FIFTIETH ANNUAL REPORT

of the

BOARD OF TRUSTEES

of

The Clemson Agricultural College

to the

General Assembly of South Carolina

1939

The Clemson Agricultural College

RECORD

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<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LETTER OF TRANSMITTAL</td>
</tr>
<tr>
<td>ENROLLMENT FOR 1939-1940</td>
</tr>
<tr>
<td>REPORT OF THE PRESIDENT</td>
</tr>
<tr>
<td>REPORT OF TREASURER</td>
</tr>
<tr>
<td>REPORT OF DIRECTOR OF EXTENSION SERVICE</td>
</tr>
<tr>
<td>REPORT OF BOARD OF VISITORS</td>
</tr>
<tr>
<td>REPORT OF DIRECTOR OF DEPARTMENT OF FERTILIZER INSPECTION AND ANALYSIS</td>
</tr>
<tr>
<td>REPORT OF STATE VETERINARIAN</td>
</tr>
<tr>
<td>REPORT OF STATE CROP PEST COMMISSION</td>
</tr>
<tr>
<td>REPORT OF DIRECTOR OF EXPERIMENT STATION</td>
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</tbody>
</table>
LETTER OF TRANSMITTAL

To the Members of the General Assembly
Columbia, South Carolina

Gentlemen:

The Trustees of the Clemson Agricultural and Mechanical College are pleased to transmit, herewith, for your thoughtful consideration, the Report of President E. W. Sikes, concerning the affairs of the College, for the fiscal year, July 1, 1938 to June 30, 1939. The report reviews, in detail, all College activities and gives a fair conception of the broad and useful scope of work in which the institution is engaged. There is also reflected the very efficient service of the teaching staff and general employees.

Respectfully submitted,

W. W. BRADLEY,
President, Board of Trustees

December 1, 1939
WHERE THE CLEMSON STUDENTS COME FROM 1939-1940

SOUTH CAROLINA
OUT-OF-STATE 344
TOTAL ENROLLMENT 2227
Report of the President of the College

Clemson, South Carolina
December 1, 1939

From E. W. Sikes
President, The Clemson Agricultural College

To The Honorable W. W. Bradley
President, The Board of Trustees

Dear Sir:

I have the honor to present to you the fiftieth report of the President of Clemson College, this report covering the forty-sixth session of the institution.

The publication includes reports from the College Treasurer, the Board of Visitors, and from the Directors of all our Public Service Activities.

Agricultural and Mechanical Colleges are unique institutions designed for a specific purpose and in my report I am discussing the contribution that such colleges have made to education.

The Function of A. and M. Colleges

Every institution should be distinctive and have some definite objective. The purpose of these A. and M. colleges is to raise up, qualify, and send forth more young people to improve the economic and social condition of the states in which they are located. These institutions came to the South at the end of the great Civil War upheaval. They came at a time when the economic system based on slavery had passed away. This system had been wasteful and unwholesome. The founders of these institutions felt that the time had come when the farmer and mechanic needed training such as had been provided for the so-called learned professions.

This was a revolutionary idea in education. Hitherto it had been felt that the farmer learned his vocation through imitation and the mechanic learned his through apprentice-
ship. Now it was proposed to teach and train them for their vocations. It meant that applied science would supplant tradition and authority; it meant that science, the laboratory, and experimentation would take the place of languages. It was a novel idea which shocked conservatism.

At this time there was much public land held by the Federal Government. These lands had been given to railways and other corporations. It was now proposed to divide these lands among the states for the purpose of founding the so-called Land Grant Colleges. The Federal Government under the first Morrill Bill stimulated the idea by making federal grants for instruction in specific subjects.

These institutions were not founded because there were not enough colleges. In every Southern state there were a number of high-grade colleges but none gave special attention to the farmer and the mechanic, to agriculture and engineering. The A. and M. colleges came to the South in its hour of need. The poverty that followed the Civil War and Reconstruction was heavy upon up. Agriculture, the basis of our civilization, needed stimulation—it was the one way left by which people could earn a livelihood. The savings of the former generation had been invested in slaves, and this $2,000-000,000 had been swept away. The economic life in the South had to start from the scratch—it was really pioneer days again. It was at this time that there came to the South these institutions with the distinctive purpose of meeting this situation—of helping the needy earn a living.

These objectives are accomplished by the curriculum that requires certain basic courses which are common to most colleges. These are service courses which prepare students for the courses in which they major. Agriculture has many majors including agronomy, economics, animal husbandry, dairying, horticulture, entomology, agricultural engineering, and vocational agricultural teaching. Engineering has architecture, chemical engineering, civil, electrical, and mechanical engineering. The textile course includes textile engineering, dyeing, weaving, and designing. Chemistry is made the basis of agriculture. Physics and mathematics are bases of engineering.
In these institutions all students take laboratory courses. Laboratories, not the libraries, are the core of these schools. The work is a good illustration of learning by doing. The shop, the forge, the foundry, and the textile plant are busy places. By these methods the men are trained to engage in research, to look for new plants and new devices. The subject matter is forever changing. Investigations keep the teachers in major subjects ever on the alert. Scientific discoveries soon make textbooks out of date.

In addition to the resident faculty, who teach students in the classroom, there is a large outside faculty engaged in teaching out in the fields and on the farms. In cooperation with the U. S. Department of Agriculture experiment stations with farms are located in various parts of the state. Here trained scientists are engaged in both fundamental and secondary research. At these stations there is prepared subject matter in plants, animals, and economics for teachers.

It was early realized that this information was useless if it remained locked up in bulletins, so there was organized an extension service to carry this information to the farmer and the stockraiser. All South Carolina counties have a county agent who is the mouthpiece of the research station, and a home demonstration agent who is trained in domestic sciences and arts. The vocational teachers in the public schools engage in a similar work. These groups reach people who never have been to college but who are engaged in agriculture and industry. Through these means the social and economic life of rural families can be enriched.

In the summer Clemson College is the home of the Opportunity School, the summer school for various vocational teachers, and the assembling place for large gatherings of farm men and women and industrial groups.

The most striking evidence of success is the improved efficiency in agriculture. A better staple is grown, better seeds are used, a larger yield is secured, proper fertilizer is selected, and better cultural methods employed. These things are fundamental to a section whose population is largely agricultural and dependent on agriculture. Through these institutions the teaching of agriculture has entered the public schools and
thousands are reached in this way. The future farmers realize that agriculture calls for a high grade of intelligence. The work among these boys and girls, who will continue to live on farms, reveals that this training enables them to produce larger yields at less cost. They learn not only to do but why to do. Nothing is more stimulating to mental development than to ask “why?” “How” is only manual labor, but “why” is intellectual. “Why” breaks down tradition and custom. The methods of scientific investigation are inimical to political despotism, ecclesiastical bigotry, and economic traditionalism. Civilization advances through the mastery of the natural resources with which bounteous Heaven has endowed us. Teaching men how to preserve the soil, how to analyze it, how to improve it, means the preservation of the foundations of Southern civilization. A land flowing with milk and honey can become a desert. This type of education is teaching the love of the soil, and to me it is questionable whether democracy can exist if removed from close contact with the good earth.

In the eighteenth century Malthus terrified the world by saying that population would outstrip the food supply and starvation would result. The efficiency of agricultural methods has answered the question so well that the surplus becomes a problem.

These institutions have emphasized the significance of water power and harnessing it to the wheels of industry. While the South will remain agricultural, it must become more industrial. It must learn to transform its products into greater utilities. There is not a plant that grows, an animal that walks, or a mineral that the earth holds but what can be transmuted into something of greater utility. New crops must be found and new machines invented. Old crops must be made into new money-making crops. Diseases of plants and animals must be combatted. Rural life must be strengthened through the home, the church, and the school. All must be fitted to the needs of the present day. This can be done only by the popularization of scientific knowledge, the wider dissemination of known facts, and the more complete diffusion of information. This is the task of the A. and M. colleges. While these institutions are not unmindful of the cultural and spirit-
ual, they must ever keep in mind that their task is to help the farmer and the mechanic. They must help answer the prayer for daily bread, help to clothe the naked, and feed the hungry.

The last words of that great Southern statesman, John C. Calhoun, spoken in 1850 were, "The South, the poor South, what is to become of her now?" His son-in-law, Thomas G. Clemson, later answered by saying, "There can be no civilization without population, no population without food, and no food without phosphoric acid." He left his own wealth and Calhoun's plantation to South Carolina for the founding of an A. and M. college.

Respectfully submitted,

E. W. SIKES, President
REPORT OF TREASURER

Dr. E. W. Sikes, President
The Clemson Agricultural College
Clemson, South Carolina

Dear Dr. Sikes:

I have the honor of transmitting herewith my annual report of the financial affairs of the Clemson Agricultural College of South Carolina for the fiscal year July 1, 1938 to June 30, 1939 in accordance with an act of the General Assembly.

Yours very truly,
S. W. EVANS,
Secretary-Treasurer.

THE CLEMSON AGRICULTURAL COLLEGE
Collegiate Activities
FISCAL YEAR—JULY 1, 1938 to JUNE 30, 1939

INCOME

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1—State Appropriation</td>
<td>$105,923.03</td>
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<tr>
<td>2—Privilege Fertilizer Tax</td>
<td>$170,000.00</td>
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<tr>
<td>Less Cost Insp. and Analysis</td>
<td>$34,175.56</td>
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<tr>
<td>3—Federal Funds:</td>
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</tr>
<tr>
<td>Morrill-Nelson and Bankhead-Jones Funds</td>
<td>$45,631.91</td>
</tr>
<tr>
<td>Landscrip</td>
<td>$5,754.00</td>
</tr>
<tr>
<td>4—Tuition and Fees</td>
<td></td>
</tr>
<tr>
<td>5—Interest Clemson Bequest and Anderson Fellowship</td>
<td>$3,850.36</td>
</tr>
<tr>
<td>6—Miscellaneous Funds:</td>
<td></td>
</tr>
<tr>
<td>Rent College Residences, Sales Electric Current and Water</td>
<td>$38,526.30</td>
</tr>
<tr>
<td>Total Income Collegiate Activities</td>
<td>$534,997.52</td>
</tr>
</tbody>
</table>
### Collegiate Activities
**FISCAL YEAR, JULY 1, 1938 TO JUNE 30, 1939**

#### EXPENDITURES

**Exhibit A**

### A—Personal Services:

1. **Salaries:**
   - Morrill-Nelson and Bankhead-Jones Funds: $45,631.91
   - Landscrip: $5,754.00
   - Other Funds: $264,668.33
   - **Total:** $316,054.24

2. **Wages:** 45,968.87
3. **Special Payments:** 325.00

**Total:** $362,348.11

### B—Contractual Services:

1. Freight, Express and Deliveries: 217.10
2. Travel: 4,132.74
3. Telegraph and Telephone: 2,488.00
4. Repairs: 28,577.42
5. Printing and Advertising: 3,467.80

**Total:** $38,883.06

### C—Supplies:

2. Fuel Supplies: 24,647.82
3. Feed and Veterinary Supplies: 3,026.65
4. Office Supplies: 7,786.99
7. Educational Supplies: 10,568.44
9. Agricultural Supplies: 1,143.90
11. Other Supplies: 3,392.83

**Total:** $53,727.75

### D—Fixed Charges and Contributions:

1. Rents: 158.50
2. Insurance: 17,971.27
4. Other Fixed Charges: 9,255.35

**Total:** $27,385.12

### G—Equipment:

1. Office Equipment: 644.87
3. Household Equipment: 50.00
4. Motor Vehicle Equipment: 975.00
7. Educational Equipment: 2,158.40
8. Other Equipment: 485.91

**Total:** $4,314.18

### Transfers:

G—Equipment and Plant Fund: 36,000.00
H—Buildings—Building Sinking Fund: 12,240.00

**Total Collegiate Operation:** $534,898.22
Fertilizer Inspection and Analysis, Poison Analyses, Analyses of Water, Soils, Manures, Etc.

A-1 Salaries $16,704.00
A-2 Wages 4,934.34
A-3 Legal Services 250.00
B-1 Freight, Express and Deliveries 192.35
B-2 Travel 3,323.11
B-3 Telegraph and Telephone 142.76
B-4 Repairs 155.62
B-5 Printing and Advertising 530.32
C-4 Office Supplies 549.79
C-11 Other Supplies 5,774.65
D-1 Rents 6.00
D-2 Insurance 135.28
G-1 Office Equipment 684.84
G-4 Motor Vehicle Equipment 300.00
G-7 Educational Equipment 492.50 $34,175.56

Smith-Lever Agricultural Extension Work

Exhibit B

Receipts:

Appropriations:
Federal $476,878.98
State 162,398.88 $639,277.86

Expenditures:
A-1 Salaries $496,124.36
A-2 Wages 1,296.61
B-1 Freight, Express and Deliveries 599.14
B-2 Travel 96,292.66
B-3 Telegraph and Telephone 6,001.12
B-4 Repairs 1,575.06
B-5 Printing and Advertising 4,533.37
B-6 Water, Heat, Light and Power 472.08
C-4 Office Supplies 15,100.36
C-11 Other Supplies 1,606.77
D-1 Rents 1,211.25
G- Equipment 14,465.08 $639,277.86
# South Carolina Experiment Station Federal Funds
(Adams, Hatch, Purnell and Bankhead-Jones)

## Exhibit C

**Receipts:**

<table>
<thead>
<tr>
<th>Fund</th>
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</thead>
<tbody>
<tr>
<td>Hatch Fund</td>
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<tr>
<td>Adams Fund</td>
<td>$15,000.00</td>
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<tr>
<td>Purnell Fund</td>
<td>$60,000.00</td>
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<tr>
<td>Bankhead-Jones Fund</td>
<td>$52,031.84</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$142,031.84</strong></td>
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</tbody>
</table>

**Expenditures:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1 Salaries</td>
<td>$92,996.40</td>
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<tr>
<td>A-2 Wages</td>
<td>$11,041.94</td>
</tr>
<tr>
<td>B-1 Freight, Express and Deliveries</td>
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</tr>
<tr>
<td>B-2 Travel</td>
<td>$3,202.98</td>
</tr>
<tr>
<td>B-3 Telegraph and Telephone</td>
<td>$1,395.11</td>
</tr>
<tr>
<td>B-4 Repairs</td>
<td>$694.40</td>
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<tr>
<td>B-5 Printing and Advertising</td>
<td>$2,462.23</td>
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<td>C-2 Fuel Supplies</td>
<td>$1,597.72</td>
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<tr>
<td>C-3 Feed and Veterinary Supplies</td>
<td>$6,606.96</td>
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<td>C-4 Office Supplies</td>
<td>$736.86</td>
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<td>C-8 Motor Vehicle Supplies</td>
<td>$699.45</td>
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<td>C-9 Agricultural Supplies</td>
<td>$2,513.96</td>
</tr>
<tr>
<td>C-11 Other Supplies</td>
<td>$3,644.78</td>
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<tr>
<td>D-2 Insurance</td>
<td>$37.00</td>
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<td>D-4 Other Fixed Charges</td>
<td>$250.87</td>
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<tr>
<td>G-1 Office Equipment</td>
<td>$511.44</td>
</tr>
<tr>
<td>G-4 Motor Vehicle Equipment</td>
<td>$1,208.26</td>
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<tr>
<td>G-5 Agricultural Equipment</td>
<td>$4,229.58</td>
</tr>
<tr>
<td>G-6 Livestock</td>
<td>$476.25</td>
</tr>
<tr>
<td>G-7 Educational Equipment</td>
<td>$904.43</td>
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<tr>
<td>G-8 Other Equipment</td>
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<tr>
<td>H-3 Non-Structural Improvements</td>
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<td><strong>Total</strong></td>
<td><strong>$142,031.84</strong></td>
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**Agricultural Research**

Paid by Warrants on Comptroller General of South Carolina

## Exhibit D

**Expenditures:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
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<tbody>
<tr>
<td>A-1 Salaries</td>
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<td>A-2 Wages</td>
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<td>B-3 Telegraph and Telephone</td>
<td>$189.72</td>
</tr>
<tr>
<td>B-4 Repairs</td>
<td>$451.69</td>
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</tbody>
</table>
B-5 Printing and Advertising 70.74
B-6 Heat, Light and Water 285.54
C-3 Feed and Veterinary Supplies 1,068.67
C-4 Office Supplies 798.48
C-8 Motor Vehicle Supplies 1,287.34
C-9 Agricultural Supplies 2,770.25
C-11 Other Supplies 74.71
D-1 Rents 656.90
D-2 Insurance 1,388.43
G-1 Office Equipment 149.00
G-4 Motor Vehicle Equipment 854.35
G-5 Agricultural Equipment 113.83
G-7 Educational Equipment 2.90
G-8 Other Equipment 636.77 $ 46,654.00

Crop Pests and Diseases
Paid by Warrants on Comptroller General of South Carolina

Exhibit E

Expenditures:
A-1 Salaries $ 6,372.00
B-2 Travel 545.13
B-3 Telegraph and Telephone 4.50
B-4 Repairs 20.78
B-5 Printing and Advertising 64.50
D-4 Office Supplies 92.42
C-8 Motor Vehicle Supplies 433.09
C-11 Other Supplies 60.58
G-4 Motor Vehicle Equipment 310.00 $ 7,903.00

Livestock Sanitary Work
Paid by Warrants on Comptroller General of South Carolina

Exhibit F

Expenditures:
A-1 Salaries $ 26,518.27
A-2 Wages 133.44
A-3 Special Payments 3,873.75
B-2 Travel 9,559.31
B-3 Telegraph and Telephone 356.10
C-11 Other Supplies 31.00
D-2 Insurance 32.53
D-3 Contributions 995.00
E- Balance .60 $ 41,500.00
# Truck Experiment Station
Paid by Warrants on Comptroller General of South Carolina

**Exhibit G**

<table>
<thead>
<tr>
<th>Expenditures</th>
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</tr>
</thead>
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<tr>
<td>A-1 Salaries</td>
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<td>A-2 Wages</td>
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<tr>
<td>B-2 Travel</td>
<td>170.24</td>
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<tr>
<td>B-3 Telegraph and Telephone</td>
<td>201.22</td>
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<tr>
<td>B-4 Repairs</td>
<td>252.60</td>
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<tr>
<td>B-6 Water, Heat, Light and Power</td>
<td>103.84</td>
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<tr>
<td>C-4 Office Supplies</td>
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<tr>
<td>C-7 Educational Supplies</td>
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<td>C-8 Motor Vehicle Supplies</td>
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<td>C-9 Agricultural Supplies</td>
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<tr>
<td>C-11 Other Supplies</td>
<td>313.44</td>
</tr>
<tr>
<td>D-2 Insurance</td>
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<td>G-1 Office Equipment</td>
<td>100.71</td>
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<td>G-5 Agricultural Equipment</td>
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<td>G-8 Other Equipment</td>
<td>141.41</td>
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<td>H-3 Non-Structural Improvements</td>
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<td>$14,700.00</td>
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# Edisto Experiment Station
Paid by Warrants on Comptroller General of South Carolina

**Exhibit H**

<table>
<thead>
<tr>
<th>Expenditures</th>
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<td>A-1 Salaries</td>
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<td>A-2 Wages</td>
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<td>B-1 Freight, Express and Deliveries</td>
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<td>B-2 Travel</td>
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<td>B-3 Telegraph and Telephone</td>
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<td>C-8 Motor Vehicle Supplies</td>
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<td>C-9 Agricultural Supplies</td>
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<td>C-11 Other Supplies</td>
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<td>D-4 Other Fixed Charges</td>
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<tr>
<td>G-1 Office Equipment</td>
<td>526.25</td>
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<tr>
<td>G-4 Motor Vehicle Equipment</td>
<td>300.00</td>
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<td>G-5 Agricultural Equipment</td>
<td>1,524.70</td>
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<td>G-6 Livestock</td>
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<td></td>
<td>$27,863.09</td>
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**Tobacco Research Work**

Paid by Warrants on Comptroller General of South Carolina

**Exhibit I**

<table>
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<th>Expenditures</th>
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<td>A-2 Wages</td>
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<tr>
<td>H-2 Buildings</td>
<td>2,909.16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$16,820.00</strong></td>
</tr>
</tbody>
</table>

**Cadet Fund**

(These funds, paid by the students for their living and other expenses, are kept entirely separate. None of this money is used to pay the cost of teaching.)

**Exhibit J**

| Expenditures for Board, Laundry, Room, Uniforms, Hospital, Student Activities and Incidents: |
|---------------------------------------------------|--------------|
| A-1 Salaries                                      | $14,566.00   |
| A-2 Wages                                         | 77,352.63    |
| A-3 Special Payments                              | 539.38       |
| B-2 Travel                                        | 1,284.60     |
| B-3 Telegraph and Telephone                       | 763.02       |
| B-4 Repairs                                       | 18,988.62    |
| B-5 Printing and Advertising                      | 15,952.40    |
| C-1 Food Supplies                                 | 162,452.72   |
| C-2 Water, Heat, Light and Power                  | 22,693.50    |
| C-4 Office Supplies                               | 690.22       |
| C-5 Laundry Supplies                              | 3,490.47     |
| C-6 Medical Supplies                              | 2,759.94     |
| C-7 Educational Supplies                          | 1,432.92     |
| C-8 Motor Vehicle Supplies                        | 852.14       |
Clemson Agricultural College

C -10 Clothing Supplies _________________ 69,335.10
C -11 Other Supplies _________________ 17,372.84
D-2 Insurance _________________ 5,228.31
D-4 Other Fixed Charges—Bonds, Etc. _________________ 18,668.56
G-1 Office Equipment _________________ 737.32
G-2 Medical Equipment _________________ 815.94
G-3 Household Equipment _________________ 2,039.54
G-7 Educational Equipment _________________ 80.20
G-8 Other Equipment _________________ 19,384.50
H-1 Purchase of Lands _________________ 598.98
H-2 Buildings _________________ 46,278.49
H-3 Non-Structural Improvements _________________ 3,363.73
E- Athletic Department _________________ 14,680.84 $522,402.91

Student Banking Account
Exhibit K

Balance on Hand July 1, 1938 _________________ $ 6,145.90
Deposits—Current Year _________________ 165,850.23 $171,996.13

Checks—Paid Current Year _________________ $163,064.96 $171,996.13
Balance June 30, 1939 _________________ 8,931.17
REPORT OF DIRECTOR OF EXTENSION SERVICE

Dr. E. W. Sikes, President
The Clemson Agricultural College
Clemson, South Carolina

Dear Dr. Sikes:

I have the honor to submit herewith the annual report of the Extension Service, which is to be included in the report of the Board of Trustees to the General Assembly.

