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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 1917**

By
J. F. DUGGAR
Director

Opelika, Ala.
Post Publishing Company,
1918

AGRICULTURAL EXPERIMENT STATION
 OF THE
 ALABAMA POLYTECHNIC INSTITUTE
 CHAS. C. THACH, President

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Auburn, Ala., Feb. 19, 1918.

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 1917, 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
- **H. B. Tisdale Associate Plant Breeder
- * O. H. Sellers 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 in Entomology
- * D. C. Warren Field Agent in Entomology

DRAINAGE

**Guy A. Hart, in charge.

FARM MACHINERY

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

HORTICULTURAL INVESTIGATIONS

* G. C. Starcher, in charge.

- * J. C. C. Price Associate Horticulturist
- C. L. Isbell Field Agent in Horticulture

JUNIOR AND HOME ECONOMICS EXTENSION

**L. N. Duncan, in charge.

- **Miss Mary Femeinar State Agent Girls' Canning Clubs
- **J. C. Ford In charge Pig Clubs
- **C. E. Newman Assistant in Boys' Corn Clubs
- **Miss Gladys Tappan 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.

***Resigned.

REPORT OF WORK DONE DURING 1917 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 1917, 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 published at the expense of the State appropriation for Local Experiments:

- Bulletin No. 198: Velvet Beans Compared with Cottonseed Meal for Fattening Steers.
Velvet Beans, Cottonseed Meal and Corn as Feeds for Dairy Cattle.
Velvet Bean Pasture Compared with Corn and Dried Blood; Velvet Bean Meal Compared with Corn for Fattening Hogs; by the Animal Husbandman and Assistants.
- Circular No. 35: Annual Report of the Director of the Experiment Station on Work Done Under the Local Experiment Law in 1916.
- Circular No. 36: Preserving Eggs for Home Use; by the Animal Husbandman.
- Press Bulletin No. 67: (Reprint.) Oat Smut; by the Director.

FARM MACHINERY

The Agricultural Engineer has given the greater part of his time to Extension work, including the drawing of plans and furnishing of blue prints for barns and other farm structures, assistance in the installation of water systems, construction of silos, operation of tractors, etc.

Under the head of the Local Experiment work he has continued to give attention to certain lines of machin-

ery, especially for the harvesting and threshing of cowpeas and other legumes, and to the lines indicated in report made a year ago.

INJURIOUS INSECTS

The Entomologist and his assistants have continued to give attention to the boll weevil, with special reference to studying the effects of weather conditions as determining the extent of injury and as a possible means of forecasting the extent of future injury.

The presence of the dreaded sweet potato root borer in Florida, and the fear that its depredations had been extended into the southern counties of Alabama made necessary a number of trips and careful examination of sweet potatoes on a number of farms in that part of the State. It is gratifying for me to be able to report that no evidence could be found that the Alabama line had yet been crossed by this dangerous insect. Quarantine regulations, adopted as the result of these investigations, will prevent, it is hoped, the entrance of the sweet potato borer into any part of Alabama.

The Argentine ant, a troublesome household and farm pest in some localities, especially in Central Alabama, and the soft brown scale and other insects affecting citrus fruits have received the attention of the Entomologist.

LIVESTOCK AND POULTRY INVESTIGATIONS

The experimental feeding of beef cattle has been continued at Allenville, on the line between Hale and Marengo Counties. A comparison between cottonseed meal and velvet beans showed that when twice as many pounds of unhulled velvet beans as of cottonseed meal were fed the average daily rate of gain to steers was practically the same.

In a comparison of corn silage with sorghum silage for steers each 100 pounds of gain in weight required 3235 pounds of sorghum silage as compared with only 2811 pounds of corn silage.

At Allenville the relative carrying capacity of pastures of Bermuda, Johnson grass, and large water grass (*Paspalum*) was continued, using one-year old heifers as experimental live stock.

Feeding experiments with steers, especially with reference to determining the best methods of preparation

of velvet beans, are in progress at Allenville during the winter now drawing to a close.

Experimental work in feeding hogs has been conducted at Ozark, Dale County, and later near Union Springs, Bullock County. One outstanding practical point in these experiments was the profit from feeding a small amount of tankage to hogs while grazing on peanuts. This increased the daily rate of gain from 1.27 pounds to 1.67 per day per pig. Moreover, the tankage reduced the cost per pound of gain; that is, notably increased the profit. The application of this practice throughout the region where hogs are fattened extensively on peanuts would add many thousands of dollars to the profits of the farmers who grow hogs.

