

CIRCULAR No. 34

FEBRUARY, 1916

ALABAMA
Agricultural Experiment Station

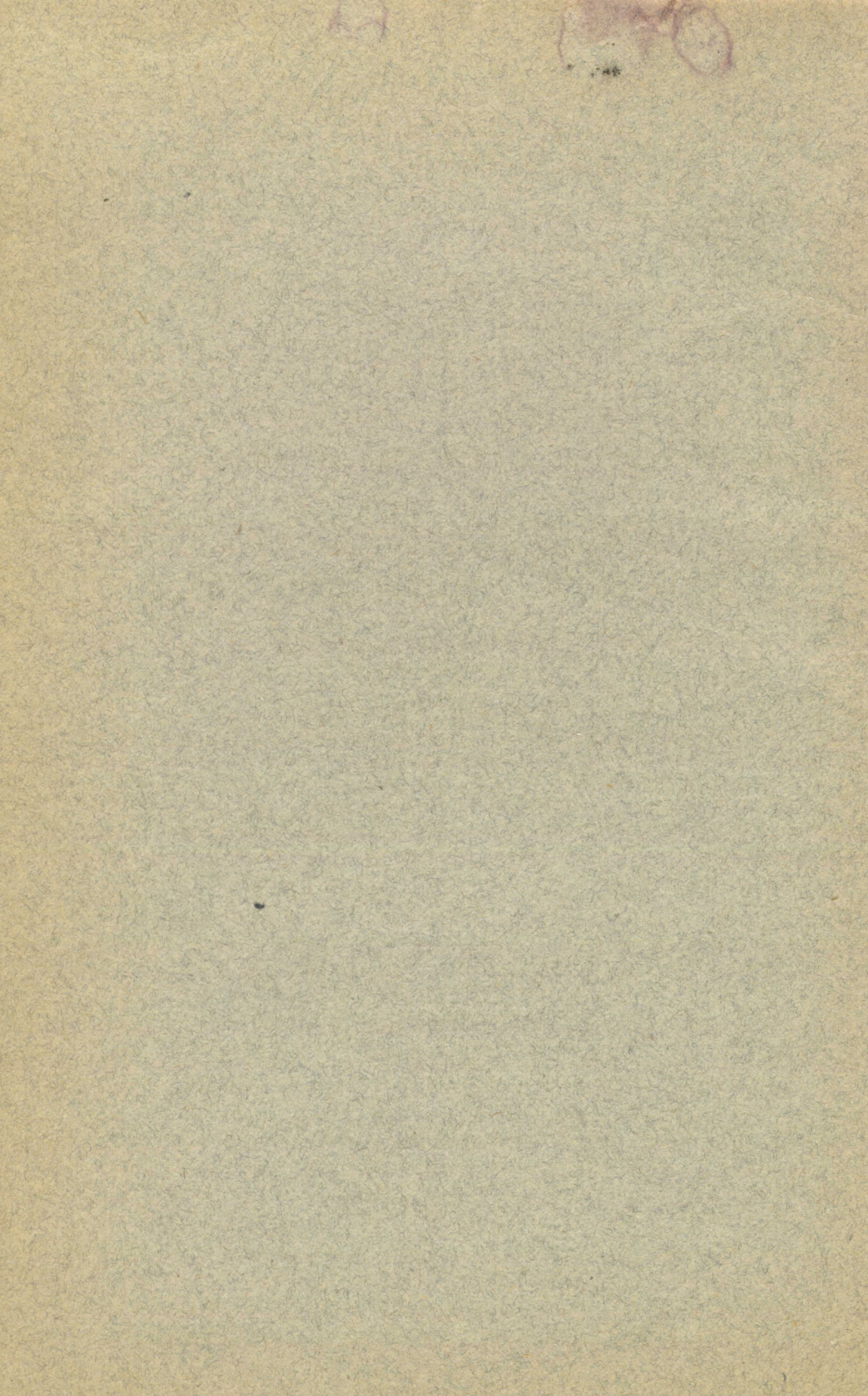
OF THE

Alabama Polytechnic Institute**AUBURN**

**Annual Report of the Director of the Ex-
periment Station on Work Done Under
the Local Experiment Law in 1915**

By
J. F. DUGGAR
Director

1916
Post Publishing Company
Opelika, Ala.



Auburn, Ala., Feb. 23, 1916.

HON. J. A. WADE,

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 1915, with the request that you transmit this report to his Excellency, Governor Charles Henderson.

Yours very truly,

J. F. DUGGAR,

Director Experiment Station of
the Alabama Polytechnic Institute.

STAFF OF SPECIALISTS ENGAGED IN WORK UNDER THE LOCAL EX- PERIMENT LAW

J. F. DUGGAR, *Director*

AGRICULTURE AND PLANT BREEDING

* J. F. Duggar, in charge.

- * E. F. Cauthen.....Associate Agriculturist
- * M. J. Funchess.....Associate Agriculturist
- J. T. Williamson.....Field Agent in Agriculture
- * D. J. Burlison.....Assistant Agriculturist
- * O. H. Sellers.....Assistant in Agriculture
- * H. B. Tisdale.....Assistant in Agriculture
- * F. E. Boyd.....Assistant in Agriculture

LIVESTOCK AND POULTRY INVESTIGATIONS

* Geo. S. Templeton, in charge.

- E. Gibbens.....Assistant in Animal Husbandry
- F. W. Wendt.....Assistant in Animal Husbandry

ENTOMOLOGY

* W. E. Hinds, in charge.

- * F. L. Thomas.....Assistant Entomologist
- * E. A. Vaughan.....Field Assistant in Entomology

DRAINAGE

**Lewis A. Jones, in charge.

FARM MACHINERY

- * R. U. Blasingame.....Agricultural Engineer

HORTICULTURAL INVESTIGATIONS

* Ernest Walker, in charge.

- * J. C. C. Price.....Associate Horticulturist
- G. V. Stelzenmueller.....Field Assistant in Horticulture

JUNIOR AND HOME ECONOMICS EXTENSION

**L. N. Duncan, in charge.

- **Miss Madge J. Reese.....State Agent Girls' Canning Clubs
- **J. C. Ford.....In charge-Pig Clubs
- **I. B. Kerlin.....Assistant in Boys' Corn Clubs

PLANT DISEASES

* F. A. Wolf, in charge.

- * Devoting only part time to Local Experiment Work.

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

REPORT OF WORK DONE DURING 1915 UNDER THE LOCAL EXPERIMENT LAW.