Yours very truly,

D. W. WATKINS. Director.

FOREWORD

As the cotton situation has developed in recent years it is fortunate that many farmers in this state have already inaugurated enterprises that are yielding a growing income. We are happy to say that the Extension Service through its system of county agents, specialists, home demonstration work, and Negro demonstration work has been influential in helping to bring about these changes with a minimum of loss.

South Carolina leads all other non-irrigated cotton-producing states in the percentage of lint 15/16 inch or longer and stands second among the major cotton-producing states in the average yield per acre. On the basis of an average production per acre in 1937-38 this state ranks among the eight Southern states growing tobacco. Substantial increase in the acreage of food, feed, and soil-building crops is evident. Extension workers have undertaken with some success to aid farmers in utilizing terms of the Agricultural Adjustment Administration Act, Soil Conservation Service, and the Farm Security program in providing more adequate food, feed, and soil-building crops. Farmers in the Coastal Plains marketed over 1300 carloads of surplus hogs during the past year receiving over one and a half million dollars. The average milk production of all cows on
farms of the state has increased by 105 gallons per cow or about 38 per cent between the years 1919 and 1934. During this period we have had an active extension program in dairy work. Commercial peach growers sold this year the equivalent of over 3000 carloads of peaches, the largest amount ever produced for sale. Over 450 cars of improved Porto Rico potatoes were sold from the Coastal Plains area. Marketing services have been stimulated or made available through the activities of the Extension Service on many of our miscellaneous crops including livestock, poultry, dairy products, fruits, truck crops, etc.

Many of our soils are too acid for the best crop and grass production but progress is being made in overcoming this situation largely through taking advantage of the AAA arrangement whereby lime is furnished farmers as grants-in-aid, cost being taken out of amounts due them later. Agents have been promoting this means of securing lime.

The habit of one-crop farming is strong upon us and we feel that the progress made in developing other sources of income is remarkable under all circumstances.

ORGANIZATION AND PERSONNEL

The headquarters of the South Carolina Extension Service is located at the Clemson Agricultural College. The home demonstration branch of the service maintains headquarters at Winthrop College, and headquarters for Negro extension work is maintained at the state negro college.

The director of extension is administratively in charge of all agricultural extension work in the state including home demonstration extension work and Negro extension work. The state home demonstration agent is responsible to the director of extension for all home demonstration extension work in the state, including Negro home demonstration work.

The director of extension is assisted in the administration of the agricultural extension program by an assistant to the director and three district agents. The field force consists of 34 extension specialists representing the most important lines of agriculture in the state; 46 county farm agents, one in each county; and 21 assistant county agents, who are located in the counties having the largest number of farmers.

The state home demonstration agent is assisted in the supervision of the home demonstration extension program by an assistant state home demonstration agent and three district home demonstration agents. The field staff of the home demonstration service consists of seven specialists, 46 home demonstration agents, one in each county, and three assistant home demonstration agents.

The staff of Negro workers is composed of a Negro district agent who supervises the work of the Negro agricultural agents, and a Negro
supervising agent for the Negro home demonstration agents. The field force includes 18 Negro agricultural agents and 15 Negro home demonstration agents.

THE PROGRAM OF EXTENSION WORK

In each county a county program-planning committee, made up of representative farmers and farm women, business men, and representatives of other agencies, cooperates with the extension agents in developing a sound agricultural program for the county, studying the problems and determining the general objectives of the program to meet the greatest needs of the farm people.

In conformity with the general objectives of the program thus determined, the extension specialists and agents develop and set up definite demonstrations and activities which will be carried out to accomplish the objectives of the program.

As a result of this work, a definite and practical program is set up in each county, bringing into account the main problems in the way of agricultural progress in that county, and outlining the most practical means of solution as seen by all concerned.

County farm and home demonstration agents in each county, working jointly, then hold meetings in as many communities as possible where the county program is explained, and the farmers and farm women are given opportunity to state their problems, contribute their knowledge and experience to the program, and select suitable persons to conduct demonstrations of practices and methods designed to develop solutions to their problems.

Through the work of the county program-planning committees and the community meetings, the farmers develop a greater interest in the agricultural program of the county, feeling that they have definite responsibilities in its formulation and conduct. Thus the agricultural program becomes a vital factor in the agricultural progress of the counties and of the state.

RESULTS FROM THE 1938 PROGRAM OF EXTENSION WORK

Field Activities

During 1938, county farm and home demonstration agents working in cooperation with 4,260 voluntary county and community leaders, conducted extension work in 2,296 communities of the state. These agents made a total of 72,075 farm and home visits, to assist farmers and homemakers with their problems.

County farm and home demonstration agents received 702,815 office calls and 153,905 telephone calls from farm people, who wished
to consult the agents with regard to their problems. These agents held 29,007 farm meetings, which were attended by 728,951 farm people, and conducted 15,990 result demonstrations of improved farm and home practices.

The Agricultural Conservation Program

During 1938 the Extension Service continued to render all possible assistance to the Agricultural Adjustment Administration, and to the state, county, and community committees in handling the AAA program to the best interests of the farmers of the state.

The records show that in 1938 the county agents spent 4,928 days, or an average of 36 percent of their time, and the assistant county agents spent 688 days, or 15 percent of their time in AAA work. These agents held 1,178 educational meetings on the AAA program, which were attended by 115,071 farmers, and 288 training meetings were held for committeemen. Farm visits totaling 5,302 were made by agents, 1,348 news stories were published, 1,924 circular letters, and 74,591 personal letters were written to farm people, and 665,232 farm people called at the agents' offices for information on the program.

Agricultural Economics and Farm Management

Program of Work: The 1938 extension program in agricultural economics and farm management included the giving of outlook and economic information to farmers, farm and home accounts, analysis of farm records, and county program-planning work.

Farmers Plan According to Outlook: County farm and home demonstration agents, with the assistance of the staff of the farm management division, held 51 county outlook meetings and 284 community outlook meetings during 1938, which were attended by 22,328 farm people; published 260 newspaper articles and issued 113 circular letters giving outlook information.

Farm Accounts and Enterprise Records: One hundred and forty-four complete farm records kept by farmers in 1937 were analyzed in 1938. Thirty-six home accounts, and the following listed enterprise records were analyzed; corn, 223; Irish potatoes, 87; cucumbers, 76; tobacco, 200; oats, 56; wheat, 40; and dairy herd improvement, 81.

Results of the analysis of these records were carried back to the farmers by the county agents and specialists as the basis on which to aid them in improving their practices and increasing their farm incomes.

Program Planning: The farm management division assisted the county farm and home demonstration agents in the development and use of basic economic data for use in county program planning. The division also led in the development of the land-use planning work in several selected counties.
Agricultural Engineering

Program of Work: The extension program of work in agricultural engineering for 1938 included educational demonstration work in farm buildings and structures, home improvement, rural electrification, cotton ginning, farm machinery, farm water supply, irrigation and drainage, and soil conservation.

Farm Buildings and Structures: The farmers of the state showed great interest in the farm buildings plan service developed by the Extension Service, as is shown by the fact that 2,159 farm buildings and structures were constructed in 1938 by plans furnished by the Extension Service. Surveys by county agents showed that 5,351 brick brooders and 395 trench silos, built with the aid of the Extension Service, were in use in 1938.

Clean-Up, Fix-Up Campaign: Over ten thousand farm families cooperated in this campaign, with the result that their farm homes were repaired or remodeled, conveniences installed, and in many ways made more livable.

Rural Electrification Spreading: On January 1, 1935, there were 650 miles of rural electric lines in South Carolina reaching some 4,500 farms. By June 30, 1938, this had been increased to 6,388 miles of rural lines reaching an estimated 17,000 farm homes. The Extension Service aided 112 communities in organizing to obtain 1,358 miles of electric lines, reaching 4,945 farm homes in 1938. Three hundred fifty-four demonstrations were conducted in the use of electric equipment, and 42 rural electrification schools were held with farm people.

Improving Cotton Handling and Ginning: While South Carolina has made more progress than any other Southern state in improving the length and quality of lint cotton, the state stands at the bottom of the list in the matter of preparation for the market, with 16 percent of the total crop classed as rough ginned, resulting from cotton being ginned green or wet and from ginning equipment being in need of adjustment or repair. Such damage usually results in reducing the value of a bale of cotton $1.00 to $10.00.

During 1938 the Extension Service held 47 farmer-ginner meetings to show farmers and ginners how this damage occurs and to suggest how such damage may be avoided. With a small model gin, samples of wet and dry cotton were ginned and those present were shown the difference in the quality of lint. These meetings were attended by 3,521 farmers and ginners, and reports from cotton buyers indicate that as a result of the campaign much improvement has already been noted in the quality of lint cotton offered for sale.
Farm Machinery: From county agents' reports there were 123 demonstrations given during the year in the care and repair of farm machinery. Sixty-seven demonstrations were given of proper methods and equipment in harvesting lespedeza seed.

Soil Conservation: The soil conservation program in South Carolina is in charge of a state committee composed of the director of the Extension Service, the director of the Experiment Station, and the state coordinator of the Soil Conservation Service. Educational work in connection with the soil conservation program is conducted by the Extension Service.

Twenty-two voluntary county soil conservation associations of farmers, owning and operating under the supervision of the county agents 40 power terracing outfits, terraced 37,808 acres of farm land on 936 farms under agreement with the Soil Conservation Service in 1938. In addition, 10,416 acres of farmer-built terraces were constructed on 450 farms, and 9,501,765 trees were planted on badly eroded land.

Agronomy

Program of Work: The 1938 extension program in agronomy work included educational demonstration work in the production of cotton, corn, tobacco, small grains, and hay.

Cotton Improvement Demonstrations: In 1938 a total of 725 farmers, representing all counties of the state, conducted demonstrations in the five-acre cotton contest, with an average production of 529 pounds of lint cotton per acre.

South Carolina farmers continue to maintain their high standard in the length and quality of lint cotton produced. In 1929 only 36.7 percent of the lint cotton produced on the farms of the state was 15/16 inch long or longer, while in 1938, 96 percent of all lint produced in the state was 15/16 inch long or longer, and over 70 percent was one inch long or longer. The average yield of lint cotton per acre has increased from 208 pounds for the ten-year period, 1923-1932, to an average of 284 pounds per acre during the three-year period, 1936-1938, an increase of 76 pounds per acre, or 36 percent. South Carolina leads all other non-irrigated cotton-producing states in the percentage of lint 15/16 inch or longer, and stands second among the major cotton-producing states in the average yield per acre.

Corn, Small Grains, and Hay: During 1938, 530 corn production demonstrations, including 7,154 acres, were conducted by farmers who, through following improved methods, produced an average of 36 bushels of corn per acre, as compared with a state average of 14.5 bushels per acre. In small grains, farmers conducted 119 demonstrations in the production of oats, with an average production of 48.6 bushels per acre; 108
demonstrations in wheat, with an average production of 22.7 bushels per acre; 22 demonstrations of beardless barley with an average production of 39.3 bushels per acre; and 7 demonstrations in rye with an average production of 15.5 bushels per acre.

Fifty-nine farmers conducted demonstrations in the production of lespedeza hay with an average production of 1.26 tons per acre.

A substantial increase in the acreage of food, feed, and soil-building crops is noted. South Carolina produces more oats than any other Southern state east of the Mississippi River, and during 1937-1938 stood second among these states in average production per acre. From the five-year period, 1928-1932, to the two-year period, 1937-1938, the production of oats in the state increased from an average of 365,000 acres and 8,076,000 bushels to an average of 463,000 acres and 10,362,000 bushels, an increase of 98,000 acres and 2,286,000 bushels per year.

From an average of the five-year period, 1928-1932, to an average of the two-year period, 1937-1938, corn production in the state has increased from 1,525,000 acres and 20,240,000 bushels to 1,754,000 acres and 25,856,000 bushels, an increase of 229,000 acres and 5,616,000 bushels per year; wheat production increased from 67,000 acres and 704,000 bushels to 155,000 acres and 1,594,000 bushels, an increase of 88,000 acres and 890,000 bushels per year; tame hay production, including cowpeas, soybeans, lespedeza, sorghums, clovers, alfalfa, and others, increased from 353,000 acres and 255,000 tons to 577,000 acres and 466,000 tons, an increase of 224,000 acres and 211,000 tons per year. Acreage to permanent pasture has also shown substantial increase and improvement during this period.

**Tobacco Demonstrations Improving Crop:** For the fourth consecutive year the main educational work of the Extension Service with tobacco growers was through result enterprise demonstrations showing methods of producing higher yields per acre of better quality tobacco. During 1938 such demonstrations were conducted by 232 farmers in 22 counties, who produced an average of 1,159 pounds of tobacco per acre which sold at an average price of 22.6 cents per pound.

Tobacco yields on South Carolina farms increased from an average of 692 pounds per acre during the five-year period, 1928-1932, to an average of 915 pounds per acre during the three-year period, 1936-1938, an increase of 223 pounds per acre, or 32 percent. On the basis of an average production per acre in 1937-1938, South Carolina stands second among the eight Southern states growing tobacco. Through improved production and curing practices the quality of South Carolina tobacco has been improved to the extent that the buyers who formerly went elsewhere to purchase high quality flue-cured tobacco now come to the South Carolina markets to fill their needs.
Animal Husbandry

Program of Work: The 1938 program of extension work in animal husbandry included assistance to farmers in obtaining purebred sires and dams, hog feeding demonstrations, swine sanitation demonstrations, cooperative marketing of hogs, 4-H pig and beef calf club work, work with beef cattle, and meat curing and canning.

Hog Production Increases: The county agents and livestock specialists aided farmers in selecting and buying 293 purebred boars and 509 purebred or highgrade sows and gilts in 1938. Twenty-six swine sanitation demonstrations showing methods of producing hogs free of worms and other parasites were conducted with striking results in growth and quality of carcass. Thirty-seven hog feeding demonstrations were conducted, including 895 hogs, which, fed according to recommendations, gained an average of 1.59 pounds each per day at an average cost of $5.07 per 100 pounds gain.

The number of hogs produced on the farms of the state has increased to over 600,000 head per year, with an annual value of over $10,000,000, including those slaughtered on the farms for home use. Sales of pork and pork products in 1938, brought farmers over $4,000,000. In comparatively recent years South Carolina hogs sold on the big Eastern markets as "soft hogs", at one to two cents below the market price. However, as a result of feeding and marketing demonstrations, the farmers of the Coastal Plains counties marketed over 1,300 cars of surplus hogs in 1938, which sold at the top of the market prices bringing these farmers over $1,500,000.

4-H Pig Club Work: During 1938 a total of 946 club boys fed out 1,167 pigs which brought them $21,966. In the breeding class, 105 boys grew out 115 gilts, and 100 boys raised 616 pigs from brood sows they had grown out.

Beef Cattle on Increase: Interest in beef cattle is increasing as is shown by the number of new producers who are entering the field. Five auction sales of beef bulls were held in 1938, and, in addition breeders were able to sell their bulls and surplus females at good prices. Through cooperative sales and individual assistance by the county agents and livestock specialists, farmers were aided in the selection and purchase of 212 purebred beef bulls, and 310 purebred and high-grade females. County agents report a total of 689 purebred beef bulls in use in the state in 1938.

4-H Beef Calf Club Work: During the year 93 head of beef calves were grown out by 4-H club members, 65 head of which were shown and sold at auction in cooperative shows and sales.

Other Work included meat cutting and curing demonstrations, assistance to sheep growers, and mule production.
Dairying

Program of Work: The 1938 extension program of work in dairying included the placing of purebred dairy bulls, 4-H dairy calf club work, herd management, marketing, silage production, and pastures.

Selected Purebred Dairy Bulls Improve Production: During 1938 county agents and dairy specialists assisted farmers in selecting and purchasing 157 purebred dairy bulls for breeding purposes.

The average milk production of all cows on South Carolina farms increased from 2,347 pounds per cow per year in 1919 to 3,250 pounds in 1935, an increase of 903 pounds or 105 gallons per cow. This increase was the greatest made in any Southern state during this period, and places South Carolina second among the Southern states in the average annual milk production per cow. In addition, South Carolina, an obscure state as far as volume in dairy production is concerned, ranks third among all the states in the United States in the number of cows qualifying as Advanced Registry class leaders with annual production records of 600 pounds of butterfat or more per year.

Herd Management: During 1938 91 dairy herds in 20 counties and including 3,504 cows were enrolled in dairy herd improvement associations. Accurate records were kept on the production, cost, and returns in connection with these demonstration herds, and the practical and useful information gained serves as the basis of extension work with dairymen throughout the state.

Permanent Pastures and Grazing Crops: County agents report 5,801 acres of permanent pasture improved through mechanical means, seeding, fertilizing, and liming, during 1938. Twenty-one demonstrations of annual grazing crops were conducted, which afforded grazing for an average of 2.3 cows per acre for an average period of 94 days.

Silage Production: Twenty-five silage production demonstrations were conducted by farmers in 1938, with an average production of 6.9 tons per acre at an average cost of $2.84 per ton. The advent of the trench silo has placed an adequate supply of silage within reach of a large percentage of dairymen of the state, and estimates by the county agents place the 1938 tonnage of silage stored at 48,330 tons.

Marketing Dairy Products and Dairy Cattle: The Extension Service assisted farmers in marketing dairy products to the value of $216,531; and dairy cattle to the value of $150,400 in 1938. In addition, farmers were assisted in purchasing dairy cattle to the value of $3,752, bringing the total amount of sales and purchases to $370,683.
Crop Insects and Diseases

Program of Work: The 1938 program of extension work with crop insects and diseases affecting the farms of the state included educational demonstration work in their prevention and control, and emergency aid to farmers suffering outbreaks of crop insects and diseases.

Crop Insects: County agents made weekly infestation counts on representative farms throughout the state in order to determine the degree of boll weevil infestation and be able to advise farmers regarding methods of control. A total of 460 farmers conducted demonstrations in the use of early 1-1-1 poison, and county agents report that over 18,000 farmers used the early poison on over 220,000 acres of cotton with satisfactory results.

On account of the growing seriousness of the wireworm damage in the lower part of the state, 18 demonstrations of cropping and fertilizer practices designed to control the wireworm were started with farmers in 1938.

County agents report that 9,940 farmers were assisted in preventing and controlling outbreaks of miscellaneous crop insects in 1938.

Crop Diseases: For the fourth consecutive year the Extension Service conducted a program of demonstrations to show the farmers the value of treating cotton planting seed with mercury dust to control seed-borne diseases. During these four years, 505 demonstrations of this practice have been carried out by farmers and the results carefully checked and made known to the farmers of the state. As a result, the number of bushels of cotton planting seed treated by farmers of the state has increased from an estimated 5,000 bushels in 1935 to 533,000 bushels or 30 percent of all seed planted in 1938.

County agents report 59 result demonstrations of smut-resistant varieties of oats, 50 demonstrations of seed treatment of oats to control smut. Seventy-seven commercial Irish potato growers conducted demonstrations in the treatment of planting seed, and 5,770 farmers were aided in preventing and controlling miscellaneous crop diseases.

Sixty-one demonstrations of the treatment of pine, gum, and cypress fence posts with either bluestone or zinc chloride to protect them against insect and rot damage were begun during the year. Indications are that many years can be added to the durability of posts from these soft woods by this treatment. Widespread interest has been aroused in this work, and farmers in 1938 treated thousands of posts, which are now under observation.

Several years ago the extension entomologist developed a formula for a dust to control cattle lice. During the winter of 1938, over 20,000 head of cattle were treated with this dust with entirely satisfactory results.
**Beekeeping**

**Program of Work:** Extension work with beekeepers in 1938 consisted mainly of educational demonstrations in requeening and transferring, and work with county beekeepers associations and with queen breeders.

County agents report 31 transferring demonstrations given in 1938 including 240 swarms from old box and gum hives to modern loose frame hives. As a result of this work over a period of years, the agents report a total of 7,859 modern loose frame hives in use in the state in 1938.

Forty-three requeening demonstrations were given in 1938 in which 514 Italian queens were introduced. Nine counties have county beekeepers associations, and in 1938 a state association was formed with membership from 20 counties.

**Forestry**

**Program of Work:** The 1938 extension program in forestry included educational demonstration work in reforestation, thinning, pruning, selective cutting, fire protection, and timber estimating. This work was conducted by the county agents under the leadership of the extension forester, and in close cooperation with the South Carolina State Forestry Commission, and the Soil Conservation Service.

County agents report that in cooperation with the above listed agencies 14,826,000 trees were planted on 16,000 farms in 1938.

County agents held 15 thinning demonstrations, which resulted in 82 landowners practicing thinning in their woodlands. Two thousand and forty farmers pruned forest trees in their woods, and 100 selective cutting demonstrations, given by county agents and the extension forester, resulted in 242 farmers applying selective cutting practices to their woodlands.

Assistance was given in the organization and operation of county fire protective associations, and county agents report 17,849 farmers taking definite steps to prevent forest fires. Assistance was given 473 farmers in marketing forest products in 1938.

**Four-H Club Work**

**Program of Work:** The 1938 program of 4-H club work included organization of 4-H community clubs of farm boys and girls, supervision of 4-H club crops, livestock and home-making demonstrations, training 4-H club judging and demonstration teams, leadership training, and holding 4-H club camps, achievement days, and recreational meetings.

**Boys’ 4-H Club Work:** White boys in 1938 conducted 7,015 demonstrations in 4-H club work, submitting 3,689 completed records, or 52.6 percent.
Records turned in showed the total value of products grown was $129,207. Seven hundred and fifty-six cotton club members grew 542 acres of cotton with an average production of 431 pounds of lint cotton per acre. Eleven hundred and seventy-seven corn club boys grew 1,236 acres of corn with an average production of 36 bushels per acre. Other records in crops and livestock showed the progress 4-H club boys are making.

**Girls’ 4-H Club Work:** The 1938 enrollment of 4-H club girls was 11,577. Of this number 7,174, or 70 percent completed their projects. Ten thousand, two hundred and forty-five girls canned 288,203 quarts of fruits and vegetables, and dried and stored 17,193 pounds. In poultry clubs, 698 girls grew out 39,983 chickens, while in foods and nutrition clubs, 4,927 girls prepared and served 25,594 meals. In clothing projects, 3,943 girls made 1,784 dresses and 5,828 other garments; 1,699 girls improved 984 rooms in farm homes, and made 42,200 articles for the house. In 31 counties 3,584 girls took part in health contests.

