to provide adequate buildings, facilities, apparatus and equipment for the program that is serving, not only 3,200 students but, in a large degree, the people of South Carolina.

Clemson College, it appears, is not only an institution of learning, specializing in the agricultural and technical education of students, in conjunction with military training, but the directing agency of a state-wide extension program and the center of vital and important research of incalculable value to the farmers and business men of South Carolina.

The Board, on the basis of its observation, commends without reservation the magnificent effort of officials, teachers and employees to cope with the problems involved in the presence of a student body and an expanded program of instruction and research that vastly exceed the capacity of the college plant.

Consequently, the Board of Visitors feels it necessary to emphasize the importance of promptly readjusting the compensation of those employed so as to permit the college to employ and retain an adequate and efficient staff and to secure the services of teachers, technicians and specialists of the highest type. The demand for capable men is great, both from other institutions and from industry, and the college, if its work is not to be impaired, must have sufficient funds to offer satisfactory compensation to the members of its staff.

The Board of Visitors suggests that the contribution of the college, through scientific research and extension programs, to the
people and the economy of South Carolina, can hardly be exaggerated. These activities are over and above normal collegiate work. They add to the operating expenses of the college but should be regarded as an investment made for the welfare of the people and the economical development of the state. We urge that efforts be made to secure increased funds, allocated to these activities, but without jeopardizing the financial support that should be available to provide adequately for the needs of students attending Clemson College.

The Board of Visitors, after inspecting the major departments and acquiring most detailed information, is deeply concerned with the crisis confronting the college, now badly overcrowded. While conscious of this general condition, the Board without depreciating the over-all need offers the following suggestions:

(1) We reemphasize the necessity for providing adequate salaries.

(2) The physical plant of the college should be preserved and maintained by timely repairs and renovation and it is important that money be available to keep the plant in good repair.

(3) That the School of Architecture be separated from the School of Engineering and that a suitable building be provided for it; this will release space now occupied in the Engineering Department, thus partially relieving over-crowded conditions in that Department.

(4) The shortage of modern and necessary equipment in many departments is a serious handicap that should be remedied as early as practicable; this is especially noticeable in the Textile Department.

(5) In connection with the public service, extension and research program, we consider the following buildings are most essential:

(a) A ceramics engineering building; (b) an animal husbandry building; and (c) an experimental freezer-locker plant.

(6) That the members of the General Assembly be invited to visit Clemson College and, if this is impractical, that selected committees of both houses be urged to do so.
The Board of Visitors commends the General Assembly for its action in providing funds for a centralized heating plant, a chemistry building and agricultural and industrial engineering building and a student hospital. These buildings have been badly needed for years.

The Board has been favorably impressed with (a) the conservative leadership of a sincerely progressive staff; (b) the efficient and economical operation of all departments, (c) the excellent appearance of the cadet corps, (d) the morale and good behavior of the entire student body, and (e) the manner in which the students have maintained the cleanliness of the campus and the buildings used by them.

The Board recommends to the Trustees the appointment of Mr. Hugo S. Sims, of Orangeburg, as the hold-over member of the Board of Visitors for 1949.

The members of the Board appreciate the opportunity of visiting Clemson College and to become acquainted with the great work that it is doing for the State of South Carolina. We express our appreciation of Dr. R. F. Poole and those associated with him in this work and our thanks to Mr. J. H. Woodward and others who contributed so greatly to our comfort and convenience while at Clemson College.

Respectfully submitted,

Roddy Reid, Chairman
Hugo Sims, Secretary

Austin Busby
R. R. Coker
Frank Duncan
T. J. Mitchell
Chas. B. Nichols

Frank P. Prettyman
A. B. Taylor
P. A. Wallace
W. L. Watkins
Albert Simons
REPORT OF DIRECTOR OF DEPARTMENT OF FERTILIZER INSPECTION AND ANALYSIS

Dr. R. F. Poole, President
The Clemson Agricultural College
Clemson, South Carolina

Dear Dr. Poole:

I have the honor to transmit herewith the report of the Department of Fertilizer Inspection and Analysis for the fiscal year ending June 30, 1948.

Respectfully submitted,

H. P. COOPER, Director

Inspection and Analysis of Commercial Fertilizers

The inspection and analysis of fertilizers is under the supervision of the Fertilizer Board of Control, a Committee of the Board of Trustees. The Department of Fertilizer Inspection and Analysis is a department of the Agricultural Experiment Station. Its duties are to collect official fertilizer samples for analysis and to check on the tagging, labeling and weighing of all fertilizers and fertilizer materials.

Practically all samples, 95 per cent or more, are drawn on the farm. A list of inspectors, addresses, and territory worked is sent to all county agents, vocational agricultural teachers, Farmers Home Administration supervisors, and soil conservation officials annually in order that they may request their services when needed. In addition to performing their normal duties, the inspectors have served to disseminate agricultural information to farmers.

The chemical work consists of the analysis of commercial fertilizers as provided for in the South Carolina Fertilizer Law. This department also undertakes the analysis of waters, ores, minerals and other naturally occurring materials, portions of human bodies in cases of suspected poisoning (as provided for by law), and the analysis of home-mixed fertilizers. All the work of this department is done without direct charge to the purchaser.
All mixed fertilizers which are sampled in South Carolina are tested for nitrogen, phosphorus and potash content in this laboratory of the Department of Fertilizer Inspection and Analysis at Clemson. Refunds are secured for farmers where samples are found deficient.

The following is a brief summary of the activities of the department for the fiscal year 1947-1948.

- Number of samples secured and analyzed: 5,125
- Percent of samples deficient: 3.14
- Refunds to farmers on account of deficiencies: $6,345.90
- Number of bags found underweight: 9,322
- Number human stomachs analyzed: 16

This department works closely with all agricultural agencies and the fertilizer industry. These efforts have resulted in raising the analyses from a 3-8-3 in 1937 to a 4-10-6 in 1947; this represents a tremendous reduction in useless, inert filler. The number of grades has been reduced from 222 to 30. Six of the 30 grades constituted 90 percent of the sales. An annual fertilizer conference, attended by fertilizer manufacturers, dealers, salesmen, and agri-
cultural workers, is sponsored by this department. Nearly 300 persons attended the 1948 conference held at the Pee Dee Experiment Station, Florence. Fertilizer deficiency symptoms, variety tests, and results with various insecticides were observed on the station's farms.

Fertilizer weights are checked to protect the farmer against underweight bags. In 1948, 9,322 bags of fertilizer were found underweight in this manner by the Fertilizer Inspection and Analysis Department.

Several trips were made by the department and college staff members to Washington in an attempt to alleviate the acute fertilizer material shortage, especially the critical shortage of nitrogen.

A hearing was arranged in Washington, D. C., on May 11, 1948, with agricultural leaders, congressional and farm representatives from Virginia, North Carolina, and South Carolina to protest any increase in the export of nitrogen. The committee stressed at the hearing the acute nitrogen shortage in their states and requested Congress and other government officials to exert every effort to remedy the shortage.
Infectious Anemia (Swamp Fever)

During the year Infectious Anemia (Swamp Fever) caused considerable losses among race horses in the New England States and other isolated sections of the United States. As many of these horses are trained in South Carolina during the winter months, it was necessary to issue a quarantine against the importation of any exposed animals from the diseased area. All horses and mules coming into the state from these areas were required to be accompanied by a health certificate, showing that they had successfully passed the screen test as outlined by the Bureau of Animal Industry for the detection of this disease. By taking this precaution we feel sure that many diseased animals were not allowed to enter the state. No Infectious Anemia was found in any of the racing horses or other horses and mules in the state during the year. We received excellent cooperation from all parties interested in the racing horse industry in the prevention of the spread of diseases among their animals.
Equine Encephalomyelitis

Equine Encephalomyelitis (sleeping sickness in horses and mules) has been found in some sections of the state. In the infected areas all exposed animals have been inoculated with vaccine to prevent this disease and also many known exposed animals were treated as a matter of routine precaution to keep the disease from spreading among horses and mules on many farms.

Newcastle Disease

Newcastle disease of chickens and other species of poultry has required much work in the laboratory in order to determine its presence within the state. Birds were received from all sections of the state. The laboratory is now making a routine Hemagglutination test on all fowls which show any symptoms indicating that the disease might be affecting the birds. Making this test is a definite added contribution in assisting the poultry industry to determine if the disease is present and to outline methods of control.

Swine Erysipelas

Many investigations were made during the year with a view of determining if Swine Erysipelas is prevalent among the herds of hogs within the state. This work was carried on in cooperation with other public service agencies of the state and the Bureau of Animal Industry. According to the findings of these combined agencies, Swine Erysipelas is known to exist in several sections of the state. However, it was also found that the disease is not present to any large extent and that the swine owners' losses are not very large from this disease. On some farms where infection was found, the remaining young hogs were injected with Swine Erysipelas serum to assist in protecting them during the first few months of life. Further investigations are being made to assist in controlling this disease.