PART I

DIRECTOR'S SUMMARIZED REPORT OF WORK IN ALL DEPARTMENTS.

By

J. F. DUGGAR, Director of Experiment Station.

This report is prepared and submitted in accordance with Section 5 of an Act of the Legislature of Alabama, approved February 9, 1911, generally known as the "Local Experiment Law." This Act makes provision for local experiments to be conducted by the Experiment Station in as many of the counties of Alabama as practicable, and for other agricultural services to be rendered by this Station to the farmers of Alabama.

In 1915, as in each of the preceding four years, a part of the experimental work done under this law has been conducted in every county in the State. These experiments are of a more popular and local nature than is permitted under the funds appropriated to the Experiment Station by Congress. The purpose in the execution of this law has constantly been to extend to all parts of Alabama the advantage of having field experiments, feeding experiments, etc., made under the same local conditions of soil and climate that surround the farmers who grow crops and livestock in all parts of the State.

Most of these experiments have had as their ultimate aim to point the way to a diversified but entirely safe system of agriculture, while others have as their immediate object the determination of the best method of growing cotton successfully, especially in the presence of the cotton boll weevil or of cotton wilt or black root. In other words, all activities under this law, whether directed to improvements in cotton culture or to the encouragement of diversified farming, have been part of an anti-boll weevil campaign. Among the crops or other farm products on which these local experiments have thrown sufficient light to serve as a guide for the local farmer's practice may be especially mentioned the following:

The adaptability of the several new varieties or species of velvet beans to the central and northern, as well as to the southern, parts of the State. These experiments, conducted for three years in nearly every county, have had much to do with the rapid spread of the cultivation of velvet beans, a plant that is destined to play a most important part in soil improvement and stock raising throughout the entire State. Likewise, experiments with various forage crops, including sudan grass, soybeans, wilt-resistant varieties of cowpeas, bur clover, crimson clover, and the various vetches and grasses have laid a more secure foundation for the wise selection of the best forage crops for the different classes of soils found in Alabama.

Experiments with wheat, conducted under this law for several years, have been one of the factors in proving the adaptability of wheat to large areas on which no wheat had been grown in recent decades, and in effecting a tremendous increase in the production of wheat in 1915.

The data accumulated on varieties and fertilizer requirements of peanuts constitutes the basis for a bulletin, now in course of preparation, which will answer the present wide-spread demand for information on one of the crops that will be extensively grown in 1916 as a partial substitute for cotton.

Fertilizer experiments with cotton and corn have been made in most of the counties of the State, and will constitute, when continued long enough, the basis for a fertilizer map of the State that should result in tremendous financial gains to farmers through the more judicious use of fertilizers in accordance with the various requirements of soils and crops.

The testing, on wilt infested land, of all available varieties of cotton that have shown any degree of wilt resistance has afforded a large amount of information. The results of these experiments are being prepared for publication in a bulletin that may be taken as a safe guide for farm practice in the large part of Alabama where black root of cotton occurs.

Other subjects on which these local experiments are throwing light may be found in the lists of experiments made in the Agricultural, Animal Husbandry, Horticultural, and other Departments, as mentioned in succeeding pages of this report.

PUBLICATIONS UNDER THE LOCAL EXPERIMENT LAW.

From the funds provided under the Local Experiment Law there were published in 1915 one bulletin, two circulars, four press bulletins, and four reprints of earlier publications, making a total of eleven publications. The number of pages in these was 131, and the total in all of the copies printed amounted to 1,332-500 pages.

The following is the list of publications of the Alabama Experiment Station issued in the calendar year 1915 under the Local Experiment Law:

- Bulletin No. 184: Local Fertilizer Experiments with Sweet Potatoes; by the Director and Field Agent.
- Circular No. 31: Annual Report of the Director of the Experiment Station on Work Done Under the Local Experiment Law in 1914.
- Circular No. 33: Boll Weevil Control by Cotton Stalk Destruction; by the Entomologist.
- Press Bulletin No. 77: Insecticides Uncertain for Boll Weevil Control; by the Entomologist.
- Press Bulletin No. 78: Chain Drag for Boll Weevil Control; by the Entomologist.
- Press Bulletin No. 79: Fall Campaign Against the Boll Weevil; by the Entomologist.
- Press Bulletin No. 80: Cotton Boll Weevil Infested Area and Quarantine Line in Alabama, 1915 to 1916; by the Entomologist.

In addition to the above publications the following reprints were published:

- Bulletin No. 181: Local Fertilizer Experiments with Corn in South Alabama in 1911, 1912, 1913, 1914; by the Director and Field Agent.
- Bulletin No. 182: Local Fertilizer Experiments with Corn in North Alabama in 1911, 1912, 1913, 1914; by the Director and Field Agent.
- Press Bulletin No. 30: Crimson Clover; by the Director.
- Press Bulletin No. 31: Hairy Vetch; by the Director.

FERTILIZER EXPERIMENTS AND OTHER EXPERIMENTS WITH FIELD AND FORAGE CROPS.

Forty distinct lines of popular field experiments were conducted in 1915. Their locations included practically every county in the State. The list of field experiments conducted elsewhere than at Auburn by the Agricultural Department of the Experiment Station in 1915 is as follows:

- Alfalfa experiments.
- Bur clover, variety tests.
- Clover, Ladino versus white.
- Crimson clover experiments, methods of inoculation.
- Cotton, complete fertilizer experiments.
- Cotton, time of applying nitrate of soda.
- Cotton, extensive variety tests.

Cotton, tests of wilt resistant varieties.
 Cotton, variety tests, short.
 Cotton, breeding.
 Corn, complete fertilizer experiments.
 Corn, time of applying nitrate of soda.
 Corn, variety tests, extensive.
 Corn, variety tests, short.
 Corn, breeding.
 Cowpeas, variety tests.
 Forage crop tests, extensive.
 Japanese sugar cane experiments.
 Johnson grass, fertilizer experiments.
 Kudzu experiments.
 Lespedeza, fertilizer experiments.
 Oats, fertilizer experiments.
 Oats, variety tests.
 Oats, breeding experiments.
 Oats, time of applying nitrate of soda.
 Oats, treatment for smut.
 Peanuts, complete fertilizer experiments.
 Peanuts, variety tests.
 Rotation experiment.
 Rice experiments.
 Sugar cane, complete fertilizer experiments.
 Sweet potatoes, complete fertilizer experiments.
 Soybean tests.
 Sudan grass experiments.
 Velvet beans, variety tests.
 Velvet beans, versus cowpeas.
 Vetch, variety tests.
 Wheat, complete fertilizer experiments.
 Wheat, variety tests.
 Wheat breeding .

