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FEBRUARY, 1912

**ALABAMA**  
**Agricultural Experiment Station**

OF THE

**Alabama Polytechnic Institute**

**AUBURN**

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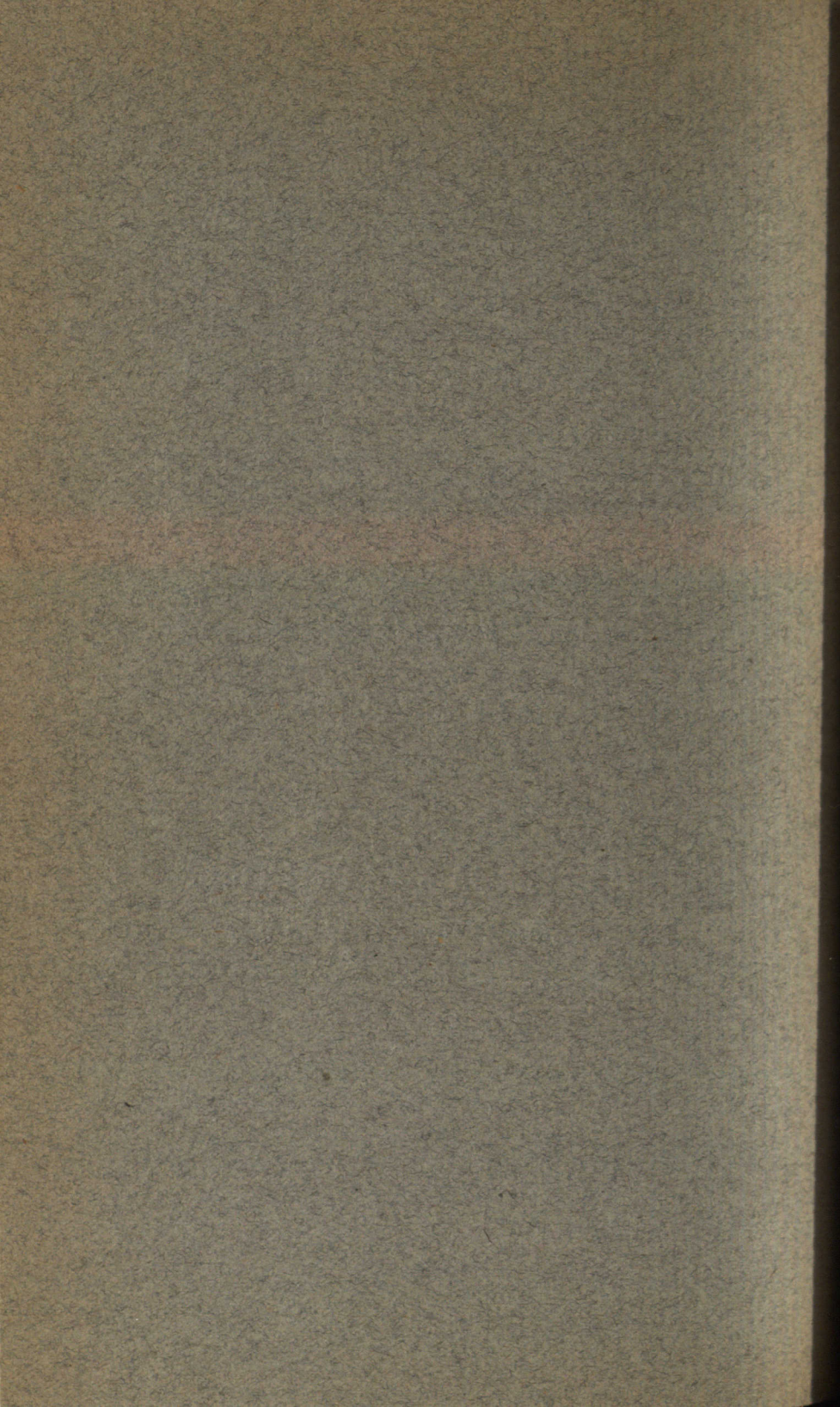
**Annual Report of the Director of the Ex-  
periment Station on Work Done under  
the Local Experiment Law in 1911**

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BY  
**J. F. DUGGAR**  
Director

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Opelika, Ala.  
Post Publishing Company



Auburn, Ala., Feb. 28, 1912.

CAPT. R. F. KOLB,  
Commissioner of Agriculture and Industries,  
Montgomery, Ala,

Dear Sir: In accordance with Section 5 of the Local Experiment Law, requiring me, as Director of the Experiment Station of the Alabama Polytechnic Institute, to make a full and complete annual report through the Commissioner of Agriculture to the Governor of Alabama, I herewith hand you my report of work done under the Local Experiment Law in the calendar year 1911, with the request that you transmit this report to his Excellency, Governor Emmet A. O'Neal.

Yours very truly,  
(Signed): J. F. DUGGAR,  
Director Experiment Station of the  
Alabama Polytechnic Institute.

STAFF OF SPECIALISTS ENGAGED IN WORK  
UNDER THE LOCAL EXPERIMENT LAW.

**J. F. Duggar, Director.**

**Agriculture, Plant Breeding and Farm Machinery.**

\*J. F. Duggar, in charge.

- \*E. F. Cauthen.....Associate Agriculturist
- \*M. J. Funchess.....Assistant Agriculturist
- J. T. Williamson.....Field Agent in Agriculture
- L. L. Glover.....Field Agent in Agriculture
- \*E. Hodson.....Assistant in Agriculture
- \*L. T. Rhodes.....Acting Field Agent

**Livestock and Poultry Investigations.**

\*D. T. Gray, in charge.