Laboratory

We have added much needed equipment and supplies in the diagnostic laboratory which will enable the department to render additional improved diagnostic service to the livestock and poultry
owners of the state. With these improvements and trained personnel we are in a better position to render this type of service than at any time during the past years the laboratory has been in operation. Among the routine examinations made are tests to detect the presence of Bang's disease in cattle and hogs and pullorum disease in chickens and turkeys. Many birds of all species, young pigs and various specimens from other livestock, are received for diagnostic examinations. This laboratory service includes gross postmortem examinations, bacteriological and pathological examinations and many other tests. When examinations are completed, in many cases veterinarians visit the farms in order to render further assistance in controlling and eliminating the diseases affecting livestock and poultry.

Various tests and examinations are made in the diagnostic laboratory of the Livestock Sanitary Department, including tests for pullorum disease in chickens and turkeys and Bang's disease in cattle.
Bang's Disease

Brucellosis (Bang's disease) in cattle and hogs continues to be one of our main disease control problems. Much progress has been made during the year in eliminating the infection from many herds of cattle and a small number of swine herds. At this time we have approximately 112 Bang's Disease-Free Accredited Herds in South Carolina and approximately 186 other herds which are in the process of accreditation. During the year 1,102 Bang's disease reactors were found in testing 52,327 cattle blood samples. Additional experimental and research work is needed in order that we may have increased information in the control of swine brucellosis.

Drawing a blood sample from a cow in order to test for Bang's disease (Brucellosis). During the year 52,327 cattle were tested in this manner, and 1,102 of them were found to have the disease.

Tuberculosis

Tuberculosis was found in a few additional farms during the year; however, many of the previously infected herds have now been released from quarantine. All quarantined infected herds
are being tested at periodic intervals in cooperation with the Bureau of Animal Industry. A check is made on all incoming shipments of cattle, where this office has advance knowledge of their arrivals, to see that the cattle were properly tested for tuberculosis prior to their entry into the state. If there appears to be any question regarding the health status of these shipments, the animals are rechecked upon their arrival within the state.

**Indemnity Payments for Cattle Infected with Tuberculosis and Bang's Disease**

During the year the General Assembly amended the state law regulating the payment of indemnity to owners of cattle which were slaughtered as a result of Tuberculosis and Bang's disease infection. In amending the laws provisions were made whereby the state may make indemnity payments in many cases where the cooperating federal agency is not authorized to make such payments from federal funds, since the owners cannot meet all requirements of that agency. These changes in the state law have been an aid in improving the relationship between this department of the college and the owners of diseased livestock. Plans are now under way to further liberalize indemnity payments made by the Bureau of Animal Industry.

**Other Services Rendered**

During the year calls were made to 12,051 farms to assist with prevention, control and elimination of livestock and poultry diseases. In making these calls 131,390 hogs were treated against cholera; 2,332 cattle were treated against Hemorrhagic Septicemia; 3,366 cattle were treated against Black-leg; 655 cattle were treated against Keratitis; 18,188 chickens were treated against Fowl Pox; 971 dogs were treated against Rabies; 651 miscellaneous animals were treated for various diseases and 308 other animals and poultry were examined in making special field investigations.

**Promotional Sales**

An increased number of the various species of livestock and poultry has been examined and tested during the year to assure pro-
pective purchasers that they were getting disease-free animals. Such examinations and tests, together with a physical examination of the individuals to be shipped, include tests for Bang’s disease, Tuberculosis, Mastitis, Newcastle and Pullorum diseases.

**Livestock Auction Markets**

Progress is being made by working with livestock auction market operators and their customers to assist in offering healthier animals for sale through this medium of exchange. Many hogs are treated against cholera before and after the sale in order to prevent and control the spread of this disease. As a result of educational and publicity programs, we find more cattle which leave these markets are being tested for Tuberculosis and Bang’s disease than during previous years. An increasing number of cattle are being treated before leaving the markets in order to prevent such diseases as Hemorrhagic Septicemia, Infectious Keratitis and Black-leg.

**Health Certificates**

We are receiving excellent cooperation from livestock owners who purchase animals and poultry in other states and ship them to their farms to improve their livestock and poultry. In the majority of cases the purchaser has met the health requirements for admission of such shipments into the state. During the year approved health certificates were received indicating that we imported 4,898 cattle, 1,650 hogs, 2,920 horses and mules, 366 dogs, sheep and goats and 10,011 chickens. When we have knowledge of shipments made contrary to the state laws, rules and regulations, the incoming livestock is required to be examined by a veterinarian, from this office or a deputy state veterinarian. If necessary, tests are conducted and if any diseased and exposed animals are found, they are placed under quarantine, pending the outcome of the entire shipment.

During the year health certificates were issued and approved covering 1,595 cattle, 1,134 chickens, 516 horses and mules, 268 hogs and 111 miscellaneous species of animals shipped out of the state.
Educational

Mimeographed copies of excerpts from the Code of Laws of the State, pertaining to the health requirements for admission of livestock into the state and also the sale of diseased livestock within the state, were mailed to more than 1,000 livestock and poultry owners and other groups of people who are vitally interested in the welfare of the livestock industry. This information was disseminated in order to better acquaint the prospective purchaser of livestock and poultry of the necessity of determining the health status of animals and poultry prior to their shipment into the state. We feel that much progress is resulting from the dissemination of this information.

State-wide and local group meetings were held in cooperation with the various public service agencies of the state, and livestock owners, in order to discuss the disease control problems with the view of developing plans and programs to eliminate many disease hazards affecting the livestock and poultry industries of the state. Committees were appointed to study the disease problems and make reports back to the various groups at an early date.
REPORT OF THE STATE CROP PEST COMMISSION

Dr. R. F. Poole, President
The Clemson Agricultural College
Clemson, South Carolina

Dear Dr. Poole:

I have the honor to transmit herewith the Annual Report of the Crop Pest Commission for the fiscal year ending June 30, 1948.

Respectfully submitted,

H. P. COOPER, Director

White-fringed Beetle

The white-fringed beetle was discovered in this country in 1936 in Okaloosa County, Florida. The time and method of its introduction into the United States is not known, but it was probably introduced into the Gulf Coast and South Atlantic ports in a shipment from South America. These beetles have been spread from early infested areas to nurseries, railroads, residential, farm and industrial sites.

In 1946, a small isolated infestation was found in the Five Points section at Columbia. At the close of the 1946 inspection season, only a small portion of one city block was known to be infested. This infestation resulted through the movement of nursery stock from an infested nursery in Georgia prior to the time that infestations were found in the nurseries of that state. Large quantities of nursery stock which originated in known infested nurseries in Georgia had been sold in and around Columbia through a dealer in that city. Time did not permit a thorough inspection of all likely points of infestation in 1946.

During 1947, a total of 9,708 man-hours devoted to inspection activities in this state resulted in the discovery of three additional more-or-less isolated infestations in the City of Columbia and one infestation in a small nursery near Winnsboro. All of the infesta-
tions in Columbia are traceable to shipments of nursery stock from the same infested nursery in Georgia. One of these infestations, located at Geiger Street, involves three larvae taken in a flower bed. No additional larvae or adult specimens could be recovered in that vicinity. An infestation at Duncan Street is also restricted in size, as only a limited number of specimens was recovered in the middle of a residential city block. No specimens were found in any of the adjoining city properties.

Specimens were taken around two new buildings on the grounds of the South Carolina State Hospital which had been landscaped with nursery stock originating in Georgia. White-fringed beetles were found in the edges of the two fields lying adjacent to these buildings. Thirty-six acres are considered infested in the City of Columbia, nearly half of which is farm land located on the State Hospital grounds.

The infestation at Winnsboro was found in a small two-acre nursery. The property is located approximately six miles northwest of the City of Winnsboro.

Although specimens were recovered only in a small portion of the two acres planted to nursery stock, adults were taken in the margins of a cotton field, a field planted to corn and peas, and in the edge of a small pasture.

All of the nursery stock in the two-acre infested nursery at Winnsboro has been moved and fumigated, or otherwise handled in accordance with approved practices, to eliminate the dissemination of white-fringed beetles.

All of the other inspection activities throughout the state, including the intensive surveys of planting sites of nursery stock which had originated in the known infested nursery at Winnsboro, revealed no additional infestations.

The larvae of the white-fringed beetle are known to feed on over 300 species of plants, while the adults feed on a smaller number. The damage caused by this insect is a result of the activity of the larval stage. Considerable damage can be expected when the larvae population exceeds 50 to 70 larvae per square yard of soil. These beetles are an agricultural pest causing damage to row crops such as peanuts, cowpeas, soybeans, corn, cotton, etc.,
which have soft tissues. They will, however, under certain conditions attack woody stem plants, such as ornamental shrubbery and orchard trees.

Since known infestations in South Carolina are within a relatively small area, the State Crop Pest Commission and the United States Department of Agriculture have quarantined these areas and put into effect drastic control measures. The primary objective of these measures is not only to prevent further spread of the white-fringed beetle but to eradicate this pest before it can become well established in this state.