**Four-H Club Camps:** During 1938 4-H club camps were held by every county in the state with 5,269 4-H club boys and girls and local leaders attending. In addition, the following listed special camps were held; a conservation camp, rural life conference for older 4-H club boys and girls, a collegiate 4-H club camp, and a leadership training and achievement conference for local 4-H leaders.

**Older Youth Clubs:** Fourteen counties had 21 older youth organizations in 1938 with a membership of 635 young farm men and women.

**Horticulture**

**Program of Work:** The 1938 program of extension work in horticulture included demonstration work in home orchard management, commercial orcharding, vegetable gardening, and truck crops.

**Home Orchards:** During 1938 county agents assisted farmers in conducting 21 home orchard demonstrations in which recommended practices as to varieties, culture, pruning, spraying, harvesting, and conserving the fruit were carried out. Records on these demonstrations show that these orchards gave a return of $89.23 per acre in products sold and conserved. The cost averaged $17.32 per acre.

**Commercial Peach Production:** During the past four years fertilizer demonstrations showing the value of complete fertilizer for peaches have enabled the commercial peach growers of the state to correct an abnormal condition of their trees that had arisen from the use of nitrogen alone as a fertilizer. At one time this condition threatened the peach industry in the state. Results of these demonstrations have changed the fertilizer practices of practically all commercial peach growers in South Carolina.
Since 1931 the Extension Service has emphasized the importance of orchard cover crops in commercial peach production, and in 1938 it is estimated that 90 percent of the acreage of bearing peach orchards in the state was planted to a cover crop of either rye or Austrian peas.

Pruning demonstrations given in 1938 were attended by fully 75 percent of all commercial peach growers. Practically all commercial orchards in the state are pruned according to standard approved methods.

Commercial peach growers of the Piedmont and Sandhill areas of the state have developed a $1,500,000 peach industry, increasing carlot shipments of high quality peaches from 23 cars in 1923 to the equivalent of over 3,000 cars in 1938. These farmers are maintaining their place in that field by producing high yields per acre of quality peaches.

Home Vegetable Gardens: County agents and home demonstration agents report a total of 1,929 demonstrations in vegetable gardening. These demonstrations are being analyzed for information to carry back to farm people. The monthly garden letter issued jointly by the extension Horticulture Divison and the Home Demonstration Department was sent monthly to 5,800 farm families in 1938.

Truck Crops: Approximately 181,000 acres of truck crops are grown in South Carolina, bringing the growers an annual return of 20 to 22 millions of dollars.

During 1938 the Extension Service cooperated with producers in obtaining the following listed demonstration records: Irish potatoes, 87; cucumbers, 76; and representative records on English peas, asparagus, snap beans, and tomatoes.

Sweet Potatoes: During 1938 the Extension Service continued the program to further develop sweet potatoes as a money crop on the farms of the state. As a result of demonstration work, over 450 cars of improved Porto Rico potatoes were shipped from the 1938 crop at the top of the market prices.

Marketing

Program of Work: The 1938 extension program of marketing work included assistance to farmers in the establishment and conduct of cooperative marketing organizations, cooperation with auction markets, supervision of federal-state shipping-point inspection service for fruits and vegetables, standardization of grade and pack, and general assistance to farmers in their marketing problems.

Cooperative Organizations: Assistance was given in the formation of three cooperative livestock sales organizations of farmers, three cooperative organizations for handling fruits and vegetables, one farmers’
wholesale market, and one woman's club market. Eleven livestock shipping organizations were assisted in conducting their operations.

**Standardization of Fruits and Vegetables:** Demonstration work was conducted in teaching farmers the standardization of their fruits and vegetables offered for market. This work was conducted in connection with the marketing of 368,000 crates of asparagus, 1,986 cars of watermelons, 657 cars of tomatoes, 3,043 cars of Irish potatoes, 2,000 cars of peaches, 450 cars of sweet potatoes, 346 cars of cabbage, 60 cars of green corn, 225 cars of snap beans, and 54 cars of green peas.

A total of 6,999 cars of fruits and vegetables received shipping-point inspection under the supervision of the Extension Service Division of Markets in 1938. Returns to growers from these shipments amounted to over $2,500,000.

**Carlot Shipments of Poultry:** During 1938, the Extension Service organized and assisted with the shipment of 45 cars of surplus poultry totaling 812,957 pounds, for 14,013 farmers. The returns from these shipments amounted to $139,677.

**Marketing Surplus Farm Products:** The Extension Service continued in 1938 to give assistance to farmers in marketing surplus farm products. The records show that the value of such products marketed amounted to $4,431,370.

**Poultry**

**Program of Work:** The 1938 extension program of poultry demonstration work included demonstration flocks, turkey demonstrations, brooding and rearing chicks, disease and parasite control, demonstration of houses and equipment, 4-H poultry club work, advancement of the National Poultry Improvement Plan, and miscellaneous poultry work.

**Demonstration Poultry Flocks:** One hundred poultrymen conducted demonstrations of poultry management in 1938, submitting monthly records to the Extension Service for analysis. The records show that these poultrymen averaged a labor income of $1.58 per hen. The analysis of their records was carried back to these demonstrators, and facts learned were used to assist poultrymen throughout the state in improving the efficiency of handling their flocks.

**Brooding and Rearing Chicks:** Twelve demonstrations were conducted in brooding and rearing baby chicks. Records of these demonstrations showed a mortality of 15.6 percent, and that it required 8.5 pounds of feed to grow a chick to 12 weeks of age.

**Turkey Demonstrations:** Twelve demonstrations were conducted by farmers in turkey production. These demonstrations included 1,359 poultis,
which gave a labor income of $1.94 each. Turkey production is expanding rapidly in the state.

**Disease and Parasite Control:** In 1938 records were obtained on 117 poultry flocks, including 27,931 birds which were vaccinated for chicken pox under the supervision of the county agents and poultry specialists. A summary of these records showed that of this number of birds vaccinated, only 341, or 2.1 percent died as a result of the vaccination, and of the remaining 27,590 birds, only 225, or nine-tenths of one percent developed chicken pox. As a result of this demonstration work over a period of years, there are scarcely any flocks of over 100 birds in the entire state that are not vaccinated.

County agents report a total of 7,822 poultrymen following recommendations for the prevention and control of poultry diseases and parasites.

**Poultry Houses and Equipment:** Farmers built 339 poultry houses in 1938 according to plans furnished by the Extension Service. County agents report that 3,714 farmers remodeled or repaired poultry houses and equipment according to recommendations during the year.

**National Poultry Improvement Plan:** Eleven hatcheries and 182 poultry flock owners in South Carolina are operating under the National Poultry Improvement Plan. The plan of operation includes rigid culling of breeding stock, testing for pullorum disease, and selection of breeding stock for vigor, standard type, and egg production. This work is intended to improve the quality of poultry in this state, as it has been done in other states.

**Poultry Work with Home Demonstration Clubs:** Poultry work was conducted with 3,875 farm women through home demonstration clubs in 1938. The value of poultry and poultry products produced by these women amounted to $291,050, or an average of $75.11 for each woman taking part.

**Four-H Poultry Club Work:** Poultry work was conducted by the home demonstration agents with 700 4-H poultry club members in 39 counties. The records show that these boys and girls bought an average of 159 chicks each, and after deducting all costs, made an average profit of $27.65 per member. These boys and girls kept an average of 67 pullets each for their 4-H club poultry flocks.

A state 4-H poultry judging contest was held during the State Fair with 12 teams of 2 members each participating. Twenty-six members from 8 counties entered 323 birds in the 4-H poultry exhibit at the State Fair.
Plan of Work: The 1938 extension program of educational publications included the preparation, editing, and distribution of two extension bulletins, eight extension circulars, two information cards, 12 issues of the Carolina Club Boy, and 787 news letters carrying spot news, information about agricultural matters, and feature articles on the accomplishments of farmers.

County agents and home demonstration agents prepared 10,440 news articles for publication in county newspapers, and issued 5,869 circular letters to farm people. Specialists issued 502 circular letters of instruction to agents and information to farmers during the year.

Regular weekly radio broadcasts giving agricultural information were made by extension workers over Stations WAIM, Anderson; WIS, Columbia; and WOLS, Florence. Twice-monthly programs were given over WBT, Charlotte. These broadcasts included approximately 225 prepared talks.

Visual Instruction

Program of Work: The 1938 extension program of visual instruction included the showing of agricultural motion pictures to 429 audiences, including 62,914 farm people. One motion picture showing recommended methods of cotton production in South Carolina was made in cooperation with the United States Department of Agriculture, and over 300 photographs of agricultural demonstrations were produced and filed for uses.

HOME DEMONSTRATION WORK

Clothing

Program of Work: Consumer education, improved storage spaces, laundering, home accounts, and clothing budgets for the farm family, are the phases emphasized in the extension clothing program. In 19 counties, 706 farm women kept family clothing accounts as a basis for planning the next year's clothing budget.

Five sewing schools, or "clinics for old garments" proved a highly beneficial piece of work.

Eighteen counties had all or a part of the 4-H girls enrolled in clothing work, with 3,943 girls taking part and making clothing under the leadership of the home demonstration agents and clothing specialist.

Home Management and House Furnishings

Program of Work: Kitchen improvement, farm home sanitation, lightening household tasks, and general home improvement featured the ex-
tension program in home management and house furnishings in 1938.

During the year 1,709 farm kitchens were better equipped and more conveniently arranged according to plans worked out by the home demonstration agents. Special emphasis was given on correct working height of kitchen equipment, homemade cabinets, simple water systems, kitchen sinks, covered garbage pails, woodboxes, stools, etc.

In farm sanitation work, 1,299 sanitary toilets and 432 sewerage systems were built according to plans furnished by the Extension Service, and water was installed in 274 farm homes.

House Furnishings: Making the farm homes of the state more comfortable and attractive is still of great importance. In conducting the program in house furnishings, the home demonstration agents and the specialist assisted 2,630 farm women to add color to the home; 3,685 to improve the arrangement of furniture; 2,499 to refinish walls, woodwork, and floors; 2,219 to correct home lighting; and 1,760 to build or remodel one or more storage spaces.

As a result of the project “Old Furniture Made New”, 3,057 families repaired, refinished, or made furniture for their homes.

In 4-H club home improvement work, 1,216 girls improved the care of their bedrooms and 394 pieces of old furniture were made over or refinished by 4-H club girls.

Nutrition and Child Development

Program of Work: Human nutrition, food preparation, health, and child development featured the extension program of nutrition and child development.

Foods and Nutrition: In all, 12,111 farm women did some type of foods work under the leadership of the home demonstration agents and the nutrition specialist in 1938, and 1,205 farm women participated in child development work. A total of 4,712 farm families followed recommendations as to the preparation and balance of the family food, 8,687 families were assisted in using timely information as a basis for readjusting the family food supply, 1,412 farm women prepared and followed a food budget for their families, and 1,676 farm women prepared canning budgets.

Production and Conservation

Program of Work: The extension conservation program emphasizes the canning, drying, or otherwise storing and conserving the surplus food produced on the farm, including the canning of meats.
Six hundred canning demonstrations were given by home demonstration agents, through which 17,393 farm families canned and preserved 2,327,655 quarts of vegetables and fruits; 533,625 containers of jams, jellies, and preserves; and dried 17,193 pounds of fruits and vegetables, with an estimated total value of $458,616. A total of 11,529 home demonstration women conducted garden projects, and 2,091 farm women improved the grounds around their homes.

**Marketing**

**Program of Work:** Home demonstration agents assisted in the conduct of 29 county home demonstration club markets, through which around 1,800 farm women sold surplus farm and home products to the value of $452,306 during 1938.

Seven counties carried the Plantation Project, in which an effort is being made to show, by demonstrating with a number of tenant families in cooperation with their landlords, that it is possible in South Carolina for a low-income group of farmers to have balanced, adequate diets, and better standards of living than many now have. In all 106 tenant families were enrolled, and definite progress is being made in demonstrating that their standards of living can be improved.

**NEGRO HOME DEMONSTRATION WORK**

**Program of Work:** Home demonstration work by Negro agents with Negro farm women is conducted in 15 counties. During 1938 Negro women numbering 6,227 were enrolled in the home gardening project, 2,046 of these not only raising enough vegetables for home use, but a surplus for the market. Poultry flocks were started or improved by 2,125 Negro farm women; 59 Negro families were influenced to buy cows; 41,446 families served balanced meals, and canned 403,952 quarts of fruits and vegetables, and 63,157 containers of pickles, jellies, and jams. Kitchens were improved by 1,493 Negro women, 2,629 pieces of old furniture were repaired and refinished, and 1,192 sanitary toilets were built.

In all, 8,338 Negro girls were enrolled in 4-H club work.

**NEGRO FARM DEMONSTRATION WORK**

**Program of Work:** The program of Negro farm demonstration work is set up to teach the Negro farmers of the state to become more self-supporting on their farms, and, thereby, raise their standard of living. Eighteen Negro county agricultural agents conducted a program in 1938 of crops and livestock demonstrations, soil conservation, farm buildings, and truck and garden crops.
Negro agricultural agents assisted 31 Negro farmers in terracing 1,630 acres of land, and farm buildings were constructed and repairs were made on 946 farms.

Cotton production demonstrations were conducted by 115 Negro farmers with an average yield of 511 pounds of lint per acre. Corn production demonstrations were conducted by 137 with an average yield of 34 bushels per acre. Oats demonstrations were conducted by 97 Negro farmers with an average yield of 34 bushels per acre, and 47 demonstrations in wheat production yielded 22 bushels per acre.

Hog-raising demonstrations were conducted by 166 Negro farmers; 28 purebred boars and four purebred gilts were placed; and 16 hog-feeding demonstrations were conducted.

Negro farmers conducted 24 demonstrations of dust treatment of cotton seed showing an average increase of 206 pounds of lint cotton per acre over untreated seed.

Negro boys numbering 3,683 joined 4-H clubs growing farm products worth $59,625.
REPORT OF BOARD OF VISITORS

To the Board of Trustees,
The Clemson Agricultural College
Clemson, South Carolina

Gentlemen:

The Board of Visitors met at Clemson College on the third and fourth of May, visited buildings and farms, heard reports of officials, talked with faculty members and students, then retired for deliberation and adopted this report, which is respectfully submitted to you.

The Board is convinced that South Carolina's agricultural and general economic development will be speeded if functional education, such as students receive at Clemson, becomes more general. The fundamental rural need in South Carolina is for improvement in the working skill of people. This, also, is a general need. Men simply cannot do successfully what they do not know how to do. This Board believes a primary concern of every normal man is to earn a livelihood, therefore it believes a primary concern of education should be to teach him how to earn it. This is not an exclusive policy. It does not exclude or belittle the teaching of ideals. It does not exclude or belittle the desirability of pure culture. It does, however, seek to put an economic base under ideals and under culture. Without such a base the superstructures of civilization will totter.

This Board knows that Clemson College needs more and larger buildings, better equipment in some of the existing buildings, more money for plant maintenance, and that Clemson College could, if it had the facilities, add hundreds of students to its present enrollment. The same is true of many institutions. But this Board does not know where the money for all the needs is to be found, therefore it reluctantly refrains from recommendations for costly additions to plant equipment, and merely suggests respectfully that Clemson, as always, place emphasis on the quality of work done, rather than on numbers and size.

This Board hopes in all earnestness that it soon will be possible to raise the pay of faculty members and of officials, so that Clemson may hold the devoted and competent staff it now has, and add to it from time to time top flight men in the educational world. This seems of greater importance than plant expansion because the quality of the faculty determines the worth of most courses.

This Board respectfully suggests (1) that as soon as money is available for additional plant expansion and improvement, the hospital building be given precedence; (2) that the maintenance of existing buildings
and equipment be given attention comparable with the attention given the matter of expansion of plant and equipment; (3) that the military program be expanded, if this is practicable and can be done without cost to South Carolina, to include one or more branches of service in addition to infantry, but the Board does not recommend that the military feature be made more impressive in the experience of Clemson students in peaceful and normal times; (4) that increased attention be given to training in forestry; (5) that the matter of weekend leaves and hitchhiking by students be reexamined with a view to tightening requirements for leaves if reexamination shows that such would be warranted; and (6) that, if practicable, increased emphasis be placed on the teaching of practical economics in relation to life and tasks in South Carolina.

One member of the Board asks that, in addition to these recommendations, the matter of hazing be reexamined also. The Board as a whole took no position on this matter because it did not come before the Board, but this member states that he has information that suggests the need for another look at hazing practices; and two members, after examination of the recommendations, find No. 5, concerning weekend leave and hitchhiking by students in uniform, much milder than their feelings on the subject.

This Board assumed a special and agreeable task—the inspection by some of its members of the various experiment stations, and it urges that the fine programs of those stations be energetically pushed. It is apparent that South Carolina must have additional crops, and higher yields—hence lower costs—per acre for its present crops. The chance is at hand for South Carolina to improve its system of agriculture. The work of Dean Cooper in soil analysis and other work done by Clemson men shows how that improvement may be hastened. Clemson is the institution to lead rural South Carolina toward and to the achievement of a genuinely abundant life, which never in its recent history has it had except for a too limited number of persons; and Clemson is the institution to lead South Carolina toward and to the achievement of far greater technical skill than it has profited from in the past.

This Board knows that lack of money is a down-dragging handicap; but if there can be developed enough inspired leaders the standard of workmanship will improve in South Carolina, then the standard of income may rise, and after that Clemson and all other institutions may have more money. The problem at the moment is how to do great work without the aid of great riches. That is not a novel problem for Clemson College to face, and solve.

Yours very truly,

A. E. Jury, Chairman
James C. Derieux, Secretary
Membership:
Edward H. McLver, Charleston
James C. Derieux, Columbia
L. D. Holmes, Johnston
Ernest R. Rosenberg, Greenwood
J. C. Wilkinson, Seneca
T. J. Hendrix, Duncan
H. K. Osborne, Spartanburg
Thomas Ancrum, Camden
R. B. Caldwell, Chester
E. M. Meares, Nichols
C. S. McCall, Bennettsville
Hold-Over Member from 1938
A. E. Jury, Winnsboro
REPORT OF DIRECTOR OF DEPARTMENT OF FERTILIZER INSPECTION AND ANALYSIS

Dr. E. W. Sikes, President
The Clemson Agricultural College
Clemson, South Carolina

Dear Dr. Sikes:

I submit herewith the annual report of the Department of Fertilizer Inspection and Analysis for the past year.

The new fertilizer law approved by the General Assembly at its last session has placed our fertilizer inspection and analysis work on a much sounder and more satisfactory basis. In addition it brings this state in accord with all others in the matter of the order of the elements in the fertilizer analysis. The requirement that 16 units of plant food shall be the minimum carried by fertilizer mixtures is one which I believe will ultimately result in substantial savings to farmers in that the per unit cost of the higher grade mixtures is less than that of the lower grade fertilizers heretofore widely used.

Yours very truly,

H. P. COOPER, Director

Ten efficient, well trained fertilizer inspectors in addition to checking weights, tagging and branding of fertilizer and fertilizer materials, submitted 4,980 official fertilizer samples to the laboratory for analysis. Ninety percent of these samples was drawn on the farm, thus making it easier and more accurate to make refund to the ultimate consumer in case of a deficiency. Drawing samples from small lots, five to ten bags, brought about a more uniform mixture which is very essential for highly specialized crops.

In order to keep the inspectors posted on the latest changes in the fertilizer industry and findings of the Experiment Stations a one-day meeting was held at the Pee Dee Experiment Station, Florence, S. C., for all inspectors in the lower part of the state and another at Greenwood,
S. C., for the ones in the upper part of the state. A timely program conducted by agricultural officials of the college was rendered.

Numerous bulletins and other information were distributed to farmers through the fertilizer inspectors. These requests for information were made through the inspectors on their daily reports. The farmers of South Carolina appreciate the interest shown by the college in having an inspector visit their farms and draw samples for analysis.

Each inspector works four to five counties including his home county so that he may return to his home at night. A list of inspectors, their addresses and territory worked, was sent to all County Agents, Extension Workers and Vocational Agricultural Teachers who were asked to request the services of the inspectors whenever needed.

South Carolina is now operating on a minimum of 16 units of plant food, a nitrogen basis, and expressing the formulae in the order, nitrogen, phosphoric acid and potash, which will be of tremendous help to the manufacturers and research men and will prove highly economical to the farmers.

There was an increase of 1 percent in fertilizer consumption in South Carolina for the 1938-39 season.

The following is a brief summary of the activities of the Department of Fertilizer Inspection and Analysis from July 1, 1938 to June 30, 1939.

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of official samples collected</td>
<td>4,980</td>
</tr>
<tr>
<td>Number of tons of fertilizer sold 1938-39</td>
<td>672,753</td>
</tr>
<tr>
<td>Number of tons seized because of irregularities</td>
<td>303</td>
</tr>
<tr>
<td>Fines collected on irregular goods</td>
<td>$754.17</td>
</tr>
<tr>
<td>Amount derived from tag sales 1937-38</td>
<td>166,686.50</td>
</tr>
<tr>
<td>Amount derived from tag sales 1938-39</td>
<td>168,188.25</td>
</tr>
</tbody>
</table>

Increase of tag sale over 1937-38 $1,501.75

Tonnage increase 6.007

Percent of tonnage increase .01%

Tons of fertilizer sold in South Carolina 1938-1939 for each sample collected by the College 136.
Dr. E. W. Sikes, President
The Clemson Agricultural College
Clemson, South Carolina

Dear Dr. Sikes:

As requested in your favor of June 20, we are enclosing our annual report for the fiscal year closing June 30, 1939.

This, in the main, is more or less a repetition of the report we made this spring, but we trust that it will meet with your approval.

With kind regards, I am

Yours very truly,

W. K. LEWIS, State Veterinarian

CLEMSON COLLEGE LIVESTOCK SANITARY DEPARTMENT
PUBLIC SERVICE ACTIVITIES

In accordance with the laws of the State of South Carolina this department is maintained in Columbia, South Carolina, in cooperation with the U. S. Department of Agriculture for the control and eradication of contagious, infectious and communicable diseases in livestock and poultry.

This department has been maintained in Columbia since October, 1914, at which time we had a very small organization. At present we have an organization capable of taking care of livestock and poultry diseases within our state. During this time we have eradicated cattle fever ticks and have also tested all cattle in the state for bovine tuberculosis and at this time we do not know of any animals infected with this condition.