- \*\*W. F. Ward.....Junior Animal Husbandman
- \*L. W. Shook.....Assistant in Animal Industry
- E. R. Eudaly.....Assistant in Beef and Swine Industry
- \*\*S. S. Jerdan.....Assistant in Beef Industry
- A. R. Gissendanner.....Assistant in Swine Husbandry
- \*C. D. Allis.....Assistant in Poultry

**Entomology.**

\*W. E. Hinds, in charge.

- I. W. Carpenter.....Field Assistant

**Horticultural Investigations.**

\*F. F. Williams, in charge.

- H. M. Conolly.....Field Assistant in Horticulture
- \*J. C. C. Price.....Assistant in Horticulture

**Agricultural Extension.**

\*\*L. N. Duncan, in charge.

- \*\*J. B. Hobdy.....Assistant in Extension Work
- \*\*S. I. Bechdel.....Dairy Extension
- Miss D. E. Stroud.....Assistant in Extension

**Plant Diseases.**

F. A. Wolf, in charge.

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\*Devoting only part of time to Local Experiment work.

\*\*In co-operation with United States Department of Agriculture.

## REPORT OF WORK DONE DURING 1911 UNDER THE LOCAL EXPERIMENT LAW.

(APPROVED FEBRUARY, 1911.)

In February, 1911, the Legislature of Alabama passed a bill introduced by Mr. W. W. Lavender in the House, and by Judge S. H. Sprott in the Senate, appropriating funds to the Experiment Station of the Alabama Polytechnic Institute with which to conduct experiments and to carry on extension work in the different counties of Alabama. This bill, approved by Gov. E. A. O'Neal February, 1911, made the following annual appropriations:

For local fertilizer experiments in the several counties and for the investigation and introduction of new or improved field crops and forage plants.....	\$7,000.00
For combatting the cotton boll weevil and other injurious insects..	2,300.00
For plant breeding of field and forage crops.....	1,200.00
For work in drainage, irrigation and farm machinery.....	1,500.00
For publication and administrative expenses, etc. ....	2,500.00
For horticultural investigations.....	2,000.00
For livestock investigations.....	3,500.00
For investigations of diseases of cotton and other plants.....	1,000.00
For promoting the poultry industry.....	1,000.00
For agricultural extension.....	5,000.00

It is in accordance with the following provision of this bill that this report is made:

' "Section 5. That by or before March 1 of each year the Director of the said Experiment Station shall make a full and complete report, through the Commissioner of Agriculture, to the Governor of Alabama, on the work of the previous year in execution of this Act."

The funds which constitute the nucleus for the work of the Experiment Stations in every state are provided by Congress. Most states have for many years supplemented such support by appropriations from the State Treasury, but not until 1911 had any state appropriations ever been made for the support or equipment of the Alabama Experiment Station at Auburn.

The funds received from the National Government are subject to strict limitations and the Federal officials supervising expenditures under those funds do not permit them to be used for popular experiments nor for other publications than those giving the results of original investigations. Hence, there was urgent need in Alabama for supplementary State funds with which to broaden and popu-

larize the work of the Experiment Station at Auburn and to carry its experiments and teachings to the farms and farmers of every part of Alabama.

### Publications Under the Local Experiment Law.

Under the Local Experiment Law the Station is now able to publish an increased number of bulletins, circulars and brief articles, and may publish popular bulletins of a nature not heretofore possible, by reason of the limitations governing the Federal funds. The following is a list of publications made during the latter months of the calendar year 1911, under the provisions of this law:

- Bulletin No. 152:**—Self-Boiled Lime Sulfur and Its Use; by the Horticulturist and the Assistant Horticulturist.
- Bulletin No. 155:**—The Pecan in Alabama; by the Horticulturist.
- Bulletin No. 157:**—The Satsuma Orange; by the Horticulturist.
- Bulletin No. 158:**—Feeding Calves in Alabama; by the Animal Husbandman and his assistant.
- Bulletin No. 159:**—Heading Off the Boll Weevil Panic; by the Entomologist.
- Bulletin No. 160:**—Local Fertilizer Experiments With Cotton in South Alabama in 1911; by the Director and Assistants.
- Bulletin No. 161:**—Lime for Alabama Soils; by the Director and Assistant Agriculturist.
- Circular No. 9:**—The Relation of the County Superintendent of Education to the Boys' Corn Club Work. How to Organize a Club; by the Superintendent of Extension Work.
- Circular No. 10:**—Fighting the Cotton Worm; by the Entomologist.
- Circular No. 11:**—The Relation of the Teacher to the Boys' Corn Club Work; by the Superintendent and Assistant in Extension Work.
- Circular No. 12:**—How to Organize and conduct a Girl's Canning Club; by the Assistant in Extension Work.
- Circular No. 13:**—School Gardening; by the Botanist and the Superintendent of Extension Work.
- Press Bulletin No. 44:**—Protect Your Peaches from Plum Curculio and Brown Rot; by the Entomologist.
- Press Bulletin No. 45:**—Look Out for the Cotton Worm; by the Entomologist.
- Press Bulletin No. 46:**—Cotton Worms Increasing; by the Entomologist.
- Press Bulletin No. 47:**—Cotton Worms of Second Crop Soon Due; by the Entomologist.
- Press Bulletin No. 48:**—Cotton Worm Damage in Alabama; by the Entomologist.
- Press Bulletin No. 49:**—The Boll Weevil is Spreading Fast. Look Out for it; by the Entomologist.

**Press Bulletin No. 50:**—Announcement of Boll Weevil Line and Quarantine Rules Applying to Alabama; by the Entomologist.

**Press Bulletin No. 51:**—Notice Relative to Shipments of Articles Quarantined Against on Account of the Boll Weevil; by the Entomologist.