PLANT BREEDING.

In plant breeding the small State appropriation of \$1200.00 has permitted the testing, under the local conditions of the different counties, of a number of varieties of improved seed. Most prominent among these have been new strains or varieties of cotton, oats, and corn originated by systematic selection on the Experiment Station farm at Auburn. Seed of these new varieties are thus propagated and made available to the farmers of every section of the State through the supplies produced on farms near them. In this way it has been practicable to first test locally and then to arrange for the distribution, at low prices, of new and improved varieties, without demoralizing the public by the distribution of free seeds. Farmers who have been selected, by reason of their proved carefulness, for the purpose of propagating such seeds enter into a signed contract governing the precautions to be taken to keep these seeds pure, and making one-half the total pro-

duction of such seeds available to their neighbors at stipulated maximum prices, which are far below those that would otherwise prevail.

WORK IN DRAINAGE AND FARM MACHINERY.

Drainage work has been done in 1915 under the same plan as in former years. This involves co-operation between the Alabama Experiment Station and the Office of Public Roads and Rural Engineering of the U. S. Department of Agriculture. Under the terms of this agreement Mr. Lewis A. Jones, U. S. Drainage Engineer, has been in charge of the experimental drainage work. His report shows that during the year 1915 surveys were made for tile drainage systems on 11 farms. On 2 of these the tiles were laid under the supervision of the drainage engineer or his assistant.

One of the objects of experimental work in drainage has been to so interest farmers in the advantages of drainage that public sentiment would lead to the enactment of a state drainage law. Such a law, patterned after that which has proved practicable in other Southern States, was enacted by the Legislature in 1915.

This law permits the land owners of any region to form a drainage district and to sell bonds against the land for the construction of the necessary ditches. Under this law, Mr. Jones and his assistants have recently made a preliminary drainage survey of 18,000 acres of land in one body in Fayette and Lamar counties. It is not too much to expect that when these plans are put into execution and the land drained and cleared, the increased value of these valley lands, (say from \$10.00 up to \$65.00 per acre), will amount to about a million dollars. The increased tax revenue on this sum alone, would then be sufficient to pay each year about six times the amount that is now paid by the State for the support of the drainage and farm machinery work under the Local Experiment Law.

The work in farm machinery has consisted of the collecting of additional information, for the benefit of farmers, on tractors for plowing, on machinery for harvesting or thrashing cowpeas, and in the giving of information regarding various kinds of farm machinery.

In August, 1915, this work was placed under the

charge of a specialist in Agricultural Engineering, Prof. R. U. Blasingame. He has given advice by personal visits, correspondence, and detailed drawings relative to waterworks for the home and farm, farm motors, barn plans, and various other questions connected with farm machinery and farm structures.

INJURIOUS INSECTS.

During 1915 the boll weevil spread over a much larger extent of territory in Alabama than in any former year. This is explained largely by the storm and high winds prevailing last August. Hence by the end of the migration season the boll weevil was found in all except five Alabama counties, located in the extreme northeastern corner of the State.

The Department of Entomology has been active in connection with the giving of information relative to the boll weevil by visits, addresses at farmer's meetings, and publications. Other insects, including the grass worm, have also received attention.

LIVESTOCK AND POULTRY INVESTIGATIONS.

In 1915 one series of feeding tests with grades of the beef breeds was completed at Allenville, and another series begun on the same farm. In the latter series, in which 100 steers are being fed, especial attention is given to the determination of the relative feeding value of ground velvet bean pods in comparison with cotton seed meal. The former promises to come into quite general use as a food.

The use of alfalfa as a substitute for part of the usual ration of cotton seed meal and the value of shelter for fattening cattle are other matters covered by these experiments.

Experiments with dairy cattle and hogs have been continued, with some change of plan. A part of the hogs used in these experiments have already been marketed at the packing house at Moultrie, Georgia, so that the effects of the various foods on quality of meat and lard as well as on rate of growth are being determined from the commercial standpoint as well as in the laboratory.

Experiments in feeding mules are in progress on Cottonwood Plantation, near Faunsdale, Marengo County, the principal aim being to find means of re-

ducing the usual corn ration without decreasing the efficiency of the teams. Alfalfa, Johnson grass, and cottonseed meal are among the foods under investigation.

Poultry experiments in co-operation with a professional poultryman in Mobile County are being continued, and some of the results are being prepared for publication.

LOCAL WORK IN HORTICULTURE.

Tests of varieties of vegetables and of fertilizers for sweet potatoes, strawberries, Satsuma oranges, and other horticultural plants have been continued; and experiments have been begun with a number of new horticultural crops, including pimiento peppers.

A bulletin giving the results of local fertilizer and variety tests of cabbages has been published.

The Department of Horticulture has been heavily taxed with work relating to the citrus canker.

JUNIOR AND HOME ECONOMICS EXTENSION WORK.

As heretofore, the State fund for extension has been devoted to the support of boys' corn clubs, boys' pig clubs, boys' four-crop clubs, girls' canning clubs, etc. The reports of the specialists in these lines of work show the following enrollment in 1915:

Boys' Corn Clubs	3782
Boys' Four Crop Clubs	490
Boys' Pig Clubs	2482
Girls' Canning Clubs	1490

Gratifying progress has been made in lengthening the terms during which the women county agents are employed, and hence in the efficiency of the canning club work and the other work in the special interest of girls and women.

One feature of the boys' corn club work was the holding of a special Boys' Corn Club School of Practical Agriculture at Auburn, July 26-31, 1915. This was attended by 221 corn club boys, who received instruction not only in corn culture but in a number of agricultural subjects. The return to their home counties of these boys thus instructed each summer cannot fail to have a beneficial influence in improving the local farm practice and in broadening the outlook of young people on the farm.

Along parallel lines there was held at Auburn, June

21-26, 1915, a school of instruction for members of the girls' canning clubs. This was attended by 42 girls, who received instruction not alone in canning but in a number of lines of home economics work. The inspirational effects of this school for girls can scarcely be overestimated.

During 1915 26 counties had organized pig club work, and the demands for an increase in this line of work are pressing.

The report of the pig club agent shows that the average net profit per hog owned by the members of the boys' pig clubs was \$7.21.

WORK WITH PLANT DISEASES.

