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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 1916**

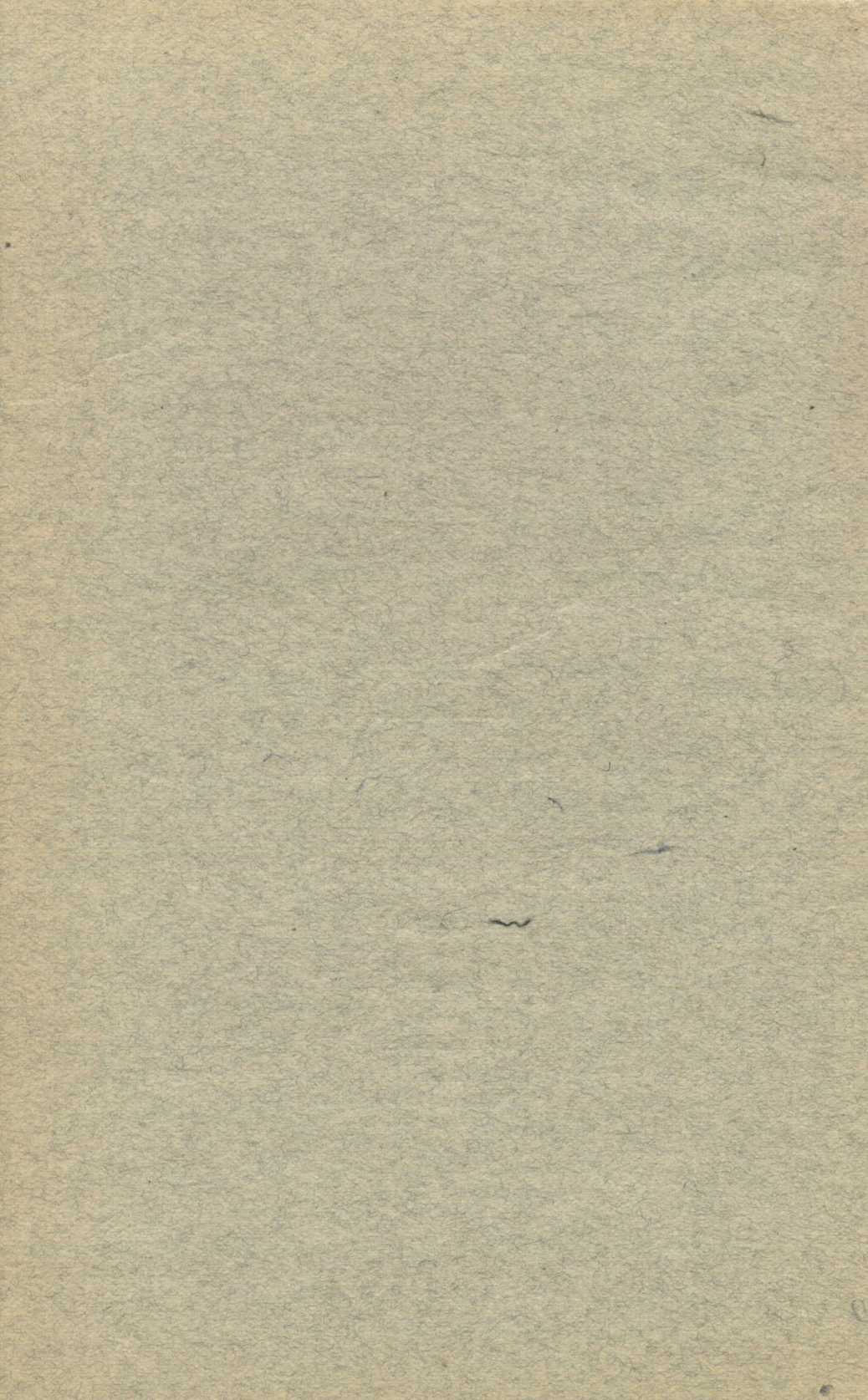
By

J. F. DUGGAR

Director

1917

Post Publishing Company
Opelika, Ala.



Auburn, Ala., Feb. 20, 1917.

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 1916, 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
- * O. H. Sellers 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
- A. E. Hayes 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

* G. C. Starcher, in charge.

- * J. C. C. Price Associate Horticulturist
- P. O. Davis 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
- **Miss Mary Feminear Poultry Clubs

PLANT DISEASES

* G. L. Peltier, in charge.

* Devoting only part time to Local Experiment Work.

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

REPORT OF WORK DONE DURING 1916 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 annual report, for the calendar year 1916, of work done under the Local Experiment Law, and chiefly outside of Lee County, is submitted as required by law. The following is a brief resume of the lines of work reported by each head of department and published in more detail elsewhere:

PUBLICATIONS.

The following publications of the Alabama Experiment Station were those published at the expense of the State appropriation for Local Experiments:

- Bulletin No. 188: Boll Weevil in Alabama; by the Entomologist.
- Bulletin No. 189: Wilt Resistant Varieties of Cotton; by the Associate Agriculturist.
- Bulletin No. 192: Cottonseed Meal Compared with Velvet Beans for Fattening Steers; by the Animal Husbandman and Assistant.
- Circular No. 34: Annual Report of the Director of the Experiment Station.
- Press Bulletin No. 83: Controlling the Boll Weevil by Collecting Weevils and Infested Squares; by the Entomologist.
- Press Bulletin No. 84: Wilt Resistant Varieties of Cotton; by the Associate Agriculturist and Recorder.
- Press Bulletin No. 87: Varieties of Fruits for a Home Orchard in Alabama; by the Associate Horticulturist and Field Agent in Horticulture.
- Press Bulletin No. 89: The Home Orchard; Setting and Care; by the Associate Horticulturist and Field Agent in Horticulture.

FIELD CROPS AND FERTILIZERS.

As usual, many of the activities under this heading are in continuation of similar work of past years, since field experiments require frequent repetition. However, additions and changes that seemed desirable under changing conditions have been made.

Experiments with fertilizers with cotton, corn, oats,

wheat, sugar cane, and sweet potatoes have been made on representative soils in various parts of the State.

Tests to determine the relative values of numerous varieties and species of forage crops, varieties of cotton, corn, oats, wheat, peanuts and velvet beans have been made throughout the State.

In these lines of work every county in the State has been represented.

In tests to determine the best fertilizers for various soils and crops, and to ascertain the best kinds and varieties for each region, forty-six distinct lines of experiments have been conducted.