**Press Bulletin No. 52:**—Tests of Varieties of Cotton in 1911; by the Director and the Associate Agriculturist.

### Organizing the Work.

The execution of the various projects of the law was assigned to the following officers of the Alabama Experiment Station.

To the Director the matter of publications and administration.

To the Agriculturist, J. F. Duggar, charge of all the work with field and forage crops, including breeding, and also supervision of the work in drainage, irrigation and farm machinery.

To the Entomologist, Dr. W. E. Hinds, was assigned all matters connected with the cotton boll weevil and the other injurious insects.

To the Horticulturist, Professor P. F. Williams, was entrusted the supervision of all horticultural investigations.

To the chief of the Department of Animal Industry, Prof. D. T. Gray, was assigned livestock investigations and the work in promoting the poultry industry.

To the Plant Pathologist, Dr. F. A. Wolf, falls the work with diseases of cotton and other plants, and to the Superintendent of Extension work, Prof. L. N. Duncan, is entrusted the activities of the Station under this bill for agricultural extension work.

In order to secure the services of the most efficient assistants it was not possible in most departments to fully organize the work until the summer of 1911, and the work in plant pathology could not be begun until November. Under a resolution of the Board of Trustees of the Alabama Polytechnic Institute it is required that all work under the Local Experiment Law be submitted in the form of "project statements" and approved by the Director of the Experiment Station.

"Heads of each department will file in Director's office for each separate line of proposed work written "project statements" of the form usually employed in other Stations, outlining proposed experiments, surveys, or other activities, including estimated annual cost of each, and counties where the

work will probably be done; and on approval of these plans, or detailed "project statements", each head of a department is authorized to spend amounts not exceeding the monthly pro rata share of the funds provided under this law for the support of the particular work assigned to his department."

Under the provisions of this law it has become possible for a number of assistants to be added to the staff, namely:

Three in agriculture, drainage and farm machinery.

Five in animal industry.

Two in extension.

One in horticulture.

One in entomology.

By the employment of these new men it is now possible for the several departments of the Experiment Station to conduct their experiments or carry their teachings to the farmers of every part of Alabama. In addition to the new assistants giving their whole time to the Local Experiment work, certain other members of the staff of the Experiment Station devote a small part of their time to directing these new lines of work.

### Work With Injurious Insects.

It is fortunate for Alabama that the appropriation for local experimental work was made a few months before the widespread invasion of the State for the first time in years by the cotton caterpillar. By reason of the small fund placed at the disposal of the Entomologist of the Alabama Experiment Station, Dr. W. E. Hinds, he was able to take steps which resulted in the much more general use of poison than would otherwise have been possible and to give personal advice to many farmers and to issue several publications pointing out the best methods of combatting this serious insect pest. This department has also been kept very actively employed in matters connected with the maintenance of the quarantine of parts of the State against the parts already infested with the cotton boll weevil.

Reference to the list of publications on a preceding page shows that during the year the Department of Entomology of this Station issued seven press bulletins, one circular, and one bulletin, none of which popular pamphlets would have been published under the National appropriation for this Station.

### Agricultural Extension.

In agricultural extension work it seemed best to join forces with the farm demonstration work of the United



States Department of Agriculture, which was already engaged in organizing corn clubs, tomato clubs, etc., in Alabama. By this combination of forces it has been possible to carry the work into a much larger number of counties and to employ several additional experts, including a lady who devotes her time to the promotion of tomato clubs and the encouragement of the home canning of vegetables, as well as assisting girls in other lines of industrial effort.

#### **Livestock Investigations and Poultry Industry.**

From the nature of the work of feeding and rearing livestock it was necessary for the work of this department to be concentrated on a limited number of farms. The Animal Industry Department now has local experiment work in animal industry and poultry husbandry under way in eight counties, including co-operative work with four of the agricultural schools. In addition some more general work is being done in other localities for the promotion of the poultry industry, especially in the matter of improving conditions for the profitable marketing of poultry and poultry products.

#### **Horticultural Investigations.**

Before making any experiments in horticulture it seemed advisable to make a general examination of conditions throughout Alabama with reference to horticultural possibilities. Hence, the activities of Prof. P. F. Williams, head of the department, Mr. H. M. Conolly, Field Assistant, and Mr. J. C. C. Price, who is paid from this fund for only a small part of his time, have devoted themselves to the collection of information which would be needed in the experimental work in horticulture in 1912. In addition they have disseminated much horticultural information through letters and circulars.

#### **Fertilizer Experiments and Other Experiments With Field and Forage Crops.**

My correspondence indicates that the question to which the average farmer is seeking the most immediate answer is how to fertilize cotton on the various soils of Alabama. This problem was therefore made the leading line of work in 1911. To throw light on this matter provision was made for more than 130 fertilizer experiments with cotton. In order to make the results as widely applicable as possible, one or more of these was located in each county. The results are in part published in Bulletin No. 160 and 162 of

this Station. It will require the repetition of each experiment for several years under similar conditions before conclusions can be drawn as to the best fertilizer for each soil; however, even the results of the first year's tests are helpful and capable of adding greatly to the farmers' profits in 1912 and thereafter by suggesting the most profitable combination of fertilizer for many soils.

Smaller numbers of fertilizer experiments were made with corn, sweet potatoes, peanuts, and sugar cane.

In order to show the value of some of the best varieties of corn, cotton, and cowpeas, variety tests of these crops were arranged in all sections of the State.