At Union Springs data were secured to determine whether it is more profitable to sell peanuts to the oil mills at present prices or to utilize them by "hogging off." Both the yield of peanuts and the yield of pork per acre showed large profits in utilizing the crop by either method. This experiment will need to be repeated for one or more years before a final conclusion is justified.

The experimental feeding of several lots of purebred Leghorn laying hens has been continued at Citronelle, Mobile County. Experiments were made in testing methods of preserving eggs.

LOCAL WORK IN HORTICULTURE

Various kinds of spraying materials were tested in an orchard near Opelika, Lee County, with most gratifying results in the increased crop of apples and improved condition of the trees.

A fertilizer experiment was begun in an orchard in Madison County.

Fertilizer experiments with satsumas are being conducted in an orchard at Silverhill, Baldwin County, partly as a means of noting their effect in assisting in the recovery of trees injured by the destructive freeze in February, 1917. Extensive studies have been made of the effects of various preceding methods of tillage, fertilization, etc., in reducing or increasing the amount of damage to satsumas, grape-fruit, and kumquats from the freeze mentioned. The results are in press as an Experiment Station Bulletin.

Numerous tests of varieties and specimens of new fruits and also of dasheens were continued.

PLANT DISEASES

The Plant Pathologist has been confronted with an even larger array of plant diseases than heretofore. Among those receiving especial attention during the past year are the following:

A leaf disease of Sudan grass and Johnson grass, for the prevention of which he is working out a method of treating the seed of these grasses;

Stem and leaf diseases of vetch, bur clover, and crimson clover, for which there is hope of prevention by seed treatment;

A diseased condition of peach trees in South Alabama, apparently connected both with the frost injury and the presence of a fungus;

A disease of the corn plant, serving to darken and otherwise injure the leaves and leaf sheaths, has been widely prevalent, and has apparently caused noticeable injury, especially in bottom lands in the central part of the State. This subject is under investigation;

Two diseases of soybeans;

Two leaf spots and a root rot of velvet bean plants;

The various rots with which the dasheen is affected during storage have been investigated.

The Pathologist has devoted much time to correspondence, giving information regarding the best method of combatting numerous plant diseases, and to determining the kinds of diseases and the extent of injury throughout the State. His work is closely connected with the effort to increase the production of diversified crops.

PLANT BREEDING

One feature of this work consists in the testing out by farmers in all parts of the State, of new varieties and strains of wheat, oats, corn, cotton, and other crops bred up by systematic selection at the Experiment Station at Auburn. In this way seed of improved varieties are multiplied and disseminated without the demoralization resulting from free seed distribution.

A feature of the study of soils and fertilizers which was prominent during the past year consisted in field experiments to determine the effect of lime on different crops and various soils. Moreover, laboratory tests were made to measure accurately the amount of lime required to overcome the acidity in most of the types of soils on which fertilizer experiments were conducted. The results showed that more than half of the soils in-

vestigated required at least 1 ton per acre of ground limestone to correct their natural acidity, and thus fit them for the maximum production of certain of the diversified crops.

JUDICIOUS FERTILIZING PROFITABLE

A single instance may serve to exemplify the immediate financial value to an individual farmer and to an entire section of the State of the fertilizer experiments that are being conducted under this law. In one such experiment in Conecuh County the increased value of the cotton crop per acre, after paying the cost of the fertilizer was as follows:

\$10.16 from 240 pounds of acid phosphate alone;

\$28.92 from a mixture of this amount of acid phosphate with 200 pounds of cottonseed meal.

When 200 pounds of kainit per acre was used the present high price of potash absorbed all the profits from the other two fertilizers, bringing the net loss from using this combination, including potash, to \$1.36 per acre.

On the other hand note the difference in the fertilizer requirements of a soil in the adjacent county of Wilcox where potash was highly profitable in spite of the present high price. In this case the last named mixture of all three fertilizers gave a net profit of \$23.72 per acre, a large part of which net profit was due to the use of potash in spite of the fact that it was applied in the form of kainit costing \$140.00 per ton.

With sweet potatoes a judicious combination of fertilizers increased the yield in one case by more than 99 bushels per acre. Other similar instances are mentioned in the report of the Field Agent.