Hog Cholera

When this department was created by the Board of Trustees the hog cholera situation in our state was very serious. At present, due to the fact that this condition is being handled by licensed, graduate veteri-
narians, the infection has been reduced to the minimum and hog cholera control is one of the principal projects of this department. As an indication of the interest in this line of work on the part of the hog raisers, our records show that during the past fiscal year there was an increase of forty-five percent in the number of hogs treated against cholera as compared to the previous year.

Our swine sanitation project is still growing in favor with the swine raisers and a great amount of good is being accomplished by those taking part in it.

Laboratory

Each year there is an increase over the previous year in the number of specimens from all classes of livestock including poultry which are examined in our laboratory which is an indication that the livestock owners in our state are taking a greater interest in obtaining correct information regarding conditions in their livestock and poultry and are depending to a greater extent upon the service this department is able to render.

Deputy State Veterinarians

The plan we established several years ago whereby graduate, licensed veterinarians practicing in sections where we do not have employees located, are deputized to take care of emergency calls, is still proving to be satisfactory. This plan enables us to furnish prompt service to the livestock owners in all sections of the state at a minimum cost.

Maintenance

This department is maintained by appropriations from the State of South Carolina and the U. S. Department of Agriculture.

U. S. Bureau of Animal Industry Cooperation

The U. S. Bureau of Animal Industry, Department of Agriculture, continues to cooperate with this department in bovine tuberculosis and hog cholera control. Also, on July 1, 1934, the Bureau established the Bang's Disease Elimination Plan in this state and since that date up to the close of June 30, 1939, we have tested for Bang's disease a total of 29,398 herds containing 256,915 head of cattle. In addition to the individual herd testing all over the state we have established the Area plan of testing in several counties. Full cooperation is being received from the livestock owners in having their cattle tested for this condition.

The U. S. Bureau of Animal Industry has paid indemnity to livestock owners whose cattle reacted to the Bang's disease test up to the close of April 30, 1939.
On May 4, 1939, an Act became effective to pay State indemnity on cattle that react to the Bang's disease test, however the last General Assembly failed to provide funds for this purpose. As the Bureau since May 1, 1939, is paying indemnity only in states with appropriations for the same purpose, the livestock owners in this state will not receive indemnity for their diseased cattle that react to the Bang's disease test until such time as the State of South Carolina appropriates sufficient funds for this purpose, which funds will be supplemented by the Federal Government.

We trust that the members of the General Assembly will take cognizance of this fact and that we may receive sufficient funds next year to continue this project which is a very important one so far as our livestock industry is concerned.
REPORT OF THE STATE CROP PEST COMMISSION

Dr. E. W. Sikes, President
The Clemson Agricultural College
Clemson, South Carolina

Dear Dr. Sikes:

Accompanying this letter is the annual report of the State Crop Pest Commission.

I wish to call attention to the fact that whereas the demands upon this agency are constantly increasing the funds provided for the work during the current year are less than they have ever been except in 1934.

Two important new duties are the inspection of cotton seed shipped by our cotton breeders to other states and the inspection of seed Irish potatoes used by our truck growers. The latter work is imposed by a law passed at the last session of the General Assembly which at the same time made a substantial reduction in the appropriation for the Commission.

In spite of the handicap under which the Commission must operate it is rendering the state a great deal of valuable service.

Yours very truly,

H. P. COOPER, Dean and Director.

The South Carolina State Crop Pest Commission in its efforts to prevent the introduction into and the spread within the state of injurious insect pests and plant diseases is at present charged with the enforcement of regulations concerning the growing and sale of nursery stock, sweet potato plants and seed sweet potatoes, cabbage and tomato plants, apiary inspection, phony peach, seed Irish potatoes, cotton seed, European corn borer, and insecticides and fungicides. The Commission is also cooperating with the Bureau of Entomology and Plant Quarantine in trapping and scouting for Japanese beetle, sweet potato weevil, and white fringed beetle.
Nursery Inspections

In compliance with the law and regulations concerning South Carolina nurseries the annual inspections were begun in June and completed during the latter part of August. These nurseries are located throughout the state one or more being found in 32 of the 46 counties. One hundred twenty-five properties were given one or more inspections. This is an increase of 17 nurseries over last season. The combined acreage of these nurseries is approximately 775, showing an increase in acreage of 25 over last season. Several of these nurseries have since gone out of business.

The stock in these nurseries is composed chiefly of ornamentals, though there are several specializing only in pecan, while others grow a general line of nursery stock including fruit, nuts, and ornamentals.

The inspection of these nurseries not only prevents the spread of injurious plant pests, but it enables nurserymen to compete favorably with those of other states in the sale of their products. All states have similar plant regulations and unless nurseries have been inspected and certified as to freedom from injurious insects and plant diseases the stock will not be accepted by common carriers.

As a whole the South Carolina nurseries were in very good condition both as to growth of plants and freedom from pests. A few of the more common pests are usually found in some of the nurseries, but at the time of inspection, control or eradicative measures are recommended and the nurserymen have been found quite willing and anxious to take whatever steps were necessary to rid the nursery of whatever pests are encountered.

There were, as usual, a few scattered infestations of scale insects, mainly San Jose and euonymous, aphids, red spiders, bagworms, lace bugs, gall insects, leaf-feeding insects, and various leaf spots on many varieties of plants. None of these were found to be doing serious damage. The nurserymen are well acquainted with the control of the common pests and readily call upon the Commission for advice on problems with which they are not familiar.

One nursery reported several years ago as having a rather severe infestation of the cottony cushion scale on Pittosporum has been practically freed of this pest through the introduction and colonization of a predaceous ladybird beetle which feeds exclusively on this scale insect. These recommendations were made by this Commission and thoroughly carried out by the nurserymen concerned with very gratifying results. This particular scale insect is rather impervious to insecticides, but satisfactory control has been obtained when oil sprays are thoroughly and properly applied with considerable pressure.
In addition to the regular nursery inspections 60 inspections were made of home or yard plantings. These yard plantings consist chiefly of small rooted stock that is to go by parcel post, but are just as likely, possibly more so, to harbor injurious pests as are the plants grown by the regular nurserymen. The United States postal regulations, as well as the regulations of other states require these inspections. Fifteen more inspections of this type were made than last year.

Following is a list of the South Carolina nurseries:

**List of South Carolina Nurseries for the Season 1939-40**

<table>
<thead>
<tr>
<th>Name of Nursery</th>
<th>Kind of Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen, Walter, Summerville</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Anderson, Mrs. O. D., Anderson</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Aull, L. D., Pomaria</td>
<td>Perennials</td>
</tr>
<tr>
<td>Barron, Mrs. Mack, Seneca</td>
<td>Bulbs</td>
</tr>
<tr>
<td>Belue, W. A., Inman</td>
<td>Peach</td>
</tr>
<tr>
<td>Bittersweet Nursery, Chesterfield</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Borden Nursery, Rembert</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Boxwood Gardens, Society Hill</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Briggs' Nursery, 11 Hyde St., Greenville</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Buckfield Plantation, Yemassee</td>
<td>Narcissus</td>
</tr>
<tr>
<td>Bush, James C., North Augusta</td>
<td>Perennials</td>
</tr>
<tr>
<td>Beauty-Lane Nursery, Lane</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Cain, Miss Caroline P., Pinopolis</td>
<td>Daffodils</td>
</tr>
<tr>
<td>Campbell, W. A., Sheldon</td>
<td>Bulbs</td>
</tr>
<tr>
<td>Campobello Nursery, Campobello</td>
<td>General</td>
</tr>
<tr>
<td>Cannon, Mrs. Leila, Duncan</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Carolina Floral Company, Charleston</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Cason, J. M., Lykesland</td>
<td>Strawberry</td>
</tr>
<tr>
<td>Catawba Farms, R. 2, Hamlet, N. C.</td>
<td>Grape</td>
</tr>
<tr>
<td>Cherokee Gardens, 2227 Wheat St., Columbia</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Chester Kings Nursery, Spartanburg</td>
<td>General</td>
</tr>
<tr>
<td>Culler, Mrs. J. W., Orangeburg</td>
<td>Ornamental</td>
</tr>
<tr>
<td>Craig, Marcus, Pendleton</td>
<td>Ornamentals</td>
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<tr>
<td>Dailey's Nursery, Clinton</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Davis, John O., Ware Shoals</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Dibble Nursery, Orangeburg</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Dunean Nursery, Greenville</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Dorndale Nurseries, Route 4, Sumter</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Edwards Nursery, Darlington</td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Eidsdon, Mrs. A. L., Johnston</td>
<td>Bulbs</td>
</tr>
<tr>
<td>Elm Abode Nurseries, 1207-09 Hampton St., Columbia</td>
<td>Ornamentals</td>
</tr>
</tbody>
</table>
Evergreen Nurseries, Conway ___________________________ Privet
Evergreen Nursery, Camden ___________________________ Ornamentals
Evergreen Nursery, Rembert ___________________________ Ornamentals
Fant’s Greenhouses, Anderson __________________________ Ornamentals
Fletcher, Mrs. Jasper, McColl __________________________ Ornamentals
Flowerland Nursery, 125 Meeting St., Charleston _______ Ornamentals
Fruitland Nurseries, Augusta, Ga. ______________________ Peach
Fulmer, Mrs. Jutson, Aiken _____________________________ Annual and Perennials
Frierson, Wm. C., Westminster __________________________ Ornamentals
Gallman Nursery, R. 1, Jonesville ______________________ Ornamentals
Gaffney Greenhouse, Gaffney __________________________ Ornamentals
Gibson, Mrs. R. H., Hampton ____________________________ Ornamentals
Gillison, Mrs. Paul, Seneca _____________________________ Perennials
Greenville Nursery Co., Greenville _____________________ General
Greengate Gardens, Bennettsville ________________________ Iris
Deason, Mrs. F. P., McCormick __________________________ Ornamentals
Green Brothers Nursery, Elloree ________________________ Ornamentals
Guion, Mrs. L. L., Lugoff ______________________________ Bulbs
Greer Nursery, Greer _________________________________ General
Harmon, Mrs. Ethel, Saluda _____________________________ Ornamentals
Harrison, W. P., Columbia ______________________________ Ornamentals
Harris, Mrs. Hunter, Union ______________________________ Perennials
Helms Nursery, Bethune ________________________________ Ornamentals
Howell-Gillespie Nursery, Taylors _______________________ Ornamentals
Huggins, Charlie, R. 5, Gaffney __________________________ General
Henderson, L. P., Scotia ________________________________ Bulbs
Jahnz, Hugo, Summerville ______________________________ Ornamentals
Jordan’s Pansy Garden, Aiken __________________________ Ornamentals
Jenkins, Micah & Co., Edisto Island ______________________ Ornamentals
Lockwood, A. L., Anderson _____________________________ Gladiolus
Liberty Nurseries, Liberty ______________________________ Ornamentals
Limehouse, Mrs. Tom, Route 4, Charleston _______________ Bulbs
Lucas, Miss Florence LeNoble, Pinopolis __________________ Daffodils
Lindfors, H. T., 4104 Main St., Columbia _________________ Bulbs
Lybering E. L., Sumter _________________________________ Ornamentals
LeConte, Louis, Lykesland ______________________________ Bulbs
LaBruce’s Nursery, Myrtle Beach __________________________ Ornamentals
Miller’s Evergreen Nursery, Roebuck _____________________ Ornamentals
Morningside Side Nursery, Newberry ______________________ Ornamentals
Moss, Chas. A., Spartanburg ______________________________ Ornamentals
Mountain View Nursery, Liberty __________________________ Ornamentals
Moore, Mrs. Margaret L., Lykeland _______________________ Bulbs
Oaklawn Nurseries, Mayesville __________________________ Ornamentals
Owen Brothers, Aiken _________________________________ Ornamentals
<table>
<thead>
<tr>
<th>Nursery</th>
<th>County</th>
<th>Commodities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palmer &amp; Harvin, Sumter</td>
<td></td>
<td>General</td>
</tr>
<tr>
<td>Palmetto Floral Nursery, Charleston</td>
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</tr>
<tr>
<td>Palmetto State Nursery, Florence</td>
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<td>Ornamentals</td>
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<tr>
<td>Pecanola Nursery, Cameron</td>
<td></td>
<td>Pecan</td>
</tr>
<tr>
<td>Pike, W. P., Nursery, Summerville</td>
<td></td>
<td>Nuts and Grapes</td>
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<tr>
<td>Pinehurst Nursery, Summerville</td>
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<tr>
<td>Rock Hill Nursery, Rock Hill</td>
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</tr>
<tr>
<td>Rosewood Greenhouses, Columbia</td>
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<td>Ornamentals</td>
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<tr>
<td>Roebuck Nursery Co., Roebuck</td>
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<tr>
<td>Santee River Nursery, Goudin</td>
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<td>Ornamentals</td>
</tr>
<tr>
<td>Senn, Mrs. L. E., Mayo</td>
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<tr>
<td>Shannon Farm Nursery, Jefferson</td>
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<td>Simons Nursery Co., Inc., Charleston</td>
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<td>Soil Conservation Nursery, Rock Hill</td>
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<td>General</td>
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<tr>
<td>Smith, A. G., Edmund</td>
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<td>Peach</td>
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<td>Smith, F. M., North</td>
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<td>Strawberry</td>
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<td>Smith's Nursery, Trenton</td>
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<td>Ornamentals</td>
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<tr>
<td>State Forest Tree Nursery, Sumter</td>
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<td>Forest</td>
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<tr>
<td>State Forest Tree Nursery, Camden</td>
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<tr>
<td>State Forest Tree Nursery, Georgetown</td>
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<td>Forest</td>
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<tr>
<td>Stephenson, J. A., Irmo</td>
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<tr>
<td>Stoudemire, Mrs. W. L., 12 Brown St., Sumter</td>
<td></td>
<td>Perennials</td>
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<tr>
<td>Summerville Floral Nursery, Summerville</td>
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<td>Ornamentals</td>
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<tr>
<td>Spartanburg Landscape Co., Spartanburg</td>
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<td>General</td>
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<td>Southern Bulb Farms, North</td>
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<td>Bulbs</td>
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<td>Sunset Nursery, Liberty</td>
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</tr>
<tr>
<td>Taylor's Nursery, Greer</td>
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<td>General</td>
</tr>
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<td>Three Trees Flower Farm, James Island</td>
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<td>Twixtboro Nursery, Darlington</td>
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<tr>
<td>Townsend, C. H., Walterboro</td>
<td></td>
<td>Amaryllis</td>
</tr>
<tr>
<td>Utopia Nursery, Greenwood</td>
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<td>Ornamentals</td>
</tr>
<tr>
<td>Wayside Nursery, Sandy Springs</td>
<td></td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Watson's Pecanwood Nursery, Orangeburg</td>
<td></td>
<td>Pecan</td>
</tr>
<tr>
<td>Watson's Nursery, 3200 Elmwood Ave., Columbia</td>
<td></td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Watson, Mrs. V. C., R. 3, Spartanburg</td>
<td></td>
<td>Perennials</td>
</tr>
<tr>
<td>Weeks, Mrs. L. W., St. George</td>
<td></td>
<td>Perennials</td>
</tr>
<tr>
<td>White, B. L., R. 3, McBee</td>
<td></td>
<td>Peach</td>
</tr>
<tr>
<td>Witherspoon, Miss P. F. 150 Archer St., Spartanburg</td>
<td></td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Wood, J. W., Duncan</td>
<td></td>
<td>Grape</td>
</tr>
<tr>
<td>Wolfe, Russell S., Orangeburg</td>
<td></td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Woodward, Mrs. A. W., R. 6, Aiken</td>
<td></td>
<td>Ornamentals</td>
</tr>
<tr>
<td>Woodward, Henry, R. 2, Johnston</td>
<td></td>
<td>General</td>
</tr>
<tr>
<td>Wyly, O. S., Walhalla</td>
<td></td>
<td>Ornamentals</td>
</tr>
</tbody>
</table>
As in previous years nurserymen of South Carolina fall far short of supplying the demand for nursery stock used in the state. It, therefore, becomes necessary to purchase this stock from nurseries of other states. There is always danger of bringing into the state pests that we do not have, or pests that may not be widely distributed throughout South Carolina. It becomes necessary then, that the State Crop Pest Commission give some means of protection to growers or purchasers of nursery stock in this state. To this end the Commission has promulgated and passed certain regulations with which outside nurserymen must comply. These regulations require that before nursery stock is shipped into South Carolina the nurserymen must file with this Commission an acceptable certificate showing that the stock to be shipped has been officially inspected and passed by the proper officials of the state of origin. There is then issued to these nurserymen South Carolina nursery permit tags, one to be attached to each bundle, bale, or package coming to South Carolina. Out-of-state nurserymen are required to account for each of these tags at the end of the season and to return all those unused or mutilated in any manner.

As a further check on outside shipments, such nurserymen must file from time to time during the shipping season duplicate invoices showing kind and quality of stock shipped, to whom and where shipped, and the number of the South Carolina tag used. These duplicate invoices are valuable in that they enable inspectors of this Commission to check any nursery stock shipped into this state, should occasion for such an inspection become necessary. Such occasions do arise, as evidenced by the finding of the whitefringed beetle in several nurseries in the New Orleans area after regular inspections had been made. Through these invoices we were able to inspect all the properties in South Carolina to which this stock went. If, by any means, light infestations of injurious pests should be found immediate eradicative measures could then be taken.

In addition to the great amount of office work that the above regulations entail we inspect, as often as it is possible to do so, incoming shipments when they arrive at destination, especially if they are large shipments.

Last season 252 nurseries located throughout the United States registered to do business in South Carolina and to them were issued 29,856 permit tags. This is an increase of 42 nurseries and 601 permit tags. This will give some idea of the amount of nursery stock shipped into the state. It must be remembered that many of these states have pests that do not occur in South Carolina and unless our people wish the doors thrown open for the unrestricted entry to pests injurious to the agriculture
of the state, means should be made available whereby an ever watchful eye can be kept on injurious insects and plant disease enemies and their progress retarded wherever possible.

**Greenhouse Inspections**

The regulations require that the plants in all the greenhouses be inspected annually, or more often if deemed necessary, in order that no plant pests may be distributed through this medium. The various florists throughout the state do not confine themselves to the sale of cut flowers alone, but do a considerable business, both wholesale and retail, in plants for propagation. The inspections were made during November and December at which season more plants were available for observation. Very little stock is grown inside during the summer months. During the greenhouse inspections, in addition to the search for especially injurious insects and diseases, especial attention is given to the recommendations leading to the control of the common pests.

There are a few Argentine ants still to be found in two of the greenhouses, but constant battle is waged against this pest and their numbers have been greatly reduced. This ant is not an uncommon pest in South Carolina, being more numerous in our coastal cities. Still it is an undesirable enemy in the greenhouses so the aim is complete eradication. No other serious pests were noticed, though there are always slight infestations of mealy bug, aphids, red spiders, scale insects, and various leaf spots especially black spot of roses. In one greenhouse last season considerable injury was done to several benches of young stock plants by the diamond back moth, which ordinarily is a cabbage pest. Much injury could have been prevented, but the operator of this particular house being unfamiliar with the insect destroyed all infested plants before calling the matter to our attention.

A total of 45 floral establishments were inspected during the season which is an increase of five over the previous year. This is an approximate area under glass of 732,000 square feet, a 92,000-square-foot increase over the previous season. The houses are located in the cities throughout the state as may be noted from the following list:

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bush's Greenhouses</td>
<td>North Augusta</td>
</tr>
<tr>
<td>Camden Floral Company</td>
<td>Camden</td>
</tr>
<tr>
<td>Carolina Floral Company</td>
<td>Charleston</td>
</tr>
<tr>
<td>Darlington Greenhouse</td>
<td>Darlington</td>
</tr>
<tr>
<td>Eastside Greenhouse</td>
<td>Laurens</td>
</tr>
<tr>
<td>Eastside Greenhouses</td>
<td>Clinton</td>
</tr>
</tbody>
</table>
Bulb Inspections

In order to comply with the regulations of the various states concerning narcissus bulbs it is necessary that this particular crop receive two inspections; namely, field and storage. The pests to which these
regulations apply are the greater bulb fly and nematode. It is during the field inspections in January and February that evidence of nematode can be most easily detected. The storage inspection during August after the bulbs have been dug and cured are for both pests. The inspection of this crop is quite specialized and tedious, requiring the handling and feeling of large quantities of bulbs in order to be sure that no pests occur. Neither of these pests have ever been found in any of our commercial plantings, but they occur to a smaller degree in other crops and might show up in the bulb plantings unless care is taken in the introduction of new stock. The bulb industry in South Carolina has decreased considerably in the past few years, possibly due to the permission by the U. S. Department of Agriculture for the entry of foreign bulbs which for a time was restricted only to new varieties. The industry at this time in South Carolina is restricted almost entirely to the Kress Plantation at Yemassee. Last year 125 acres of narcissus bulbs were inspected. This acreage produced around 2,500,000 salable bulbs. At one time in South Carolina there were grown around 500 acres of narcissus producing 40,000,000 bulbs. Twenty-one hundred permit tags were issued in 1938 for the shipment of narcissus.

Parcel Inspections

This service which consists of the inspection of plants and plant products for residents of this state who wish to ship them to friends and relatives of other states remained practically the same as the preceding season. Growers of such plants do not have sufficient quantities to warrant field inspections. In order to accommodate them the shipments are made to this office where the necessary inspections are made and the plants forwarded if they are found to conform with the requirements of the various states.

For these mail packages and to owners of small home plantings mentioned previously in this report there were issued 15,000 parcel permit labels.

These labels are also issued to a few greenhousemen of other states who make only parcel post shipments.

Sweet Potato Inspections

In order that the growers of seed sweet potatoes and sweet potato plants may have to offer to the trade only plants and seed free from injurious insects and diseases, the State Crop Pest Commission a great many years ago promulgated and passed regulations requiring inspection of the potatoes in the field and in storage and a final plant bed inspection. There are several destructive diseases of the sweet potato occurring
in both the field and storage, and unless proper sanitary and cultural methods are employed, the diseases may increase from year to year and become very destructive. During the years these regulations have been in force there has been noted a vast improvement in the quality of plants and seed potatoes produced by the growers who have received these annual inspections. Similar regulations are in force by other sweet potato-producing states and it is imperative, where inter-state shipments are concerned, that these inspections be made by inspectors of the Crop Pest Commission. The three inspections are necessary because certain diseases show up in the field that are not easily found in storage or in the plant bed.