The following is a list of the local experiments, that is, experiments made elsewhere than at Auburn, undertaken in the agricultural department during the ten months between March 1 and December 31, 1911:

- Regular fertilizer experiments with cotton.
- Complete nitrate of soda experiments with cotton.
- Special phosphate experiments with cotton.
- Special nitrate experiments with cotton.
- Cotton variety tests, extensive.
- Cotton variety tests, extensive,—wilt resistant kinds.
- Cotton variety tests, short.
- Cotton variety tests, short.—wilt resistant kinds.
- Cotton isolation tests (plant breeding).
- Regular fertilizer experiments with corn.
- Complete nitrate experiments with corn.
- Corn, variety tests, extensive.
- Corn, short variety tests, soft varieties.
- Corn, short variety tests, hard varieties.
- Corn breeding, ear-to-row test.
- Corn, isolation tests (plant breeding).
- Special nitrate experiments with oats.
- Cowpea variety tests, extensive.
- Cowpea variety tests, short.
- Regular fertilizer experiments with peanuts.
- Peanut, variety tests, extensive.
- Regular fertilizer experiment with sugar cane.
- Special fertilizer experiment with sugar cane.
- Nitrate of soda experiment with sugar cane.
- Regular fertilizer experiments with sweet potatoes.
- Sweet potato, variety tests.
- Sweet potato, isolation tests.
- Soy bean tests.
- Lime experiments (various crops).
- Wheat experiments.

Lyon bean and velvet bean experiments.  
 Johnson grass fertilizer experiments.  
 Winter forage crop tests, extensive.  
 Bur clover test.  
 Vetches.  
 Forage crops, miscellaneous (clovers, etc.)

### **Drainage and Farm Machinery and Plant Breeding of Field Crops.**

Local drainage investigations were begun in the summer of 1911 in co-operation with the Drainage Division of the Office of Experiment Stations, United States Department of Agriculture. The first points investigated are the numerous problems arising in connection with the application of tile drainage to the stiff lime or so-called prairie soils of central Alabama. Provision has been made for the experimental drainage of five small fields and the work on most of those was nearly completed before the end of the calendar year. The experiments are so arranged as to determine the best depth and distance for tiles on this character of land and to throw light on other drainage problems. The work thus inaugurated should continue to give instructive results for a number of years. It is planned that the next experiments in tile drainage shall be on a different type of land so that as results on the several types of soils become available we shall be able to answer the questions that arise in connection with tile drainage on different characters of land. The farms on which the drainage experiments have been begun are the following:

W. E. Elsberry, Montgomeay, Ala.  
 Dr. Frank McLean's Estate, McGehees, Ala.  
 M. F. Smith, Marion Junction, Ala.  
 J. T. Adams, Pineapple, Ala.  
 R. G. Ennis, Livingston, Ala.

In farm machinery a beginning was made in testing machines for the sowing of oats by the open furrow method.

In plant breeding the principal work done consisted in testing out in numerous localities, varieties and strains which had been selected or bred at Auburn in previous years.

### **Financial.**

The fact that a considerable balance is carried over, as permitted by law, is due to the fact that the expenditures under the law in 1911 were for only a fraction of a year.

This balance will be needed to carry on as planned the full year's work in 1912.

The report of the treasurer is attached. Reports are also attached from the heads of the departments of Entomology, Animal Industry, Horticulture, Agricultural Extension, and Plant Pathology.

Respectfully submitted,  
(Signed) J. F. DUGGAR,  
Director of the Experiment Station of the  
Alabama Polytechnic Institute.

TREASURER'S REPORT, LOCAL EXPERIMENT FUND,  
FOR THE YEAR 1911.

RECEIPTS

To cash from State .....	\$27,000.00	
To cash from Animal Industry .....	99.63	<u>\$27,099.63</u>

DISBURSEMENTS

By Departments —		
Amount paid Agriculture .....	\$ 6,710.71	
“ “ Horticulture .....	1,452.53	
“ “ Animal Industry .....	3,490.00	
“ “ Publication and administration .....	2,615.57	
“ “ Extension .....	3,356.21	
“ “ Entomology .....	1,886.72	
“ “ Plant Pathology .....	30.21	
“ “ Drainage .....	846.00	
“ “ Plant breeding .....	233.32	
“ “ Library .....	5.50	
By balance carried to 1912 .....	<u>6,472.86</u>	<u>\$27,099.63</u>

Respectfully,  
(Signed): M. A. GLENN, Treasurer.

State of Alabama:

Lee County.

Personally appeared before me, Welborn Jones, a Notary Public in and for said county, M. A. Glenn, known to me as Treasurer of the Alabama Polytechnic Institute, who being duly sworn, deposes and says that the above foregoing account is true and correct. Witness my hand this 27th day of February, 1912.

(Signed): WELBORN JONES,  
Notary Public, Lee County.

## ENTOMOLOGY

Auburn, Ala., Feb. 6, 1912.

Prof. J. F. Duggar,  
Auburn, Ala.

Dear Sir: Under the Local Experiment Law passed by the Alabama Legislature of 1911, the Department of Entomology received an allotment of \$2,300.

This appropriation gave us the first opportunity that we have had for extending the scope of the entomological work done by this department beyond that of investigations authorized under Federal funds. In accordance with the Local Experiment act, we planned for a considerable extension of the correspondence work of the department in order to extend the information available as to insect control so as to make it directly valuable to the planters of Alabama. Accordingly during the past year the entomological correspondence has greatly increased, requiring more than 2,200 special replies, not including circular letters, etc., of which a large number have been issued.

Realizing that the fund available would be inadequate to maintain a special field assistant during the entire year and barely enough to meet the imperative work which the advent of the boll weevil would necessitate, we did not attempt to add a new man to the entomological force until the latter half of 1911. Mr. I. W. Carpenter was then engaged as Field Assistant, serving until the first of January, 1912.