The scarcity and high price of potash has made it necessary to reduce somewhat the number of one class of fertilizer experiments (complete fertilizer tests), but the Experiment Station has been able to purchase, at high prices, sufficient potash to keep in progress a reasonable number of every kind of fertilizer experiment begun in earlier years. Such experiments are reliable and valuable in proportion to the number of years during which they can be repeated, so that the disturbing influence of unfavorable or unusual weather conditions may be overcome. The results of such experiments that are now being continued will have their greatest value after the war ends, and after conditions of normal supply and price of fertilizers are restored.

Among experiments that have thrown much light on timely agricultural questions may be especially mentioned those on variety and fertilizer experiments with peanuts; determination of the amount of lime required to overcome the acidity of a number of soils; variety tests of cotton; fertilizer experiments with cotton; fertilizer experiments with corn; and tests of numerous forage plants.

PLANT BREEDING.

Local tests have been made, in many counties, of strains of corn, cotton and oats bred upon the farm of the Experiment Station, at Auburn, Alabama, by the laborious plant-to-row method. This has not only resulted in giving farmers a knowledge of the adaptability to their soils and climatic conditions of these improved strains or varieties, but has also been the means of affording a local supply of improved seed, obtainable by neighbors from the farmer making the experiment for the Station.

DRAINAGE.

The former co-operation with the Office of Public Roads and Rural Engineering, U. S. Department of Agriculture, has been continued. The drainage work has been done by Lewis A. Jones, Drainage Engineer, and his assistant, R. L. Graybill.

Surveys and drainage plans for seven farms were made; advice given by correspondence and visits regarding tiling and other systems of drainage; and experiments continued to determine the most economical and effective distance between drains.

FARM MACHINERY.

That part of the time of the Agricultural Engineer employed in Experiment Station work, as contrasted with Extension Work and teaching, has been partly devoted to the following:

A study of methods of harvesting the seed of a promising forage crop, black medic, which is spreading rapidly in central Alabama.

Devising a simple farm level.

Devising a very simple and inexpensive water heating device for use in the home laundry and otherwise.

Miscellaneous activities.

INJURIOUS INSECTS.

The Entomologist and his assistants have continued their studies of the boll weevil under conditions prevailing in central Alabama. Among subjects studied in this connection were the effects of burying the various weevil stages at various depths; the testing of substances claimed to poison or drive off this insect; and the results of jarring of adult insects and infested squares from the plants.

Work has been continued with the Argentine ant in the hope of ascertaining means for restricting the spread of this dreaded pest of the home and field.

A new subject of study has been the green plant bug, *Nezara viridula*. This insect was especially destructive to cowpeas, velvet beans, peanuts, and to a wide range of other plants in the southeastern part of Alabama in 1916.

LIVESTOCK AND POULTRY INVESTIGATIONS.

In the steer feeding experiments conducted at Allenville, one of the important points was a comparison of unhulled and unground velvet beans with cottonseed

meal. A bulletin, No. 192, of the Alabama Experiment Station, giving results, has been published. In brief, 2½ pounds of unhulled and unground velvet beans took the place of 1 pound of cottonseed meal, and in addition, saved about one-third of the usual silage ration.

Numerous other comparisons have been made between different feed stuffs, and a beginning has been made in determining the relative carrying capacity of Bermuda grass, large watergrass (*Paspalum dilatatum*), and Johnson grass.

Feeding experiments with hogs were made at Ozark, and slaughter tests made of the hogs in each experiment after they were sold to a packing house in Birmingham.

Poultry experiments have been continued at Citronelle, chiefly comparisons of various rations for laying hens. Other questions on poultry husbandry are also covered by these experiments.

LOCAL WORK IN HORTICULTURE.

Fertilizer experiments with Satsuma oranges and with pecans have been conducted.

With strawberries tests of fertilizers, varieties, and cultural methods have been made at York, Castleberry and Bolling.

A considerable number of new horticultural plants have been tested in several localities, and observations have been continued regarding the relative values of standard varieties and their adaptability to different parts of the State.

PLANT DISEASES.

The Plant Pathologist, from the small appropriation for popular work with plant diseases, has given special attention to a new peach trouble, which is causing extensive injury in a large orchard in Escambia County. He has made a preliminary examination of conditions as related to plant diseases in various parts of the State. He has also under investigation a diseased condition from which camphor trees are dying, and is giving some attention to cabbage yellows and pecan diseases. He has been able to assist farmers and orchardists in combatting a number of well known diseases, through the advice which he has given by means of letters, and lectures, and personal visits.

EXTENSION WORK FOR BOYS AND GIRLS.

As in former years, the small State fund carried in the Local Experiment Law for Extension has been used exclusively for the partial support of the club work for boys and girls. The reports of the specialists having charge of boys' corn clubs, boys' pig clubs, boys' four-crop clubs, girls' canning clubs, etc., show the following enrollment in 1916:

Boys' Corn Clubs	3,870
Boys' Four-Crop Clubs	571
Boys' Pig Clubs	4,062
Girls' Canning Clubs	3,450

Probably the most notable advance in this line of work within the past year has been the holding, in each of a number of counties, of short courses of instruction in agriculture for club boys, and in canning for the girls. During the present winter each of these courses is being held for three days and at the same time as the teachers' institutes.

Corn clubs are maintained in every county, and pig clubs in 36 counties. Notable increase in the membership in the latter is evidence of growing interest.

Home demonstration work is now organized in 27 counties, in which 27 women agents are employed.

A new line of work during the past year, supported chiefly by the Extension funds granted by Congress, is the formation of poultry clubs. Although this work has been under way for only a few months, the poultry clubs have an enrollment of 352 members. This is one of the steps taken in the effort to further interest the girls of the farm in rural industries, and to enlarge the income of farm women and girls.

**TREASURER'S REPORT LOCAL EXPERIMENT
FUND FOR THE YEAR 1916**

RECEIPTS.

To cash balance from 1915 -----	\$ 4,276.10
To cash from State -----	27,000.00
Total -----	\$31,276.10

DISBURSEMENTS.

By amount paid Agriculture -----	\$7,585.47
By amount paid Horticulture -----	2,123.18
By amount paid Animal Husbandry -----	3,900.61
By amount paid Extension (Junior and H. E.) -----	5,583.34
By amount paid Printing and Administration -----	3,007.94
By amount paid Entomology -----	2,210.97
By amount paid Drainage and Farm Machinery -----	1,377.09
By amount paid Plant Breeding -----	1,015.10
By amount paid Plant Pathology -----	466.53
By amount paid Poultry Husbandry -----	736.68
By balance carried to 1917 -----	3,269.19
Total -----	\$31,276.10

Respectfully,

M. A. GLENN,

Treasurer Alabama Polytechnic Institute.

Subscribed and sworn to before me, this the 19th
day of January, 1917.