During the past three years inspections for this crop have greatly increased, due partly to the increased interest in the production of a high quality potato for the Northern markets. A year ago the Commission passed regulations, at the request of some of the growers, governing the production of certified seed which means that they are practically free from any disease. Certified seed and plants require two field inspections in addition to the storage and plant bed inspection, thus adding to the duties of this office. Last season we made 324 inspections involving 104 growers, an increase of 15 growers over last season, with a total acreage of 457 1-2. Six of these growers produced certified seed and plants. These growers are located throughout the state and it is conservatively estimated that during the spring of 1939 they produced 277,850,000 plants.

The regulations require that a permit tag, issued by the Commission accompany all shipments, and for this purpose last year there were issued 6,444 tags. This is a smaller number than issued for the preceding year and would indicate that our growers are using home-grown plants rather than purchasing them from other states.

Below is a list of the growers for the 1939 season. This will show how widely scattered they are and will give some idea of the amount of travel necessary to see all of these properties three times during the season.

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atkins, Boyd</td>
<td>Marion</td>
</tr>
<tr>
<td>Barnes, Wm.</td>
<td>Estill</td>
</tr>
<tr>
<td>Batson, Miss Betty</td>
<td>Greenville</td>
</tr>
<tr>
<td>Batson, L. R.</td>
<td>Greenville</td>
</tr>
<tr>
<td>Bell, Ralph</td>
<td>Hartsville</td>
</tr>
<tr>
<td>Bell, W. M.</td>
<td>Hartsville</td>
</tr>
<tr>
<td>Bickley, Harper</td>
<td>Ballentine</td>
</tr>
</tbody>
</table>
Boykin, B. D. ------------------------ --- Boykin
Brown, J. E. --------------------------------- R. 1, Liberty
Bryant, D. C. --------------------------------- Swansea
Burbage, L. M. ___________________________ R. F. D., Summerville
Carrison, H. G. ___________________________ Camden
Causey, J. T. ______________________________ Furman
Cloaninger B. T. __________________________ Lykesland
Collier, Herbert _____________________________________________
Crapse, G. H. _____________________________________________ Lena
Crapse, H. T. _____________________________________________ Lena
Davis, C. E. _____________________________________________ Garnett
Davis, Jess _____________________________________________ Scotia
Davis, T. A. & “Ned” Johnson ____________________________ Scotia
Deer, L. R. _____________________________________________ Ulmers
DeLoach, A. J. _____________________________________________ Scotia
Dewitt, W. H. _____________________________________________ Blackville
Dickson, Kenneth __________________________________________ R. F. D., Westminster
Dinkins, H. L. _____________________________________________ Lugoff
Durant, J. E. _____________________________________________ Lynchburg
Funderburke, L. O. __________________________________________ Camden
Goethe, J. T., Jr. __________________________________________ Furman
Goethe, Miss Kate __________________________________________ Scotia
Gohagen, D. B. _____________________________________________ Scotia
Gohagen, Mrs. R. J. __________________________________________ Scotia
Gohagen, G. W. _____________________________________________ Furman
Galloway, Chas. W. __________________________________________ R. 2, Hartsville
Gramling, T. L. _____________________________________________ Orangeburg
Grover, John _____________________________________________ Ridgeland
Guess, E. L. _____________________________________________ Round
Harrington, H. B. _____________________________________________ Manning
Hawkins, E. M. _____________________________________________ Spartanburg
Hayden, John C. _____________________________________________ Orangeburg
Henderson, L. P. _____________________________________________ Scotia
Holt, D. T. _____________________________________________ Wateree
Itumpheries, A. W. __________________________________________ Camden
Jackson, F. S. _____________________________________________ Landrum
Jackston, J. M. _____________________________________________ Orangeburg
Jamison, D. F. _____________________________________________ Summerville
Jaudon Bros. _____________________________________________ Tillman
Johnson, A. B. _____________________________________________ Lake City
Kennerly, J. S. _____________________________________________ Cordova
Kittles, Thos. G. _____________________________________________ Garnett
Kouhry, F. & Co. 4011 Ridgewood St., Eauclaire, Columbia
Kouhry, F. & Co. __________________________________________ Seneca
Land, C. E. _____________________________________________ Westminster
In order to prevent the spread of injurious diseases of cabbage and tomato plants the Crop Pest Commission requires that these plants be inspected and certified before shipment. We have not often found any serious diseases of these plants in the seed beds of this state and with the limited funds provided the Commission for crop pest and disease work, we have had to restrict our inspections only to those growers who have requested them so that they might be able to ship to other states. Most of the tomato plant growers produce only small quantities, making it practically impossible to see every person who may wish to sell a few plants. The production of certified tomato plants which began in a small way two years ago has never materialized. Georgia seems to have more or less of a monopoly on this phase of plant growing at the present time. It is doubtful whether South Carolina will ever produce them in the quantity that Georgia does, but it seems that there would be an opportunity for South Carolina growers to derive a considerable income from this source on a small scale if done properly.

Approximately 30 acres of cabbage plants were inspected last season and numerous hotbed plantings of tomatoes.

All such plants coming into South Carolina are required to be inspected and certified before coming into the state.

**Cotton Seed Inspections**

The regulations of the State Crop Pest Commission have in the past required only the filing of an affidavit by the grower stating that the cotton from which the seed to be shipped was practically free from anthracnose and wilt. If this affidavit was favorable there then was issued the grower permit tags to accompany the shipments. During the past year, however, Louisiana, and Arkansas required that the fields from which seed was shipped into these states be actually inspected and certified by the pest authorities of the producing states, and that the growers meet certain other requirements in regard to growing, ginning, and storage. These facts must also be determined by inspectors of the state of origin.
In consequence of these requirements inspections have been made of several thousand acres of cotton for L. B. Wannamaker Seed Company, St. Matthews; W. W. Wannamaker, St. Matthews; Model Seed Farm, St. Matthews; Coker’s Pedigreed Seed Company, Hartsville; and Humphry-Coker Seed Co., Hartsville, who regularly ship seed to these two states. These inspections are in addition to the other regular inspection work that has been carried on by the Commission, but must be done if our growers are to compete with growers of other states.

Cotton seed breeders of other states are required to submit suitable evidence to the office of the State Crop Pest Commission that the seed they wish to ship into South Carolina are apparently free of injurious insect pests and plant diseases and must secure permit tags from this office to accompany such shipments. For this purpose last year there were issued 43,263 permits. This figure includes both inter and intra-state shipments.

**Apiary Inspection**

The law requires that all apiaries from which queen bees, bees, or used beekeeping equipment is sold, be inspected every 60 days during the shipping season in order that none of the serious brood diseases may be spread.

American foulbrood, probably the most serious of brood diseases, as well as European foulbrood, has been found at different points in the state, American foulbrood mainly in the Piedmont and European foulbrood in the South and East. In only one commercial queen-rearing yard has American foulbrood been found and we believe this infection now to be eradicated. Because of lack of funds no systematic clean-up work has been attempted in South Carolina, though wherever the disease has come to our attention we have employed rather drastic eradicative measures, namely, burning the entire colony including honey, frames, excluders, and covers, and then thoroughly cleaning and charring the hive bodies. European foulbrood is controlled entirely by requeening with a good strain of Italian queens from some queen breeder, either from this state or other states. South Carolina is not a great honey-producing state neither are there many people in the state dependent entirely upon the keeping of bees for a livelihood; still it appears that in many parts of the state beekeeping could be made a profitable sideline, if proper thought is given to the producing and marketing of the product. It would seem advantageous, therefore, if and when the necessary funds can be secured to employ a seasonal inspector who could put his entire time on bee inspection work during the summer months. As it is, inspections have necessarily been largely confined to those who produce queen or package bees. As a general rule, the bees were in much better condition than the previous year.
Last season 2,706 colonies of bees were inspected. Eradication work was done in four yards. To the shippers of package bees were issued 1,140 permits, and 700 queen cage certificates were furnished queen breeders.

Phony Peach Inspections

During the past several years the State Crop Pest Commission has cooperated with the U. S. Bureau of Entomology and Plant Quarantine in the eradication of phony peach disease from the orchards of this state, to the extent of assigning one inspector for practically the full time during the months of June, July, and August. This inspector's time could well be used on other work during this season of the year, but it is felt that any money spent in the protection of the $1,500,000 peach industry is well worthwhile. The amount contributed by the State Crop Pest Commission is indeed insignificant in comparison with that furnished by the federal government. We believe that it would be of advantage to the Commission, if it had sufficient funds, to employ at least one additional inspector during the summer season. In the future the help extended by the federal government will probably depend a great deal upon the amount the state is able to expend in cooperation with this project. This virus disease of peach, which has caused much loss in states where it has been longest established, is not widespread or abundant in South Carolina at the present time and we believe that continued efforts should be made to eradicate it from the state. Much progress has been made in this direction.

The phony peach work in South Carolina may be divided into three main groups: (1) Nursery environs inspections, (2) orchard inspections, (3) tree removal.

The nursery environs inspections involve an intensive inspection within a one-mile radius of all nurseries from which peach stock is likely to be sold. An infection found within this radius must be removed prior to June 30 of the year in which found, if permits are to be issued for the sale of peach trees. The South Carolina regulations require, as do those of other states, a permit tag attached to each shipment of peach trees. There were issued for this purpose last season 5,371 tags, a slight increase over the previous year. The following table shows the number of properties inspected within a one-mile radius of eight nurseries located in five counties. Fortunately no phony trees were found.
The orchard inspections consist of the examination of both commercial and home orchards. Several years ago all the commercial orchards in the state were inspected and since that time reinspection has been made each year of all infected and adjacent properties and in addition, inspections have been made of young orchards as they come into bearing. All infected trees found in South Carolina up to this time have been removed. Wonderful cooperation has been given by the commercial peach growers and very little opposition has come from owners of small home orchards when they have been made acquainted with the importance of the work. The accompanying table shows the scope of this work in South Carolina for last year.

<table>
<thead>
<tr>
<th>County</th>
<th>Total nursery trees</th>
<th>Number trees infected within one mile</th>
<th>Number inspected</th>
<th>Number infected</th>
<th>Total no. inspected</th>
<th>Number infected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aiken</td>
<td>3,000</td>
<td>0</td>
<td>26</td>
<td>0</td>
<td>320</td>
<td>0</td>
</tr>
<tr>
<td>Edgefield</td>
<td>325</td>
<td>0</td>
<td>22</td>
<td>0</td>
<td>323</td>
<td>0</td>
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<tr>
<td>Greenville</td>
<td>6,655</td>
<td>0</td>
<td>36</td>
<td>0</td>
<td>428</td>
<td>0</td>
</tr>
<tr>
<td>Lexington</td>
<td>50,500</td>
<td>0</td>
<td>14</td>
<td>0</td>
<td>12,177</td>
<td>0</td>
</tr>
<tr>
<td>Spartanburg</td>
<td>27,586</td>
<td>0</td>
<td>151</td>
<td>0</td>
<td>92,890</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>86,066</td>
<td>0</td>
<td>249</td>
<td>0</td>
<td>106,138</td>
<td>0</td>
</tr>
</tbody>
</table>
Tree removal consists of locating and removing all peach trees in abandoned orchards and all escaped peach trees in the territory worked. This removal work has been carried on each year in conjunction with the regular phony peach inspections, and much good has been accomplished, not only in phony peach control, but in the control of other diseases and insects as well. Removal is done with the consent of the property owners and by WPA labor in charge of an inspector of the Bureau of Entomology and Plant Quarantine in cooperation with the Crop Pest Commission. The following table give a summary of abandoned and escaped trees removed in South Carolina last year.
Japanese Beetle

The Japanese beetle, an introduced pest first discovered in this country in 1916, is probably one than cannot always be kept out of South Carolina, but the longer its advance can be retarded the better it will be for the agriculture of the state. Continual vigilance by the Commission is maintained to prevent its untimely introduction into the state and at present it is gratifying to report that so far as known, no established infestation occurs in South Carolina. Each year the Bureau of Entomology carries on trapping and scouting for this insect in the various states outside of infested areas. Last year several hundred traps were again placed in Greenville, at which point it will be remembered that several years ago, over 100 beetles were trapped. Soil treatment was given this area and since that time only a few beetles have been captured each season. The past year only five beetles were taken in the traps at Greenville, which would indicate that the soil treatment was effective, and that no infestation has yet become established there.

In addition to the trapping in Greenville 13 traps were set in Charleston on May 10 and removed on June 3, no beetles having been captured during that time. Scouting work was again done in Charleston on June 24, at which time most of the points at which beetles had been taken in previous years were visited, but no beetles were observed.

The area around the car clearing tracks of the Atlantic Coast Line Railroads at Florence was scouted on June 25, but no beetles were observed. Two beetles had been taken in this area in 1932 and the area subsequently treated with lead arsenate.

The federal men in charge of this project each year request, and would like some financial assistance from the state but our limited funds have prevented us from cooperating in this manner. It must be remembered, however, that in each instance where soil treatment has been deemed necessary that the state has supplied funds for purchase of the arsenate of lead used.
White Fringed Beetle

No material change has been noted in the distribution of the white fringed beetle which is another important pest of destructive habits. It is still confined to restricted areas in the states of Louisiana, Mississippi, Alabama, and Florida, though during the past year was found in a few additional cities in the same general localities. Inspectors of the Bureau of Entomology last year made a rather comprehensive survey in South Carolina, especially around port and railroad terminals and cities along main traveled highways with negative results. Inspections by this Commission have been limited to properties whose owners received small amounts of nursery stock shipped from a nursery in Louisiana afterwards found to be infested with this pest. A peculiar thing about this insect is that it is parthenogenetic. Any specimen, therefore, is potentially able to start an infestation if introduced into new territory. The Bureau of Entomology is carrying an extensive eradication campaign against this pest and it is hoped they will be successful before it reaches this state.

New Regulations

For the past several years Irish potato growers in this and other states have felt that they have not been receiving first quality seed potatoes from the Northern seed growers. Last year pathologists and plant pest officials met in Baton Rouge, Louisiana, and adopted more or less uniform regulations governing the sale of seed potatoes, with the hope that they would be passed by all the Southern states. These regulations were promulgated and passed late last year by the Crop Pest Commission and it is hoped our growers may this year benefit by them. All inspections, however, to be effective must be made by the seed growing states, although the last legislature has passed H. B. 1175 which requires inspections at destination by inspectors of the Crop Pest Commission or inspectors of the Food Products Inspection Service of the U. S. Department of Agriculture or by both.

It will be seen throughout this report that the duties of the Commission are increasing from year to year, while there has been no increase in funds. We believe the work of the Crop Pest Commission to be of great importance to the agricultural interests of the state and it should be supported sufficiently to permit efficient enforcement of the laws and regulations with which it is charged. Regulatory work, unfortunately, is a type in which spectacular and immediate results cannot be portrayed, the good being, on the other hand, rather accumulative. There is no way of determining in advance, just exactly how much damage insects and diseases would cause if left free to multiply and spread in their own natural way. Climatic conditions in South Carolina are conducive to the rapid multiplication of most insects and diseases, therefore, all measures possible should be continued to prevent the introduction of new pests or the undue spread of those already present.
Dear Dr. Sikes:

Attached is a brief report of the work of the South Carolina Agricultural Experiment Station for the past year.

The main station at Clemson and the five branch stations near Columbia, Florence, Charleston, Summerville, and Blackville are engaged in a wide variety of investigational work bearing upon farm problems. The farmers of the state are looking more and more to these stations for the information which they need in adjusting their operations to the constantly changing agricultural situation.

During the past year the research program of the Edisto Station has gotten actively under way and the physical plant of the station is now well along toward completion. A well trained staff has been secured and if the financial support continues adequate, this station should be able to render outstanding service to its constituents.

One new development to which attention should be called is the expansion of the tobacco research conducted by the United States Bureau of Plant Industry in cooperation with the Pee Dee Station. At the last session of Congress, an appropriation was made to enlarge this work. The additional investigations made possible through these funds should prove of much value to tobacco producers.

Yours very truly,

H. P. COOPER, Director

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

The program of the Department of Agricultural Economics and Rural Sociology has been constructed on the theory that its function is to serve the people of South Carolina insofar as their rural, social, and economic needs are concerned. Research projects were inaugurated
several years ago in anticipation of demands which are just now beginning to make themselves felt. As a result definite and specific information is available on many questions of immediate and general importance. Of particular interest in this connection is the widespread demand for and utilization of data which are available on the subjects of homestead tax exemption, assessed and actual value of real estate, tax delinquency, agricultural adjustment, rural school opportunities and problems, and others. These accomplishments have been possible only because the closest cooperation has been maintained with other state and federal agencies and because the members of the staff have worked loyally and unselfishly in spite of discouragement and disappointments due to lack of adequate financial support.

Valuable assistance and cooperation has been rendered by the Bureau of Agricultural Economics, the Agricultural Adjustment Administration, the Works Projects Administration, the Farm Credit Administration, the State Tax Commission, and the General Education Board.

The department is being called upon to supply information of importance to the various action programs of federal and state governments. This type of work is going to require increasing emphasis in the future and an effort is being made to meet the situation in the best possible manner. It is only by the knowledge of the causes and consequences of various activities that systematic and efficient progress can be made.

During the year the department was responsible for the publication of three bulletins. Bulletin 316 describes some economic characteristics of owner-operated farms from the standpoint of area, size, investments, and income. Consideration is given to the relationship of these factors and to taxes paid by farmers in the different groups. Bulletin 318 deals with farming possibilities in Horry county. It shows the present status of agriculture in this area and makes some recommendations for adjustment in the light of new economic conditions. Bulletin 320 gives the results of an analytical study of a rural school area. This study was made in cooperation with the General Education Board and is the first of its kind to be reported in South Carolina. The results of all of these publications are of immediate and practical importance and are already being widely utilized.

There is planned for publication during the year a final report on a study of "The Probable Economic Effects of Homestead Tax Exemption on Public Revenues in South Carolina". Also there will be ready a report on a study of the availability, adequacy, source, and methods of short term credit to South Carolina farmers. It is expected that a statistical bulletin will be issued during the year reporting the present status of farm real estate tax delinquency in the state; and another bulletin giving the results of an analysis of the sale price and assessed value in the case of more than 30 thousand recorded transfers of farm real estate.
Considerable progress is being made on a study of wholesale fruit and vegetable markets in South Carolina which is being conducted jointly by the department, the Bureau of Agricultural Economics, and four Southeastern Experiment Stations. The results of this study are expected to be made available during the latter part of the present fiscal year.

Among other studies being made by the department should be mentioned one dealing with the economic status of farm tenants; another, with rural housing; a third, with the ownership of agricultural land in South Carolina; and still another with farm organization and management in a soil conservation area. Emphasis is being given to those problems which seem to be of most importance to the people of South Carolina.

**AGRONOMY**

*Soils, Field Crops, and Fertilizers*

The experimental work with soils, field crops, and fertilizers is conducted at Clemson Agricultural College and five substations. These experiments involve fundamental research work that is of immediate value in the production of crops. In addition to the work at Clemson and the substations experiments are extended to farms scattered over the entire state by having cooperative arrangements with the farm operators. The more technical studies are conducted at Clemson, combining laboratory, greenhouse, and small plot technic. Various problems are being investigated in this way.

**Soil-Testing Service**

Farmers are showing an increased interest every year in having their soils tested as a basis for fertilizer and liming recommendations. During the past year 7,153 soil samples were tested in the laboratory at Clemson and recommendations based on the results of these tests were sent to individual farmers. The samples came from soils growing cotton, corn, oats, tobacco, pastures, truck crops, lawns, golf courses, gardens, and small flower beds.

Tests to determine the soil acidity, or pH, and phosphorus and potassium requirements are made on all samples. Certain samples are also tested for available magnesium and manganese when these elements seem likely to be deficient.

Although the tests are not infallible, they are sufficiently accurate to enable experienced workers to secure within a few minutes a fairly accurate index of the available nutrients in the soil. More accurate fertilizer recommendations may be made as a result of the tests and increasing numbers of farmers are following the recommendations.
Variety Tests

Our changing system of agriculture due largely to the reduction in the export of cotton makes it important that we determine the varieties of other crops best suited to be grown. As the summers are often too hot and dry for the successful production of corn in the Piedmont section of the state, the winter grain crops are more economical stock feed than corn.

The yields from 24 varieties of corn including white, yellow, and hybrid varieties for the past year show that Douthit’s Prolific produced the highest yield in the group of white varieties and Marett’s Yellow Chief in the yellow varieties. Six hybrid varieties were included in the test. As hybrid seed is not produced in the state, the varieties came from the North and Middle West. Consequently they have not been adapted to this region and the results show that the hybrid varieties may or may not produce as much as the local varieties.

In the wheat variety test the highest yield of 48.0 bushels per acre was secured from Redhart Strain 3, followed by Pedigreed Redhart Strain 4 and Clemson Blue Stem with yield of 43.0 and 41.4 bushels, respectively, these being the three highest yielding varieties.

Among the varieties of oats the Clemson Fulghum variety produced 94.3 bushels per acre, followed closely by Pedigreed Fulgrain Strain 2 with 94.1 bushels and Pedigreed Fulgrain Strain 1 with 90.9 bushels.

Grain sorghum is more suited as a drought-resistant crop than corn. The Grohoma variety produced 48.6 bushels per acre. The Blackhull and Sgrain varieties also produced high yields.

A wide variation has been found in the yield of soybeans for the production of seed. The Clemson variety produced 19 bushels per acre and the Palmetto variety produced 15.4 bushels while the Virginia variety produced only 4.3 bushels. The latter variety is recognized as a hay variety rather than a seed variety.

Most cowpea varieties are grown for hay and do not produce as high yields of seed as soybeans. The yields of hay ranged from 1067 to 3511 pounds per acre. The highest yield was obtained from the Whippoorwill variety.

Fertilizer Experiments

A series of field tests has been conducted in cooperation with farmers in both the Piedmont and Coastal Plains sections of the state to determine the optimum rate and time of applying potash fertilizers to cotton. The average yields secured from these tests over a six-year period indicate that no significant differences resulted from various times of application with rates up to 75 pounds but above that amount it is often
desirable to apply some of the potash before the crop is planted. Under the conditions prevailing in these experiments, the average yields for the six-year tests suggest that it might be expected that one pound of potash would increase the yield of seed cotton 8 to 16 pounds, depending upon the rate of application.

Results from the old cooperative fertilizer experiments conducted over a period of years and on various soil types located in the Piedmont and Coastal Plains sections showed that fertilizers containing 4 to 6 per cent nitrogen, 8 to 10 per cent phosphoric acid, and 6 per cent potash gave the highest yields of seed cotton. Varying the rates of application of a complete fertilizer having a 4-8-3 analysis showed that from 600 to 800 pounds per acre could be used with profit.