In the control work, 100 acres of infested land were sprayed every two weeks during the summer within the City of Columbia, using foliage applications of DDT. In those areas where feasible, soil treatments (incorporating DDT into the soil) are being made. The soil treatments are more effective than the foliage spraying, but two or three years are required before the beetles can be eradicated from a particular site.

A tractor mounted sprayer-duster of the type used by the Crop Pest Commission in applying concentrated emulsion DDT spray for the white-fringed beetle infestation in Columbia and Winnsboro.

The total acreage treated in South Carolina has been confined to the infested sites. Treatments were first begun by using a concentrated sprayer mounted on a tractor, and later the sprayer was mounted on a jeep to provide more mobility.
Considerable soil movement has taken place in the infested area in Columbia. All of this soil has been fumigated or otherwise treated before being moved to other locations.

A specially-equipped plane was used in dusting some of the areas infested with the white fringed beetle. This insect is a serious pest of many agricultural crops, including corn, cotton, cowpeas and other plants having soft tissues.

**Sweet Potato Weevil**

The sweet potato weevil, evidently of Asiatic origin, found its way into this country by way of South America and the West Indies. Early records note its presence in this country about 1875 in South Louisiana and the Florida peninsula. For some years it was confined to the extreme coastal portion of the Gulf Coast states where its native host plants, certain species of the genus *Ipomoea*, flourish in tidewater areas. It gradually became established in local sweet potato plantings adjacent to infested coastal areas. Later, it spread inland to areas of large commercial sweet potato production, where it is now a menace to areas representing approximately 67 percent of the total annual production of sweet potatoes in the United States.

This insect was first found in South Carolina during the fall of 1944, infesting vines of one of its native hosts, the seaside morning glory, which was growing in the sand dunes along the beach of the Isle of Palms.
During the fall of 1946, the sweet potato weevil was found infesting sweet potato vines and tubers on thirty-seven different properties in the vicinity of Charleston. The finding of this weevil in South Carolina-grown sweet potatoes was the first real threat by a major insect pest to the $12,000,000 sweet potato industry of this state. After intensive surveys, the weevil seems to be confined to a restricted area in Charleston County.

For this reason the South Carolina State Crop Pest Commission, cooperating with the United States Bureau of Entomology and Plant Quarantine, deemed an attempt at eradication advisable. Consequently, the Crop Pest Commission promulgated and passed a sweet potato weevil quarantine which became effective in March, 1947. This quarantine provided that certain areas be set aside as non-potato growing areas, and the regulations became effective for the 1948 crop. The quarantine also provides for the maintenance of certain farm management practices which are necessary to accomplish eradication of the pest.

The total area under quarantine is approximately 115 square miles. It has been estimated that sweet potatoes were grown in 1947 on 176 acres within the now quarantined area. About 300 properties were involved but only five or six large growers were affected.

The quarantine was immediately put into effect, and through the concerted effort and cooperation of the inspectors, county agents, school teachers, farmers and other interested agencies, it has been successfully enforced.

During the winter months, the control work consisted principally of cleaning up the old patches and fields; tearing down the banks and storage places; the disposal of all potatoes in the infested areas; the burning of all trash that might harbor the weevil, and the spraying of bank sites and storage places with DDT. Most of this work was completed by March 1. The cold, rainy weather that prevailed in Charleston County during last fall and winter aided materially in this clean-up campaign by causing many of the potatoes that ordinarily remain in the ground during the winter to rot.
With the advent of warm weather, the control work shifted to the eradication of "volunteer" sweet potato plants in the non-potato zone and the enforcement of the quarantine which prohibited the planting of potatoes in certain areas. This required frequent trips over the area. Only two or three gardeners in the city proper were found violating the quarantine by putting out potato plants. When the quarantine was explained to these people they readily cooperated and destroyed the plants.

Beginning about the first of May, most of the inspectors' time was devoted to the eradication of the native host plants by spraying with 2,4-D. The morning glory vines on the beaches of Folly, the Isle of Palms and Sullivan's Island were sprayed regularly throughout the growing season according to a planned schedule, using a combination spray of 2,4-D and DDT. The native host on the beach at Morris Island was given one spraying in May and another later in the season. This island can only be reached by boat. Transportation to the island was made possible through the cooperation of the United States Coast Guard, who supplied without charge boats for transportation and fresh water for mixing with the chemicals necessary for spraying.

Prospects are bright for successful and complete eradication of the weevil in sweet potatoes and the seaside morning glory (Ipomoea litteralis) through continued control operations. During the summer, however, the weevil was found infesting another species of morning glory (Ipomoea sagitatta) which is more widespread and grows in more inaccessible places. It has not yet been determined how important this species is as a host, but so long as it can support weevils it is deemed advisable to eradicate this species also. This will probably lengthen the time necessary for complete eradication of the weevil but with continued cooperation, complete control of the weevil is possible. However, additional funds and personnel will be necessary if this is to be accomplished.

Japanese Beetle

No trapping of Japanese beetles was done in South Carolina in 1948 because of lack of funds for this work, which must be done in June. No known infestation of the Japanese beetle occurs in this state at the present time, but it is a major pest in the states to the
northeast and there is every reason to believe that it would be a serious pest in South Carolina should it become established. It is believed therefore, that plant quarantine control operations should be continued and sufficient funds made available to do the necessary cooperative work with the Federal Bureau of Entomology and Plant Quarantine.

No recurrence of the insect has been noted in the areas where soil treatments were made several years ago.

**Phony Peach**

The State Crop Pest Commission, cooperating with the Bureau of Entomology and Plant Quarantine, has been making inspections annually since 1936 of the commercial peach orchards in the counties where this disease is known to occur.

Inspections began June 23, with first attention being given to nursery environs. This required about a week, and orchard inspections were underway by July 2, continuing until September 19. This latter phase of the work included practically all commercial orchards in the Ridge section and all in the Piedmont section, except in heavily-planted Spartanburg County, where only previously infected and adjacent orchards could be inspected.

Orchards were inspected in eight counties and phony-infected trees were found in seven. Of the 824 properties inspected, 87 were found to be infected. Trees inspected totaled 1,639,795, of which 372 were found to be infected with the phony disease. This rate of infection was only .02 percent, a slight increase over that found in 1946.

Phony disease has never reached serious proportions, though individual orchards in the Ridge section (Edgefield and Saluda counties) have experienced some losses. In the Spartanburg area losses from the disease have been negligible, and the primary object of the program from its beginning has been an attempt to eradicate the diseased trees in that area. There is need for complete annual inspections in this area.

Two other virus diseases, peach yellows and peach rosette, were again observed in Spartanburg County.
Nurseries

The annual nursery inspections were begun in July and completed in September. One hundred thirty nurseries, located in 35 counties, with a total of approximately 700 acres were inspected and certified. No pests of major importance were observed, but light infestations of a few of the common scale insects were found in a few of the nurseries, but not in sufficient quantities to justify refusal of certification.

The nursery business has been good during the past few years and quite a few new nurseries are beginning operation. Most of these are small enterprises but some of them, especially the camellia and azalea nurseries, have valuable stock and considerable capital may be involved even on the small acreages.

The most troublesome nursery pest at present is probably the tea scale on camellias. It is rather difficult and costly to control, requiring periodic sprayings, but can be eliminated when the spraying is properly done.

The nurseries are in better condition than during the war years and considerable interest is being manifested in the growing and sale of ornamental stock. Most of the stock is sold locally. There were issued during the 1948 fiscal year 1,352 permit tags for the shipment of nursery stock.

Greenhouses

The annual inspection of greenhouses was made during October and November. Fifty-two greenhouses, with an area of approximately 598,650 square feet, located in 25 cities were inspected and certified. No major pests were found in any of these, though some of the common ones were observed, such as aphids, red spiders, mealy bugs and scale insects.

Sweet Potato Diseases

For a number of years the State Crop Pest Commission has required the inspection of sweet potatoes in the field, in storage and plant bed in an effort to prevent the distribution of diseases and to help the growers produce disease-free stock.
None of the major diseases in field or storage occurred in quantities sufficient to refuse certification except in the case of wilt.

The virus disease known as internal cork is quite common throughout South Carolina and is a matter of concern to plant quarantine officials and growers alike. So far, there have been no complaints from this disease from the northern markets, though it has the possibilities of becoming a serious problem.

During the season, three inspections were given the plantings of 130 sweet potato growers, 14 more than the 1946-1947 season. These consisted of field, storage and plant bed inspections. The field inspections covered approximately 1,000 acres, located in 28 counties.

Last year 4,116 permit tags were issued for the shipment of seed sweet potatoes and plants.

**Irish Potatoes**

The annual inspection of seed Irish potatoes for planting in Charleston County was begun on January 5 and completed on January 15. One shipload consisting of 100 cars arrived in late December. No effort was made in this shipment to keep the various cars or varieties separated, thereby making inspection difficult. A total of 167 cars was inspected during this period. The common diseases such as scab and rhizoctonia were observed in most of the cars, but none in quantities exceeding the tolerance as prescribed by regulations.