FIELD CROPS AND FERTILIZERS

In 1917 442 field experiments were made to determine the fertilizer requirements of the principal soils of Alabama, and the crops and varieties best adapted to each part of the State. Such experiments were made in every county, four or more being located in nearly every county. A full list of the field experiments under way is given in the report of the Field Agent (page 21).

In this connection it is not inappropriate to state that the general adoption of velvet beans in all parts of the State in 1916, and especially in 1917, was in part the result of numerous tests of the principal varieties of velvet beans made by this Station in preceding years

under the provisions of the Local Experiment Law. Such tests constituted a basis for the information which caused county farm demonstration agents to urge the universal growing of this plant, with the resulting acreage of more than 2,400,000 acres in 1917.

DRAINAGE WORK

As heretofore there has been cooperation between the Experiment Station and the U. S. Department of Agriculture. By this agreement the expert services of the Government Drainage Engineer have been available to supervise this work.

Mr. R. L. Grabell, acting as Assistant Drainage Engineer, has done most of the experimental drainage work under the supervision, first, of Mr. Lewis A. Jones, and later of Mr. Guy A. Hart, U. S. Drainage Engineer. A detailed statement of the drainage activities is found in this report under the heading, "Drainage Engineering."

As heretofore, much attention has been paid to tile drainage. Examinations have also been made of six tracts of land, with a view to advising their owners as to means by which such land might be irrigated; four of these projects have been surveyed for irrigation.

BOYS' CLUB WORK

The total enrollment in corn and other boys' clubs in 1917 was 7,138. Short courses in agriculture for club boys were held in forty counties, and the usual State Short Course for boys was held at Auburn in the summer of 1917.

HOME DEMONSTRATION WORK

In the Home Demonstration Work a larger increase has been made in the number of employees than in any other activity of the Extension Service. A part of the salary and expenses of a few of these workers are paid from the Local Experiment Fund.

During the past summer Miss Mary Faminear was appointed State Home Demonstration Agent and the staff of Assistant State Home Demonstration Agents has been increased from two to four. By means of the funds from Congress under the Emergency Food Law it has been possible to increase the number of County Home Demonstration Agents from 29 to 52. Those counties not having the full time of one agent receive half the services of an agent working in two counties.

The enrollment in girls' clubs was 4,595, an increase of about 100 per cent compared with the preceding

year. Seventy per cent of these girls reported and put up nearly 670,000 cans or equivalents. Sewing and gardening were among the activities in which most of the club girls engaged.

In home demonstration clubs 2818 women were enrolled. Among their activities were cooking, canning, gardening, butter making, poultry raising, and the installation of household conveniences. More than a million and a half containers were packed with fruits and vegetables, of an estimated value of \$307,639.00.

The annual short course of instruction for club girls was held last summer at Montevallo and was attended by 115 girls from 23 counties. In 21 counties local short courses were held, attended by 1,004 girls, in addition to its visitors.

That home demonstration is successfully performing one of its functions,—providing the girls and women on the farms with a source of personal income,—is evidenced by the fact that about 75 girls are reported as paying all or part of their expenses in high schools with funds earned through club activities.

This branch of the Extension Service has borne the chief responsibility for the conservation of food in the home. In addition to the routine work along this line by all county home demonstration agents, a special course in food conservation, including canning, was conducted at Auburn near the beginning of the canning season by the combined forces of the home demonstration leaders and the horticultural department of the Extension Service of the Alabama Polytechnic Institute. This was in large part repeated by the same staff at most of the colleges and normal schools in Alabama.

Home demonstration agents held 3,975 meetings and demonstrations, attended by 619,724 people.

PIG CLUBS

The enrollment was 2,428 in 53 counties. This work has especially appealed to bankers, who in many localities have loaned funds on most liberal terms to enable needy boys to purchase pigs. At this time when the production of an increased supply of meat, and especially of fat, is essential to the success of our country and of our country's allies, the boys, in their organized pig clubs, are doing a work that is extremely important. It will require the continued efforts of both the boys and of mature farmers to effect the increase of 30 per cent. in pork production which the government asks as one of Alabama's contributions in 1918 to the winning of the war.