Soil Acidity and Liming

Results of the extensive soil acidity tests conducted a few years ago combined with the regular soil-testing service now being furnished have caused farmers of the state to become more interested in the condition of their soils. During the past year more lime has been applied in the state than ever before and farmers are reporting excellent results.

Soil Erosion Investigations

The South Carolina Agricultural Experiment Station and the Soil Conservation Service, with headquarters at Clemson, are conducting a cooperative research project on soil erosion. Results show that cropping systems for erosion control vary in their effectiveness. Rotation should include legumes that afford protection especially during winter months and during late fall and early spring. Legumes retard soil and water losses not only during their growth but also long after the crop has been turned under as a green manure. The legume apparently causes a change in the physical structure of the soil, making it less susceptible to erosion.

ANIMAL HUSBANDRY

Cottonseed Meal and Hulls Compared With Corn and Lespedeza Hay For Fattening Steers

Forty steers averaging approximately 750 pounds in weight were divided into four lots. The steers in Lots 1 and 2 received all the cottonseed hulls they would consume. Lot 1 was fed one pound of cottonseed meal for each 100 pounds of steer weight while Lot 2 was fed 1 1/2 pounds per 100 pounds of live weight.

Lots 3 and 4 received all the hay they would consume. One per cent of shelled corn was fed to Lot 3 and 1 1/2 per cent to Lot 4.
The steers in Lots 1 and 3 were fed until a gain of 200 pounds per steer had been made, while those in Lots 2 and 4 were fed for a 300-pound gain.

When meal and hulls were fed, the steers receiving the smaller amounts of meal for the shorter feeding period made more rapid and economical gains. The steers on corn and hay made faster and cheaper gains when they were fed the larger amounts of corn, and were carried to a higher finish.

The relatively high price of hay caused the gains made by steers receiving corn and hay to be more expensive than those made by cottonseed meal and hulls.

At the close of the feeding test these cattle were shipped to the United States Research Center at Beltsville, Maryland, where complete carcass studies were made. The results of these studies have not yet been received.

Some Factors Affecting the Economy of Gains Made by Fattening Swine

The relation of economy of gain to certain morphological and physiological factors is being studied with 25 Berkshire barrows that were put in individual feeding pens at weaning. Some of the ante-mortem factors that are being considered are daily gain, body conformation, coefficient of digestibility, and the red and white cell and haemoglobin contents of the blood. Each hog will be slaughtered at a 200-pound weight. The post-mortem factors studied will include the weight of the blood, percentage of edible fat in the carcass weights and measurements, histological studies of some of the internal organs and glands, and the capacity of the digestive tract.

At the present time, the heaviest hogs have made about two-thirds of their required gain. The extreme variation in the amounts of feed required for 100 pounds of gain has been 38 pounds when litter mates were considered and 63 pounds when all the hogs were compared.

The cell count made from the blood of the 63-day old pigs varied from 5.8 million to 9.6 million for the red cells and from 6840 to 17700 for the white cells. The haemoglobin per 100 c. c. of blood varied from 8.9 to 14.7.

The digestion trials have not shown significant differences in the ability of the pigs to absorb the food nutrients.

A Comparison of Crossbred and Purebred Pigs

Twenty-three pigs were produced by Poland China sows that had been bred to purebred Poland China and Duroc Jersey boars. Thirty-
nine per cent of the pigs farrowed were crossbreds while the others were purebred Poland Chinas.

The crossbred pigs averaged 3.33 pounds at birth and 40 pounds at weaning, as compared with average birth and weaning weights of 2.44 and 32.27 pounds for the purebreds.

Immediately after weaning the pigs were divided into two lots and fed to a final average weight of 200 pounds. The crossbred pigs made an average daily gain of 1.83 pounds and ate 321 pounds of corn and 34 pounds of supplement for each 100 pounds of gain. The purebred pigs made an average daily gain of 1.49 pounds and ate 309 pounds of corn and 25 pounds of supplement for 100 pounds of gain.

The crossbred pigs finished 23 days earlier than the purebreds and sold for one-half cent more per pound.

**Effect of Kidney Worms Upon The Growth of Swine**

Swine experimentally infected four weeks before weaning with various numbers of kidney worm larvae showed that those pigs that received the greatest number of larvae exhibited the smallest daily gains and the greatest amount of tissue damage in the liver.

**PLANT PHYSIOLOGY AND PLANT DISEASES**

**Fusarium Wilt of Cotton**

A cotton wilt survey in 1938 conducted in cooperation with two offices of the United States Department of Agriculture showed that at least 4 percent of the cotton crop in South Carolina was lost because of this disease. An additional undetermined loss is suffered due to the shortening of the lint on plants affected with the disease but not completely destroyed. A cooperative regional wilt-resistant variety test has been completed for two years and at the conclusion of the test this year, a bulletin giving the results will be published.

Cases of the wilting of resistant varieties in certain fields continue to be reported. For several years, collections of the fungus from various localities were made and pathogenicity tests have been concluded. A paper reporting the results has been submitted for publication. The isolates of the fungus from various localities showed a wide range in pathogenicity and variants of the fungus arose while in culture. Some of the variants were less pathogenic than the original culture while others had lost none of their pathogenicity. Whether or not the development of cultural variants differing in pathogenicity answers the problem of why a variety of cotton seems to be more resistant in some localities than in others may be open to question. Edaphic factors may be of significance. Nevertheless, since this fungus grows saprophytically in the soil it is possible that variants differing in pathogenicity may occur in the field.
The technique for infecting cotton in water cultures has been further perfected in that small tray-tanks similar to those in commercial use have been employed. These tanks have also been used with tobacco and coffee weed. Last year Burley tobacco planted in several fields where no tobacco had ever been grown showed a fusarium wilt. The growers immediately suspected that the cotton wilt fungus was causing the wilt since cotton was known to wilt in these fields. Cross-inoculations in the greenhouse have shown that the fungus from tobacco causes a typical wilt of the susceptible cotton variety Farm Relief, and that a fungus from cotton also causes a typical wilt in the susceptible Burley tobacco. Further tests in soil and water-culture are now being conducted.

The Effect of Mineral Nutrition on the Wilt Resistance of A Resistant and Susceptible Variety of Cotton

Wilt-infected and healthy plants of the wilt-susceptible variety, Farm Relief, and of the wilt-resistant variety, Dixie Triumph, were grown in comparable culture solutions under high and low concentrations of nitrogen and potassium in the solutions. Chemical analyses have shown that the leaves of the Farm Relief variety were higher in percentage of sulfur and that the leaves of wilt-infected plants were also higher in sulfur content. It was further noted that wilt-infected plants had a higher calcium content in their leaves than comparable healthy plants of the same variety. The concentrations of high and low nitrogen and potassium in the culture solutions affected mineral absorption by the plant roots irrespective of variety and whether the plants were wilt-infected or wilt-free.

In general, the infected plants of both varieties survived longer in the solutions with low nitrogen than in those with high nitrogen. The infected plants of the susceptible variety survived longer in solutions of high potassium than in those of low potassium and the infected plants of the resistant Dixie Triumph variety survived longer than the infected plants of the susceptible Farm Relief variety under all conditions.

The possible relationships of these differences upon the question of susceptibility and resistance to cotton wilt are being further studied.

Cotton Fiber Studies

The work in the fiber laboratory during the year has been concerned chiefly with samples obtained from the various cotton projects of the department. During several years, self-pollination of a wilt-resistant variety of cotton has been practiced. In 1936, a very high percentage of the plants was killed in several spots in a field heavily infested with the cotton wilt fungus. From the original wilt-resistant variety with good fiber properties, some lines were evidently highly susceptible to wilt and some of them also showed very poor fiber characteristics. In
1937 and 1938, selections were made to isolate a pure line with high wilt resistance and good fiber qualities. Fibers from various lines have been studied for uniformity of distribution of the fiber lengths, fineness, and maturity. Some seem to be very good and it is expected that pure lines necessary for other phases of the investigations will be secured.

**Cotton Seedling Diseases**

The experiments which were begun several years ago to study the effect of the treatment of cotton seed indicate that an average increase in the yield of lint of approximately 20 percent may be expected from treated seed over a period of years. The actual increases have ranged from zero to 33 percent. They have been determined largely by weather conditions during the first two weeks after planting and the degree of infestation of the seed with the anthracnose fungus. Thus, the increases have generally been greater in early plantings which have been followed by cool rainy weather. Seed treatments have been found much less effective against seedling infection by fungi when cool, rainy weather occurs after the second week.

During the past season a number of organic mercurial compounds and two copper dusts have been tested in the laboratory and in the field. The mercurial compounds seem to be about equally effective as dusts to remove anthracnose infestation. Several of them, however, have given unsatisfactory results in the field. The results indicate that the mercurial dusts should be applied to give by weight a mercury-seed ratio of 1:10,000. The cuprous oxides which have been found very effective for treating vegetable seeds have given uncertain results. They do not effectively remove anthracnose infestation and often retard seedling emergence. At low concentrations, when anthracnose infestation is not a factor, there is some evidence that copper at times may slightly increase yields. This may be due to protection afforded the seedling against infection by soil-inhabiting fungi. When soil conditions indicate the desirability of using the copper dusts, the concentration of red cuprous oxide should not exceed 1:500 and that of the yellow cuprous oxide 1:1000.

Recently compiled data have added interesting supplementary information to the extensive observations of the effect of storage conditions on the survival of the anthracnose fungus in and on cotton seed. In a cooperative cotton seed storage project with the Federal Bureau of Plant Industry, two lots of seed highly infected with the anthracnose fungus were stored at four different temperatures. The fungus died out completely within a year at 90 degrees Fahrenheit, regardless of the moisture content of the seed. At 70 degrees Fahrenheit and also when the seed was exposed to the temperature fluctuations of the laboratory, there was from 5 to 10 percent survival after 18 months with seed moisture contents of 8, 10, and 12 percent. At the storage temperature of 33 degrees Fahrenheit, however, practically all seedlings were infected by the
fungus when the seed was germinated at 75 degrees Fahrenheit. The results emphasize the necessity of cotton seed storage at relatively high temperatures if the anthracnose fungus is to be eradicated.

Previous reports from this station have indicated that the anthracnose fungus is the most important cause of the damping-off of cotton seedlings and that this fungus is generally associated with boll rot. The manner in which this fungus survives from the seedling stage of the cotton plant to the time when it infects the bolls has not been clear. About 20 years ago when boll rots were very destructive, it was suggested that the fungus survives as a saprophyte or benign parasite on the nectar glands, leaf scars, stipules, and bracts. An investigation of the past season has verified this suggestion. The fungus was readily isolated from these portions of the plants, in one instance from a field which had been planted to treated seed and in which there was no evidence of anthracnose damping-off but in which the plants had not been plowed under until immediately before planting. These observations suggest that, if the anthracnose fungus is to be eliminated as a factor in cotton production, the methods which were suggested by Dr. H. W. Barre 25 years ago and more recently recommended for the control of boll weevil must be generally practiced. Any treatment of the field which brings the cotton stalks into direct contact with the soil will eliminate the carry-over of the fungus on the old plants during a winter of normal rainfall.

CHEMISTRY

The Chemistry Department has analyzed during the year about 900 samples of various kinds. This work was done in connection with several chemistry projects and in cooperation with other departments in carrying on the chemistry work of several Purnell and Bankhead-Jones projects.

The carotene project has involved several phases of work as follows:

(a) A comparison of corn-soybean silage and sorghum-soybean silage as to the carotene content of the milk produced.

(b) A comparison of silages stored in the box silo and the cylindrical silo as to the stability of the carotene in these silages, and also as to the carotene content of the milk produced from these feeds.

(c) Carotene content of silage stored in paper bags and closed jars.

(d) The nutritional value of the dehydrated sweet potato is being studied. The biological value of the carotene and vitamin A in sweet potatoes is being studied by feeding the sweet potatoes to cows, chickens, and rats.

In cooperation with the Dairy Department, a rotation and continuous grazing experiment is being carried on. The cortene content of the grass
and milk produced by animals grazing the pastures is being determined at certain intervals. Also a complete feed analysis of the grass samples is being made.

A project which has for its purpose the study of the mineral content of vegetables grown under various environmental conditions was started last fall. Turnips were planted at the Clemson, Edisto, and Sandhill Stations. The turnip greens produced were analyzed for calcium, phosphorus, iron, and copper. This work is being continued.

This department has cooperated with the Poultry Department in a study of the balance between the intake and outgo of certain mineral elements in the nutrition of the hen. Approximately 300 samples of chicken droppings, feeds, whole chickens, feathers, etc. were analyzed for calcium, phosphorus, and moisture.

The pasture fertilizer experiments at the Coast Station required the analysis of 120 samples of grasses for calcium, phosphorus, and iron and a complete feed analysis.

In cooperation with the Animal Husbandry Department digestion trials are being carried on with 25 hogs. Complete feed analysis of the feces will be required.

DAIRYING

Studies of some of the many problems confronted in developing a profitable dairy industry from the standpoint of feeding, breeding, and management of dairy cattle have indicated methods of overcoming difficulties or improving conditions. Although there is much popular discussion to the effect that some sections may not be suitable for dairy production, it is reasonable to believe that most of the difficulties encountered in such localities may be successfully overcome by studying the cause of conditions which seem to be a handicap to the development of this enterprise.

Feeding Milk to Young Calves

It has been observed that most dairy farmers experienced difficulty in raising dairy calves by the usual hand-feeding methods. Digestive disturbances during the early weeks of life are responsible for the loss of many calves and the serious setback to the growth and development of a high percentage of those calves which live.

Commercial concerns have attributed these digestive disturbances to the practice of feeding the calves from an open pail set on the floor. They intimate that if the pail is raised to a position where the calf will hold its head up, more or less imitating the position of the head when sucking, this trouble is overcome. Through the use of fistulas, Dr. George H. Wise has been able to demonstrate that the difficulty experienced
with calves fed by hand is not due to the position of the bucket at the time of feeding but to the rate of intake. When the milk intake is reduced by using a nipple, the esophageal groove remains closed and the milk passes on directly into the fourth stomach, reducing the incidence of digestive disturbances from this cause practically 100 percent. When the calves are fed from the open pail, the large volume of milk swallowed at one time breaks through the esophageal groove and remains in the rumen where it goes through putrefaction and fermentation, thus causing the digestive disturbances which are so familiar with the open-pail system of feeding.

**Bovine Trichomoniasis**

On November 12, 1938, a typical abortion resulting from an infection by *Trichomonas foetus* was discovered in the college Holstein herd. A study of the herd condition through testing indicated that the infection had been brought into the herd through a bull obtained on loan early in September 1938. Some 30 odd females had been exposed, 11 of which eventually showed positive tests. Others showed recurrent heat periods typical of the disease but never were positive as shown by vaginal smears. The bull responsible for this infection was immediately retired from service and a virgin bull obtained. By giving each infected and exposed cow three months of sexual rest and then by employing artificial insemination using a clean bull, the symptoms of the disease have been entirely eliminated from the herd. It is believed that this method of elimination is entirely satisfactory for handling this disease in cattle.

**Changing From Silage to Pasture and Vice Versa**

Maintenance of uniform production of milk throughout the year is one of the major problems of the dairymen. The types of rations consumed by the cows obviously play an important role in milk yields. Marked variations in production usually occur in changing from summer to winter rations and vice versa. In the study of various methods of producing and using roughage crops for a year-round feeding program, the effects of changing from one type of roughage to another were investigated.

The change from a Bermuda grass pasture in the fall to good quality corn-soybean silage, consisting of 79 percent corn and 21 percent soybeans, resulted in no observable changes in milk production. The rate of decline in milk yield was essentially the same as when the cows were grazing. On the contrary, the change from winter roughages (either corn-soybean silage and soybean hay, or sorghum-soybean silage) to spring pasture consisting primarily of clovers, produced a pronounced temporary increase in milk yield. After the initial flush the milk flow gradually returned to the pre-grazing level and rate of decline.
Systems of Grazing Permanent Pastures

In many sections of the world intense grazing of permanent pastures has been practiced through necessity. Though such procedures have not been considered essential in the Southeast, the advantages may be sufficient to justify the use of the system where land is abundant but poor and where weeds are a pestilence. The palatability and the high nutritive value of young rapidly growing grass provide additional incentive to initiate a study of intense grazing and heavy fertilization.

A rotational system of grazing has been set up by the Dairy Department using the individual permanent Bermuda grass pasture areas previously utilized for determining comparative yields from various fertilizer and lime treatments (See Bulletin 308, Permanent Pasture Studies). During early spring and summer these pastures are grazed by milking cows only, but during late summer and early fall, bred heifers follow the milking cows in the rotation. Conclusions relative to the advantages and disadvantages of this system of pasture management in South Carolina await further investigation.

ENTOMOLOGY

No serious epidemic outbreak of insects has occurred during 1939, but there has been the usual round of standard pests. We present some facts regarding the projects for the year.

The Rice Weevil in Corn

To better understand and obtain a clearer picture of the insect problem in corn in the field, a survey of conditions throughout the state was made just before harvest last season. Two or more fields were examined in each county. The data obtained revealed the average field infestation in percentage of ears infested by the rice weevil to be 28.02 percent. In other words more than one-fourth of all the ears of corn grown in South Carolina were already infested with weevils before they were gathered from the field. Some of the ears, especially in coastal counties, were so heavily infested as to be almost completely destroyed.

The summarized data also revealed 93.82 percent of the ears had been entered and 84.14 percent damaged by the corn earworm. The pink cornworm was found in 61.05 percent, the angoumois grain moth in 31.04 percent, and flour beetles in 57.71 percent of the ears. The pink cornworm and the flour beetle each infested over 75 percent of the ears in the lower half of the state. The angoumois grain moth was found to have been more evenly distributed throughout the state and to be a much more serious field pest than had been suspected previously.
The Oriental Fruit Moth

Oriental fruit moth infestation during 1939 has been slightly higher than in recent years. In spite of moderately heavy twig injury, however, nearly all commercial orchards again escaped serious fruit injury. Firstpickings of certain varieties were rather heavily infested, as high as 16 percent in Greenville county, 18 percent in Saluda county, and 21 percent in Oconee county, but later pickings dropped down to one, two, or three percent.

Infested twigs from the various peach-growing areas in the state have been gathered and are being reared at Clemson. Results of the parasite studies will be available later in the report of the South Carolina experiment Station.

Cowpea Curculio

Studies were made on the biology and life-history of the cowpea curculio. Tests were made of poison applications the results of which were not encouraging. Data were taken on the degree of infestation in different varieties of cowpeas, and also of cowpeas which had been planted at different dates. It is possible that some degree of protection can be secured from cultural practices, but this is the first season of these tests and results are not yet complete.

Faunal Survey

In this report of a year ago it was stated that 5,581 species of insects were then on record for the state. This number has now been increased to 5,790 species, 209 species having been added to the lists during the year.

In this connection it seems appropriate to mention the advent of a game animal not heretofore on official record as occurring in South Carolina. The presence of Swamp Rabbit (*Sylvilagus aquaticus*), often called "cane-cutter", has been ascertained in creek-swamps tributary to the Savannah river in Anderson, Oconee, and Pickens counties. This rabbit is similar to the ordinary cottontail but is much larger. One specimen weighed 4 1-2 pounds.

THE CLEMSON COLLEGE FARMS

The Farms Department is charged with the responsibility of maintaining and improving the soils on the College Farm, the production of crops for the Agronomy Department in its research work with crops and fertilizers, conducting some experiments with crops and farm machinery, and the production of feeds for the experimental herds of cattle and poultry.
Research work this year includes some studies in the use of combination one-horse planters and fertilizer distributors in the production of cotton when all the fertilizer used is applied at planting; a comparison of Barrett's nitrogen solution with DuPont's liquid ammonia in the production of cotton; a variety test of cotton on a large-plot basis; and a continuation of soil improvement with manure versus a cover crop of rye and vetch in the production of cotton.

The acreages planted to crops this year by the Farms Department are as follows:

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<th>Crop</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>167</td>
</tr>
<tr>
<td>Corn and beans</td>
<td>86</td>
</tr>
<tr>
<td>Oats</td>
<td>26</td>
</tr>
<tr>
<td>Oats and vetch</td>
<td>101</td>
</tr>
<tr>
<td>Wheat</td>
<td>1</td>
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<tr>
<td>Barley</td>
<td>5</td>
</tr>
<tr>
<td>Cotton</td>
<td>114</td>
</tr>
<tr>
<td>Soybeans</td>
<td>6</td>
</tr>
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<td>Peas</td>
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<td>Peas and corn</td>
<td>23</td>
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<td>Austrian winter peas</td>
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<tr>
<td>Rye</td>
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</tr>
<tr>
<td>Rye and vetch</td>
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<td>Grain sorghum</td>
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<tr>
<td>Sorghum and soybeans</td>
<td>6</td>
</tr>
<tr>
<td>Bermuda and Johnson grass</td>
<td>10</td>
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<td><strong>Total crop acres</strong></td>
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**HORTICULTURE**

**Fruits and Vegetables**

**Clemson Spineless Okra Wins Distinction**

A new variety of okra developed at Clemson College was introduced to the seed trade in the spring of 1939. This variety, known as Clemson Spineless, is the result of several years' work by the horticultural staff of the South Carolina Experiment Station. It is the only variety of green-podded spineless okra known in this country. The plant is medium sized, a prolific bearer of green spineless pods, and is apparently widely adapted to various sections of the country. In 1937 it was entered in the nationwide test known as the "All-America Selections" sponsored by the American Seed Trade Association, which is recognized as the most authoritative and reliable test of the merits of new vegetable varieties in the country. As a recognition of its merits and wide adaptation the Clemson Spineless Okra received the silver medal award which is considered an award of high distinction by the plant breeders and seed growers of America.
Studies of Certain Nutrient Deficiency Symptoms of the Porto Rico Sweet Potato

Sweet potato plants were grown to maturity in two-gallon crocks containing leached sand and varying nutrient solutions to determine the nutrient deficiency symptoms.

The solutions used were (1) complete solution, (2) minus nitrogen, (3) minus phosphorus, (4) minus potassium, (5) minus calcium, and (6) minus magnesium. The reaction of all solutions was maintained between pH 5.5 and 6.5 and the solutions were renewed thrice weekly.

Symptoms characteristic of the lack of each element were studied and described. There was a marked and characteristic difference between plants of different treatments in the size of the plants, the number of new stems, leaf color and marking, stem color, root, stem, and flesh color, and the areas in which the deficiency symptoms appeared. The color of the skin and the flesh of the roots of various treatments showed some interesting relationships. Evidently the proportion of nitrogen to other nutrients, particularly to potassium in the nutrient solution has an important bearing on the color of the skin and the flesh of the roots.