As stated in previous reports, it is impossible to see a great quantity of the potatoes when making these inspections, but it is felt that a representative sample is seen and that the results of the inspection give a fairly accurate estimate of the diseases present. The 167 cars by varieties were as follows: Katahdin, 41 cars; Sebago, 57 cars; Irish Cobblers, 13 cars; Pontiac, 6 cars; White Rose, 5 cars; and Bliss Triumph, 2 cars. Miscellaneous cars which consisted of some of those in the boat shipment that could not be separated were a mixture of 43 cars of Katahdins, Green Mountain, Sequoias and Sebagos. Many of these seed were probably shipped to the upper part of the state and were not used in Charleston County. The majority of the seed came from Prince Edward Island, Canada, though there were some from South Dakota, Maine, Minnesota and Nebraska.
**Bees**

In compliance with the regulations requiring the inspection and certification of all apiaries of beekeepers who sell package bees or queen bees, 8,107 colonies were inspected last year. One hundred eight colonies of bees with the following diseases were found: American foulbrood disease, 86 colonies; European foulbrood, 72; sacbrood, 21; and nosema, 1.

These inspections are made throughout the state; however, the larger beekeepers are located in the southern part. Some disease is found in all sections of the state, but the incidence of disease is low compared with many other states. The policy of the Commission is to burn all colonies infected with American foulbrood, the most serious of the diseases. The others may be satisfactorily controlled by requeening. Good beekeeping methods play an important role in disease control and the inspector has continued to cooperate with the beekeepers in giving them advice and help when possible.

The magnitude of the industry at the present time, however, is such that practically all of the inspector's time is necessary purely for inspection and disease control.

**Pink Boll Worm**

The pink boll worm is probably one of the most serious insect pests of cotton. A native of Egypt, it was first found in the United States at several points in southeastern Texas in the fall of 1917.

In the spring of 1932, the pink boll worm was found infesting a species of wild cotton in Southern Florida. Until 1946 the Bureau of Entomology and Plant Quarantine had done an excellent job of eradicating this wild cotton, thereby protecting the cotton-growing states in the Southeast from possible infestation by this pest.

The last Congress saw fit to eliminate the appropriation for this work in southern Florida. This is of great concern to the plant quarantine officials of the Southern states, because if appropriations are not provided for the resumption of this work, it will not be long before the insect will become established in the cotton producing areas.
Dear Dr. Poole:

I submit below a report of some of the investigations carried on by the South Carolina Experiment Station. Only brief statements regarding the various projects are given since most of them are reported in detail in the Annual Report of the Station. Copies of the latter are available upon request.

Respectfully submitted,

H. P. COOPER, Director

Changes in the economic and social conditions in agriculture have created new and significant situations which will require numerous research studies to determine the most efficient combination of agricultural enterprises to meet the needs of South Carolina's agricultural interests. The migration of many agricultural workers to industrial areas has resulted in a marked reduction in the supply of farm labor in certain sections. The loss of farm labor has stimulated interest in the use of farm machinery and the introduction of more efficient practices in the production of most of the major farm products.

The large prospective surpluses of many farm products in the near future may necessitate making numerous readjustments in agricultural enterprises. It is expected that the present surpluses of feed and fiber crops will result in a larger supply of meat and other animal products.

Since the prospect of farm surpluses is imminent, it is expected that there will be demands for research information on new uses of agricultural commodities and more efficient production and marketing practices. The rapid increase in industrial enterprises in South Carolina will greatly stimulate the demands for bulky and perishable products such as vegetables, fruits and fluid milk.
The experiment station will, as far as its personnel and facilities permit, provide the farmers of the state with the research information they need to enable them to meet the changing demands for the products of their labor.

**Wireworm Control**

The sand wireworm has long been a serious problem in the production of corn and a number of other crops on certain light, sandy soils in Allendale, Hampton, Barnwell, Bamberg and parts of adjoining counties. In the past this wireworm damage could be avoided only by a rigid and often expensive system of crop rotation and fallowing. However, results of experiments now being conducted at the Edisto Station indicate that it may be possible to obtain practical control of wireworms through the addition of insecticides to the fertilizer. Both Chlordane and BHC have shown promise for the successful control of this pest.

In experiments with the tobacco wireworm, the Pee Dee Station has found that a wettable powder containing 50 per cent Chlordane could be added to the setting water to provide a very effective
means of control. This is an inexpensive treatment, since no extra labor or equipment is needed for its successful application.

Dehorning Calves

Dehorning of dairy and beef cattle is found to be a desirable practice since horns often result in damage to the animals and cause a direct money loss to the farmer. The udders of dairy cows and the meat of beef animals are often injured in this way. Such injuries may cause mastitis in the dairy cows and result in lower prices for the damaged beef animals. Experience of the Clemson Dairy Department has shown that it is preferable to dehorn calves before they are three weeks old because the horn buttons are more easily destroyed at that stage.

Clemson Jersey cows which were dehorned in calfhood. Results obtained over a twenty year period have shown that this practice pays dividends to producers of both beef and dairy animals.

Where dehorning is done, rest sheds for housing and feeding roughages can be used satisfactorily since the animals can be crowded together without danger of injuring each other. Rest sheds reduce barn costs and concentrate valuable manure which may be readily saved.
Plant Breeding

Cantaloupes — The frequency and severity of leaf spot diseases is one of the principal reasons for the poor quality of South Carolina cantaloupes. Certain lines of wild cantaloupes from India have shown a very high degree of resistance to these diseases, particularly downy mildew (commonly called blight). In an effort to obtain such resistance in South Carolina-grown cantaloupes, crosses have been made between one of the wild strains and certain commercial varieties. Since the hybrid melons retain much of the undesirable flavor of the wild parent, the plants have been backcrossed to the commercial parents in an attempt to improve quality. Observations indicate that after some further work in purifying these back crosses suitable mildew-resistant varieties of cantaloupes may be obtained.

Corn — Corn occupies more cultivated acreage in South Carolina than any other crop, yet the statistics on yield and income from this crop relegate it to a position of secondary importance in the economy of the state. Since the newer cultural practices and fertilizer recommendations can only reflect their maximum effect in combination with top quality seed, it becomes doubly important that such seed be made available to the farmer as quickly as possible.

In furtherance of this objective, two hybrids are being recommended to South Carolina farmers. NC 27, a yellow hybrid, has demonstrated its value in the Coastal Plains area of the state. It is resistant to the rice weevil and has exceeded the yield of such standard varieties as Douthit’s Prolific by an average of 10 bushels per acre. Approximately 25 acres of foundation seed of this variety were grown at Clemson the past season. Dixie 17, a white hybrid, has an outstanding record in the Piedmont area, but is not sufficiently resistant to the rice weevil for use in the Coastal Plains.

South Carolina is a member of the Southern Corn Improvement Conference and has access, as a result, to all foundation seed stocks owned by the various state and federal experiment stations. This reservoir of material is the basis for a number of promising new hybrids being tested at 10 locations in the state. Seed of these hybrids will be made available, within the physical limits of the program, as fast as they prove their worth.
Cucumbers — A new downy mildew resistant variety of cucumber developed at the Truck Station known as Palmetto, was released to the seed trade on January 1, 1948. The new variety in one trial commercial planting in the fall of 1947 had an average value of well over $1,000 per acre while standard varieties barely paid the costs of production. The Palmetto variety is particularly well suited to fall production, but it is doubtful if it has a place in commercial spring plantings outside of Florida. However, a related strain which should fill the need for a resistant early variety for spring production should be ready for release next year.

Sweet Potatoes — The Porto Rico sweet potato, although an excellent variety in certain respects including table quality, falls far short of the ideal in other ways. Among its faults are susceptibility to fusarium wilt and internal cork, as well as a tendency toward cracking under certain conditions. Efforts to develop a superior variety were begun several years ago and it is apparent that seedlings already have been obtained which are superior in color to the common Porto Rico and which produce a higher percentage of top

Dr. H. P. Cooper, director of the S.C. Experiment Station, answers questions about the cotton insecticide experiments at the Pee Dee Branch Station during the 1948 Fertilizer Conference. The annual event was attended by nearly 300 fertilizer manufacturers, dealers, salesmen and agricultural workers.
quality potatoes. Some seedlings appear to be resistant to certain organisms that cause disease and it seems likely that others are superior in yield.

**Cotton Insect Control**

Considerable progress has been made toward the development of a cotton insect control program which can be successfully used by all growers. Research conducted at the Pee Dee and Edisto experiment stations has shown that new organic insecticides are valuable additions to present materials used for cotton insect control. Of the various insecticides tested, the three most effective have been: (1) a 5 percent DDT-3 percent gamma benzene hexachloride mixture, (2) 20 percent chlorinated camphene; and (3) 10 per cent chlordane. Detailed recommendations on how to use these new insecticides have been published and widely circulated by the experiment station and extension service.

**Fruit and Nut Investigations**

Since commercial peach production has become an important agricultural enterprise in South Carolina, the need of additional research for the control of insects attacking this crop has greatly increased in recent years.