**TREASURER'S REPORT LOCAL EXPERIMENT
FUND FOR THE YEAR 1917.**

RECEIPTS

To cash balance from 1916.....	\$ 3,269.19
To cash from State.....	27,000.00
Total.....	\$30,269.19

DISBURSEMENTS

By amount paid Agriculture.....	\$ 7,433.01
By amount paid Horticulture.....	2,025.65
By amount paid Animal Husbandry.....	3,664.50
By amount paid Extension (Junior and H. E.).....	4,437.12
By amount paid Printing and Administration.....	1,998.39
By amount paid Entomology.....	2,430.67
By amount paid Drainage and Farm Machinery.....	1,011.08
By amount paid Plant Breeding.....	836.64
By amount paid Plant Pathology.....	1,118.48
By amount paid Poultry Husbandry.....	1,005.26
By balance carried to 1918.....	4,308.39
Total.....	\$30,269.19

Respectfully,

M. A. GLENN,

Treasurer, Alabama Polytechnic Institute.

Subscribed and sworn to before me, this 19th day of
January, 1918.

B. L. SHI, Notary Public.

This is to certify that I have compared the account
with the ledger account of the Treasurer, and this is a
correct transcript of the same.

C. C. THACH,

President, Alabama Polytechnic Institute.

PART II
DETAILED REPORTS OF HEADS OF DE-
PARTMENTS

REPORT OF AGRICULTURAL DEPARTMENT

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

Sir:

I respectfully submit the following as a report on the work done under the Local Experiment Fund by the Agricultural Department of the Alabama Experiment Station in 1917:

The number of distinct lines of experimentation conducted by this Department was forty-two. As in previous years it was necessary to locate the experiments in every county in Alabama in order to secure information relative to as many soils as possible, and under the different climatic conditions which the State affords. No county received less than two experiments, and all but three counties had four or more tests. The total number of experiments arranged for the season of 1917 was 442, with 304 experimenters.

The following list shows the kind of experiments which were undertaken by this Department in 1917:

Barley, extensive variety experiments.
Corn, complete fertilizer experiments.
Corn, complete lime experiments.
Corn, time of applying nitrate of soda.
Corn, sources of nitrogen experiments.
Corn, extensive variety experiments.
Corn, short variety experiments.
Corn, ear-to-row breeding experiments.
Corn, multiplication.
Cotton, complete fertilizer experiments.
Cotton, complete lime experiments.
Cotton, time of applying nitrate of soda.
Cotton, sources of nitrogen experiments.
Cotton, extensive variety experiments.
Cotton, extensive wilt variety experiments.
Cotton, short variety experiments.
Cotton, short wilt variety experiments.
Cotton, multiplication.
Cowpeas, extensive variety experiments.
Fertilizer, rotation experiments.
Forage, crop experiments, extensive.

Forage crop experiments, miscellaneous, winter.
 Forage crop experiments, miscellaneous, summer.
 Kudzu multiplication.
 Lespedeza, complete fertilizer experiments.
 Medicago, short variety experiments.
 Oats, extensive variety experiments.
 Oats, multiplication.
 Peanuts, complete fertilizer experiments.
 Peanuts, extensive variety experiments.
 Plant-lime experiments.
 Rye, extensive variety experiments.
 Rye, multiplication of Abbruzzi.
 Soybeans, short variety experiments.
 Sudan grass, experiments.
 Sugar cane, complete fertilizer experiments.
 Sugar cane, multiplication of Japanese.
 Sweet potatoes, complete fertilizer experiments.
 Velvet beans, extensive variety experiments.
 Vetch, short variety experiments.
 Wheat, extensive variety experiments.
 Wheat, multiplication.

The testing and multiplying of small grains was given special attention during the past season. Varieties of wheat, oats, rye, and barley were tested in comparison with other varieties of the same crop. Extreme cold weather in February damaged many of these tests but good results were secured in the experiments in the southern part of the State. In a wheat variety experiment at Canoe, Escambia County, all varieties were ruined by rust except Alabama Blue Stem from Auburn, which produced about eight bushels per acre.

The Station had for distribution in the fall of 1916 a small quantity of a pure strain of Alabama Blue Stem wheat. This seed was distributed to a few farmers, with the understanding that they were to sell all of the product, which they did not plant, to farmers which the Station would designate. By this means, several growers of this variety of seed are now to be found in various parts of the State. It is hoped that by the fall of 1918 there will be several hundred bushels of this pure seed for sale.

All strains of oats which were distributed by the Station during the fall of 1916 were killed by cold.

The variety of forage crops tested in 1917 was increased by the addition of several medicago varieties to the bur clover experiments and by the addition of several new grasses to the summer experiments.