B. L. SHI, Notary Public.

PART II
DETAILED REPORTS OF HEADS OF DE-
PARTMENTS

REPORT OF AGRICULTURAL DEPARTMENT

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

Dear Sir:

I respectfully submit the following as a brief synopsis of the experimental work undertaken by the Agricultural Department of the Alabama Experiment Station under the Local Experiment Fund for 1916:

Forty-six distinct lines of experiments were conducted by this Department during the year. In order to secure information on as many soils as possible, under the many different climatic conditions, these experiments were located in every county in Alabama. No county received less than three experiments, although it has been necessary to reduce the number as compared with previous years, due to the high price of fertilizers and of some seeds.

The following is a list of the experiments made by this Department for the calendar year, 1916:

- Bur clover, treatment of seed.
- Corn, complete fertilizer experiments.
- Corn, time of applying nitrate of soda.
- Corn, complete lime experiments.
- Corn, sources of nitrogen.
- Corn, extensive variety experiments.
- Corn, short variety experiments.
- Corn, ear-to-row breeding.
- Corn, multiplication.
- Cotton, complete fertilizer experiments.
- Cotton, complete lime experiments.
- Cotton, time of applying nitrate of soda.
- Cotton, sources of nitrogen.
- Cotton, extensive variety experiments.
- Cotton, extensive wilt variety experiments.
- Cotton, short variety experiments.
- Cotton, short wilt variety experiments.
- Cotton, multiplication.
- Cotton, time and method of thinning.
- Cowpeas, extensive variety experiments.
- Fertilizer-rotation experiments.
- Forage crop experiments, extensive.
- Kudzu, multiplication
- Melilotus, experiments.

- Oats, complete fertilizer experiments.
- Oats, time of applying nitrate of soda.
- Oats, rate of applying nitrate of soda.
- Oats, extensive variety experiments.
- Oats, multiplication.
- Orchard grass mixtures, experiments.
- Peanuts, complete fertilizer experiments.
- Peanuts, extensive variety experiments.
- Plant-Lime, experiments.
- Red top mixtures, experiments.
- Rye, multiplication of Abruzzi.
- Soybeans, variety experiments.
- Sudan grass, experiments.
- Sugar cane, complete fertilizer experiments.
- Sugar cane, multiplication of Japanese.
- Sweet potatoes, complete fertilizer experiments.
- Velvet beans, variety experiments.
- Wheat, complete fertilizer experiments.
- Wheat, time of applying nitrate of soda.
- Wheat, rate of applying nitrate of soda.
- Wheat, extensive variety experiments.
- Wheat, multiplication.

Special attention has been paid to the testing of forage plants under as widely different conditions as possible. The true clovers, vetches, bur clovers, and several of the small grains, are some of the winter forage crops with which experiments were made. Among the summer growing forage crops are cowpeas, soybeans, Sudan grass, kudzu and velvet beans. The experiments with six varieties of velvet beans have been given more attention than usual with a view to publishing the results of several years' work some time in the early part of 1917.

The damage to the cotton crop by boll weevil has been the cause of more than usual interest in varieties of cotton, and much time has been spent keeping up with our cotton variety experiments in boll weevil territory. The stormy weather of July damaged our extensive variety experiments, as did the boll weevil afterward, but in spite of this, three of the four experiments which were started in the spring were carried to a conclusion.

The usual fertilizer experiments with corn, cotton and sweet potatoes, have been conducted during the past season. It was necessary to reduce the number of these, due to the high price of fertilizers, but the majority of those conducted appear to give information of unexpected reliability, considering the unfavorable season. It is well to say here that many of these tests on sweet potatoes and cotton show large profits, even where cottonseed meal, acid phosphate and kainit,

costing respectively \$35.00, \$17.50 and \$140.00 per ton, were used.

In anticipation of an increased interest in peanuts, the number of experiments testing fertilizers and varieties of this legume was increased.

Probably the most important new experiment undertaken is a ten-year fertilizer-rotation test. The crops grown on these plots are cotton, corn and cowpeas, in summer; and oats and crimson clover in winter. The fertilizers being used alone and in various combinations are cottonseed meal, nitrate of soda, acid phosphate, basic slag, rock phosphate, muriate of potash and lime.

The Department of Soils, under the direction of Professor M. J. Funchess, aided us in securing valuable information as to the lime requirements of a number of soils, by running laboratory tests on samples secured by this Department from the soils of various plots where experiments were being conducted. To each experimenter, from whose farm the sample was taken, was written a letter stating the requirement of his particular soil, and giving addresses from which he could secure crushed limestone. A bulletin on "Lime for Alabama Soils" published by this Station was also mailed to him.

Respectfully submitted,
J. T. WILLIAMSON, Field Agent.

REPORT OF ENTOMOLOGIST.

Auburn, Ala., Jan. 15, 1917.

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

Dear Sir:

I submit below a report of the work done by the Department of Entomology under Local Experiment Fund during the calendar year 1916.

There has been no change in the Departmental staff during the past year.

The principal lines of new insect investigations have been as follows:

1. Field studies of the boll weevil under central Alabama conditions;
2. Study of the life history and methods of control of the green plant bug, *Nezara viridula*;
3. Work with the Argentine ant.

The boll weevil investigations, conducted in Wilcox County, were rather varied in scope. They included principally studies upon the effect of burial of infested squares, bolls and of adult weevils at varying depths and in different types of soil to determine the effectiveness and value of burial by various methods as related to boll weevil control. Climatic records were kept carefully during the period of these experiments and related to such mortality as was found in the burial tests particularly. The second subject of special investigations dealt particularly with the jarring of adult weevils and infested squares from the plants to the ground by various methods of agitation and the relation of this jarring work to weevil control under varying conditions. The third subject of special investigations dealt with insecticide tests. In this work a number of standard, as well as proposed, insecticides were tested out under field conditions with no indications of any considerable value in connection with any of these materials.

The advance of the boll weevil during the past season, 1916, carried it into every county in the north-eastern corner of the State. The line of infestation now runs from about Veto in Limestone County, to Brownsboro in Madison County, to Scottsboro in Jackson County and thence drops in a southerly direction across the southeastern portion of DeKalb County, thence

southeastwardly across Cherokee County to the northern edge of Polk County, Georgia.

The season of 1916 was particularly unfavorable for cotton production in Alabama, and the yield of lint cotton per acre is doubtless the smallest ever obtained. Two factors particularly may be held responsible for this low yield: first, the extremely heavy rainfall and the unusually large number of rainy days occurring during July, which prevented to an unusual degree the setting of cotton during that month, and coincidentally favored the development of so large a number of weevils that within the territory first infested in 1914 very little cotton could be made on account of weevils after the July rains ceased. There is no good reason to anticipate that this extremely low yield will occur again in the near future. In a general way, we have reason to believe that an unusually good fight was being made against the weevil up to the 5th of July, when the heavy rains began.