A survey of the three leading peach growing areas of the state showed that growers believed the plum Curculio, Oriental fruit moth, plant bug and peach tree borer to be the most important pests attacking the crop. Experiments were therefore planned to determine the most effective methods for controlling these insects.

Experiments and demonstrations are being conducted in all three of the peach growing areas. In addition, an experiment is in progress to determine to what extent the new organic insecticides affect the flavor of fresh and canned peaches.

An investigation has been started near Orangeburg to obtain a comparison of five fungicides in the control of pecan scab on the Schley variety. In addition, studies are being made of the pecan weevil and pecan nut casebearer.

During the 1948 season, a survey of peach diseases was conducted in the principal commercial peach areas of South Carolina. In
the Piedmont area, brown rot was the more common disease ob­served, while in the Ridge and Sandhill sections bacterial spot (Bacteriosis) was of primary importance in many orchards.

In order to determine the most effective control measures, an ex­perimental spray program for brown rot was carried on through­out the growing season near Gramling, South Carolina. The ex­periment included eight spray treatments, of which four contained sulfur and three new organic fungicides, including Zerlate, Parzate and Phygon XL. The results show that all eight treatments gave good control of brown rot through the harvest period.

Several different spray programs for the control of bacterial spot conducted by individual growers were observed during the season. Where highly susceptible peach varieties were grown, even nine or ten applications of zinc sulfate failed to give adequate control. Detailed and extensive experiments are planned for next year in an effort to find more effective control methods.

The Economics of Tractor Farming

A study of 131 farms using tractor power in 1946 showed that more cropland is needed for efficient use of tractor power than is available on many farms in the Piedmont area. Tractor power has completely replaced mule power on many farms, and the farmers who use both tractor and mule power usually make little use of the mules.

There was a tendency on the part of the tractor farmers to change the land utilization practices on their farms by growing fewer acres of cotton and corn and more acres of small grains and hay.

A small tractor appears to be more economical than mule power on typical Piedmont farms with as little as 50 acres of cropland. The advantages of tractor power are relatively greater on larger farms.

Studies of the Marketing of South Carolina Agricultural Products

A South-wide research project has been inaugurated by several state experiment stations to determine the causes and incidence of losses in marketing early Irish potatoes.
Because of the cooperative nature of the project specific and detailed results cannot now be reported. However, it may be said that the study has served to emphasize that a number of common practices are detrimental to the best interests of every producer. Many of these have already been called to the attention of those concerned and doubtless will be corrected.

Washing and grading have become accepted practices in marketing South Carolina potatoes. Consumer acceptance is greatly increased by these operations.

On the positive side, the study strongly suggests the necessity for washing and the desirability of shipping potatoes somewhat more mature than the bulk of those now going to market. While the latter would in the beginning place South Carolina potatoes in more direct competition with early (green) potatoes from states farther north, it is believed that these states, too, will recognize the advantages of shipping a more mature product and delay digging, thus restoring the usual seasonal differentials in harvesting dates.

In order to analyze existing egg marketing practices and make recommendations for improving them, a comprehensive survey has been made of the volume of egg production, sales, farm con-
sumption and losses on 625 farms in 23 South Carolina counties. The seasonal surplus and deficit periods are being studied along with egg imports and shipments as well as the relation of these factors to egg-quality and price.

For the first time it has been possible in 1948 to make some observations of South Carolina produce on the New York markets in competition with produce from other states. Growers having a "brand name" under which only high quality products are sold were found to have a definite advantage over other growers, especially when the supply was above normal.

This picture offers a good example of one way in which watermelons are damaged while being loaded. A worker is shown standing on melons as they are moved from the truck to the car. This damage does not show up when the car leaves the shipping point but often results in souring of the damaged melons in transit, rendering them unfit for sale.
Buyers showed special interest in "bulge" and heavy packs of tomatoes. A slack pack was highly objectionable and resulted in reduced prices for the tomatoes packed in that manner. Since freight and selling costs are the same for both light and heavy packs growers can add to their net return by including a few more tomatoes in each package.

In the case of watermelons, the picking and loading practices being followed by a few growers in Allendale and Hampton counties were noted, and the melons were followed through to the auction markets in New York. It was found that the principal injuries to melons occurring at the shipping point were caused by dropping them and by walking and sitting on them during loading. This damage was not apparent when the car left the shipping point, but often resulted in souring of the damaged melons in transit, rendering them unfit for sale.

A portion of the Clemson beef cattle breeding herd grazing on a winter pasture composed of crimson clover and Italian rye. Such tests have shown that labor costs for feeding can be sharply reduced during the winter months by the use of this type of pasture.

**Winter Forage for Beef Cattle**

Tests conducted by the Animal Husbandry Department during the past two years have shown that its breeding herd of beef cows can be satisfactorily and economically carried through the year on permanent (summer) pasture and winter forage.
The 27 cows in the tests were moved from permanent pasture to a winter pasture of rye grass and crimson clover late in November and had made average gains of 213 pounds each by April 28. The cost of preparation, fertilization and seeding of the winter pasture was approximately the same as the cost of the feed used in the dry lot method of feeding. However, there was practically no labor cost involved when the animals were grazed on winter pasture, while in the dry lot method of feeding the animals had to be fed twice daily. In addition to requiring less labor, the cows and calves on winter forage were healthier than those carried through the winter by the usual method.

Since this system of pasture management reduces soil erosion and increases the fertility of the soil as well, it is reasonable to assume that the costs of winter pasture preparation will be gradually reduced each year as soil fertility increases.

**Grain Sorghum for Poultry Rations**

Studies on the use of milo (grain sorghum) in poultry rations are being made by the experiment station for all classes of poultry. During the past year, trials have been conducted to determine the value of milo in broiler rations, this grain being used to replace varying amounts of yellow corn. The gain in weight of broilers and the quantity of feed necessary to produce these gains were found to be nearly identical for chickens fed rations containing corn or milo combinations of these grains.

Since yellow corn contains considerable pigments which are deposited in the skin of the chicken, thus improving market appearance, special attention was paid to this factor in these studies. Although the broilers which were fed rations containing milo and a normal amount of alfalfa meal did not have as much pigment in the skin and shanks as the corn-fed birds, they were entirely acceptable according to market standards.

Milo is an important grain crop in South Carolina, especially in the Piedmont section of the state. It is somewhat cheaper than corn, which makes possible a reduction in the cost of poultry production with an increase in returns to growers. With the wider use of cheaper, locally produced milo, poultry raisers in this state should be able to compete more favorably with producers in other sections of the country.
Experiments With Supplemental Irrigation

Many farmers throughout South Carolina have turned to supplemental irrigation equipment and applied water to their crops without any guidance or knowledge of the fundamentals of irrigation.

Samples of corn harvested from irrigated and non-irrigated plots in 1947. The corn on the left is from an irrigated plot yielding 110 bushels per acre, while that on the right is from a non-irrigated plot yielding only 22 bushels per acre.

In order to secure the greatly needed technical information on this subject, the South Carolina Experiment Station began preliminary investigations in this field in 1946. Experiments conducted so far have included irrigation of corn, alfalfa and peaches, with marked increases in the yields of each crop, as compared with the non-irrigated check plots.

Seed Treatment Research

Beginning in 1940, research work was started at Clemson in an effort to find an organic compound which could be used in treating cotton seed, replacing the present mercury compounds which are highly poisonous and disagreeable to handle. Heretofore, treated seed which were not planted could only be used for fertilizer because the toxic compounds used in disinfecting the seed prevented their use as livestock feed or as a source of vegetable oil.
As a result of the extensive experiments conducted by the Botany Department, 2-4-5 trichlorophenyl acetate, known commercially as Seedox, has proven effective in controlling seed-borne pathogens in cotton seed treatment. Feeding tests, financed by the manufacturers, have been carried out in cooperation with the Animal Husbandry Department. When 400 pound steers were fed for three months a daily amount of the chemical nine times as great as that which would be fed with treated seed, no symptoms of toxicity occurred.

Forest Research

The forest research program being carried out includes several significant experiments.

Studies are being made to determine the economic feasibility of converting low-value scrub hardwood stands to stands of more desirable pines and hardwoods. There are many such areas in South Carolina which are not contributing to farm income, since they produce no saleable timber. Preliminary results indicate that eradication of "weed" species by use of the chemical "Ammate", followed by replanting, seems to be the most likely solution to the problem.

Since the period needed to reforest the woodland areas of the state by natural means is estimated to be about 80 years, it seems likely that the use of pelleted pine seeds in a direct seeding program might aid in reducing this long period. The incorporation of a fungicide, rodenticide and plant nutrients in a mixture which can be used to pellet pine seeds will assist the seedlings in making a satisfactory start.

Another project, involving the use of the fungus, *Fusarium lateritium*, for inducing gum flow in Virginia pine, is being undertaken in cooperation with the Southeastern Forest Experiment Station.