The work of the plant pathologist, who devotes only a part of his time to the local experiment work, was directed largely to the citrus canker, which threatens the Satsuma orange and grapefruit industry in the southern counties of the State, and to diseases of the peanut.

His work with a disease of bur clover that is sometimes injurious suggests a promising means of preventive treatment. Pecan rosette and other diseases have also engaged his attention. By lectures and correspondence, he has disseminated a large amount of information relative to the cause and prevention of various plant diseases.

FINANCIAL SUPPORT.

The appropriation received from the State for the support of all lines of local experiment work in agriculture, horticulture, drainage, farm machinery, plant breeding, entomology, and plant diseases, and for extension work with corn clubs, girls' canning clubs, etc., is \$27,000.00. While such restriction of the work as to permit the carrying over of at least a small balance as a safe-guard against any delay in the annual January payment is the usual policy, a slightly larger balance is this year carried over than usual, because of a reduction of printing and other activities rendered advisable during the latter part of the year as a result of delay in the cashing of one of the warrants for the support of this work.

TREASURER'S REPORT, LOCAL EXPERIMENT
FUND, FOR THE YEAR 1915.

RECEIPTS

To cash balance from 1914	\$ 3,058.86
To cash from Animal Husbandry	108.24
To cash from State	27,000.00
	\$30,167.10

DISBURSEMENTS

By amount paid Agriculture	\$ 8,517.12
By amount paid Horticulture	2,363.10
By amount paid Animal Husbandry	2,965.31
By amount paid Junior and Home Economics Extension	4,118.14
By amount paid Publications and Administration	2,102.86
By amount paid Entomology	2,341.01
By amount paid Drainage and Farm Machinery	831.25
By amount paid Plant Breeding	1,113.53
By amount paid Plant Pathology	973.92
By amount paid Poultry	564.76
By balance carried to 1916	4,276.10
	\$30,167.10

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

Subscribed and sworn to before me, this the 16th day
of February, 1916.

(Signed) B. L. SHI, Notary Public.

PART II
DETAILED REPORTS OF HEADS OF DE-
PARTMENTS

REPORT OF ENTOMOLOGIST

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

Dear Sir:

I submit below a report of the work done by the Department of Entomology under the Local Experiment Fund during the calendar year 1915.

During the year we continued a study of the methods for the control of Satsuma insect pests with a series of field experiments carried on near Mobile. A brief report of the results of this work has been published in the proceedings of the Gulf Coast Horticultural Society for 1915.

An extensive study of the grass worm or fall army worm (*Laphygma frugiperda*), begun by Field Assistant J. A. Dew in 1912, has been published by the Station in Bulletin No. 186. The completion of this publication involved considerable additional work during the past season when the grass worm appeared in large numbers in many localities, doing particular injury to fields of cowpeas.

The major part of the Local Experiment work has been in connection with the Mexican cotton boll weevil. The weevil made the largest advance thus far recorded during the fall of 1915. The winter of 1914 and 1915 was quite favorable for the hibernation of the weevils and they appeared in large numbers early in the season of 1915, especially along the line reached by them first in 1912. Many cotton farmers were so much alarmed that they plowed up cotton after it had become knee-high and planted the ground in other crops. This action was advisable in some cases where the planter was attempting to raise a larger acreage in cotton than he could successfully handle under the prevailing conditions of weevil infestation.

Weevils became very abundant throughout the southwestern third of Alabama before the first of August, and the advance movement for 1915 was apparently

well started by the middle of that month. On or about the 20th of August there occurred heavy winds from the southwest which seemed to have been primarily responsible for scattering weevils through more than 100 miles of new territory beyond the 1914 weevil line in Alabama. This extensive new territory was infested mainly during the last week of August and the weevils became generally established, as they had time to produce one or two generations before the cotton was destroyed by killing frost. The weevil infested area in Alabama is shown in Press Bulletin No. 80. Only five counties in the northeastern corner of the State are now outside of the weevil line for 1915. In all probability these counties will become infested during 1916. There is reason to expect that the weevils will reach every cotton field in Alabama and that they will maintain themselves even in the northern-most part of the State.

A study of the cotton ginning records available at this date for Alabama during 1915, shows that the principal area of decrease in yield coincides with the area of heaviest weevil infestation. After making proper allowances for the reduction in acreage, reduction in use of commercial fertilizers and unfavorable climatic conditions of 1915, it appears that these factors together account for a decrease of twenty to twenty-five per cent. based upon the 1914 yield in the State. Those counties uninfested by the weevil in 1915 showed a reduction of twenty-three percent; those reached by the weevils during the fall of 1915 lost twenty-seven per cent; counties reached by the weevil in 1913 and 1914 together showed a loss of forty per cent, while those counties reached by the weevil before 1912 and in which it was most thoroughly established, showed a reduction of sixty-three per cent. This would indicate a direct loss due to weevils amounting to forty per cent. in twenty-one of the oldest infested counties in Alabama.

A campaign for early destruction of cotton to secure the most complete and economical possible control of the weevil for 1916 was carried out during the last week of September and the first two weeks of October. This campaign was conducted by four speaking parties made up of representatives of the Experiment Station staff and State Department of Agriculture, Demonstra-

tion Agents, and Railroad Agricultural Agents. These parties held county meetings in forty-eight of the principal weevil infested counties. Following the central county meeting the Demonstration Agents in most counties continued the work with community meetings in a number of community centers through their counties. This campaign apparently resulted in a much larger destruction of cotton stalks with the subsequent planting of winter cover crops than has heretofore occurred in Alabama.

Through designation by the State Superintendent of Education, November 5th, 1915, was observed as boll weevil day in the schools of the State. This gave us a welcome opportunity for co-operation in the furnishing of information to the teachers. About 5000 sets of boll weevil bulletins were thus distributed where we believe they accomplished much good.

Additional new publications on the boll weevil include Press Bulletin No. 80, Cotton Boll Weevil Infested Area and Quarantine Line in Alabama, 1915-16; Press bulletin No. 79, Fall Campaign Against the Boll Weevil; Press bulletin No. 78, Chain Drag for Boll Weevil Control; Press bulletin No. 77, Insecticides Uncertain for Boll Weevil Control; Circular No. 33, Boll Weevil Control by Cotton Stalk Destruction; Extension Leaflet No. 8, Summary of Boll Weevil Suggestions.