Unusual care was given to the seeding of the winter forage crop tests and Station representatives made special efforts to assist the experimenters at seeding time. Several of the true clovers, vetches, medicagoes,

and small grains were tested as winter forage crops. Among the summer growing forage crops were various grasses (Sudan, Rhodes, Natal, etc.), cowpeas, soybeans, Japanese sugar cane, velvet beans, and Kudzu.

The velvet bean variety experiments were made to include the Wakulla variety in addition to the six other varieties which were tested in 1916. Kudzu is being studied closely with a view of ascertaining its value as a grazing crop and as a hay crop, also whether or not it can be eradicated after it is well rooted. The number of Japanese sugar cane experiments in North Alabama was increased in order to further test its value as a forage and for syrup.

One form of experimentation to which this Department continues to give considerable attention is the conducting of fertilizer experiments. The high price of commercial fertilizer made it necessary to reduce the number of complete fertilizer tests, but, even with this handicap, more than eighty-five experiments were made with commercial fertilizers and more than twenty with lime. These experiments were made chiefly with corn, cotton, peanuts, lespedeza, sweet potatoes, and sugar cane. Many of these tests show large increases, and in many cases, large profits were obtained even when cottonseed meal, acid phosphate, and kainit, costing respectively, \$50.00, \$18.00, and \$140.00 per ton were used. Interesting data from some of these tests can be found further on in this report.

The question as to whether a variety of cotton which blooms early really sets its fruit early was studied during the blooming and early opening period of three of the cotton variety experiments in 1917. Counts of the blooms that opened on fifty stalks of each variety were made each day for fifteen days on each experiment; and at opening time, three counts, each five days apart, were made of the open bolls. This work will be continued in 1918 after which time the results will probably be published.

The cooperation of this department with the Division of Soils which was begun in 1916, to determine the lime requirements of various soils of the State, was continued. Further samples of soil were secured from our experimental plots, and additional laboratory tests were made to see if lime was required by these soils. The results show a lime requirement varying from no lime to a calcium carbonate requirement of

4,000 pounds per acre. Soil from sixty-three different plots was tested for lime requirement, and of this number, approximately 57 per cent. need at least one ton of lime to correct the acidity.

A letter was written to each experimenter from whose farm a sample of soil was taken, stating the lime requirement of his particular soil, and giving him addresses of dealers in ground limestone. Bulletin 161 of this Station, "Lime for Alabama Soils," was also mailed to him.

The usual number of extensive variety experiments with cotton, corn, peanuts, cowpeas, and velvet beans were conducted during the past season. The tests are more valuable than those of 1916 because there were no damages by excessive rains, and in the case of cotton, by boll weevils.

It is interesting to note the value of experimental work with varieties. For instance, in the case of variety tests with corn at Athens, the variety that ranked first there, was thirteenth at Uniontown, and eighteenth when carried to Uriah, Monroe County. Relative yields of the different varieties of corn varied from 25.6 bushels to 42.2 bushels in one experiment and yields of the different varieties of cotton in one experiment varied more than 450 pounds per acre.

Taking the average price of corn as \$1.25 per bushel and seed cotton at 11c per pound (these are approximately the figures given by Mr. F. W. Gist of the Bureau of Statistics) we find from the experiments mentioned that a man planting the highest yielding variety of corn would make a profit of \$20.75 per acre more than by planting seed of the lowest yielding variety. In the case of cotton his profit would be \$49.50 more per acre by planting the highest yielding variety than by planting the lowest. (It is interesting to know that the variety of corn which yielded lowest, 25.6 bushels per acre in the above named experiment, ranked first in another test in 1917.)

The value of making fertilizer experiments throughout the State cannot be over estimated. The farmers are showing special interest in the fertilizer question today and are wanting to know whether or not to use fertilizers for such crops as corn, cotton, and peanuts when fertilizing elements are selling at prices ranging from 30 to 500 per cent, and even more, above normal.