Home Economics Research

During the year 1947-48, the Home Economics Research Department conducted surveys on food consumption and housing as a part of a regional study in cooperation with other Southern Ex-

In the food consumption study, a daily record of the kinds, amounts and prices of foods used for a given week was kept by 149 rural South Carolina families in four Coastal Plains counties. Another group of 25 families was interviewed and a list of the foods eaten by them during the previous week was obtained.

When the analysis of the data which were obtained has been completed, this information will give a picture of the kinds, amounts and costs of foods which South Carolina farm people eat in the Coastal Areas. The survey will also show whether the representative diets of these people are nutritionally adequate. This information has many and varied uses, one of the most important of which is to provide a basis for future educational work in improving the diets, health and living standards of rural South Carolinians.

**Cross-Breeding Beef Cattle**

Preliminary experiments in breeding Angus cows to a Brahman bull at the Coast Station have shown promise for the production of heavy market calves.

To determine the comparative value of Brahman-Angus cross-bred and pure-bred Angus calves in the production of heavy market calves, a Brahman bull was obtained and purebred Angus cows were bred to him in 1947. At the same time a corresponding number of purebred Angus cows were bred to a purebred Angus bull. Of the thirteen purebred and thirteen cross-bred calves which resulted from this program, the cross-bred calves in every case have outweighed the purebred calves by at least seven pounds at birth. While data on weaning weights are not yet available, it seems evident that these weights will also be in favor of the cross-breds by approximately the same percentages as the birth weight differences.

The entire project has stimulated much interest and attention among beef cattle producers in this state.
Alfalfa Production

Alfalfa production studies made by the experiment station have shown that this valuable forage crop may be profitably and successfully grown on well-drained sandy loam soils in this state. A frequent and moderate amount of rainfall is an essential requirement after the farmer has done his part toward making careful land preparation and providing a high soil fertility condition. Rainfall is especially necessary after each successive cutting in order for the new shoots to appear and start growth. Four or five cuttings of hay can easily be made each season.

Making the fourth cutting of alfalfa (August 1) on Cecil sandy loam soil after a season of ample rainfall. Another crop may also easily be produced.

Experimental results have shown that the soil should be prepared well in advance of seeding and kept in a fallowed condition for a suitable period to eliminate weeds and grass. From two to three tons of limestone per acre are required, and a rather heavy application of complete fertilizer plus 500 to 800 pounds of superphosphate give best results for initial applications.
Variety tests have shown that the Kansas Common variety is well adapted to South Carolina conditions. On bacterial wilt-infested soils, the new Ranger and Buffalo varieties are desirable and may be successfully used. From 20 to 30 pounds per acre of well inoculated seed give best results, for the seed should be applied at a heavy rate in order to get a good stand which will shade out the weeds and grass.

One cause of failure with alfalfa in former years was boron deficiency, which is known as "Alfalfa Yellow". In order to prevent this condition, borax should be applied with a cyclone seeder at the rate of 25 to 40 pounds per acre after the crop has been sown. The resulting hay is a nutritious feed possessing a high nutritive value in both proteins and minerals.

Mechanization of Cotton Production

The South Carolina Experiment Station has been designated from among the Southeastern experiment stations to conduct the harvesting research phase of the regional cotton mechanization project. This study is being financed with funds made available under the federal Research and Marketing Act, passed by Congress in 1946.

The harvesting phase of the project is planned to utilize both types of mechanical harvesters which are now being produced commercially. The Sandhill Branch Station will conduct research on the stripper type harvester, while experiments at Clemson will include both the stripper and spindle types of mechanical harvesters. Other experimental harvesters will be tested and evaluated as they become available.

100 Acre Experiment — Most phases of cotton production have been successfully mechanized in connection with the 100 acre cotton mechanization project conducted at the Edisto Station. However, a few operations still remain difficult, especially during wet seasons, and a small amount of hand labor is required. Results so far have shown that seed bed preparation, planting and fertilizing can be satisfactorily performed entirely by machinery in almost any kind of weather conditions which are ordinarily encountered in the Southeast. Successful weed control with rotary hoes, sweep and flame cultivators has been found to be dependent to a large
degree on the amount of rainfall. If prolonged rainfall occurs be­
tween seedling emergence and the time at which the plants reach
a height of six inches, some hand hoeing is necessary.

Cotton fields in the 100 acre experiment have been dusted with
insecticides at the rate of 12 to 15 acres per hour with a tractor
equipped with a power take-off duster.

The spindle type cotton picker has performed very satisfactorily
in these experiments. Results obtained from the 1947 harvest show
that this type of mechanical picker harvested approximately 95
per cent of the open cotton on the plants without damage to the un­
opened bolls. This high efficiency was obtained only by careful
adjustment and servicing of the machine. The best results have
been obtained following chemical defoliation, permitting the sun
to open all of the mature bolls simultaneously. Only one picking
with the machine is then required, reducing both the cost of pick­
ing and the amount of foreign matter present in the lint.

Seed Certification Work

The South Carolina Crop Improvement Association, the official
organization designated by the Board of Trustees of Clemson Col­
lege to carry out the aims and purposes of seed certification, is
composed of those farmers, future farmers and 4-H boys who are
making certified seed production a definite part of their farm pro­
gram.

The purpose of the seed certification program is to maintain and
make available to the public a supply of high quality seed of superi­
or varieties so grown and distributed as to maintain correct identi­
ty and purity. The association works in cooperation with all other
agricultural agencies in carrying out its aims and objectives. The
objectives of the program are to develop reliable sources of high
quality seed of known origin which consist of superior adapted
varieties and hybrids; to safeguard the purity and quality of pure­
bred seed as developed by agricultural experiment stations and
recognized plant breeders; to protect purchases of seed by main­
taining an inspection service for certifying seed of high quality,
known origin, and of varietal purity; and to emphasize the import­
ance and value of certified seed to the farmers as well as to foster the production, distribution, and general use of such seed.

Those farmers desiring to have their seed certified file an application with the South Carolina Crop Improvement Association, Clemson, South Carolina, furnishing evidences as to source of seed. An inspection of the growing crop is made after maturity and prior to harvest by an inspector who draws an official sample for laboratory analysis. If the inspected field and seed meet the standards required by the association, the farmer is then notified that his seed is eligible for certification and that he may order tags to be placed on each bag of seed from the acreage concerned identifying it as certified seed. During the 1948 season 390 applications have been received from farmers covering the following acreages:

A field of aromatic or Turkish tobacco two months after transplanting. The young plants are intentionally crowded to produce dwarfing which is favorable for leaf quality.
Barley 210 acres
Clover (Dixie Hard Seed) 36 acres
Corn (Hybrid) 122 acres
Corn (Open-pollinated) 12 acres
Cotton 7,333 acres
Fescue 83 acres
Lespedeza 141 acres
Oats 1,554 acres
Okra 25 acres
Peanuts 7 acres
Sorghum 82 acres
Soybeans 185 acres
Tobacco 5 acres
Watermelons 7 acres

In addition to the farmers' acreages given above, 2,423 acres of small grains have been inspected for breeders and approximately 14,000 acres of cotton, 700 acres of soybeans, and 150 acres of tobacco are listed for inspection by breeders in South Carolina.

The South Carolina Crop Improvement Association is incorporated under the laws of this state as a non-profit organization. It is a member of the International Crop Improvement Association, an organization which prescribes the minimum standards which must be attained in order to certify various types of seed.

Research on New Crops

Aromatic tobacco. During the past five years, research carried on at Clemson has indicated that high quality yields of aromatic (Turkish) tobacco averaging 1,000 pounds per acre can be produced successfully on certain soils of the Piedmont area. However, the chief limiting factor in the commercial expansion of the crop is the high labor requirement involved in stringing the leaves and tying them to poles prior to curing. The small size of the leaves as compared to those of flue-cured tobacco also increases the labor necessary for harvesting.

In order to eliminate some of this hand labor, experiments with new methods of curing have been undertaken by the South Carolina Experiment Station. These studies show that at least 40 per cent of the hand labor now required can be eliminated, and that
certain modifications in the experimental equipment and method of handling the leaves may reduce the labor requirement considerably more.

As a direct result of research at Clemson, in 1947 over 350 South Carolina farmers grew a total of 90 acres of the aromatic leaf and were guaranteed 75 cents a pound for all that they produced. Yields averaged over 1,000 pounds per acre. Experience in this state has shown that after two years of supervision by Extension Service workers, a grower will be able to plant, harvest and cure aromatic tobacco which can compete profitably at present prices and on a quality basis with the imported product. Thus, small Piedmont farmers have a real opportunity for a new cash crop to boost farm income.

**Sesame.** Experimental work with sesame, commonly called “benne” was begun by the experiment station in 1943 because of

An outstanding variety of sesame grown for breeding purposes last year. The seed of this valuable plant contain from 38 to 56 per cent high-grade oil and the residue which remains makes a nutritious feed which is high in protein.
the possibilities that the crop offered for edible oil and confectionery purposes. The breeding work conducted so far has been concerned primarily with the development of non-shattering and high yielding varieties adapted to mechanized production and to the climatic conditions prevalent in South Carolina.