Respectfully submitted,

W. E. HINDS, Entomologist.

REPORT OF DRAINAGE ENGINEER

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

Dear Sir:

During the year 1915 the following drainage surveys were made under the co-operative agreement between the Alabama State Experiment Station at Auburn and the Office of Public Roads and Rural Engineering, U. S. Department of Agriculture:

SURVEYS AND PLANS FOR TILE DRAIN SYSTEMS.

<i>Name of Farm</i>	<i>County</i>	<i>No. of Acres Surveyed</i>
S. P. Storrs -----	Elmore -----	140
W. D. Null -----	Marengo -----	270
Inge-Reynolds-Hunter tract -----	Mobile -----	20
E. B. Davis -----	Mobile -----	30
N. W. Morrisette -----	Hale -----	20
Meadowbrook Farm -----	Greene -----	40
W. D. Johnson -----	Greene -----	80
W. H. Spencer -----	Hale -----	40
N. J. Bell -----	Montgomery -----	40
Chas. Anderson -----	Perry -----	10
W. W. Thompson -----	Macon -----	30

Supervision of construction was furnished for the Inge-Reynolds-Hunter tract and the W. D. Johnson tract.

All of the tile tracts previously installed under the direction of this Office were visited and the results of the work noted.

Preliminary examinations and reports were made on the swamp and overflowed lands along Huntsville Spring Creek, Madison County (5,000 acres), and Letohatchee or "Big Swamp", Lowndes County (11,000 acres.)

Field ditches were surveyed for the farm of Mr. C. M. Sellers, Autauga County.

The study of the action of soil water in tiled land was continued on the Elsberry plantation, Montgomery County.

A drainage survey was made of approximately 18,000 acres of swamp and overflowed lands lying along the Luxapallila River in Fayette and Lamar Counties. Plans for draining this land will be prepared during the early part of 1916, and it is hoped that the reclamation work will be started in the near future.

Interest in drainage work is rapidly increasing in Alabama. This is illustrated by the increased number of requests for advice and assistance received by this Office.

The drainage law passed by the last session of the State Legislature furnishes the necessary legal machinery for the organization of drainage districts to reclaim the large areas of swamp and overflowed lands. The organization of drain tile factories in various parts of the state enables the landowner to purchase tile at a reasonable cost. With these advantages it is to be expected that the drainage conditions of the agricultural lands of the state will be rapidly improved.

Very truly yours,

LEWIS A. JONES, Drainage Engineer.

REPORT OF ANIMAL HUSBANDMAN.

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

Dear Sir:

I respectfully submit the following report of the Local Experiment work in the Animal Husbandry Department for the past year:

BEEF CATTLE

The co-operative steer feeding experiments started at Allenville, Alabama, last year, are being continued. Judge B. M. Allen, Allenville, Marengo County, Alabama, furnishes the cattle and the feeds for the work, and the Alabama Experiment Station provides a man, Mr. E. Gibbens, to live on the farm and have personal supervision of the experimental work. One hundred head of steers are now on feed at Allenville. The questions under consideration are as follows:

First, to determine the value of the following feeds for fattening beef cattle:

- (1) Sorghum silage, corn and cotton seed meal.
- (2) Corn silage, corn and cotton seed meal.
- (3) Corn silage, corn, cotton seed meal and alfalfa.
- (4) Cotton seed meal and corn silage.
- (5) Velvet beans in pod, ground, and corn silage.

Second, to determine the value of paved lots for fattening beef cattle.

Third, to determine the value of shelter for young cattle while being fattened.

Fourth, to determine whether or not there are any toxic effects on hogs following steers that are being fed cotton seed meal.

DAIRY CATTLE

The co-operative dairy cattle experiments with M. W. Hall & Son, James, Alabama, Bullock County, were continued. The problems studied are as follows:

First, to determine the relative value of various concentrates for milk production.

Second, to determine the cost of raising dairy heifers to a producing age.

Hogs

During the year the experimental work on the farm of Dr. J. F. Yarbrough, in Henry County, near Columbia, Alabama, was transferred to the farm of Mr. L. F.

Sessions, Ozark, Dale County, Alabama. Mr. Sessions furnishes the hogs and feeds, and the Alabama Experiment Station furnishes a trained man, Mr. F. W. Wendt, to live on the farm and have personal supervision of the experimental work.

Two lots of hogs were used in an experiment this fall at Ozark, to determine the acre value, in terms of pork produced, from a crop of peanuts.

The hogs were divided into two lots as follows:

Lot 1. Peanut pasture.

Lot 2. Peanut pasture and one-fourth ration of corn.

These hogs were shipped to the Packing House at Moultrie, Georgia, and samples of the lard will be analyzed to determine what influence the quarter ration of corn, fed while the hogs were grazing peanuts, will have on the melting point of the lards.

An experiment was started during the year on Mr. Sessions' farm, to study the best methods of producing pork under farm conditions in South East Alabama. Several crops will be studied to obtain data on their value per acre for pork production.

MULES

An experiment was started April 1st, 1915, on Cottonwood Plantation, Allenville, Marengo County, Alabama, to test the value of various rations for mules engaged in farm work. Twenty-two head of mules were divided into three lots, and fed on the following ration.

Lot 1. Corn and alfalfa.

Lot 2. Corn, mixed hay and cotton seed meal.

Lot 3. Corn and Johnson Grass hay.

It is planned to continue feeding experiments with mules.

POULTRY

The experimental work with Mr. Herman Schlueterbusch at Citronelle, Mobile County, Alabama, was continued throughout the year. The Mobile County experiment is a study of various feeds to determine the cost of egg production. Four lots were used in this experiment, as follows:

Lot 1. Dry mash, cracked corn and oats.

Lot 2. Dry mash, and cracked corn.

Lot 3. Purina chowder.

Lot 4. Dry mash, cracked corn and oats.

Yours very truly,

GEO. S. TEMPLETON, Animal Husbandman.

REPORT OF HORTICULTURIST.

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

Dear Sir:

Under the Local Experiment Fund, experiments have been inaugurated as follows: The same test is frequently made at two or three different points:

Variety and fertilizer tests with sweet potatoes; Irish potatoes, seed selection; dasheen; new bush muskmelons; new watermelon; cucumbers; fertilizers and varieties; rhubarb; pimiento pepper; navy beans; Chinese celery and cabbage; strawberries, fertilizers and cover crops, varieties, cultural methods in Alabama; peppermint and spearmint for extracts; ginseng; tea; coffee; bulbs; sweet peas; Satsuma oranges, fertilizers and cover crops; English walnut; pistachio; and olive.

New tests undertaken (1916): Smyrna figs; Vinifera grapes; spraying, fertilizers and pruning experiments with apples in North Alabama.