No strictly experimental work could be undertaken because of the limit of funds, which it was thought could be used to more general advantage in other ways. The work done under the fund has been in connection with two species of insects particularly.

First, late in July, 1911, it became evident that an extensive and serious outbreak of the cotton worm, *Alabama argillacea*, was impending and prompt action was required to spread warning of the danger and information as to the most practicable methods of control. Practically the entire time of the Entomologist for nearly two months was occupied in meeting the emergency. In connection with the campaign we published Press Bulletins Nos. 45, 46, 47, 48, and Circular No. 10.

Many meetings of farmers were addressed especially during August, from one to four per day, and practically all parts of the State were aroused for the fight. Arrangement was made with the manufacturers so that practically the entire available supply of poison in the eastern United

States was shipped into Alabama and was held in readiness for quick delivery. The urgency of the situation appears when it is considered that literally hundreds of tons of arsenical poisons were moved by express in Alabama during a period of less than six weeks. Probably more than a million pounds of poison was distributed for the cotton worm fight east of the Mississippi river. Nothing like this has ever occurred elsewhere within a similarly short period of time. In spite of all that could be done many planters lost heavily by the work of the worms, which from careful field examinations appear to have decreased Alabama's cotton crop for 1911 by an average approximately 19 per cent. This is true in spite of the fact that a record breaking crop was still secured.

When the Mexican cotton boll weevil, *Anthonomus grandis*, began to advance in August and September, 1911, it became necessary to keep a man in the field most of the time in order to establish the quarantine line which had to be moved from time to time as the weevil moved forward. From one to three members of the department were engaged in this work, particularly in October and November.

The weevil line for 1911 in Alabama was definitely established about the middle of November and has been shown in Bulletin No. 159, published the latter part of December, 1911. This bulletin entitled "Heading Off Boll Weevil Panic" has been in large demand and the edition was immediately exhausted. I would recommend an early re-print of this bulletin so that it may be sent to those requesting it.

I feel that we shall be much handicapped before the end of 1912 for lack of funds with which to carry on these and other lines of work that are certain to develop. We desire to undertake demonstration work in insect control for the benefit of orchardists and planters of our most important crops. We cannot, however, go far in this work unless the balance of the fund provided for in the act of 1911 may become available during 1912. The boll weevil work in 1912 is very certain to call for more extensive travel than it did in 1911, as the infested area increases. I would respectfully recommend that an effort be made to secure the immediate availability of the balance of the entomological fund as contemplated in the act.

Respectfully submitted,  
(Signed) W. E. HINDS, Entomologist.

## LIVESTOCK AND POULTRY

Auburn, Ala., Jan. 30, 1912.

Professor J. F. Duggar, Director,  
Alabama Experiment Station,  
Auburn, Alabama.

Dear Sir:—

1. The following men were connected with the work during 1911:

- Dan T. Gray, part salary from Local fund.
- W. F. Ward, salary from Federal Government
- L. W. Shook, full salary from Local fund.
- E. R. Eudaly, part salary from Local fund.
- S. S. Jerdan, salary from Federal Government.
- A. R. Gissendanner, full salary from Local fund.
- C. D. Allis, full salary from Local fund.

2. The following work was undertaken:

A.—(a) Fattening calves in the winter months on the following feeds:

Lot 1—Cottonseed meal.

Cottonseed hulls.

Alfalfa hay.

Lot 2—Cottonseed meal  $\frac{2}{3}$

Corn-and-cob meal  $\frac{1}{3}$ .

Cottonseed hulls.

Alfalfa hay.

Lot 3—Cottonseed meal  $\frac{1}{3}$ .

Corn-and-cob meal  $\frac{2}{3}$ .

Cottonseed hulls.

Alfalfa hay.

These cattle were sold in March, 1911, at Cincinnati; reasonable profits were made on each lot, but the greatest profit was secured on the calves in Lot 2, where one-third of the concentrated part of the ration was composed of corn-and-cob meal. Owing to the fact that the result of the work is now ready to be issued as Station and Government Bulletins it is not necessary to go into extended detail.

B. Fattening calves during the winter months on cottonseed meal, cottonseed hulls, and peavine hay. Fifty-two calves were used in this test. The work was done in co-operation with Mr. Allison, of Sumter county, and the Bureau of Animal Industry, of Washington. These calves netted a clean profit of \$3.50 each when they were sold in

March, 1911, at New Orleans. The results of this work are also ready for publication, and are now in the hands of the printer.

C. Fattening steers on Pasture. This work was done in co-operation with O. E. Cobb, of Sumter county, and the Bureau of Animal Industry. Seventy-five head of steers, divided into three lots, were fattened. The lots were fed the following rations:

Lot 1—Pasture alone.

Lot 2—Pasture plus cottonseed cake.

Lot 3—Pasture plus cottonseed cake (early finish).

These cattle were sold in August, 1911, and excellent profits obtained. This work, in fact, is also ready for publication, and will be put in the hands of the printer within a few days.

D. Determining the cost and best methods of raising and fattening hogs in the western part of the State. This work is being done in co-operation with Mr. Allison, of Sumter county, and the Bureau of Animal Industry at Washington. The object of the test is to determine the best methods of raising and fattening hogs in the western part of the State. In doing this complete records are kept; the cost of every crop is recorded, and every pound of grain the hogs consume is also determined. The work has now been in progress for almost two years, as the test was inaugurated in April, 1910. A profit of almost \$300.00 was secured the first year (April to April). There is no reason why a greater profit should not be secured this year. At this date, however, we are not in position to render a statement. From 20 to 30 sows, together with the pigs, are in the test.