The work with *Nezara viridula* was conducted in Houston County during August and September, 1916. This plant bug is by no means a new species in the cotton belt. It occurs very widely distributed, and has occasionally attained the proportions of a serious pest during the past sixty years. So far as we know, however, the species has never been thoroughly studied, and its increasing injuriousness in the southeastern counties of Alabama seems to warrant our giving this pest particular attention during 1917. At the present time, it appears that this species is of much greater economic importance, and will be far more difficult to control than is the boll weevil in southeastern Alabama.

The Argentine ant has been known to occur at several points in Alabama for a number of years past. Its increasing numbers, especially in sections of Montgomery and at Letohatchee, has called for special attention during the past year. We are at present testing out the possibilities of winter trapping of colonies to obtain reasonable control of the species during the following summer season.

The following publications have been issued during the year under Local Experiment Fund:

Bulletin No. 188: Boll Weevil in Alabama.
Press Bulletin No. 83: Controlling the Boll Weevil by Collecting Weevils and Infested Squares.

Respectfully submitted,

W. E. HINDS, Entomologist.

REPORT OF ANIMAL HUSBANDMAN.

Auburn, Ala., Jan. 5, 1917.

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

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 at Allenville, Marengo County, Alabama, were continued during the year. Judge B. M. Allen, of Allenville, Alabama, furnishes the feeds and cattle for the experiments, and the Alabama Experiment Station provides a man, Mr. Ernest Gibbens, to live on the farm and have personal supervision of all experimental work conducted at that place.

At present there are forty-five head of steers on feed, divided into three lots of fifteen each, fed as follows:

Lot 1. Velvet beans and corn silage.

Lot 2. Cottonseed meal and corn silage.

Lot 3. Cottonseed meal and sorghum silage.

The velvet bean test was a repetition of the feeding experiment conducted at Allenville last year. The general summary statements of the past year's experiment are as follows:

SUMMARY STATEMENTS.

1. In this experiment one pound of cottonseed meal took the place of two and one-half pounds of velvet beans in pods. The velvet bean lot, however, required only two-thirds as much silage as the cottonseed meal lot.

2. The cost per one-hundred pounds of gain was practically equal, when cottonseed meal cost \$35.00 per ton, and unhulled velvet beans \$18.00 per ton.

3. On the above basis, the profit per steer was, on the velvet bean ration, \$7.92; and on the cottonseed meal ration, \$8.86.

4. The velvet bean ration was relished by the steers.

5. In feeding velvet beans in pods with silage it was found that it was not necessary to grind the beans.

6. The gains made by the steers in each lot were satisfactory: Lot 6 (cottonseed meal) gained an aver-

age of 1.6 pounds per day; Lot 7 (velvet beans) gained an average of 1.5 pounds per day.

A preliminary report of this work has just come from the press in the form of Bulletin No. 192.

During the past summer an experiment was conducted with the view of determining the relative carrying capacity of some of the pasture grasses adapted to the lime lands of West Alabama. The three grasses compared in this experiment were Bermuda, Paspalum and Johnson grass. It is planned to duplicate this work the coming summer.

The herd at Allenville now consists of 450 animals. The herd is divided into several lots with the view of testing different methods of wintering cattle of various ages, and to determine the cost of producing feeder steers.

Hogs.

The co-operative experiments at Ozark, Dale County, Alabama, were continued during the year. Mr. L. F. Sessions, of Ozark, Alabama, furnishes the hogs and feeds for the experiments, and the Alabama Experiment Station furnishes a trained man, Mr. Fred W. Wendt, to live on the farm and have personal supervision of the experiments.

Three 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, and to determine the effect on the carcass of supplementary feeds fed hogs on peanut pasture. The hogs were divided into three lots as follows:

Lot 1. Peanut pasture.

Lot 2. Peanut pasture and tankage in self feeder.

Lot 3. Peanut pasture and sweet potato pasture.

The hogs used in this experiment were shipped to the Birmingham Packing Company, Birmingham, Alabama, and samples of the fat will be analyzed to determine what influence the tankage and sweet potatoes had on the melting point of the lard.

An experiment is now being conducted at Ozark to test the value of winter forage crops for wintering brood sows. Three lots are used in this experiment, and are fed as follows:

Lot 1. Velvet bean and oat pasture.

Lot 2. Velvet bean and rye pasture.

Lot 3. Velvet beans fed in dry lot.

POULTRY.

The co-operative experimental work with Mr. Herman Schlueterbusch, at Citronelle, Mobile County, Alabama, was continued throughout the year. The experiments at Citronelle are as follows:

First, to determine the value in terms of egg production of various feeds. Three 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. Perune Chowder.

Second, to determine the influence of selection on the egg production of the flock.

Third, to determine the best age to market poultry.

Yours very truly,

GEO. S. TEMPLETON, Animal Husbandman.

REPORT OF THE HORTICULTURIST.

Auburn, Ala., Jan. 20, 1917.

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

Dear Sir:

I submit herewith report on the work being done with Local Experiment Funds in this Department:

Until February of the past year this work was in the charge of Mr. G. V. Stelzenmuller, at which time Mr. P. O. Davis took charge. The following varieties of plants are being given a trial in suitable locations in the State.

Avocadoes.	Quince.
Almond.	Sapota.
Apricots.	Walnuts—English.
Bulternuts.	Beets.
Calomindin.	Bulbs.
Caraca papaya.	Cucumbers.
Feijoa.	Musk Melons.
Figs—Smyrna, Capri.	Okra.
Grapes—Vinifera.	Peppermint and Spearmint for extracts.
Gauva.	Rhubarb.
Loganberries.	Sweet Corn.
Nectarines.	Tomatoes.
Olives	Watermelons.
Peaches	Lavandula.
Pistaches.	Pyrethrum.
Prunes—Italian.	

These species and varieties are being tested at Fairhope, Foley, Orange Beach, Bolling and Dadeville.

In addition to the tests of these varieties additional experimental work is under way to attempt to control twig blight by means of spraying and pruning. This work is being done in the orchard of Kelly Bros., Jeff, Madison County.

Experiments are being conducted with fertilizer and cover crops in twenty-three plats of Satsuma oranges, and the same number of plats of pecans at Fairhope, Baldwin County. Experiments are being conducted on strawberries to test varieties, effects of fertilizers and cultural methods, at York, Castleberry and Bolling.

Very sincerely yours,

G. C. STARCHER, Horticulturist.

REPORT OF THE DRAINAGE ENGINEER.

Professor J. F. Duggar,
Auburn, Alabama.