A bulletin on cabbage giving three years results of fertilizer tests at Bessemer, is now in press.

With two or three exceptions the results secured this far in the various tests are encouraging and promise to be of much interest and value.

Mr. G. V. Stelzemuller, Field Agent, held demonstration meetings, and addressed several horticultural meetings during this year, besides visiting the co-operators at their several points from one to three times during the year.

Respectfully,
ERNEST WALKER, Horticulturist.

REPORT ON JUNIOR AND HOME ECONOMICS EXTENSION

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

Dear Sir:

Below I am giving you brief reports on the following lines of work in progress in this department for the past year:

Boys' Corn Clubs,
Boys' Four-Crop Clubs,
Girls' Canning Clubs,
Home Demonstration Work,
Boys' Pig Clubs,

BOYS' CORN CLUBS

I. B. Kerlin,

State Agent, Corn Club Work.

Enrollment and Average Results.

During the year 1915 the corn club work was organized in all the counties of the state with a total enrollment of 3,782 boys. It is usually difficult to secure reports from boys, but this year we have made a special effort to secure reports and as a result 23.8 per cent. of the total enrollment made reports on their yields. The boys reporting made an average of 55.7 bushels of corn per acre at an average cost of 37 cents per bushel. The average yield of corn for the State for 1915 was 17.5 bushels. It will be seen, therefore, that the club members made an average of 38.2 bushels per acre more than the average for the State. Estimating corn at \$1.00 per bushel and deducting the cost, the club members made an average of \$35.10 profit per acre. Working on the same basis as the boys, the average profit for the State was \$5.25 per acre. The average corn club member, therefore, made an average profit of \$29.85 more per acre than was made by the average farmer.

Methods Used in Organizing Clubs.

In all cases the county farm demonstration agent is the county leader. All of these clubs were organized with the county as the unit. In a number of cases, however, local clubs were organized by school districts, and in such cases the local teacher was the leader. We made every effort to draw the county superintendent and the rural teachers into this club work. During the

organization of the work we secured lists of the teachers by counties and wrote them special letters urging them to organize the club work and enlist the boys. We enclosed a return envelope and an enrollment sheet for the teacher to use in replying. A large number of the boys were enrolled in this way through the teachers. When a boy's name was received in this way, we immediately mailed him an enrollment card for him to sign and return. No boy was considered a regular member of the club who had not filled out one of these enrollment cards and returned it. At the end of the enrollment season lists of regular members were made in alphabetical order by counties, copies of these lists being sent to the county superintendents and county agents.

Methods of Instructing Boys.

We mailed the boys a number of circulars bearing on different phases of corn growing, and during the year we wrote them a number of circular letters. Of course county agents visited and instructed the boys as they traveled.

Cover Crops.

In the various circulars we urged upon the boys the importance of planting winter cover crops, especially clovers. It is impossible, however, to give any definite estimate of the number who do this. We secured enough crimson clover seed to give each boy who attended our Short Course here in the summer of 1914 enough to plant one-fortieth of an acre. These seed were inoculated before we sent them to the boys. Most of the boys lost their clover, however, from the severe cold weather last winter. Of course the boys in the Four Crop Club planted an acre of oats in the fall, and a large number of the Pig Club boys planted various crops for pastures.

Suggestions for Improving the Club Work.

- (1) Closer supervision of the work, and personal visits to the homes and acres of corn or to prize pigs.
- (2) A definite and permanent set of prizes to be planned and announced in advance of the organization of the work in the county. We secured the passage of a special law during the recent session of the Legislature, which we think will largely solve the matter of prizes.

Gathering the Prize Acres.

A great deal of trouble has been experienced in the

past in getting accurate records of large yields. We have overcome this to a great extent by requiring the boys to give us an estimate on what they think they will make sometime in advance of the gathering. We send out cards for this estimate in July and August. When these are received we tabulate them by counties and send a copy of the list to the county agent. We at the same time write the boy telling him not to gather his corn until he receives instructions from his county agent. We send each boy a franked envelope addressed to his county agent and tell him to write his county agent. We ask the county agent either to supervise in person the gathering of these large yields or to designate two reliable men in the community where the boy may live to witness the gathering. This plan has worked remarkably well for the past two years.

Boys' Corn Club School of Practical Agriculture.

Our regular school for the corn club boys was held here in Auburn, July 26 to 31 inclusive. We had in attendance this year a total of 221 boys, representing sixty-four counties. This was a remarkably successful enterprise again, and has become a permanent feature of our Boys' Club Work in Alabama.

Diploma for the Corn Club Boys.

We designed a very attractive little diploma this year to give every boy who made a report. A copy of this was filed in the Washington Office. It had a most desirable effect in getting reports from boys and especially in causing boys who failed with their crop for various reasons to write us a personal letter. County agents, county superintendents, and other county leaders in a number of cases have called the boys together who were entitled to diplomas and had a Boys' Corn Club Rally in connection with awarding the diplomas. This has been very valuable indeed in stimulating interest in the work.

Four-Crop Club.

In this work each boy plants four crops as follows: one acre in corn; one in cotton; and one in fall oats; which is followed by cowpeas for hay after the oats are harvested. During 1915 we enrolled 490 boys in this work. Each boy plants three acres as indicated above. There were 88 boys that made reports on all four crops. The average profit per acre on cotton was \$34.82; on corn \$31.76; on oats \$13.50; and on hay \$23.42. The

prize for this work in each county was a pure bred Shorthorn bull given by the Central of Georgia Railway. This prize is awarded to the boy getting the best total results on the three acres with all four crops.

REPORT OF GIRLS' CLUB AND HOME DEMONSTRATION WORK
IN ALABAMA.

December 1914 to December 1915.

MADGE J. REESE, State Agent

Girls' Club and Home Demonstration Work.

Canning Clubs.

In the past year in Alabama there were nineteen counties doing organized Canning Club Work, with a total enrollment of 1490. This is the same number of counties organized in 1914, and a decreased enrollment of 525 members. Smaller enrollment was encouraged in order that closer supervision could be given and the standard of work done by the girls raised. The counties organized were Autauga, Baldwin, Calhoun, Chilton, Conecuh, DeKalb, Etowah, Franklin, Jefferson, Macon, Marengo, Marshall, Mobile, Monroe, Pickens, Pike, St. Clair, Tuscaloosa, and Walker.