Factors Associated with the Fruiting of the Bush Lima Bean

Studies were made of certain internal and external factors to determine the cause of the inconsistent fruit-set and yields of the large-seeded bush Lima bean of which the Fordhook is a typical example. Comparative studies were made of the large-seeded and the more consistent yielding small-seeded varieties of which the Henderson is a typical example. Early germination of the pollen and early fertilization and development of the embryos, characteristic of the small-seeded varieties, were factors associated with early pod-set and high yields. The Henderson plants possessed greater root-top ratio and greener and more efficient leaves than the Fordhook. These characteristics are considered desirable in the development of better varieties.

HOME ECONOMICS

Dietary Studies

A study of farm family diets in the lower Coastal Plains of South Carolina was completed this year and the report published as Station Bulletin 319. Planned for the coming year is a summary of the results of dietary studies in the Piedmont and the Coastal Plains, including information taken in South Carolina by the Bureau of Home Economics in its nation-wide study of consumer purchases.
Typical diets of farm families in the lower Coastal Plains were low in milk and high in cereal foods, meats, and fats. Analysis showed that the most frequent deficiencies were in calcium, iron, vitamin A, and vitamin C, and that many of the low-cost, restricted diets were poorly supplied with animal proteins, riboflavin-rich foods, and pellagra-preventive factors. It became clear that certain foods, usually produced on the farm if they were used to any great extent, were of special value in making good these deficiencies: they include milk and its products, green leafy vegetables, sweet potatoes, tomatoes, eggs, locally ground cornmeal, and homemade syrups. Increased production and consumption of milk is probably the greatest nutritive need of this section of the state.

The quality of many of these diets indicates that malnutrition is far from infrequent. The observations of public health physicians point to the same conclusion. It seems highly desirable then that South Carolina study its human nutrition problems intensively and take measures to correct faulty diets and other contributing causes of malnutrition in order that health, efficiency, and well-being may be safeguarded and enhanced.

The Use of Textiles by Farm Households

During the past year a report was written on the use of household textiles by farm families in selected areas of eight South Carolina counties. It will be published in the near future as a station bulletin. The data on which the report is based are concerned with the quantities, kinds, and cost of textile materials used for household purposes by 590 farm families. It was undertaken in order to ascertain their custom in the matter of provisions and use of textile furnishings. The average supply per household of such basic articles as sheets, pillowcases, towels, table cloths, and napkins was found to be inadequate for constant usage with the changes necessary for convenience and cleanliness. A relationship usually appeared between the number and the use of the specified articles and the race and tenure of the farm households having them. The supply of sheets and towels in the households studied was considered in relationship to the education of the homekeeper. The per-bed and per-capita number of these two essential items of household furnishings appeared to be correlated with the educational attainment of the homekeeper.

Cotton was the fabric of which most of the articles under consideration were made. What the increase in the consumption of cotton would be if the farm households studied and others with inadequate supplies of textile furnishings in South Carolina and in other states were to increase their limited supply of textile articles to adequacy is an interesting economic question.
The Production and Consumption of Dairy Products

A report is being prepared for publication on the production and consumption of milk by white and Negro farm households in selected areas of eight South Carolina counties. The data reveal 14.9 percent of the households studied to be without cows; that 55 percent had only one cow and were without home-produced milk for an average 7.9 weeks per year; that 24.9 percent of the households had two cows each but were without home-produced milk for an average of 5.5 weeks per year; and that only 5.2 percent of the farm households under consideration had three or more cows. In the households without cows and in those having an inadequate home-produced supply the home-produced milk was supplemented by very small quantities of purchased or given milk or milk equivalent.

Other Studies

The family budget guide prepared by this department at the request of the State Department of Public Welfare in 1937 was meant for immediate and temporary use. It was agreed that a relatively long-time study of family needs and expenditures was needed to serve as the foundation for the preparation of basic quantity-cost budgets for the use of social workers and others who must estimate the necessary living expenditures of individuals and families at the lower income levels. Such a study is being made by a committee representing the South Carolina Conference of Social Work and the South Carolina Home Economics Association. The two members of this department are its co-chairmen.

During the past fiscal year, taxation information has been made available in concise form for women's organizations desiring it. Also in response to interest manifested by women's clubs, a digest was made of the publication entitled "A Comparison of the Political and Civil Rights of Men and Women in the United States", Senate Document 270. South Carolina statutes were compared with statutes covering similar points of law in the other states of the union.

Information has been assembled and brief reports prepared on the state's library conditions and needs. Materials to guide groups in the study of state and federal legislation, education needs, women in gainful employment, and the relationship between agricultural and industrial progress have been prepared. For each subject a list of reference material has been submitted. Information has thus been made available in readily usable form for laywomen.
POULTRY

In further studies on "range paralysis" the importance of the resistance of certain strains of chickens to the disease has been shown. Under identical conditions of feeding and management a "susceptible" strain of birds suffered two and one-half times as much mortality from this disease as a "resistant" strain. Selection of breeding stock from strains of chickens showing good livability and using one and two-year-old hens for breeders appear to be the most practical methods for the control of the disease.

Excellent results in egg production and reduction in cannibalism and feather pulling among hens fed whole oats showed the importance of this grain in rations of laying hens. When allowed whole oats free choice along with corn and wheat and laying mash the hens consumed up to 35 percent of their entire ration of oats in this form. The use of oats in this manner in the laying ration by poultrymen of the state should reduce feed costs and also provide a home market for a large amount of this important grain crop.

Further studies on the use of cottonseed meal in the ration of growing chicks has confirmed previous investigations of the value of this feed as a source of protein in such rations. Rates of gain and ration costs have been favorable to the use of cottonseed meal. The quality of the meat of chickens produced on rations containing cottonseed meal was not affected in any observable way by this feed.

COAST EXPERIMENT STATION

The research activities of the Coast Experiment Station are devoted almost entirely to the investigation of practical problems in the agriculture of the poorly drained soil types of coastal South Carolina. These investigations are so outlined as to be of immediate value to farmers having similar soils and consist of experiments in the production and management of beef cattle, the development and management of permanent pastures, the production and utilization of feed and forage crops, the production of market hogs, varietal studies of corn and hay crops, and the production of timber.

Beef Cattle Management Studies*

The beef cattle investigations are as follows:

1. A study of the economic value of creep-feeding purebred beef calves for both slaughter and breeding purposes. Two comparable lots of 10 Angus calves from the station herd are used in this work. The

*In cooperation with the Bureau of Animal Industry, U. S. D. A.
calves of Lot 1 are fed free choice a grain ration in addition to their
dam's milk and pasture. The calves of Lot 2 receive no feed other than
their dam's milk and pasture. The data covering 50 calves that have com-
pleted this study show the following differences in favor of creep feed-
ing; average daily gain, 0.592 pound; average final weight, 70.4 pounds;
profit per head if slaughtered, $7.48; profit per head if sold for breeding
purposes, $9.77.

2. A comparison of rye pasture and sorghum silage in a wintering
ration of stocker steers. In this study, 40 beef type steers are divided
into two lots. Each lot is fed the same ration except that when condi-
tions permit, Lot 1 has access to rye pasture instead of the sorghum
silage of the ration. During the four winters in which this experiment
has been conducted, Lot 1 has grazed on rye for an average of 52 days
and has made an average of 0.133 pound greater daily gain than those of
the control lot.

3. Pearl millet as a temporary pasture for beef cattle. During ad-
verse seasonal conditions with a shortage of permanent pasture, a tem-
porary grazing crop may be of great value in maintaining beef as well
as dairy cattle. In view of this fact, pearl millet has been used in a test
of the carrying capacity and amount of beef produced per acre. First
year's data from this test show a carrying capacity of 105.9 cow days
per acre and an average of 148.1 pounds of beef produced per acre.

4. A comparison of the beef-producing capacities of native broom
sedge pasture and four carpet grass-lespedeza pastures receiving treat-
ments as follows:

CL-1 No treatment-Check

CL-2 2000 pounds of lime every third year.

CL-3 2000 pounds of lime every third year and 250 pounds of 16
percent superphosphate annually

CL-4 1500 pounds of low grade basic slag every third year

In order to measure the effect of the treatments, each pasture is
stocked according to its carrying capacity throughout the pasture season
with two-year-old steers of beef type. The carrying capacity, the rate
of gain per steer, and the total gain per acre for each pasture is recorded.
Clippings from caged areas are made periodically and samples of the her-
bage retained for chemical analysis. Disregarding any residual effect of
the treatments, the data for the first three-year period may be briefly
summarized as follows: With beef at $7.00 per hundredweight, lime is
worth $4.49 per ton, 16 percent superphosphate $11.17 per ton, and low
grade basics lag $12.33 per ton. Untreated carpet grass pasture is worth
$0.77 per acre more than broom sedge which is worth only $0.30 per acre.
Pork Production Studies

The pork production studies are divided into winter and summer projects. In the winter projects, the fall crop of pigs from the station herd are used, while the summer projects are conducted with the spring crop of pigs.

1. The winter work consists of a comparison of the protein supplements, menhaden fishmeal, sardine meal, digester tankage, and meat and bone scrap. All proteins are fed free choice to pigs receiving white corn and rye pasture free choice. A three-year average of the data from this comparison shows the feed cost per 100 pounds of gain to be as follows: menhaden fishmeal, $3.97; sardine meal, $4.04; digester tankage, $4.18; meat and bone scrap, $4.34. The rate of gain was in the same relative proportion except that the order of meat and bone scrap and tankage was reversed.

2. During the summer, a comparison of methods of sanitation in the control of kidney and roundworms of swine is conducted. In the comparison, two methods of sanitation are checked by an unsanitary lot in which pigs have been fattened for the past nine years. These sanitary methods are as follows: (1) The Georgia plan in which the pigs are farrowed on a clean lot of forage with plowed strips around the fence lines and farrowing house, and subsequently the sow and pigs are fed in separate enclosures; (2) the Clemson plan which is identical with the Georgia plan except that the plowed strips and the separate feeding of the sow and litter are omitted. Upon weaning, the pigs of both lots are moved to a cultivated lot of forage and fattened to a marketable weight, while the controls are left on unsanitary ground. All pigs are slaughtered at a local packing plant and the degree of parasitic infestation determined. To date, there has not been any great degree of kidney worm infestation, but, the roundworm infestation has varied from 25 percent in both of the sanitary lots to 86 percent in the unsanitary lot.

3. In the fall of 1937, a crossbred versus purebred project was outlined with the view of furnishing conclusive data as to the relative merits of the two systems of breeding in the production of pork. This project differs from other work done along this line in that purebred Poland China sows are double mated to a Poland China and a Duroc Jersey boar. When the result of this double mating is a mixed litter of both crossbreds and purebreds, the pigs are marked and weighed at birth. At weaning, they are again weighed, separated into a lot of crossbreds and a lot of purebreds, and then fattened to an average weight of 200 pounds. To date, 25 purebred and 25 crossbred pigs from eight mixed litters, sired by two pairs of boars, have completed the feeding period. The average daily gains of the crossbreds has been 10.93 percent greater.
than that of the purebreds. The corn consumed per 100 pounds of gain by the crossbreds has been 7.98 percent less than that used by the purebreds, while the protein supplement for the crossbreds has been 7.40 percent greater. Using the 1939 prices of feeds, the crossbreds have produced 100 pounds of pork for 27.65 cents less than the purebreds.

**Pasture Investigations**

Under pasture investigations, the following projects are included:

1. A study of the effect of heavy initial treatments on the rapidity of the development of pastures and the economy of these treatments. In this project, the amounts of basic slag, with and without potash are varied from 1500 pounds to 6000 pounds per acre. Lime is applied at the rate of 6000 pounds per acre with and without potash, superphosphate, manure, and a complete fertilizer. First year’s observations note a marked stimulation from the heavier complete applications over the minimum applications.

2. A study of the effect of basic slag and superphosphate, with and without potash on the growth and feed value of carpet grass-lespedeza pasture. This study consists of eight treatments which vary either the amount or the combination of materials used, all properly checked by a control plot, and in duplicate. Clippings from these plots have been made for four years, yields recorded, and the feed value determined. The residual effect of the treatments is now being observed under normal grazing conditions.

3. Establishing and maintaining lespedeza, hop clover, and white Dutch clover in old carpet grass sod. In this study, following applications of lime, with and without phosphorus, and basic slag alone, carpet grass pastures were searified and then seeded in the spring to lespedeza, and in the fall to hop and white Dutch clovers. From the data to date, it is evident that both lime and phosphorus are necessary in maintaining the clovers in pasture mixtures, following applications of lime materials, the clovers are showing potash deficiency.

4. A comparison of methods of seeding Dallis grass on a prepared soil. Due to the difficulty experienced in securing a stand of Dallis grass when a surface seeding is made, the following methods of seeding were compared: (1) Seeded lightly with grain drill; (2) seeded broadcast by hand in shallow grain drill furrows and pressed into the soil by cultipacker; (3) seeded broadcast by hand in cultipacker furrows and covered with smoothing harrow. Because of unfavorable seasons following germination it will be necessary to repeat the comparison of methods; however, indications are that Dallis grass seed should be lightly covered for best results.
Supplementary Reports

Corn, Cotton, and Hay Crops

The work with corn at this station consists of the comparison of 30 standard and hybrid varieties of both white and yellow corns. With the growing demand for a consistently high-yielding yellow variety, an effort is made to include as many yellow varieties as space will permit. Results of the last two years' work indicate that breeders are making progress with the yellow varieties.

The cotton plantings are in cooperation with the Bureau of Plant Industry and are limited to the breeding and seed multiplication of three upland long staple varieties, Meade, Tidewater, and Williamson. Considerable progress has been made in developing a more desirable type of Meade for possible future crossing with Sea Island.

The work with hay crops consists of a comparison of Otootan and Biloxi soybeans, and cowpeas sown broadcast for hay. An average of two years' results show Otootan soybeans to have produced 32 percent more hay than peas and Biloxi soybeans to have produced 18 percent more than peas. The upright growth of both varieties of soybeans permitted a clean harvest of the plots which was not possible with cowpeas. Both varieties of soybeans were much more easily cured than cowpeas; however, because of the woody character of the stems, neither variety was as completely consumed by cattle as the cowpea hay.

Timber Production

The timber production studies are in cooperation with the U. S. Forest Service. These studies are confined to plantings and the natural reproductions of several species of pine, and a comparison of annually burned and unburned areas of longleaf pines as to stand and rate of growth. This project has been conducted without interruption since 1912 and has been of much interest to timbermen. An efficient system of plowed fire lines has been developed and a complete fire protection of the station's 200 acres of young timber has been possible.

Pee Dee Experiment Station

The Pee Dee Experiment Station, located at Florence, serves the agriculture of a large part of the state in which the major portion of the farmer's income is from the sale of farm crops. Research activities along agronomic lines have centered chiefly on the principal crops of this area: cotton, tobacco, corn, small grains, sweet potatoes, and peanuts.

Large numbers of farmers and club boys visit the station every year to inspect the various experiments under way with field crops, gaining much valuable information that will help them in their farming operations.
Winter Legume Cover Crops

The system of farming as practiced in this section, consisting of clean cultivation and removal of crop residues, has left practically all soil types deficient in organic matter. To determine to what extent this can be replaced by growing winter legume cover crops, definite areas have been planted to Austrian peas, hairy vetch, Monantha vetch, and Hungarian vetch during the winter, followed by cotton after being turned under in the spring. As a soil-building practice, results have been outstanding for several years. Heavy applications of nitrate of soda to cotton following the winter legumes have had no appreciable effect on cotton yields.

Fertilizer Experiments

One of the oldest fertilizer experiments in the South is conducted at this station. It consists of 135 tenth-acre plots in a three-year rotation that receive nitrogen, phosphorus, and potash at varying rates and combinations. Results obtained over a 26-year period serve as a basis for fertilizer and rotation practices recommended for this section of the state.

Readily available nitrogenous fertilizer can be used profitably as side applications to many crops grown in the state. Twelve of these nitrogenous materials are being used as the sole source of nitrogen and as side dressing to determine their relative efficiency in cotton production.

Potash in varying amounts is being applied at various stages of growth of cotton to determine proper amount and time of application to prevent potash deficiency (cotton rust) which has been very prevalent in cotton within recent years, resulting in inferior staple and seed.

Investigations in fertilizer placement over a period of years at this station show that the position in which the fertilizer is placed in regard to the seed has a very marked effect upon stand and subsequent yield of cotton. When placed two to three inches to the side and slightly below the level of the seed better stands and increased yields have resulted.

Stable manure is being used at rates varying from one to five tons per acre in the drill to determine its value in cotton production. Over a five-year period two tons of manure per acre have produced slightly more cotton than 425 pounds of a high-grade fertilizer.

Nitrogenous and potash fertilizers are being used at rates varying from 50 to 300 pounds per acre as side applications to cotton to determine most profitable amounts to use.
Varieties

New strains and varieties of farm crops are being developed by plant breeders, and in order to supply information frequently requested by growers about these varieties, tests are conducted by the station. This year's tests include 48 varieties of cotton, 18 varieties of white corn; 16 varieties of yellow corn, 44 varieties of soybeans, 12 varieties of cowpeas, 18 varieties of wheat, 20 varieties of oats, 6 varieties of rye, 48 varieties and strains of sweet potatoes, 160 varieties and strains of peanuts, 6 varieties of sugar cane, and 11 varieties of crotalaria.

Other Projects

Other projects under way include rate of seeding oats, time of applying fertilizer to corn, growing soybeans in drill with corn to determine effect on yield of corn, time of applying fertilizer to cotton, varying the width of rows for cotton, treating normal, acid-and machine-delinted cotton seed with 2 percent and 5 percent Ceresan to determine effect on stand and yield.

Cooperative Projects

This station is cooperating with the Bureau of Plant Industry and Bureau of Entomology and Plant Quarantine, of the United States Department of Agriculture, in various research activities. Through such an arrangement it is possible for the station to cover a much wider field of research than would be possible otherwise. Separate reports covering these activities follow.

Cooperative Research with Cotton

There is no overproduction of extra long fine staple cotton in the United States and many thousands of bales of Egyptian cotton are being imported each year to supply the demand of American spinners. Sea island cotton can fill much of this demand, but because of susceptibility of this type of cotton to weevil damage its attempted revival is meeting with only partial success. The objective of the breeding and improvement work is to find a substitute for sea island cotton which can be grown as readily as upland under weevil conditions.

Three breeding approaches are being undertaken:

(a) Certain long staple upland varieties of the more extreme lengths are crossed with specially selected lines of the better sea island stocks, and the progenies repeatedly backcrossed to the parental stocks of the upland type; (b) single and double crossings are made among some of the long staple upland cottons; and (c) selection of improved lines within these upland long staple varieties is practiced.
As an aid in the breeding work genetic studies are being made of the process of stabilization of inter-specific hybrids and the behavior of the characters concerned. Various crosses and backcrosses have been made between upland varieties and several sea island strains. The studies of inheritance of fiber lengths and fineness, lint percent, character of fuzz on the seed, boll and leaf shape, and other peculiarities are being continued.

The regional variety study begun in 1935 is being continued with two upland varieties to study the relative spinning quality of cotton from year to year and from location to location. This is one of several tests being conducted over the cotton belt.

**Cotton Insect Investigations**

**Cotton Boll Weevil Control.** Because of the severe losses that the boll weevil causes to the cotton crop in South Carolina annually and because of the danger of soil injury if standard boll weevil control recommendations are practiced by South Carolina farmers, an effort is being made to find an adequate control that will not result in injury to the soil and that will eliminate plant lice infestations if frequent applications are made. The different insecticides that are being tested during the crop year of 1939 are as follows:

1. Molasses-calcium arsenate-water mixture
2. Calcium arsenate-water mixture
3. Calcium arsenate-water-corn starch mixture
4. Calcium arsenate-water-Arabol glue mixture
5. Calcium arsenate-dry wheat paste-water mixture
6. Molasses-cryolite-water mixture
7. Calcium arsenate dust
8. 1-1 calcium arsenate and hydrated lime and .5 percent nicotine
9. 1-1 calcium arsenate and sulphur and .5 percent rotenone and derris
10. 1-1 calcium arsenate and celite and .5 percent rotenone from cube
11. Jungman cryolite with and without rotenone
12. Alorco cryolite with and without rotenone
13. Barium fluosilicate with and without rotenone
14. Sodium fluosilicate with and without rotenone
15. Basic copper arsenate
16. Calcium arsenate plus copper arsenite
17. 1-1 Alorco cryolite and sulfur
18. Jungman cryolite and lethane
19. Calcium arsenate with nicotine bentonite
20. Calcium arsenate with nicotine bentonite-tannate
Cotton Boll Weevil Hibernation Studies. In order to obtain information on the winter survival of boll weevils in South Carolina, 35,000 weevils are collected and placed in 70 screen-wire cages containing Spanish moss, pine straw, and corn stalks in the fall. In the spring and early summer of the next season a careful check is made of the number that has survived the winter. This information is frequently used by farmers to determine the advisability of using presquare boll weevil control and making preparation for the possibilities of later control of the boll weevil.

A small trap crop of cotton is planted near the woods and isolated from other cotton fields, to determine the boll weevil emergence in nature. Weevils emerge in nature much slower and later than they do in the cages. About one-third of the weevils that emerge in nature emerge after June 15, while in the cages a very small percent emerge after June 15 and about 80 percent emerge in May. In nature about 90 percent of the weevils emerge in June.

It has been known for many years that weevils hibernate in woods trash near cotton fields, but no definite information was available as to the distance into the woods that they normally go before entering hibernation. It has been found that the majority of weevils hibernate in the first 100 feet from the edge of the woods. The examination of woods trash is done every year and valuable information is being secured on the relative number of boll weevils that hibernate in the woods each year.

In the course of examining woods trash for boll weevils many other kinds of insects were found. These were all kept and identified and a number of new species have been added to the state list of insects.