E. Determining the cost and best methods of raising and fattening hogs in the southeastern part of the State. This was inaugurated September 1, 1911, in co-operation with Dr. J. F. Yarbrough of Columbia, Ala. Dr. Yarbrough has a good and typical farm 6 miles from Columbia. The farm is now divided into several parts with good hog fencing, and is ready for the experimental work. The object is to use good sows and grade up on them with pure Berkshire boars, keeping all of the items of expense as the work progresses. Complete cost of feeds, making the crops, etc., are kept by a trained man. The aim is to work up to about 20 sows. A good permanent pasture of Bermuda is now established, and the two main temporary crops, for a while at least, will be rape and peanuts.



F. Work With District Agricultural Schools. It was thought that it would be a wise thing to do some experimental work along livestock lines in co-operation with some of the District Agricultural Schools. Sufficient funds were not available to enable us to work with all of these schools, so only four, one in each corner of the State, were finally selected. In this co-operation the Alabama Experiment Station bears practically all of the expense, while the authorities of the various district schools look after the details of carrying through the tests. The following work was done or is being done with these schools:

(a) Hamilton School.

Twenty hogs, divided into four lots of five each, were used in this test. They were fed as follows:

Lot 1—Corn  $\frac{9}{10}$ .

Tankage  $\frac{1}{10}$ .

Lot 4—Cowpea pasture.

Corn  $\frac{9}{10}$ ,  
Tankage  $\frac{9}{10}$  , }  $\frac{1}{2}$  ration.

Lot 3—Cowpea pasture.

Corn  $\frac{3}{5}$ ,  
Shorts  $\frac{1}{5}$ , }  $\frac{1}{2}$  ration.

Lot 4—Cowpea pasture.

Corn.  $\frac{1}{2}$  ration.

The average daily gains were .54, .97, .94, and .90 of a pound in lots 1, 2, 3 and 4, respectively. It required 540, 159, 187 and 174 pounds of grain to make 100 pounds of gain in live weight in the four lots, respectively. In terms of grain, it cost \$7.16, \$2.10, \$2.43 and \$2.28 to make 100 pounds of gain in Lots 1, 2, 3 and 4, respectively. Although the cowpea crop was a poor one, on account of extremely dry weather, the result was satisfactory. During 1912 the hog work at this school will be very materially enlarged.

(b) Jackson school.

At this school 12 head, divided into three lots, were employed. The following feeds were tested:

Lot 1—Corn  $\frac{9}{10}$ .

Tankage  $\frac{1}{10}$ .

Lot 2—Rice polish  $\frac{9}{10}$ .

Tankage  $\frac{1}{10}$ .

Lot 3—Corn and Cowpeas "hogged off."

The average daily gains in this lot were .94, .90, and 1.08 in Lots 1, 2 and 3, respectively. It required 363 and 367 pounds of concentrates to make 100 pounds of gain in Lots 1 and 2 respectively. When corn is valued at .70 cents a

bushel, rice polish at \$30.00 a ton, and the pasture at \$8.00 an acre, it cost \$5.01, \$5.91 and \$3.84 to make 100 pounds of gain in Lots 1, 2 and 3, respectively.

At this school the work will be enlarged and uplifted during 1912.

(c) Albertville School. Here 15 hogs, divided into three equal lots, were fed. The following rations were used:

- Lot 1—Corn  $\frac{2}{3}$ .  
Shorts  $\frac{1}{3}$ .
- Lot 2—Corn  $\frac{2}{3}$ .  
Shorts  $\frac{1}{3}$ . }  $\frac{1}{2}$  ration.  
Soy bean pasture.
- Lot 3—Corn  $\frac{2}{3}$ .  
Shorts  $\frac{1}{3}$ . }  $\frac{1}{2}$  ration.  
Cowpea pasture.

Average daily gains of .70, .81 and .95 of a pound were secured, in Lots 1, 2 and 3, respectively. To make 100 pounds of gain it required 444, 201 and 171 pounds of concentrates in Lots 1, 2 and 3, respectively. The dry weather very materially reduced the yield of the field crops, especially the cowpeas, so when they are charged against the gains at the rate of \$8.00 an acre the pasture lots show to a disadvantage. When corn is valued at 70 cents a bushel, shorts at \$30.00 a ton, and pasture at \$8.00 an acre, it would cost \$5.01, \$8.02 and \$10.92 to make 100 pounds of increase in live weight in Lots 1, 2 and 3, respectively.

(d) Abbeville School. At this school 15 hogs, divided into three equal lots, were fed. They were fed the following rations:

- Lot 1—Corn  $\frac{9}{10}$ .  
Tankage  $\frac{1}{10}$ .
- Lot 2—Corn  $\frac{9}{10}$ .  
Tankage  $\frac{1}{10}$ . }  $\frac{1}{2}$  ration.  
Cowpea pasture.
- Lot 3—Corn  $\frac{9}{10}$ .  
Tankage  $\frac{1}{10}$ . }  $\frac{1}{2}$  ration.  
Velvet bean pasture.

These pigs made an average daily gain of .69, .76, and 1.15 pounds in Lots 1, 2 and 3, respectively. It required 437, 208 and 139 pounds of concentrates to make 100 pounds of increase in live weight in the three lots in their respective order. When the feeds are valued as indicated above it cost \$5.78, \$6.13 and \$4.55 to make 100 pounds of gain in Lots 1, 2 and 3, respectively. The crops were both poor ones on account of the weather.

G. Poultry Work. The poultry work is planned to un-

dertake two lines of work. It was thought that it would be well to gather some accurate information relative to the best methods and cost of raising chickens and feeding hens for eggs. To do this a co-operative piece of work was undertaken with C. D. Allis, of Pinson, Ala. This feature of the work was inaugurated June 1, 1911. Mr. Allis at that time was just starting in the poultry business. His houses were not then completely finished. The work with Mr. Allis is divided into two parts.