Although sesame grows luxuriantly in South Carolina and is easy to cultivate, it has been unprofitable to grow because it had to be harvested by hand. Machine harvesting has been impossible because the seed were lost through shattering.

Although much research and breeding work remains to be done, plant types have already been obtained which do not shatter their seed. Yields of some of these average 1,000 pounds of seed per acre. The seeds contain from 38 to 56 per cent of high-grade sesame oil, making possible a yield of 400 to 500 pounds of oil per acre. The oil sells at a higher price than cottonseed oil and is used in the confectionery business, in insecticides, soaps, paints, as a cooking oil, in the manufacture of oleomargarine and in the drug trade. The residue which is left after the oil has been pressed from the seed provides a nutritious livestock feed high in protein which is known as sesame meal.

One indication of the possible value of sesame is the fact that the cotton seed crushers are very much interested in it and are actively supporting the breeding and testing work being done by the experiment station.
Dear Dr. Poole:

I am enclosing a copy of the annual report of the Extension Service in summary form. This division publishes a complete report which will be mailed to those requesting copies.

Respectfully submitted,

D. W. WATKINS, Director.

The Extension Staff

The staff of Agricultural Extension Workers includes the director, an assistant director, three district supervisory agents, a chief clerk, 46 county agents (one in each county), 45 assistant county agents, and 52 agricultural specialists in the following listed fields: agricultural economics, agricultural engineering, beekeeping, dairying, field crops, forestry, four-H club work, food improvement, fruits and truck crops, livestock, marketing, poultry, publications, soil conservation and visual instruction.

The staff of Home Demonstration Workers includes a state home demonstration agent, an assistant state agent, three district supervisors, 46 county home demonstration agents (one in each county), 34 assistant home demonstration agents, and eight home demonstration specialists in food production and conservation, clothing, girls four-H club work, home management, marketing, and nutrition.

The staff of Negro Extension Workers includes a state supervisor and an assistant state supervisor for Negro Agricultural agents, a state supervisor and an assistant state supervisor of Negro Home Demonstration Agents, 29 Negro Agricultural Agents and 28 Negro Home Demonstration Agents.
Agricultural Progress in South Carolina

During the year 1947 South Carolina farmers made marked progress in the efficient production of increasingly large yields of high quality crops, livestock, and livestock products; in adjusting and balancing their farming systems, in soil conservation and soil improvement, and in improving their farm homes and other farm buildings.

The gravity of the international situation — the insistent demand on the Nation for more food for a hungry world, and the realization of their great responsibility in helping supply this need, spurred farm people on to produce food and feed crops and livestock and livestock products to the limit of their ability.

In spite of unfavorable weather for the production of most cash crops, food and feed crops, continued shortages of farm labor, equipment, fertilizers, spray materials, and other items needed for efficient production, farmers managed to maintain their volume of farm products near the record high levels reached in wartime years, and, at the same time, continued to improve the quality of their products.

New high records were made in yields per acre of corn, barley, and sweet potatoes, and in the total production of corn and wheat on the farms of the state. Peach production reached a new high level, and the number of hogs on farms on January 1, 1948, was the second highest on record for the state.

Prices received for farm products were generally good, but production costs in terms of land, labor, equipment, and supplies, were relatively high. Consequently, farm profits were dependent upon efficiency in production of high quality products and sound farm management.

Mechanization of farms continued to increase. Rural electrification was extended to a new high record number of farms. New farm homes were built and others remodeled and improved. Farm-to-market roads reached new rural areas. In short, substantial progress was made by farmers in 1947 in improving the efficiency of their farms and farming operations, and the things that make for comfort and enjoyment in farm life.
Improved varieties, closer spacing and better fertilization have contributed to the increase in corn production in South Carolina from 14.5 bushels per acre to 20 bushels per acre during the past five years.
The 1947 Agricultural Program for South Carolina

The 1947 Agricultural Program for South Carolina was directed toward furnishing the farm people of the state with technical information and experience, as well as assisting them through practical demonstrations in applying such information and experience on their farms and in their homes in order to: (1) adjust and balance their farm and home operations to meet rapidly changing economic and technological conditions; (2) conserve and build the soil; (3) increase the efficiency of their production and marketing of high yields of high quality farm products at low cost per unit; (4) produce home-grown foods necessary to provide adequate nutrition; (5) improve farm homes; (6) train farm boys and girls in the principles of good farming and homemaking, health, and citizenship; and (7) make the most efficient use of Federal Aid Programs for agriculture; all to the end that the farm people of the state might build a safe, sound, and progressive agriculture and rural life.

The 1947 Agricultural Program was summarized into the following listed 15 points, and was given wide publicity throughout the state through newspaper articles, radio, farmers meetings, circular letters, and personal contacts with farm people:

1947 Agricultural Program for South Carolina
More Income Better Farm Living
Clemson College Extension Service

1. Plan the farm to make the best use of land, labor, and equipment, and to meet changing conditions.

2. Soils: Improve soils through proper fertilization, liming, and adequate soil conservation and soil building practices.

3. Equipment: Extend the efficient use of improved farm machinery and farm and home equipment, and rural electrification.

4. Feed: Increase acreage of improved permanent pastures and annual grazing crops. Produce higher yields per acre of corn, oats, hay, silage, and other feed crops.

5. Food: Continue to improve home food production and conservation for better nutrition.
6. **Livestock and Poultry:** Continue to develop a larger permanent income from hogs, beef cattle, dairy products, chickens, and turkeys through better breeding stock, closer culling, and improved feeding and marketing.

7. **Cotton:** To meet competition from other areas and other fibers, produce higher yields per acre at a lower cost per pound. Improve staple length and quality. Improve ginning. Expand grade and staple service in marketing.

8. **Tobacco:** Increase yields per acre of high quality tobacco at lower cost per pound. Improve curing and grading practices.

9. **Fruits and Vegetables:** Improve methods of production and marketing of peaches, sweet potatoes, Irish potatoes, and other fruit and truck crops.

10. **Forestry:** Take care of the farm woodlands, and do a better job in marketing the products. Reforest lands best suited to trees.

11. **Seed and Plants:** Increase production and distribution of high quality seeds and plants, including certified seed, for additional income and to aid in efficient crop production.

12. **Diseases and Insects:** Use up-to-date methods in fighting crop and livestock insects, diseases, and parasites; household insects, rats and other pests.

13. **Farm Buildings:** Plan and improve farm homes and other buildings for health and efficiency.

14. **Farm Boys and Girls:** Further develop 4-H club work to train South Carolina farm boys and girls in improved farming, homemaking, health and citizenship.

15. **Health and Recreation:** Develop more adequate rural health and recreational facilities.

Based upon the objectives outlined in these 15 points, county extension workers, with the help of voluntary farm and home leaders, district supervisors, and specialists, developed county farm and home programs and plans for the conduct of extension work in the counties of the state. Extension specialists developed plans of work in each important line of agriculture in the state; and the director of extension developed a plan for administering and supervising the conduct of extension work in 1947.
Voluntary Farm and Home Leadership

County farm and home programs were planned and conducted in each county by county extension workers in cooperation with the county agricultural committee composed of representative farmers and farm women. A total of 3,826 farmers and farm women, elected from the communities of each county, served on the 46 county agricultural committees, which met with the county extension workers from time to time to help plan and carry out a program suited to the needs of the farm people in the respective counties.

In addition, 7,346 farmers and farm women served as voluntary community and neighborhood leaders, and cooperated with county extension workers in many ways in planning and carrying out the farm and home program in their respective communities.

Negro agricultural agents and Negro home demonstration agents were assisted by 1,999 Negro farmers and farm women leaders in planning and carrying out their program of extension work with Negro farm families.

Extension Activities and Results

In the conduct of the 1947 plan of extension work, county extension workers made 114,738 farm and home visits to 68,359 different farms and homes. They prepared 12,366 newspaper articles for publication, distributed 272,198 bulletins, and made 1,686 radio talks in carrying farm and home information to the farm people. They held, or took part in 33,311 educational and demonstration meetings, with a total attendance of 925,193 farm people. A total of 162,906 farm people came to county extension offices, and 139,059 called by telephone for information and assistance.

Agricultural Economics and Farm Management work included making available to farm people agricultural outlook and other economic information to help guide them during the unsettled agricultural and economic conditions prevailing in 1947. Farm and home planning demonstrations, with complete farm and home records, established a basis for educational work in sound farm management. This program continued to improve the farm tenancy system in the state and assisted veterans in getting established on farms.
Home Management and House Furnishings program was conducted by home demonstration workers to assist farm women in planning the farm home for comfort, attractiveness, efficiency. Demonstrations included financial planning, wise use of credit, development of home industries to supplement farm income, remodeling old homes and planning new ones, furniture refinishing and upholstering, and room improvement.