The club members were enrolled in 150 clubs. Each county had its county agent who supervised the work of the clubs. In 1915 the average term of service of the county agents was eight months, while in 1914 it was four months. In 1915 six county agents were on duty for twelve months, and only four for less than six months. As a result of the increased average term of agents and closer supervision, the report of the work done by the clubs in the nineteen counties is twice what it was for 1914.

Sixty-four per cent. of the enrollment, or 957 girls, have reported the following:

Number of containers of tomatoes canned from tenth-acre club gardens.....	159,449
Number of containers of beans, okra, peas, peppers and beets canned from tenth acre club gardens.....	27,187
Number of containers of fruits and vegetables from home garden and orchard.....	114,185
Total number of containers, all products.....	300,821
Value of vegetables sold fresh and used at home.....	\$4760.00
Total value of canned products and fresh vegetables.....	\$61,998.02
Total cost of products.....	\$18,268.48
Total profit.....	\$43,729.54

(Report of containers based on No. 3 tins and quart jars.)

The first year club girl begun her work with the one-tenth acre garden in tomatoes. The second year club

girl who had already been successful in growing and canning tomatoes, grew tomatoes on one-half of her tenth-acre garden and beans on the other half. The third and fourth year club girls, in addition to the tomatoes and beans, grew a third vegetable, either okra, peas, peppers, cucumbers, or beets. It was necessary for girls to take care of the surplus fruits from the orchard at the same period that they were canning their demonstration garden products, but the experience acquired in putting up the vegetables made them more capable of properly canning fruits.

Etowah is the banner county for the State for 1915:	
Number of containers of club garden products.....	33,114
Number containers of home garden and orchard products	33,127
Total number of containers, all products	66,241
Total value of all products	\$13,514.32
Total cost	\$ 3,602.33
Total profit	\$ 9,911.99

The county had an enrollment of 135 girls, and of these 114 reported. About 20,000 cans of the girl's products will be sold in the town of Gadsden. The merchants, bankers, women's clubs, and the Gadsden Chamber of Commerce stand behind the girl's clubs and make them feel that they have an assured market.

The work of several other counties deserves special mention. Tuscaloosa County, a close second to Etowah, has an excellent report. Eighty-one girls made an average of \$23.77 from their tenth-acre products. They canned 53,155 containers from club gardens and home orchards, making a total profit of \$9,828.48.

The counties having the largest per cent. of girls reporting were Calhoun and Mobile. One hundred and nine, or 94 per cent. of Calhoun's girls sent in reports. These girls filled 29,990 containers. Ninety-three per cent. of Mobile's girls sent in reports. Forty-five Jefferson County girls reported 26,382 containers. Two hundred and seventy six club girls in Conecuh, De Kalb, Franklin, Pickens, St. Clair, Marengo, and Monroe canned an average of 325 containers each.

Our markets are good, and all of the clubs have marketed their products in their own counties. The clubs of some counties have had more orders than they were able to fill. Our motto for 1915 was "Quality rather than Quantity." In the same proportion that the quantity of work done has increased this year, so has the quality of work done by the girls im-

proved. In some of the counties the girls are not only putting on the market a commercial standard of canned fruits and vegetables, but are marketing a superior quality of fig preserves and citrus fruit products.

Canning club girls have, besides their work in gardening and canning, done some purposeful manual training work. They have designed and made baskets and boxes for containers of their products and for holiday gifts. Some beautiful baskets of native material have been made by the girls. Incidentally, there has been some good work done in sewing. Six hundred and seventy girls made the uniform canning club cap and apron.

Winter gardens have been encouraged by the county agents, and as a result, there are 448 farm women and girls in the nineteen counties growing spinach, lettuce, radishes, and cabbage for market and home use.

Back of all competitive exhibits of the girls' products at the county fairs, there has been a motive more laudable than that of following a time worn custom. The real purposes of the exhibits have been to help give a working definition of desirable standards through showing qualities that make for excellence. Most of the club girls visited the county fairs and studied the packs and standard. Every county except one put on an exhibit at a county or state fair or at some public place in the county. The exhibits were most satisfactory, every county showing its training in commercial packing. Most of the judging was done by the state agents of the department. The Short Course for Prize Winning Girls given at Auburn last summer was perhaps one of the most effective agencies in impressing upon the girls the high standards desired in the work. The girls who attended the course are today leaders in the club work in their respective counties.

The club work has been given the heartiest co-operation by farm demonstration agents, county superintendents of education, rural teachers, commercial clubs, business men, county fair associations, and woman's clubs. Financial co-operation has been given by county boards of revenue, county boards of education, state normal schools, district agricultural high schools, and chambers of commerce. For every dollar expended for salaries of the county agents in the Girl's

Club and Home Demonstration Work, a profit of \$4.22 was realized for the State of Alabama.

Home Demonstration Work.

In counties where the Girl's Club Work has become well established and the agent's efficiency proved, demonstration work for the farm women has been started. Only the county agents who are on duty from eight to twelve months are required to organize Home Demonstration Clubs. The mothers and the women generally have aided the girls in the various phases of their work, but the time has come in the process of the development of the organization when the women are eager to make some demonstration themselves. In 1915 there were 221 farm women enrolled in the Home Demonstration Clubs in eleven counties.

The work was begun by the county agents going into the homes and aiding the women in properly cooking and serving vegetables and utilizing the products canned by the club girls. A few bread demonstrations have also been made by the women.

In cooking and serving the products grown by the girls and women, there is a need for simple demonstration in improved kitchen equipment and utensils. The home-made fireless cooker has been one of the first devices to be used. Under the instructions of the county agents, forty-four home-made fireless cookers, six iceless refrigerators, eight fly traps, and two wheel trays have been made by the women. The agents are also encouraging the installing of cheap and simple waterworks systems in the kitchens of the rural homes.

The first approach to problems of sanitation in the farm homes has been made in the canning demonstrations where there is a need for absolute cleanliness and sterilization. Following such demonstrations, it is easy for the agents to suggest the use of sanitary measures with reference to milk, water, and protection of foods. Because of such suggestions, 41 houses have been screened in five counties.

The work done in 1915 with the farm women has paved the way for more extensive and effective work for 1916. Several agents are now busy organizing Home Demonstration Clubs which will have regular meetings throughout the year and whose members will

make definite demonstrations and give reports of same. A few egg marketing circles have also been organized in connection with the Home Demonstration Clubs. One success leads to another, and we can more easily accomplish the end in view, the improvement of the farm home, by taking one step at a time and not trying to do all of these things at once.

BOYS' PIG CLUBS.