(a) A complete record of his whole flock is kept. This record includes the feed, deaths, hatching, sales, etc. As a result of keeping this complete record for a series of years it will be possible to accurately determine the profits, if any, in the poultry business.

(b) Dry lot feeding vs. pasture feeding for egg production. It is expected that many different crops will be tested before this line of work is finished. This winter there are 112 hens, divided into four lots, being carried in a test of this kind. The rations are as follows:

Lot 1—Dry feed alone.

Lot 2—Dry feed and green cut bone.

Lot 3—Dry feed and crimson clover pasture.

Lot 4—Dry feed and rye pasture. This work has not continued for a sufficient number of days to warrant a discussion of conclusions.

The second line of poultry work consists in trying to get farmers to organize themselves into Egg Marketing Associations. The farmers are slow about taking hold of a project of this kind, but we have finally induced thirteen farmers in Cullman county to agree to organize themselves into such an association. After this line of work is once started it is believed that our farmers will take it up all over the State. This is new to them and it is a difficult proposition to get them to see that any good can come of it.

It is hoped that the department will have sufficient funds to inaugurate the mule breeding work within the next two or three months. If this can be started it will be done in co-operation with J. G. Street, of Mumford, Ala.

I cannot conclude this report without calling the attention of the authorities to the efficient work and loyal support of all of those who have been connected with the work. I regret to announce that Mr. Ward is no longer connected with this work; he having accepted a lucrative commercial position.

Very respectfully submitted,  
(Signed): DAN T. GRAY,  
Animal Husbandman.

## HORTICULTURE

Auburn, Ala., Feb. 1, 1912.

Professor J. F. Duggar, Director,  
Alabama Experiment Station,  
Auburn, Ala.

Dear Sir: I respectfully submit the following report of the work done and under way in my department under the Local Experiment Fund for the year ending January 1, 1912.

Mr. H. M. Conolly, a graduate of the Michigan Agricultural College, took up his work in connection with the Local Experiments July 1, 1911.

Mr. J. C. Price, Assistant Horticulturist, has taken an active part in connection with the above work. He has collected much valuable data and attended many institutes. He had charge of a co-operative fertilizer and variety test of Irish potatoes at Opelika on land owned by Mr. S. M. Puckett. Eight varieties of potatoes were used which follow: Irish Cobbler, Beauty of Hebron, Bliss Triumph, Bovee, Ohio, Early Ohio, Peerless and Burbank. A comparative test was made with fertilizers in the following way:

Acid Phosphate vs. Thomas Phosphate for their relative value as a source of phosphoric acid.

Cotton seed meal vs. sulphate of ammonia for their relative value as a source of nitrogen.

Kainit, sulphate of potash and cotton seed meal for the relative value of each as a source of potash.

Spraying operations were conducted for controlling blight and potato beetles in conjunction with the above. The above tests will be continued another season to check some very interesting facts already evidenced. Mr. Price inserted 320 separate apple grafts, consisting of 17 promising varieties in an old orchard in Montgomery county and this work will be enlarged this coming spring. There are hundreds of trees bearing worthless fruit which should be worked over in this way, especially those on roots which have resisted Woolly Aphis.

A considerable part of Mr. Conolly's time has been spent making a careful survey of the horticultural conditions of the State, studying the present conditions, collecting such data as will materially assist the department in carrying out the present system of co-operative experimental and demonstrational work. On this survey 4,700 miles have been traveled by rail and over 1,000 miles by other means. Twenty-four counties have been visited at 56 different places and these counties follow: Baldwin, Barbour, Chilton,

Clay, Cullman, Dallas, Escambia, Fayette, Jefferson, Lee, Madison, Marengo, Montgomery, Mobile, Morgan, Pike, Russell, Sumter, Walker and Washington. In these counties the principal fruit and vegetable growing districts have been visited and notes made on the crops grown, varieties, methods of culture, time of planting, time of harvesting, yields, cost of production, etc.

Photographs have been taken showing the different phases of the above work, which will be used from time to time in publication.

Mr. Conolly attended several fairs this last fall and in this way acquainted himself with the leading growers and with the products of the respective counties in which these fairs were held and this aided materially in locating many of our co-operative experiments.

The State has been divided into six horticultural districts and a list of the varieties of fruits and vegetables found to be adapted to each district has been prepared.

We have given several demonstration lectures on "The Home Canning of Vegetables" in conjunction with the work being done by Professor Duncan with the Girls' Tomato Clubs.

Several planting plans have been completed for the improvement of high school grounds and many are under way. This phase of our work has heretofore been greatly handicapped by lack of facilities and sufficient time to devote to it. I know of no other form of extension work which will do more immediate good to the schools of the State than this and I hope that funds of sufficient amount can be secured eventually for this.

Many circulars, giving information on the growing of various vegetables have been written, and most of these have been enlarged and will appear in Circular No. 14 of this Station. This circular will be available by February of the coming year.

Bulletin No. 155 on Pecans has had a very general distribution and the demand for this will undoubtedly require a reprint in the very near future.

Bulletin No. 157 on the Satsuma Orange was prepared more especially for the people of the Gulf counties and to supply the demand for information concerning this orange from the hundreds of new settlers in that section. Owing to the rapid development of the planting of this orange much attention must necessarily be given to the control of insect and fungus pests which will increase proportionately

to the increase in plantings. These ravages could be checked without much difficulty if all growers would spray at the proper time, but as in other fruit industry, there are always those who will neglect to properly care for their trees, and this affects the whole section.