Agricultural Engineering work was directed toward assisting farmers with problems arising in connection with the mechanization of farms and farm homes. Building plans were furnished for the construction and remodeling of farm buildings, including farm homes. Farm machinery schools taught farmers the proper operation, care and repair of farm machinery. Assistance was given farmers in organizing groups to obtain Rural Electrification, and in making efficient use of electricity on their farms. Terrace planning and line running schools were held to train farmers to lay out and run terrace lines. Demonstrations were conducted in drainage and irrigation. Cotton ginners were assisted in improving and adjusting their equipment for better ginning.

Field Crops, Fertilizers and Soils work was aimed at assisting farmers with problems in soil conservation, soil improvement, efficient use of fertilizers, and the improvement in yields and quality of field crops grown in the state. Pastures and forage crops to support a growing livestock industry were emphasized. Corn yields per acre reached a new high record of 20 bushels. Of the 1947 cotton crop, 97 per cent was of three staple lengths, 1 inch, 1 1/32 inches and 1 1/16 inches. Production of aromatic tobacco is being furthered in Piedmont counties. Demonstrations of flue-cured tobacco growing were conducted throughout the tobacco belt. The South Carolina Crop Improvement Association’s program of seed certification was assisted by Extension workers.

Dairying work was directed toward increased volume of high quality milk on farms through home production of feed and forage crops, the improvement of dairy cattle through better breeding, and introducing greater efficiency in the operation of dairy farms. County agents report a new high record of 2,186 purebred dairy bulls in use in the state. Assistance was given in marketing dairy products through milk routes, cream stations and creams routes,
and to processing and distributing plants. Farmers were assisted in marketing dairy cattle. Farm boys and girls in 4-H Clubs grew out 1,093 dairy calves under supervision of Extension workers. These workers assisted with the organization and operation of five artificial insemination associations through which 2,334 cows were artificially bred.

Four-H boys grew out 1,093 dairy calves in 1947. A number of fine dairy herds in South Carolina have originated with a single 4-H Club calf.

**Crop Insect and Disease** work was planned and carried out with the objective of instructing farmers in the prevention and control of insects and diseases which are injurious to crops and livestock. Intensive programs were carried out to familiarize farmers with new insecticides, and special emphasis was placed on new organic poisons to control the boll weevil. Rat control programs were conducted throughout the state.

**Beekeeping** assistance to farmers included demonstrations in transferring bees to modern hives, requeening hives with purebred
queens, shipping packaged bees, marketing honey, and bee-yard management.

**Farm Forestry** extension work was conducted in cooperation with the South Carolina State Commission of Forestry. Extension workers helped farmers with problems of timber estimating, selective cutting of farm timber, marketing timber and pulpwood, fire control and prevention, control of forest insects and diseases, and reforestation of farm lands best suited to the growing of trees.

**Food Production and Conservation** for the farm family food supply and for market was emphasized. Home demonstration extension workers assisted farm families in improving their food supplies through production of vegetables, fruits, meat, milk, and eggs. Demonstrations were conducted in butchering, canning and curing of meats, and canning, brining, freezing, and drying fruits and vegetables for home use.

**Nutrition and Health** program included assistance to farm families in improving diets. Clinics and county health contests were used to detect defects in children. Assistance was given with positive disease prevention methods such as inoculation, vaccination, etc., by organizing and assisting health departments with clinics. Schools were assisted in establishing and maintaining hot lunches.

**Food Improvement** program has resulted in over 300 corn mills in South Carolina being equipped for enriching home-ground meal and grits to improve the nutritive value of these foods. Extension workers also conducted educational programs in all counties to encourage the use of enriched corn meal and grits, especially by low-income families whose diets contain a large proportion of these foods.

**Clothing and Textiles:** Home demonstration workers assisted farm families with problems in connection with the making, care, and repair of clothing; selection of textiles, and the setting up of a clothing account and budget. "Clinics" were held to teach proper method of cleaning, repairing, and adjusting sewing machines.

**Four-H Club Work:** A new high record of 39,326 farm boys and girls were enrolled in 1,468 community 4-H Clubs in all 46 counties in 1947, and were given training in efficient farming, homemaking, health, and citizenship. Four-H Club members grew 9,917 acres of
crops, grew out 284,228 chickens, 1,093 dairy calves, 1,062 beef calves, and 6,562 hogs. Four-H girls canned and preserved 391,846 quarts of food and made and remodeled 23,876 garments.

**Fruits and Truck Crops Work** included demonstrations and educational programs aimed at aiding farmers to produce high-quality fruits and vegetables for home use and for market. A new high record production of 6,630,000 bushels of peaches on South Carolina farms was reached in 1947. The average yield of 110 bushels of sweet potatoes per acre in 1947 set a new high record for South Carolina. Demonstrations of production of commercial truck crops included Irish potatoes, sweet potatoes, cucumbers, cantaloupes, watermelons, asparagus, tomatoes, cabbage, beans, peas, and others.

Permanent pastures and annual grazing crops are providing a sound foundation for the development of livestock production on South Carolina farms, and furnish graphic proof that this state can produce good beef cattle.
Livestock production is becoming more and more firmly established on South Carolina farms. Extension workers assisted farmers with feeding, breeding, sanitation, and other practices to aid more efficient production of high quality livestock. County agents report a new high record of 2,512 purebred beef bulls in use on farms throughout the state. Demonstrations in meat cutting, curing and storing were given throughout the state. Four-H Club boys and girls grew out 1,062 beef calves, 639 of which were exhibited at fairs and shows.

Marketing work by extension workers was directed toward helping farmers develop better marketing facilities for products of diversification in a changing agriculture. Cooperatives were assisted in organizing and operating; issued market news service on truck crops during marketing season in cooperation with the USDA Fruits and Vegetables Division. Farmers were assisted in correct methods of harvesting, grading, packing, and marketing 12,315 cars of fruits and vegetables valued at $8,819,208. Total value of the products which extension workers assisted farmers in marketing reached a new high level of $21,021,097 in 1947.

The poultry program of extension service includes production demonstrations with poultry and turkeys, disease and parasite control in poultry flocks, and the development of the National Poultry Improvement plan to improve South Carolina flocks.

The Soil Conservation program emphasizes the establishment and maintenance of soil conservation practices. Demonstrations, educational meetings and other means were used to teach farmers methods of soil and water conservation.

Farm Labor recruitment and placement program, which is financed by a special grant of funds from the Federal Government, was conducted in all 46 counties in 1947.

Information Material on timely agriculture and home economics included bulletins, circulars, newspaper articles and radio broadcasts over South Carolina radio stations.

Visual Instruction in the extension program consisted of the use of educational motion pictures, slides, filmstrips, photographs, models, and exhibits.
The 1948 Program of Extension Work

The 1948 program of Extension Work was developed in the fall of 1947 in each county and for the state as a whole through conferences between extension workers and leading farm men and women. The program thus developed was summarized into a brief 14-point statement headed, "1948 Agricultural Program for South Carolina", and was given wide publicity through newspaper advertisements sponsored by business firms, newspaper articles, radio broadcasts and meetings of farm people early in 1948.

Following is a list of the 14 points:

1948 Agricultural Program for South Carolina

1. **Food and Feed**: South Carolina, the nation, and the world face a serious shortage of food and feed. Grow and save more food for home use and to help meet this need. Grow a home garden on every farm. Increase efficient production of corn, small grains, grain sorghums, pastures, annual grazing, silage, and other feed crops. Where grain crop is short, sow spring oats.

2. **Plan the farm** to make the best use of land, labor, and equipment, and for efficient production to meet market demands.

3. **Soils**: Improve productivity of soils through liming, proper fertilization, cover crops, crop rotation, terracing, drainage, and irrigation.

4. **Equipment**: Extend the efficient use and upkeep of improved farm machinery, farm and home equipment, and rural electrification.

5. **Cotton**: Meet competition from other areas and other fibers by producing higher yields per acre at lower cost per pound. Plant improved varieties by communities or larger areas. Use new recommended poisons to control boll weevil. Improve ginning. Use grade and staple service in marketing.

6. **Tobacco**: Keep up yields per acre of high quality tobacco. Give more attention to control of plant bed diseases and insects, as well as curing, grading, and preparation of tobacco for market.
8. **Fruits and Vegetables:** Use improved methods of production, grading, and marketing of peaches, sweet potatoes, Irish potatoes, and other fruit and truck crops.

9. **Forestry:** Give farm woodlands better management and fire protection. Do a better job of marketing the timber crop. Reforest lands best suited to trees.

10. **Seeds and Plants:** Increase production and distribution of high quality seeds and plants, including certified seed, for additional income and to aid in efficient crop production.

11. **Pests and Diseases:** Use recommended methods and materials in fighting crop and livestock insects, diseases, and parasites, household insects, rats and other pests.

12. **Farm Buildings:** Plan and improve farm homes and other buildings for health, safety, efficiency, comfort, and general appearance.

13. **Farm Boys and Girls:** Further develop 4-H club work to train South Carolina farm boys and girls in better farming, homemaking, health and citizenship.

14. **Health and Recreation:** Improve, develop and use rural health and recreational facilities.