Cotton Root Aphids. In certain sections of South Carolina root aphids cause severe losses to the cotton crop by killing the seedling plants early in the spring. These aphids are always attended by the cornfield ant and are entirely dependent on this ant for their existence. Because of this fact, control is directed more at the ant than at the aphid. Experiments were conducted at the Pee Dee Station during 1939 for the control of these aphids as follows:

A—Repellents
1. Oil of tansy
2. Oil of anise
3. Oil of sassafras
4. Oil of lemon
5. Tincture of asafetida
6. Kerosene
B—Soil Fumigants
1. Dichlorethyl ether at different strengths
2. Ethylene dichloride at different strengths

C—Ant Poisons
1. Tartar emetic at different strengths
2. Thallium acetate at different strengths
3. Thallium sulfate at different strengths

Cotton Leaf Aphids. Aphids attacking the leaves of cotton frequently cause severe injury. If the attack is in the spring of the year, the leaves curl up, present a wilted appearance and frequently die. If the attack is late in the season, as frequently happens following the use of insecticides for boll weevil control, much of the fruit may be shed by the plant. Efforts are being made at the Pee Dee Station to find a suitable control early in the season, and to develop a method of boll weevil control that will not induce the buildup of an infestation later in the season. To obtain this, thorough studies are being made of the rotenone compounds, fixed nicotine dusts, nicotine sulfate and pyrethrum, both when used with inert diluents or when mixed with other insecticides for boll weevil control. Excellent progress is being made on this project.

Tobacco Investigations

From time to time the tobacco growers of the state encountered many difficult problems in growing a profitable crop. In order to assist farmers with these problems, the following tobacco experiments were begun at the new experimental farm on the Florence-Darlington highway:

1. Steaming tobacco beds for weed control.

2. The fertilization of tobacco seedbeds to determine the best forms and rates of nitrogen and potash in the production of normal vigorous plants.

3. Blue mold control tests have been continued with the following materials: (a) paradichlorobenzene, (b) benzol, and (e) copper-oxide-oil spray. During the past two seasons paradichlorobenzene crystals have given excellent control of blue mold. Under average conditions the treatment is harmless, inexpensive, easy to apply, and probably offers one of the most effective and practical treatments for the control of this disease.

Benzol, a liquid, is another material which has proven to be very effective against blue mold. This material is more cumbersome to handle than paradichlorobenzene, is volatile and inflammable, and direct contact proves fatal to the plants.
For the past three seasons, another treatment known as copper-oxide-oil spray has been used for the control of blue mold. The spray treatment has not checked the mold or prevented its spread as have the fumes from paradichlorobenzene and benzol.

4. The fertilizer placement test has been continued. The fertilizer is applied in several analyses and in bands varying distances from the root of the plant at transplanting time. One thousand pounds of a 3-8-6 mixture applied directly in the furrow without stirring before bedding resulted in very poor stands. In general, fertilizer applied to the side of the plant usually resulted in almost perfect stands. Fertilizer applications delayed 21 days retarded maturity, as indicated by date of flowering.

The cooperative tests with weeds and other crops in two and three-year rotations with tobacco have been continued. Preliminary tests have indicated that weeds increased the value of the tobacco following the weed crop by approximately $50 per acre over that following commercial crops, such as cotton, corn, etc.

6. Experiments with minor elements such as sulfur, magnesium, calcium, chlorine, and boron are in progress. Elements such as these are becoming more important in the production of a satisfactory tobacco crop. These tests have been undertaken to determine the rates and forms of minor elements necessary in the production of a normal crop of tobacco.

7. Tests are in progress to ascertain the effects on yield and quality of leaf of topping to definite heights as soon as the plants have produced the correct number of leaves. This experiment is carried on in combination with several different spacings in the drill, and using 800 and 1200 pounds per acre of a 3-8-6 mixture.

8. In 1936, tests were begun to determine the most practical rate and time of applying potash, one of the most important elements in production of quality tobacco. In this test the other essential elements are added, in constant amounts, potash being the only variable. The test showed that heavier rates of potash resulted in the production of higher quality tobacco. Large amounts of potash in the fertilizer mixture might result in poor stands, therefore, it is suggested that approximately two-thirds of the potash be applied as a side application at the first cultivation.

9. Tests are under way to determine the effect on yield and quality of leaf of some of the more common individual species of weeds immediately preceding a tobacco crop. Ragweed or horseweed are excellent weeds to precede tobacco. Lamb's-quarter is very detrimental to tobacco quality and stand. Natural weeds may be utilized in producing high-grade tobacco. This test is a two-year rotation of weeds and tobacco.
10. A date-of-planting test is under way to determine the best range of dates for transplanting and also to determine the severity of the nematode infestation (root knot) on the roots from exceptionally early, medium, and late plantings set at 15-day intervals. Half the plots had rye as a winter cover crop which was turned under well in advance of transplanting.

11. A two-year rotation of tobacco with several economic crops was begun to determine the effect of these crops on the nematode population of the next tobacco crop. Crops such as crotalaria, sweet potatoes, peanuts, cotton, corn, cowpeas, oats, followed by clean and natural weed fallows, natural weeds, and tobacco following tobacco as a check, were used. This test is beginning to show marked differences.

12. Studies are in progress with such elements as iron, manganese, zinc, copper, and boron to determine their relation to the production of good tobacco.

13. Experiments with many of the common flue-cured varieties of tobacco are under way to determine the varieties best suited to our climatic and soil conditions.

14. A cooperative test with other states and with the tobacco trade was conducted to determine whether certain flue-cured varieties will properly age, burn, and work into desirable products.

15. Tests with several systems for curing are in progress, namely, an electric automatic coal stoker, and two oil burners. To date, the coal stoker has proven to be decidedly more economical than either of the oil burners tested.

**Tobacco Insect Investigations**

The income to farmers from their tobacco crop is dependent upon the quality of the cured product as well as the quantity produced. The quality may be materially influenced by the kind and quantity of insecticidal mixtures applied to the growing plants to control insect pests. Fields have been observed where farmers would have secured a good quality crop had it not been for using materials that were injurious to the plants.

Studies have been directed at control of the tobacco flea beetle, commonly known as the flea-bug; and the tobacco (tomato) hornworm in an effort to develop insecticides that are toxic to the insects and nontoxic to the plant. Further, an effort is being made to develop one insecticide that will control both pests. Hibernation of the tobacco flea beetle has also been studied.
**Flea beetle.** This small insect is present from the time the plants first appear above ground in the plant bed until the crop is harvested. The adult beetle eats small holes in the leaves and the larval or grub stage feeds on the roots and in the stems below the soil surface. Very small plants may be completely destroyed.

In plant beds severe injury is most likely to occur where very small plants are attacked, however, the plant bed is an important breeding place for the beetles and the beetles that are produced in the beds may later injure plants in the field. A good practice is to destroy all plant beds as soon as transplanting has been completed.

Where flea beetles are numerous on field plants some of the lower leaves may be completely destroyed. Where leaves are not destroyed they may be injured to such an extent that they cannot be cured properly.

A powdered insecticide containing one percent of rotenone in ordinary china clay is an effective control remedy for the beetle both in the plant bed and in the field.

**Hornworm.** The tobacco (tomato) hornworm is a familiar pest to all tobacco growers in the state. The insecticide that have been used for the control of this pest in the past have been toxic to the plant and have exerted very little control on flea beetles. An effort is being made to find an insecticide that will both control insect pests and be safe on tobacco foliage.

**Hibernation Studies.** Field and cage studies conducted over a period of three years have shown that the tobacco flea beetle can survive the winter in plain loose soil, leaves and debris, old tobacco stalks, and in grass or broomsedge. The beetles begin emerging when the temperature warms up sufficiently in January or February and emergence may continue until June. Most of the beetles emerge from hibernation by the time the plants are set in the field.

**SANDHILL EXPERIMENT STATION**

During the past year the experimental work at this station has been continued as heretofore. The seasonal conditions have been fair for most crops though some have suffered from drought or extreme cold. The small grain and hay crops were especially good during the year. The tract of land which was obtained about two years ago has been developed during the year partly by NYA youths who have been assigned to that project. Certain clearing, drainage and terracing, as well as the planting of trees has been carried out by these young men, which has resulted in splendid development of both the land and the men.
Many visitors continue to come to the station and inspect the crops being grown under varied conditions. A large group of fertilizer manufacturers and dealers was a very important group because of their relation to the use of fertilizer by farmers. These men appeared very much interested in the differences resulting from the various fertilizer treatments here.

**Field Crops and Fertilizers**

Results from experiments with field crops and various fertilizer applications for the last crop year were in line with results given in previous reports. Information is being secured annually which will be of value to the farmers in the Sandhill region.

An experiment has been conducted since 1931 to determine the most effective rate and time to apply potash to cotton. Data obtained show there is little difference in yield of seed cotton from the various times of applying potash, but the yield increased as the amount of potash in the fertilizer increased. There has been an increase of 16 to 24 pounds of seed cotton per acre for each pound of potash used.

**Forage Crops**

The work with forage crops is more or less a continuation of experiments which have been under way for two or three years. A few of the projects have been revised in order to establish more fully certain developments and findings. The variety and selection studies have been increased considerably during the year. The selection work consists chiefly of selecting early strains which may be more prolific in seed production and which possess characters which lessen shattering of the seed.

Several new promising strains of crotalaria, cowpeas, soybeans, and vetches are in trial plantings this year to determine their adaptability to Norfolk soil.

Experimental plantings of non-scarified and scarified crotalaria seed seem to have pointed toward obtaining better stands of crotalaria, lespedeza, sericea, and other plants whose seed coats are often hard. Aside from these activities a great deal of progress has been made with pasture grasses, hay crops, and other plants.

The forage crop work in general for 1939 has been very satisfactory regardless of adverse seasonal conditions.

**Soil Fertility Investigations**

Lysimeter investigations have shown that large quantities of nitrogen are lost by percolation from Norfolk coarse sand during the winter in
the absence of a cover crop but such losses are much less when a winter cover crop of small grain is grown. Phosphate losses due to leaching are unimportant. Potash losses through leaching are rather small and seem to be rather uniform under different cropping programs. Calcium and magnesium losses are much greater and are more dependent upon the nature of the crop. Extensive losses of these elements occur when legumes are used as green manures unless followed by a winter cover crop. The organic matter returned to the soil by using cover crops as green manures maintains the fertility as indicated by greater yields of summer crops following such management.

A green manure—fertilizer experiment involving a three-year rotation of legumes, corn, and cotton was revised in 1938 to compare the relative merits of legumes used as green manure versus legumes used for hay followed by use of nitrogen sidedressing of the succeeding cash crops. One series of plots is on unlimed land, the other is on land which received dolomitic limestone at the rate of 750 pounds per acre. There has not been sufficient time to permit comparison of the sidedressing versus the green manuring management but the first year’s results showed outstanding benefits due to liming, both in crop yields and in preventing symptoms of magnesium deficiency in crops on the limed areas.

Two years’ results of a fertilizer ratio experiment with soybeans indicate that the rate of application of nitrogen fertilizer is less important to this crop than either phosphate or potash. Increase from 2 percent to 8 percent of potash in 400 pounds per acre of fertilizer increased yields from 1.55 to 1.83 tons where acid-forming fertilizer was used. The non-acid-forming fertilizers gave yields superior to the acid-forming mixtures of the same plant food ratio in each of the seven ratios used in the experiment.

Studies of fertilizer placement to cotton showed that somewhat superior germination was obtained when the fertilizer was applied in advance of planting. Placement of the fertilizer close to the seed delayed and reduced germination. Sidedressing with one-third of the nitrogen gave better yields than applying all the nitrogen at or in advance of planting. Placement of the fertilizer under the seed was inferior to mixing it with the soil or placement in bands 2.5 inches to the side of and 3 inches below seed level.

**Dairying**

Experiments in the breeding, feeding, and management of dairy cattle are being continued.

The breeding project planned to produce a strain of Guernsey cattle pure for a high level of production by the continuous use of proven sires
has progressed to the fourth sire. To date we have 14 daughters of the fourth sire in the herd. The first daughters of this sire will calve this fall.

Fourteen sons of proven sire are loaned to dairymen in South Carolina and eight will be available for loan this fall. All these bulls are loaned to farmers who are doing dairy herd improvement testing so that we will be able to compare the production records of these daughters with records of their dams. Some of the daughters of these sons of proven sire are making very creditable records.

Fifteen females were sent to Beltsville, Maryland, and three to Clemson College last April. This reduction in the size of the herd was necessary because of the limited barn space. There are 57 females in the breeding herd.

Grazing experiments with annual crops and permanent pasture are being continued. Five years' data on these experiments have been summarized for publication.

The yields of hay and silage crops were very satisfactory last year. An experiment was started this year to determine the yield and value of pearl millet for silage. Thirty-two tons of pearl millet (green weight) were recently cut from four and one-fourth acres and put in the silo.

**Horticulture**

The experimental work with peaches was seriously hampered the past year since fruit buds of many varieties were killed by low spring temperatures. However, certain varieties were fruitful giving information as to relative susceptibility of buds to freezing temperature. The fertilization project has been completed. In its place an experiment concerned with studies on cover crop management in the orchard is under way. The first crop of fruit was harvested from this orchard in 1939.

Asparagus fertilizer studies are being continued. Yields obtained from different harvest practices have shown that the cutting of spears with approximately five inches of "green" on beds that are built up about nine inches over the crown is the most efficient method.

The grape project continues studies previously reported. Yield and growth records have shown the necessity of using a root stock to increase the length of life and productivity of most of the bunch varieties. Present data indicate that Dog Ridge, a stock of the Champini species, and Rupes-tris St. George are suitable under stocks.

General fertilizer and variety studies with sweet potatoes have been discontinued and other projects concerned with the problems of improve-
ment of the Porto Rico variety have been substituted. These include studies of the stability and maintenance of desirable characters in the Porto Rico and the relation of the nitrogen—potassium ratio in the fertilizer to flesh color of the roots.

TRUCK EXPERIMENT STATION

The Truck Experiment Station is located seven miles west of Charleston in the heart of the coastal trucking area. The station carries on experimental work with practically all the vegetable crops grown commercially in the state and cooperates with the United States Department of Agriculture in insect studies and vegetable breeding work. A brief summary of the projects follows:

Fertilizer and Lime Experiments. Extensive fertilizer experiments are under way with the following crops: cabbage, potatoes, tomatoes, beans, cucumbers, peas, and lettuce. Results of most of these experiments have been published in previous reports.

Studies are under way to determine the effects of different kinds of lime, applied at varying rates per acre, on the yield of truck crops. The response of crops to the minor fertilizer elements at varying degrees of soil acidity is also being investigated.

Vegetable Breeding. During the 1938-39 season a large number of F1 cabbage plants from various crosses were self-pollinated and seed from them was obtained for planting in the fall of 1939. These plants are expected to segregate into round and pointed types and selections will be made of good types which show cold resistance and other desirable characters.

Potato breeding work is being continued in cooperation with the U. S. Department of Agriculture and about 50 very good seedlings have been selected for further tests on a larger scale. New material is tested annually for adaptation to South Carolina conditions.

A new breeding project with cucumbers was started the past year, the object of which is to develop a good mildew-resistant variety. Cucumber varieties were obtained from many parts of the world and some of them show considerable resistance to mildew, although none of them was immune.

Severe cold and disease in 1939 revealed some very striking differences in the lettuce breeding plots. It is quite evident that some very valuable material is under development.

Selection of collards for a late-bolting, sure-heading variety has reached a very promising stage.
Variety Tests. Variety tests are being conducted with all vegetable crops grown commercially in the area. All new varieties are tested as soon as they are introduced in order that their adaptability may be determined. In the tomato tests Rutgers, Marglobe, and Pritchard continued to lead other varieties in yield and adaptability to South Carolina conditions.

Unfavorable weather conditions resulted in low yields of potatoes from the variety plots. Katahdin, Houma, Irish Cobbler, Sebago, and North Carolina No. 1 proved much better than other varieties under these conditions.

The new Imperial 847 lettuce is very outstanding and promises to revive this industry in South Carolina. Imperial 44 showed promise of being able to stand more heat than any other variety.

Golden Cross Bantam sweet corn is a consistent producer of excellent ears which are relatively free from worm damage. African Squash promises to give the South a good baking squash.

EDISTO EXPERIMENT STATION

The development of the Edisto Experiment Station has been watched with considerable interest by planters and agricultural workers in the Edisto and Savannah river valley sections of South Carolina. Regardless of the fact that the station is in only its second year, much service has been rendered. Daily calls for help unavailable elsewhere are received and in many instances worthwhile aid has been extended. Demands have recently arisen for the institution of livestock and pasture work at this station. As yet facilities for this work have not been provided.

Development of Station

On January 1, 1939, the station acquired an additional 216 acres of land. Although a part of this new tract is in forest a sufficient acreage was obtained on which to start considerable work with asparagus and sweet potatoes. This land was in a badly run-down condition and heavily infested with Bermuda and nut grass. Several fields have been cleaned of these grasses and soil-building rotations established.

The Works Progress Administration has continued to cooperate in the development of the station. This agency has made 15,000 additional feet of drain tile to be used in draining lowlands on the farm. It is expected that a new project for the laying of this tile and the further development of this station will be approved in the near future.
An extensive building program has been under way during the past year. The WPA has extended much valuable assistance in this work. This agency has furnished most of the labor and a considerable portion of the materials in the erection of the following structures which are now completed: A modern 1200-bushel corn crib, a 2000-bushel experimental sweet potato curing and storage house, a large machinery shed, a seed and fertilizer house, a large garage and storage shed and two six-room frame laborers' homes. Considerable work has been done on two six-room brick and frame bungalows for staff members use, and on a two-story brick and frame superintendent's residence. Some work towards the completion of the upper floor of the office and laboratory building has been done by the WPA. In this manner the station has acquired buildings totaling over $30,000 in inventory value at a cost of approximately $10,000.

Experimental Projects

Experiments started in 1937 have been continued and several new ones started. The new work undertaken consists largely of fertilizer and cultural tests with asparagus and sweet potatoes.

Experiments on the control of diseases attacking cucumbers and cantaloupes have made such satisfactory progress that control programs can be recommended to commercial growers. A few such growers have followed a program suggested by the station and were so well pleased with results that they plan to incorporate these practices in their regular farming operations in the future. Cantaloupe fields treated as recommended yielded more fruit of a higher sugar content and picking continued several days after untreated fields had been destroyed by diseases.

Following is a list of experiments now being conducted at this station:

**Variety tests.** Variety tests are being conducted with the following crops, the number given being the number of varieties of each crop in the test: Cotton, 34; corn, 18; oats, 12; wheat, 15; rye, 2; barley, 4; peanuts, 10; crotolaria, 8; cantaloupes, 55; soybeans, 22; cucumbers, 44; strawberries, 14; watermelons, 39. Several varieties of each of a number of fruit and garden crops are being studied for their adaptability to this locality.

**Fertilizer and Cultural Experiments.** Fertilizer and cultural tests of the kind indicated below are being conducted with the crops shown:

Asparagus—The effect of certain chemical compounds on reestablished asparagus plantings: studies on height of ridge; depth of planting test; type of culture test; large versus small crowns; effect of length of cutting period; rate of application of complete fertilizer; time of application of fertilizers; source of nitrogen; liming and minor element test.
Cotton—Five cooperative tests of the rate and time of application of potash; tests of the importance of minor elements; rate of application of phosphorus; time and source of application of nitrogen; rate of application of magnesium; source of nitrogenous sidedressing materials.

Corn—Five cooperative tests of the rate of application of potash.

Oats—Rate of application of potash for sidedressing; rate and source of nitrogen for sidedressing.

Cucumbers—Rate and source of liming material; rate of application of fertilizer; rate of application of potash; source of nitrogen; tests of minor elements; rate of application of sodium nitrate as a side-dresser.

Cantaloupes—Source of nitrogen; time of application of sodium nitrate as a side-dresser.

Watermelons—Source of nitrogen; determination of maturity and proper stage for picking.

Irish Potatoes—Nine cooperative tests to determine the yield of potatoes from use of manganese sulfate and different sources of nitrogen and potash.

**Cucurbit Disease Investigations.** Studies of the epidemiology and control of downy mildew and anthracnose, the two most destructive diseases of cucurbits in South Carolina, have been continued.

Epidemiological studies have included observations upon varietal susceptibility and resistance and the correlation of disease development with cultural practices, crop development, and certain environmental factors.

Disease control has been sought for chiefly in the use of fungicidal dusts, in which several proprietary copper compounds compose the active ingredients. Although the season just past was not as favorable for the evaluation of these materials as was the season of 1938, due to an untimely drouth in June of this year, nevertheless satisfactory progress has been made. On the basis of the past three years' experience it now appears that definite recommendations to growers can be made.

In the laboratory phases of the work with fungicides, particular attention has been given to the selection of suitable diluents and supplements in order to improve spreading, adherence, and other desirable physical properties of the finished dusts. It is interesting to note that one of the principal ingredients of the recommended dusts is South Carolina kaolin.

**Insect Investigations.** Asparagus beetle—The development of the asparagus beetle population was observed throughout the season and
found to be unusually low except for the first two weeks. Dusting experiments have given encouraging results in their control. At least four basic insecticides and four carriers and stickers were used in 12 combinations. The native parasites and predators were observed attacking the larval stage and probably accounted for the greatly reduced population this season.

Cucumber beetle—The cucumber beetle gave little trouble during the past season. Dusting with three basic insecticides gave satisfactory control. At least one native parasite was observed attacking the adult beetle.

Pickle and melon worms—During the past cantaloupe and melon season, considerable attention was given to the pickle and melon worms which were unusually abundant this year. Control measures used thus far have not been generally effective against these insects, which menace late crops. Further work upon the evaluation of various insecticide combinations is under way upon a fall crop.

Cotton Boll Weevil—Due to a prolonged dry period during the last of June the boll weevil damage to cotton was slight. Three applications of sweetened poison (1-1-1 mixture) gave satisfactory control of the boll weevil early in the season. According to counts made of weevils and injured squares in all general plantings the average infestation was about five percent. Final counts from experimental plots have not yet been computed.

Corn budworm—Eleven plantings of corn were made on bottom land at weekly intervals, beginning March 16 and continuing through May, to determine the period at which corn should be planted to escape severe budworm injury. For bottom land, corn planted between April 26 and May 20 had less budworm injury.

Sweet potato experiments. In 1937 a number of hill selections were made in a field of Louisiana type Porto Rico sweet potatoes. This number has now been reduced to 15 strains which are being tested in replicated plots this year for yield, color, uniformity, and other desirable characteristics. Fertilizer and cultural tests as indicated below have been started with sweet potatoes.

Source and time of application of nitrogenous fertilizers; rate and analysis test of fertilizers; effect of minor plant food elements on potatoes; comparison of time of planting of sprouts and vine cuttings; effect of height of bed on potato yields; effect of width of row on potato yields; effect of side-dressing with sodium nitrate; comparison of heat from different sources in the curing and storage of sweet potatoes.