Dear Sir:

We take pleasure in submitting below a brief resume of the work done in your State by this Office during the calendar year 1916, under the co-operative agreement with the Alabama Experiment Station:

SWAMP AND OVERFLOW LANDS.

Plans and estimates have been completed for the construction of drainage improvements along the Luxapallila River in Fayette and Lamar Counties. The Fayette and Lamar County Drainage District No 1, embracing 21,500 acres, has been organized under the State drainage law, and expects to proceed with the construction work as soon as the drainage law has been declared valid by the State Supreme Court. The estimated cost of the proposed reclamation work is \$227,000, an average of \$10.55 per acre.

A survey has been made and plans completed for draining 3300 acres for the Mobile-Bayview Growers Association, in Mobile County. A large part of this area had been planted in orchards, but owing to the wet condition of the soil, it has been impossible for the trees to make satisfactory growth. It is believed that the plans recommended will remedy the conditions to a large extent, and provide outlets for complete tile drainage. The estimated cost of the improvements recommended is \$3.60 per acre.

A preliminary examination has been made of about 5,000 acres of overflowed lands along Mud Creek, in Jackson County. An accurate topographic map of this area has been obtained from the U. S. War Department, and plans for drainage with estimates of cost will be prepared early in 1917.

Preliminary examinations have been made of 33,000 acres of wet and overflowed lands along Flint Creek, in Morgan County, and of 5,000 acres along Calabee Creek, in Macon County. Estimates for the cost of surveys for these projects have been submitted to the interested parties.

FARM DRAINAGE.

Surveys and plans for tile drain and open ditch work have been made for the following landowners:

Herin & Graham	Barbour County	100 acres
S. D. Zigler	Blount County	30 acres
E. L. Turner	Calhoun County	25 acres
J. D. Moore	Clay County	24 acres
W. P. Moon	Coosa County	25 acres
W. H. Lipton	Dallas County	40 acres
Lucien Loeb	Montgomery County	160 acres

Inspections were made of a large number of tracts where tile drains have been installed in previous years under the co-operative agreement, and in a number of instances attempts were made to obtain comparative crop yields on tiled and untilled lands. However, the results were not satisfactory because of the difficulty in getting the landowners to assist in securing the data.

The run-off investigations that have been carried on for the past two years at the Ellsberry plantation, Montgomery County, were completed during 1916. The data will be compiled during 1917 and submitted for publication. It is believed that the information obtained will prove very valuable to farmers desiring to tile prairie lands in Alabama.

Yours very truly,

LEWIS A. JONES, Drainage Engineer.

REPORT ON JUNIOR AND HOME ECONOMICS EXTENSION DEPARTMENT.

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

Dear Sir:

Our regular state short course for Corn and Pig Club boys was held at Auburn, August 7-12. It was necessary to change the date, and this, coupled with the heavy rains at the time, reduced the attendance. We had 121 boys. In every other respect, however, except attendance, this was one of the best short courses held.

One of the new and interesting features introduced into the boys' and girls' club work for 1916 was county short courses. Two of these were held for the Corn and Pig Club boys in two counties, Morgan and Jefferson, during the month of November. In Morgan County, under the leadership of Mr. J. T. High, the county agent, 105 boys were assembled at Hartselle. The program lasted for about two days. Special programs were also given for each of the two nights. These boys were entertained in the homes of the people of Hartselle. In Jefferson County, under the leadership of Messrs. H. L. Brown and J. E. Edmondson, the county agents, 30 boys were assembled for a program similar to the above. In this case the boys were entertained by the business men of Birmingham.

A total of 21 short courses for girls was held in 20 counties; the average length of term was 4 days; 561 girls attended, also 62 farm women who were engaged in some form of Home Demonstration work, and 1087 visitors.

During 1916, the main dependence for prizes was on State and County funds under the bill passed by the last legislature, known as the Club Prize Bill (827 H. 1059, Yarbrough). Under this Act, a county appropriating \$100 through its Board of Revenue receives \$100 from the State. During 1916 the following 34 counties qualified under this Act:

Barbour	Crenshaw	Jefferson	Pike
Bibb	Cullman	Lamar	Russell
Blount	DeKalb	Lauderdale	St. Clair
Bullock	Escambia	Limestone	Talladega
Calhoun	Etowah	Marengo	Tuscaloosa
Chilton	Fayette	Marion	Washington

Clark	Franklin	Monroe	Winston
Cleburne	Henry	Morgan	
Coosa	Jackson	Pickens	

In the above 34 counties, 82 scholarships were awarded to Corn and Pig Club boys to the State Short Course at Auburn. In 16 counties 41 girls had their expenses paid as prizes to the State Short Course for girls.

Registered pigs were awarded to 193 Corn and Pig Club boys. Agricultural libraries, valued at \$10 each, were awarded in 61 communities. With each library was given a subscription for one year to the Breeder's Gazette.

Closer supervision of the work, and personal visits to the homes and acres of corn or to prize pigs will render the boys' club work one of the most valuable and effective means of improving agriculture in Alabama.

Below I am giving you more detailed reports of the following lines of work in progress in this Department during 1916:

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

BOYS' CORN CLUBS.

I. B. KERLIN, Assistant Boys' Club Agent.

ENROLLMENT AND AVERAGE RESULTS.

During 1916, 3870 boys were enrolled in the Corn Club work. The year 1916 was a bad one on the corn crop in Alabama. The heavy rains during the summer months destroyed the corn of many of the boys. It is always difficult to get reports, and especially so for a year like this. We feel encouraged, however, to find that 24.2 per cent made final reports.

The average yield of the boys was 36.4 bushels per acre, and the average cost was 58 cents per bushel. The average yield of corn for the State was 12.5 bushels per acre for 1916. The boys, therefore, made an average of 23.9 bushels per acre more than the average for the State.

METHODS USED IN ORGANIZING CLUBS.

The same general plan was used as in former years, the county agent being the county leader, with teachers and other leaders in the communities.

METHODS OF INSTRUCTING BOYS.

In addition to bulletins and circulars, a regular series of letters of instructions was mailed to the boys.

COVER CROPS.

We made the same general effort as heretofore in urging the boys to grow winter cover crops on the contest acres. In addition to this, in counties qualifying under the Club Prize Bill, one-half pound of inoculated crimson clover seed was given to each of 850 boys as a reward for making a report.

GATHERING THE PRIZE ACRES.

The same plan was followed as for the past year. A blank card was mailed each boy during the month of August, and on this he made an estimate of the yield of his crop. When these cards were returned, the names of all boys who indicated that they would have large yields were forwarded to the county agent, and these boys were instructed not to gather without personal supervision. This plan has worked splendidly and has practically eliminated the trouble formerly experienced in handling large yields.