It was in anticipation of such condition that the num-

ber of fertilizer experiments was kept as large as possible during the year 1917, and the value of some of these experiments may be seen from the following:

Comparing two experiments with cotton, located in North Alabama, one near Hartsell, the other about thirty miles north, near Athens, we find at Hartsell acid phosphate, when applied alone at the rate of 240 pounds per acre gave a profit of \$9.28 per acre; but at Athens, when applied to a soil of a somewhat different nature, it gave the remarkable profit of \$27.76 per acre. In the same experiment a mixture of 200 pounds of cottonseed meal and 240 pounds of acid phosphate gave a profit of \$42.12 at Hartsell and \$36.84 at Athens. Note that in the latter case the larger profit is on the Hartsell soil, while in the former the Athens soil produced the larger profit. Note also the necessity of fertilizers as indicated by profits.

In Conecuh County near Herbert, a profit of \$10.16 was received from the application of 240 pounds of acid phosphate alone. A profit of \$28.92 was received from the application of a mixture of 200 pounds of cottonseed meal and 240 pounds of acid phosphate; while the application of a mixture of 200 pounds of cottonseed meal, 240 pounds of acid phosphate, and 200 pounds of kainit resulted in a financial loss of \$1.36 per acre.

Compare the above with the results from an experiment on a different soil at McWilliams, which is in the adjoining county. We find that on the McWilliams soil an application of 240 pounds of acid phosphate proved unprofitable by 40c per acre; the application of 200 pounds of cottonseed meal and 240 pounds of acid phosphate gave a profit of \$13.08 per acre; while a mixture containing 200 pounds of cottonseed meal, 240 pounds of acid phosphate, and 200 pounds of kainit gave a profit of \$23.72 per acre. Note that on the McWilliams soil kainit gives a profit when applied in a complete fertilizer, although it is calculated as costing \$140.00 per ton.

When the proper fertilizers were applied the yield of sweet potatoes was increased over an unfertilized plot as much as 99.7 bushels per acre, while a loss of 9.5 bushels per acre is recorded in the same experiment when other fertilizing elements were used.

How these results are taken and used, directly, by the farmer may be seen by the following:

A farmer in North Alabama who had been buying mixed fertilizers containing five per cent. potash was induced to take an experiment with cotton. The first year's experimentation showed that his soil did not need potash for cotton. However, he was not satisfied with the results and asked for the test the second year; the second year's results were practically the same as the first, and so have been other year's results since then. This farmer has since the second year of his experimental work been using fertilizers containing only nitrogen and phosphate. Further than this, he has been buying his own raw materials, mixing them himself, and applying 400 pounds of home mixed goods per acre instead of 200 pounds of ready-mixed goods, and in 1918, he will probably apply 600 pounds per acre instead of the smaller amounts.

Another example: The farmer at Herbert whose results are cited in another paragraph in this report, had planned to use acid phosphate alone to his cotton in 1918, because, as he said, cottonseed meal was too costly at \$50.00 per ton. The Station representative who visited him had but little trouble in getting this man to promise to add cottonseed meal to his acid phosphate when the representative presented the results of the former year's work. As can be seen by referring to another paragraph in this report, acid phosphate gave a profit of \$10.16 per acre on this soil, while a mixture of cottonseed meal and acid phosphate gave a profit of \$28.92 per acre.

One line of experimental work which is being conducted that is of much assistance to the farmer, as well as to the Experiment Station, is the making of short variety experiments of varieties of various crops. In conducting one of these experiments the farmer is furnished a small quantity of seed, usually four varieties of the crop which he wishes to test, after he has signed an agreement to compare these varieties with his own variety of the same crop. Such experiments not only secure information for the Station, but are the direct cause of the farmer's becoming acquainted with new varieties which are often superior to his own. The experimenter secures seed of the highest yielding variety, and through him the community becomes acquainted with a variety which is often more suitable to their conditions than others which are grown there.

Respectfully submitted,

J. T. WILLIAMSON, Field Agent.

REPORT OF ENTOMOLOGIST

Auburn, Ala., January 23, 1918.

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

Sir:

Herewith I give you a report of the Local Experiment work done during the calendar year 1917.

Boll Weevil. The boll weevil has now advanced so it occurs in all of Alabama except for a distance of about fifteen miles southwest from the extreme north-eastern corner of the State.

Argentine Ant. The Argentine Ant has been located in Lowndes, Montgomery, Dallas and Mobile Counties. Some control work has been done, and some additional work along this line is planned.

Citrus Insects. Citrus insects have been greatly reduced in numbers this year following the most severe cold experienced since 1899, except soft brown scale which has been more abundant than ever before and has also proven harder than usual to control. Fumigation investigations will be extended to include this subject.