In view of the above situation Dr. Hinds of the Department of Entomology and myself have arranged to work together in demonstrating to the growers the best method of insect and fungus control. For the coming year we have arranged with ten different growers to carry on variety tests with one or more of the following vegetables: Irish Potatoes, Onions, Canteloupes, Cabbage, Tomatoes, Beans, Peas, Sweet Corn and Strawberries. In addition to this four different growers will carry on fertilizer tests. Two acre fertilizer and variety tests combined have been inaugurated with the Tennessee Coal and Iron Company at Bessemer, in Jefferson county and a duplicate of this experiment is under way at Marbury in Autauga county.

We will co-operate with several growers in pruning, spraying, and fertilizing orchards. Orchard heating will also be tested in North Alabama for frost protection. Heaters have already been placed in two localities. Considerable work will be done in top-working pecans. Two parties have been secured who will set out fruit orchards in the "Black Belt," and Central Sandy Districts respectively. Small fruits will be tested in Sumter county.

It will be rather difficult to give sufficient time to all of the above operations with the limited help and funds at our disposal, but I feel that the work will develop and stimulate interest in fruit and vegetable growing and be of material benefit over a considerable part of the State.

Yours very respectfully,  
(Signed): P. F. WILLIAMS, Horticulturist.

## EXTENSION

Auburn, Ala.

Professor J. F. Duggar, Director,  
Alabama Experiment Station,  
Auburn, Ala.

Dear Sir: The Extension Department is doing work along the following lines:

1. Boys' Corn Club (Duncan and Hobdy).
2. Girls' Canning Clubs (Duncan, Hobdy and Miss Stroud).
2. Dairy Field Investigation Work (Bechdel).
4. Work of a general nature, circular letters, personal letters, pamphlets, farmers' meetings and so on.

Boys' Corn Clubs have been organized for 1912 as follows:

County.	Number of Boys.
Autauga	50
Baldwin	81
Barbour	56
Bibb	98
Blount	72
Bullock	79
Butler	34
Calhoun	56
Chambers	54
Cherokee	29
Chilton	138
Choctaw	23
Clarke	68
Clay	85
Cleburne	83
Coffee	283
Colbert	70
Conecuh	72
Coosa	101
Covington	91
Crenshaw	158
Cullman	108
Dale	174
Dallas	12
DeKalb	179
Elmore	76
Escambia	43
Etowah	113
Fayette	117
Franklin	102
Geneva	124
Greene	40
Hale	2

Henry .....	24
Houston .....	111
Jackson .....	60
Jefferson .....	65
Lamar .....	71
Lauderdale .....	27
Lawrence .....	208
Lee .....	74
Limestone .....	30
Lowndes .....	88
Macon .....	24
Madison .....	40
Marengo .....	12
Marion .....	59
Marshall .....	436
Mobile .....	48
Monroe .....	87
Montgomery .....	55
Morgan .....	164
Perry .....	103
Pickens .....	68
Pike .....	234
Randolph .....	155
Russell .....	15
St. Clair .....	179
Shelby .....	22
Sumter .....	49
Talladega .....	213
Tallapoosa .....	128
Tuscaloosa .....	56
Walker .....	179
Washington .....	26
Wilcox .....	68
Winston .....	78
Total .....	6031

Girls' Canning Clubs have been organized for 1912 as follows:

County.	Number of Girls.
Baldwin .....	120
Bibb .....	78
Chilton .....	95
DeKalb .....	17
Franklin .....	81
Etowah .....	--
Houston .....	--
Lee .....	80
Lowndes .....	8
Marshall .....	215
Mobile .....	85
Morgan .....	83
Pike .....	5
Walker .....	158
Monroe .....	--
Miscellaneous .....	1026
Miscellaneous .....	257
Total .....	1283



The Dairy Extension Work consists in trying to improve conditions in dairying in all parts of the State in every way possible. Dairymen are aided in building model barns, silos and dairy houses, in the keeping of herd records, in breeding of stock, in compounding proper rations for animals, and in all other ways possible. Personal visits to dairy farmers are always made when it is deemed necessary. Demonstrations in butter making, in the separating and handling of milk and cream, and in the making of Babcock tests, are given at institutes, fairs, etc., and dairy meetings are held for the dairy farmers. These demonstrations and dairy meetings are a new feature in the extension work of this department and all indications are that the work is going to be of much value. A complete dairy demonstration equipment has been secured for the department.

Silos, model barns and keeping records are the three points emphasized to the greatest extent in this work. Circular letters giving information on silos, and silage, and urging farmers to build silos are sent out. When a man can be persuaded to keep records of his herd sheets are furnished him, he is taught how to properly make the Babcock test, and finally to keep the records in proper shape.

This record work is purely co-operative, in most cases the data of the different herds is secured for publication from the department in the form of a bulletin. The bulletin on silos and herd records work are of about equal importance at the present time. The former is the greatest factor available for solving our feed problem, while the latter is the only true way of eliminating the many unprofitable animals found in most herds.

In some sections of the State a great deal of progress has been made in improving conditions and considering the present great change that is taking place in the improvement in the conditions of agriculture generally, the work will no doubt make greater progress in the near future.

Respectfully submitted,

(Signed): L. N. DUNCAN,  
In Charge Extension Work.

## PLANT DISEASES

Auburn, Ala., Feb. 28, 1912.

Professor J. F. Duggar,  
Auburn, Ala.

Dear Sir: Since the work in Plant Pathology was not organized until November 1, 1911, no special report can be made of investigations on plant diseases. The time for the two months covered by this report has been spent in securing equipment, planning the work for the coming year, and becoming acquainted with some of the most important plant diseases of the State.

Respectfully submitted,

(Signed): F. A. WOLF,  
Plant Pathologist.