COMMUNITY PROGRAMS.

During 1916 definite programs were made out and forwarded to community leaders in quite a number of cases. Accompanying each program was ample reference literature. This community program idea is being pushed this year very effectively.

FOUR-CROP CLUBS.

This project was conducted along the same lines as in previous years. Each boy grows four crops on three acres, as follows: One acre in corn; one in cotton; and one in fall oats followed by cowpeas for hay. During 1916, 571 boys were enrolled in 17 counties. The boys reporting made an average of 46.3 bushels of corn per acre; 819.8 pounds seed cotton; 37.9 bushels of oats; 3057 pounds of hay. The county prize for this work is given by the Central of Georgia Railway, and is a pure bred, short horn bull. The prize is awarded to the boy getting the best total results on all three acres with all four crops.

BOYS' PIG CLUBS.

J. C. FORD, State Agent, Pig Club Work.

During the year 1916, Pig Club work was carried on in 36 counties, with a total enrollment of 4062, including a few clubs and scattered members in unorganized counties. The organized counties were as follows:

Autauga	Coosa	Lamar	Montgomery
Baldwin	Cullman	Lauderdale	Morgan
Barbour	Escambia	Lee	Pickens
Blount	Etowah	Limestone	Pike
Bullock	Fayette	Macon	Russell
Butler	Geneva	Madison	Shelby
Chilton	Henry	Marengo	Tallapoosa
Clay	Houston	Marion	Tuscaloosa
Colbert	Jefferson	Marshall	Walker

The following summary sets forth some of the concrete results of the work:

STATISTICAL SUMMARY OF PIG CLUB WORK IN ALABAMA
IN 1916.

1. Number of counties organized	36
2. Total number of members enrolled	4062
3. Total number of members reporting	1003
4. Per cent of members reporting	24.7
5. Average weight of meat and pure bred hogs at beginning (brood sows not included)	47.6
6. Average weight at close of work (brood sows and litters not included)	189.6
7. Average daily gain (brood sows and litters not included)	1.02
8. Average cost per pound gain0366
9. Average profit made on each meat hog	\$ 6.70
10. Average profit made on each pig raised for breeding purposes	\$ 15.14
11. Average profit made on each sow and litter	\$ 14.76

The slogan adopted for the Pig Club work is "Good Pastures on Every Farm, and Good Hogs in Every Pasture." The value of pastures, and how to make them, has been kept constantly in the minds of the members. Most gratifying results followed the distribution of rape seed to club members in the fall of 1915, the average grazing value, as reported by the members, being \$20.96 per acre. In the fall of 1916 rape seed were again distributed to club members, and reports will be requested in the spring of 1917. The members have been encouraged to get good blood, and to raise litters of pigs when possible. In a few counties bankers have extended aid to club members for the purchase of pigs and for other necessary expenses of the club work.

ORGANIZATION AND INSTRUCTION

This work was organized chiefly through the schools, the county being the unit within the State, and the school district being the unit within the county. The county agent is the county head of the work, and the local president the head of the community or school district club. The members were instructed individually by means of bulletins and circular letters, and collectively by means of definite monthly programs and printed matter to make possible interesting and instructive discussions. Sixty-nine clubs used these programs. The organized club with monthly programs for timely discussions proved so effective that an effort will be made to have several hundred such clubs in 1917.

Further instruction and training in club work were given in a State Short Course for Corn and Pig Club boys in Auburn in August, and in two county short courses, one in Morgan and the other in Jefferson County, in November.

CONTESTS AND PRIZES.

No State contest was held, though most of the counties held contests and awarded prizes. Prizes aggregating approximately \$3000 were awarded. The general policy is to avoid cash prizes as far as possible and to give such prizes as pure bred pigs, free trips to the State Short Course, seeds, farm implements, etc.

REPORT OF HOME DEMONSTRATION WORK
IN ALABAMA.
1916.

MADGE J. REESE,

State Home Demonstration Agent.

In the past year in Alabama there were twenty-seven counties doing organized Home Demonstration Work, with a total enrollment of 3,450 women and girls, an increase of eight counties and 1,739 club members over the year 1915. The counties organized were Autauga, Baldwin, Calhoun, Chilton, Conecuh, Coosa, DeKalb, Elmore, Escambia, Etowah, Franklin, Jefferson, Lauderdale, Lee, Macon, Madison, Marengo, Marshall, Mobile, Monroe, Pickens, Pike, St. Clair, Talladega, Tallapoosa, Tuscaloosa and Walker.

The Home Demonstration Work in these counties was supervised by twenty-seven county agents. In seven counties eleven assistant county agents were on duty two months during the canning season. The county agents held 1,475 public and club meetings, at which there was a total attendance of 38,710; made 7,519 visits to the homes of club members and 1,794 to rural schools.

CANNING CLUB WORK.

The canning club members, 2,260 in number, were enrolled in 220 clubs. Regular meetings were held by 168 clubs. Seventy per cent of the enrollment, or 1,580 girls, report a very creditable record in gardening and canning, considering that this has been one of the most unfavorable seasons for gardens and orchards known in Alabama.

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

Number of pounds of tomatoes harvested from tenth-acre club gardens	725,961
Number of pounds of beans, okra, peppers, beets, etc., harvested from tenth-acre club gardens	41,435
Number of containers of tomatoes canned from tenth-acre club gardens	107,315
Number of containers of string beans canned from tenth-acre club gardens	11,735
Number of containers of okra, peppers, peas, beets, etc., canned from tenth-acre club gardens ..	18,263
Number of containers canned from farm garden and orchard	80,228
Total number of containers	217,541

Total value of canned products	\$45,775.86
Value of fresh vegetables from club gardens sold and used at home	9,654.20
Total value of canned products and fresh vegetables,	55,430.06
Total cost of products	6,716.55
Total profit	48,713.51

About six hundred women belonging to the Home Demonstration Clubs filled 55,745 containers according to canning club methods, the value of same amounting to \$16,880.27.

Total number of containers canned by women and girls, 273,286.
Total value of products of women and girls\$72,310.23.

The first year club girl began her work with one tenth-acre garden in tomatoes. The second year club girl grew tomatoes and beans, and the fourth year girl grew tomatoes, beans and other vegetables. The planting of the tenth-acre in perennials is being encouraged for the girl who has been a member of the club for several years. As a result, 102 girls started permanent gardens this year. Forty strawberry patches have been started in Etowah County. Girls from Calhoun County report 250 fig trees planted. Thirty girls in Pike County have planted fruit trees. Up to the present date 640 fig trees, 800 other fruit trees, and 150 berry bushes have been planted in the permanent gardens.