Sweet Potato Root Borer (Cylas formicarius). Sweet potato root borer presence in Alabama has been suspected but quite extensive inquiry and field and shipping shed inspections have failed to give as yet a single positive proof of the presence of this pest in Alabama.

Very truly yours,
W. E. HINDS, Entomologist.

REPORT OF ANIMAL HUSBANDMAN

Auburn, Ala., February 18, 1918.
Prof. J. F. Duggar, Director,
Alabama Experiment Station,
Auburn, Alabama.

Sir:

I respectfully submit the following report of Local Experiment Work conducted by the Animal Husbandry Department during the past fiscal year:

BEEF CATTLE

The cooperative steer feeding work at Allenville, Marengo County, Alabama, was continued during the year. Judge B. M. Allen, of Allenville, furnished the feed and cattle for the experiment and the Alabama Experiment Station furnished a man, Mr. Ernest Gibbens, to live on the farm and have personal supervision of the work.

At present sixty head of cattle, divided into four lots of fifteen each, are being fed as follows:

- Lot 1. Velvet beans in pods, and sorghum silage.
- Lot 2. Velvet beans in pods, natural condition, and sorghum silage.
- Lot 3. Velvet beans in pods, ground to a meal, and sorghum silage.
- Lot 4. Cottonseed meal and sorghum silage.

The above experiment is being conducted to test the various methods of preparing velvet beans as the concentrate part of the ration for fattening steers; and the relative feeding value of velvet beans and cottonseed meal as the concentrate part of the ration for fattening steers.

The experiment now under way is the third year's work in testing the relative feeding value of cottonseed meal and velvet beans for fattening steers. A second report of this experiment is found in Bulletin No. 198, issued by this Department in November, 1917. The general summary statements of the past year's work on this subject are as follows:

1. The steers used in this test were from one to two years old. They were grade Angus, Hereford, and Shorthorn.
2. At the beginning of the test they averaged about 775 pounds.

3. The thirty head of steers were divided into two lots and fed as follows:

Lot 1. Velvet beans in the pod and corn silage.

Lot 2. Cottonseed meal and corn silage.

4. For the 119 day feeding period average daily gains of 1.6 and 1.55 pounds were secured in Lots 1 and 2 respectively.

5. It cost \$9.30 and \$10.42 to make 100 pounds of gain in Lots 1 and 2 respectively.

6. The steers cost six cents per pound when they were put in the feed lot. At the close of the experiment they were sold in St. Louis. The velvet bean steers sold for \$9.75 per hundred weight, and the cottonseed meal steers for \$9.40 per hundred weight.

7. Each steer in Lot 1 (velvet beans) netted a clear profit of \$19.62; and Lot 2 (cottonseed meal) \$16.39.

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

9. In this experiment one pound of cottonseed meal took the place of 2.05 pounds of velvet beans in the pod. The velvet bean lot, however, required only approximately two-thirds as much silage as the cottonseed meal lot.

During the past year an experiment was conducted with a view of determining the relative carrying capacity of some pasture grasses adapted to the lime lands of West Alabama. The three grasses compared in this experiment were Bermuda, Paspalum, and Johnson grass. The experiment will be repeated the coming summer and will give us sufficient data to draw definite conclusions on this subject.

Hogs

The cooperative experimental work with hogs was transferred during the year from Ozark, Dale County, Alabama, to Union Springs, Bullock County, Alabama. The experimental work with this class of live stock is now being conducted on the farm of Mr. T. R. Martin, at Union Springs. Mr. Martin furnishes the hogs, feed and equipment for the work, and the Alabama Experiment Station furnishes a trained man to live on the farm and have personal supervision of the experiments.

Sixty head of hogs were grazed on peanuts for eight weeks this past fall. Following the peanut pasture period forty-five head were divided into three lots of fifteen each and fed in dry lot for five weeks as follows:

Lot 1. Two weeks on corn and tankage in self feeder, and three weeks corn 2 parts, and cottonseed meal 1 part, in self feeder.

Lot 2. Velvet beans one part and corn four parts.

Lot 3. Corn and tankage in self feeder.

The three lots of hogs were sold at the close of the period to the Birmingham Packing Company, Birmingham, Alabama. The packer classed the hogs as medium soft, consequently the finishing period increased the value of the hogs one-cent over straight peanut-fed hogs (oily carcass).

Lot 3 returned the greatest profit per hog, while Lot 2 returned the least profit.