J. C. FORD,

State Agent, Pig Club Work.

Viewed from almost any angle, the Pig Club work in Alabama was more than 100 per cent. more successful in 1915 than in 1914. The following counties, 26 in number, were organized: Autauga, Baldwin, Bullock, Butler, Chilton, Clay, Colbert, Cullman, Fayette, Geneva, Henry, Jefferson, Lamar, Lauderdale, Lee, Macon, Madison, Marion, Marshall, Pickens, Pike, Russell, Shelby, Tallapoosa, Tuscaloosa, and Walker. Eighteen of the above counties were organized in 1914, with an enrollment of 1207 members, 213 of whom made reports. The following summary presents phases of the work in 1915.

Summary of Pig Club Work in Alabama 1915.

1.	Number of counties organized	26
2.	Total number of members enrolled	2482
3.	Total number of members reporting	840
4.	Per cent of members reporting	33.44
5.	Number of hogs in spring	1024
6.	Average number of hogs per member	1.22
7.	Average weight per hog (831 weights reported) ..	43
8.	Average value per hog (839 values reported) ..	\$5.67
9.	Number of hogs sold or killed by members	396
10.	Weight of hogs sold or killed by members (306 reported)	60012
11.	Average weight of the 306 hogs	196
12.	Value of hogs sold or killed (373 reported)	\$5715.05
13.	Average value of the 373 hogs	15.33
14.	Number of hogs owned by members at time of reporting	1006
15.	Weight of hogs on hand (582 reported)	79712
16.	Average weight of the 582 hogs	137
17.	Value of hogs on hand (599 reported)	\$8719.97
18.	Average value of the 599 hogs	14.56
19.	Cost of feeds (858 reported)	\$3979.66
20.	Average cost of feed for the 858 hogs	4.64
21.	Average cost per lb. gain, about04
22.	Net profits (598 reported)	\$4311.65
23.	Average net profit for the 598 hogs	7.21
24.	Number of hogs lost by death	180.

25. Total number hogs sold, killed, lost and on hand	1582
26. Average number per member reporting	1.88
27. Number of members who raised registered hogs	144
28. Number of members who raised litters of pigs	110
29. Number who bought their club pigs	276
30. Number who raised their club pigs	297
31. Number whose pigs ran on pasture	386
32. Number who fed soiling crops	261
33. Number who reported pure bred for sale	53
34. Number who expect to buy pure bred for 1916	279

Without going into a full discussion of this summary, I wish to call attention to lines 27 to 34 inclusive, as showing, in a measure, the constructive nature of the work. It will be seen that many are already raising registered hogs, quite a number having animals of their own raising for sale, while a large number are planning to get registered hogs for 1916. Steps are being taken to assist those who wish to buy or sell pigs. Lines 29 and 30 show the proportion of members who bought and who raised their club pigs. Many of those who raised their pigs have registered animals, while nearly all who bought got good blood.

Nearly 400 members ran their hogs on pasture. To further encourage the use of pasture and soiling crops, seed were furnished to nearly 800 members (all who reported promptly) to make pasture for their pigs during the winter or spring. All received rape seed and many received in addition bur clover, crimson clover, and Bermuda grass seed. All who received these seed agreed to make a report, when requested to do so, showing their results.

The organization and management of the work was practically the same in 1915 as in previous years. The county was the unit, with the county farm demonstration agent as the county head of the work. The active co-operation of the school authorities was enlisted in every county. Local clubs were formed in school districts where a resident teacher or a successful breeder of live stock could be made the leader. Club members and those co-operating in this work were never permitted to lose sight of the fact that the real object of the Pig Club work is to make of its members successful animal husbandmen and trained citizens.

As was to be expected, there is much difference in the results obtained in the different counties. Fayette is easily the banner county of the State, and doubtless also of the entire United States. The enrollment for

this county numbered 313 with 119 making reports. These 119 members raised hogs valued at \$1885.20.

No State show was held though most of the counties held contests. Where permitted to compete in open classes the boys usually carried off the best prizes. In a number of counties where no county fairs were held, Pig Club exhibits were arranged. In every case they created great interest and enthusiasm.

Respectfully submitted,

L. N. DUNCAN,

Supt. of Junior and Home Economics Extension Department.

REPORT OF THE PLANT PATHOLOGIST.

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

Dear Sir:

I respectfully submit the following brief statement of the work done in the Department of Plant Pathology under the Local Experiment Fund during the year 1915.

Most of the available funds have been utilized in field studies on the control of peanut leaf spot and of citrus canker. The work on peanut diseases was conducted near Eutaw, Ala., and that on citrus canker near Mobile, Ala. Valuable information on both of these studies has been secured and has been prepared for publication.

Several additional problems have been undertaken, among which are the control of bur clover leaf spot, tests on the blight resistance of the Sand Pear, and a study of peanut wilt and fruit rot, and a decay of onions caused by *Sclerotium Rolfsii*.

It has been found that the bur clover leaf spot organism is carried over on the burs and that it can withstand the heat of summer. It may attack the seed leaves of the seedling plants first, pass to other of the leaves, and pass the winter on the green leaves of the growing plant. Seed treatment should therefore be of value in preventing this disease when the plant is being grown in a new locality.

The so-called blight proof pear can be made to develop blight when it is inoculated with cultures of the blight bacteria from apples. Similar results were secured in New York where trees were sent to test the influence of changes in locality on blight resistance.

In the field studies several fungi have been found in plants not previously reported as hosts for these fungi. Among them are *Sclerotium Rolfsii* associated with a decay of onions, a study of which is in progress. The same organism has been found to cause a disease of seedling grapefruit trees. This fungus was reported in 1914, from the Isle of Pines as productive of a rot of citrus fruits which hang in contact with the soil. This is the first observation of its occurrence on Citrus in the United States. The fungus associated with the red rot

of peanuts has been found on Irish potatoes and Adzuki beans (*Phaseolus angularis*), on both of which hosts it has not previously been recorded.

Sclerotium Rolfsii has also been found to cause a typical wilt disease of peanuts and a rot of the fruits.

A brief treatise on certain citrus diseases and pecan rosette has been prepared and published in Proceedings of the Gulf Coast Horticultural Society.

A resume of the work on pear blight has been prepared for publication in the Proceedings of the Alabama State Horticultural Society for 1915.

Numerous letters of inquiry relative to the more common plant diseases have been received and answered.

Very respectfully submitted,

FREDERICK A. WOLF,
Plant Pathologist