High quality and standardization in canning have been stressed. Nothing but 4-H Brand standards have been taught. The girls have successfully canned in tin and glass for market and home use tomatoes, string beans, peas, peaches, berries, soup mixtures and kraut. Most attractive commercial packs in glass are being placed on the market by efficient and experienced club girls. They are specializing in first class fig, pear, pepper, strawberry, watermelon rind, satsuma, kumquat and cucumber products. The club girls will be taught next year how to make good vinegar from various fruits which often are wasted. In most of the club girls' homes can be found pantry shelves well stocked with a good supply of canned fruits and vegetables, preserves, jellies and relishes for winter use.

WINTER GARDENS.

Club girls usually use one-fourth of their tenth-acre plot for a winter garden. This year 655 club girls and 320 women, a total of 975 demonstrators, are growing winter gardens. Through the generosity of several seed companies of Alabama, free seed were furnished.

Spinach, lettuce, radishes, cabbage, beans, peas, turnips, mustard and other vegetables are grown for market and home use. Last year one Calhoun County girl made \$10.00 selling spinach.

MARKETS.

Our markets are good, and practically 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. The 4-H Brand canned products are sold to merchants, hotels, restaurants, factory and mill commissaries, college dining halls and direct to the housewife. Because of scarcity of canned products this year, and also because of the high quality of 4-H Brand products, they are bringing unusually good prices. Selected fresh vegetables, well-packed, have been sold this year at fancy prices. Last year 46 club girls attended city and county high schools, paying their expenses with canning club earnings. This year 63 are attending high schools, paying their expenses by the same means.

OTHER CLUB ACTIVITIES.

The club girls need clean and neat caps, aprons and dresses in which to work and appear in public demonstrations. There were 1307 caps and aprons, and 714 uniform dresses made this year. There were also 142 very attractive and useful bulletin files made.

A very popular club activity is the basketry which some of the county agents have been teaching the girls and women. Fifty-five clubs have received instructions, and as a result, 468 pine needle baskets have been made. These baskets are selling from one to five dollars. Twenty-five baskets have recently been sold by Mobile County girls. One club woman of Lee County has sold four pieces for \$10.00, and has many orders for Christmas. Forty-eight baskets made of white oak, sweet grass, willow, oat straw, bonnet squash and honeysuckle have been reported.

Six hundred and eight girls have been cooking club products, and 88 girls have been baking bread according to demonstration methods.

FAIRS AND EXHIBITS.

Seventeen counties put on club exhibits at the county fairs. All other counties had special exhibits in show windows or at the county court houses. The exhibits showed excellence of quality and high stand-

ards. Most of the judging was done by the State agents. Permanent exhibits have been established in several counties at chambers of commerce, county superintendent of education offices and at rest rooms.

STATE AND COUNTY SHORT COURSES.

The second annual state short course was held for one week at the Alabama Girls' Technical Institute, at Montevallo, with which we co-operate in employing Miss Mary Paxton, Assistant State Home Demonstration Agent. Each of the twenty-six counties were represented by sixty-nine club girls, Macon leading with six girls. Fourteen county agents also attended the short course and gave valuable assistance. The girls were taught canning, cooking and sewing by the state agents, county agents and faculty members of the Institute. Model club meetings were also held. Plenty of time was given to recreation and fun. The scholarships to the State Short Course were given to best record girls by county boards and co-operative citizens.

Twenty county short courses for club girls have been held this year in nineteen counties for an average of four days each. Five hundred and sixty club girls, 62 club women, and 1087 visitors received the instructions given at the county short courses. At all meetings there was a total attendance of 7042. At each county short course a state agent gave assistance to the county agent in giving demonstrations and instructing the girls. Financial support was given to the county short courses by county boards of revenue and generous citizens of the county.

The state and county short courses have brought about immediate results. The girls who attended are now the leaders in their respective clubs, and have passed the instructions which they received on to their friends and neighbors.

CO-OPERATION.

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 the townswomen'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.

HOME DEMONSTRATION WORK FOR FARM WOMEN.

The mothers of the club girls and other farm women usually manifest great interest in the instructions given to the girls. They have helped the girls in cultivating their gardens, in their canning, sewing and cooking. They have attended the demonstrations given by the county agents and club girls, and have put into practice in their homes the instructions given. This close co-operation of the girls and women in the girls' club work paves the way for demonstration work for the women.

In all the twenty-seven counties, some demonstration work for farm women has been carried on in connection with the girls' club work. When an agent has proved her efficiency in working with the girls and is on duty at least eight months, she begins organized work with the women. In the thirteen following counties there have been organized Home Demonstration Clubs: Baldwin, Calhoun, Chilton, Conecuh, Coosa, Elmore, Lauderdale, Lee, Madison, Marengo, Mobile, Talladega and Walker. Forty-eight clubs had a total enrollment of 838. Thirty-eight of the clubs held regular monthly meetings, total attendance of all meetings, 7405.

The county agents have made 173 demonstrations in home-made conveniences, 220 in canning and preserving, 331 in cooking, 41 in sewing, 34 in butter making, and 28 in basketry at Home Demonstration Club meetings. As a result of these demonstrations, the women have improved their methods of cooking and canning and have added many conveniences and labor saving devices to their kitchens.

DEMONSTRATIONS MADE IN HOME.

	<i>No. of Women Following County Agents' Instructions</i>
Bread Making	99
Meat Cookery	60
Vegetable Cookery	144
Miscellaneous	93

The report on canning done by the women has been given above.

The following useful home-made conveniences have been made and installed by home demonstrators this year:

<i>Convenience</i>	<i>Number Installed</i>
Fireless Cookers	329
Iceless Refrigerators	88
Folding Ironing Boards	39
Kitchen Cabinets	6
Cheap Waterworks Systems	9
Shower Baths	19
Screened Baby Cribs	8
Fly Traps	235
Homes Screened	131

In Tuscaloosa County 75 fireless cookers have been made; in Talladega 57; and in Lee 41. In Conecuh County 21 homes were screened, and 54 fly traps, 18 iceless refrigerators, and 8 screened baby cribs were made. The farm women are also buying labor saving devices upon the recommendation of the county agents. In ten counties 47 oil stoves have been bought; in two counties 26 gasoline irons.

In four counties the farm women are particularly interested in making good butter for market. Thirty women in the four counties have sold 3529 pounds in the last six months. In Lauderdale County, fifteen women have sold in six months 1075 pounds of butter, packed in special cartons, at 30c per pound. Before receiving instructions from the county agent, they sold their butter at 12½c per pound. In the four counties, 8 workers, 11 barrel churns, 64 paddles, and 19 thermometers, and 68 molds have been purchased or made. A total of 170 butter making devices are now being used by the thirty women.

During the social hour at the club meetings the women sew and do basketry. An experiment is now being made in making dyes from barks, acorns, etc., to be used in rug making.

REST ROOMS FOR FARM WOMEN.

In eighteen of the twenty-seven organized counties are rest rooms for farm women at the county seats. Fourteen of these rest rooms have been established through the efforts of the county agents. The county agent often makes her headquarters on Saturdays at the rest room so that she may have conferences with farm girls and women.

The rest room is in the court house or a convenient room rented in the business section. It is usually financed by merchants, club women or county boards of revenue.

POULTRY CLUB WORK.

The organization of poultry club work was begun in Alabama September 15th, under the supervision of the Assistant State Home Demonstration Agent, Miss Mary Feminear, who is a poultry specialist. Since that time, 34 clubs have been organized in 10 counties, with an enrollment of 352 members, 271 women and 81 girls.

The county agents meet with these clubs regularly once a month, at which time they study the special letters of instructions sent out from the Auburn office. The following demonstrations have been given:

Grading and candling eggs.

Packing eggs for market.

Dry plucking of fowls.

Judging poultry.

Dressing fowls for the table.

The feeding for winter egg production, improved marketing and housing of poultry are being stressed. Two counties have one club each doing co-operative marketing. Most clubs are selling their eggs direct to local consumers. Hucksters have been paying good prices this season, especially in Chilton, Jefferson and Lauderdale Counties.

The poultry club work has already proved to be very popular with the farm women and girls. Clubs will be organized within a short time in all counties doing Home Demonstration Work.

EXTENSION SCHOOLS OF AGRICULTURE AND HOME ECONOMICS.

In thirty counties, thirty-four Extension Schools of Agriculture and Home Economics have been conducted. Separate meetings were held for men and women. Practical demonstrations in cooking, canning, grading and packing of eggs were given. Gardening and sanitation problems were discussed. There was a total attendance of 4524 farm women at the meetings. The demonstrations and talks were given by the state agents and two Home Economics specialists who were employed for several weeks to help conduct these schools.

Respectfully submitted,

L. N. DUNCAN,

Supt. Junior and Home Economics Extension.

REPORT OF PLANT PATHOLOGIST.

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

Dear Sir:

I am herewith submitting a brief statement relative to the Local Experiment work in this Department of Plant Pathology for the past year.

During parts of the months of June and July, on a temporary appointment, I made a trip through the State with a view of obtaining knowledge of the various diseases found in Alabama. This trip was very instructive to me, and was equal to six months spent in the laboratory. My appointment took effect September 1st, and since that time I have, in a preliminary way, undertaken three problems.

During the past season, the camphor trees in Mobile County have been dying off in considerable numbers. There has been found thrips, which undoubtedly caused most of the trouble, and an anthracnose on the diseased trees. This fungus has been isolated and inoculation experiments have been carried on in the greenhouse this winter. If this trouble can be reproduced at will in the greenhouse, steps towards its control will be carried out in the field this coming season.

In Escambia County, a new peach trouble, which is causing serious damage, was found. This trouble, if not checked, will wipe out this industry in this region. The cause of the trouble has as yet not been definitely located. However, a fungus has been isolated from the diseased trees, with which inoculation experiments are to be conducted in the greenhouse this winter. With the beginning of the growing season, it is hoped that a number of experiments, with a view of controlling this trouble, can be carried on in this locality.

During the late cabbage growing season in Mobile County, the growers are troubled to some extent with a fungus trouble commonly called "Cabbage Yellows." Prof. R. L. Jones, of the Wisconsin Experiment Station, has been kind enough to send me seed of three varieties resistant to "Yellows." With the assistance of the Horticultural Department the seed will be distributed to several growers who are troubled with this fungus and planted in the infected areas. This experiment

will be of great value to the truckers, if they can use these resistant varieties.

Besides the problems outlined above, observations have been made of many other troubles, of which several pecan diseases were the most important. A large number of letters of inquiry from various parts of the State were received and suitable replies sent out.

Very truly yours,

GEO. L. PELTIER, Plant Pathologist.

REPORT OF AGRICULTURAL ENGINEER—LOCAL
EXPERIMENTS IN FARM MACHINERY.

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

Dear Sir:

I beg to submit the following outline of work which has been done in Farm Machinery experimental work:

(1). COLLECTION OF BLACK MEDIC CLOVER SEED.

(a) With lawn mower and attached grass collector. This was tried preparatory to the adaptation of the horse-drawn lawn mower for such work.

(b) The lezpedeza pan was used for the same purpose; however, it was not successful where Johnson grass was mixed with black medic.

(c) We have made inquiry regarding success with threshing black medic to save the seed. Such information is rather scarce at present.

(2). SECURING CRIMSON CLOVER SEED.

(a) A hand-stripper was made and tried out on the College farm and found entirely satisfactory in collecting crimson clover seed.

(b) The farms of Messrs. Harrington, in Montgomery County, and Sarber, in Elmore County, were visited in order to secure data concerning the success of adapting grain threshers to threshing crimson clover. At a cost of about \$50.00 one may get fair results by means of an attachment to a small grain thresher.

(3). PEA THRESHING.

A visit was made to Tuskegee Institute to investigate the success of the Koger pea thresher. The machine was turning out about *10 bushels of comparatively clean peas per hour*. Peas in this case contained about 50 per cent crabgrass hay.

(4). TRACTOR INVESTIGATIONS

(a) Mr. E. R. Jamieson's farm near Elmore Station was visited. He was using a Denning tractor, plowing sod or heavy clay loam, burning a mixture of 16 gallons kerosene to 4 gallons gasoline. This tractor pulled a 4-disc plow; plowed 5 acres in $7\frac{1}{2}$ hours; burned 2 gallons of oil and 11 gallons of fuel. This is one gallon

of oil and 1.46 gallons of fuel for every 2½ acres plowed.

(b) Farms of Messrs. Goodrich and LaGarde, Alexandria, were visited in the spring. Plowing, harrowing, and general farm work were observed being done by Bull tractors.

(5). *Hydraulic rams* have been tested with water having varying falls and required elevations.

(6). *An A-shaped terracing implement* has been built and tested for laying off both sloping and level terraces.

(7). *A water heating device* has been devised consisting of a coil of 1-inch pipe attached to a barrel. 30 gallons of water were heated for laundry purposes in about 20 minutes.

(8). *A hose level* has been constructed and tested. Its accuracy is remarkable. It may be used where any area of land to be drained is not too large or rough.

Respectfully submitted,

R. U. BLASINGAME,
Agricultural Engineer.