An experiment was conducted at Allenville under the personal supervision of Mr. Gibbens testing the best method of grazing alfalfa pasture with hogs, and to test the relative profits to be derived from an alfalfa crop when sold as hay as compared with being grazed by hogs. Four one-acre plots were used in this test as follows:

1. Enough hogs were kept on this acre throughout the grazing period so that the entire crop was consumed by the hogs with as little injury as possible to the stand.

2. A limited number of hogs were kept on this acre so that the alfalfa made a fair growth and was cut occasionally for hay.

3. This acre was hurdled off so that the hogs were kept moving every few days in rotation, and enough hogs were used to consume the alfalfa without injury to the stand.

4. This acre was cut for hay at the proper stage of growth.

Lots 1, 2, and 3 were fed a uniform ration of corn. This experiment will be repeated this coming summer.

POULTRY

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

1. A study of several feeds as to their relative efficiency and economy in egg production.

2. A study of the influence of selection on egg production.

3. A study to determine the best age to market poultry.
4. A study as to the relative profits derived from a farm flock of poultry as compared with a flock handled on a commercial basis.
5. A study of several methods of preserving eggs for home use.

Very respectfully,

GEO. S. TEMPLETON, Animal Husbandman.

REPORT OF HORTICULTURIST

Auburn, Ala., February 15, 1918

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

Sir:

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

There has been a continuation of the work in testing varieties of:

Almond	Loganberries
Apricots	Nectarines
Butternuts	Olives
Dasheens	Peaches
Calomindin	Pistaches
Caraca papaya	Prunes—Italian
Feijoa	Quince
Figs—Smyrna, Capri	Sapota
Grapes—Vinefera	Walnuts—English
Gauva	

One local experiment with various kinds of spraying materials was started in the orchard of Mr. W. E. McClendon, Opelika, Alabama. The first season's results were most gratifying indeed and plans have been completed for the continuation of the work at this place.

Another spraying experiment was put on in the orchard of Mr. E. E. Polla, Montgomery, Alabama, but, owing to severe freeze injury, no results were secured.

A small experiment with nitrate of soda, used at varying rates, was inaugurated in the orchard of Kelly Brothers, at Jeff, Alabama. This work will be enlarged considerably during the present year to include not only fertilizing experiments, but spraying experiments as well.

Two experiments, covering considerable scope, were put on in the orchard of Dr. O. F. E. Winberg, Silverhill, Alabama, to test the value of various fertilizers, applied at different seasons, on satsumas, which had been injured by freeze.

A large amount of data was collected, showing the influence on freeze injury to satsumas, grapefruit, kumquats and other citrus fruits; of various methods of tillage, fertilization, etc. These data have been prepared and are ready for publication in bulletin form.

Since we have secured a new man, Mr. Leon A. Hawkins, we will be able to enlarge the scope of work during the next year.

Very sincerely yours,
G. C. STARCHER, Horticulturist.

REPORT OF DRAINAGE ENGINEERING

Washington, D. C., January 17, 1918.

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

Sir:

Following is a brief resume, prepared for your reference, of the work done by this Office during the calendar year of 1917, under the cooperative agreement between this Office and the Alabama Experiment Station.

From January 1st to September 1st, Mr. Lewis A. Jones, Senior Drainage Engineer, was in charge of the Office at Montgomery and directed the work of the other engineers. Since the 1st of September the Office has been under the direction of Mr. Guy A. Hart, Drainage Engineer, while Mr. R. L. Grable has assisted with the work done by the Office from February 25 to December 1.

SWAMP AND OVERFLOW

Plans with the estimated cost of construction were completed for the proposed drainage improvements along the Mud Creek bottoms in Jackson County. The area of this district is about 5,000 acres, but due to the high cost of the work under present conditions, together with the possibility of having a dam established on the Tennessee River by the War Department, a short distance below the outlet of Mud Creek, no legal steps have yet been taken toward any district organization.

At the request of Hon. Edward B. Almon, U. S. Representative from the Eighth District of Alabama, a survey was made and a report written giving the probable cost of the proposed drainage improvements along Pond Creek and Dry Creek, located just east of Tusculumbia and Sheffield, in Colbert County. The Dry Creek project is the more feasible from an engineering standpoint with the cost of reclamation of the 2,000 acres being about \$19.50 per acre, the cost of the Pond Creek project would be nearly \$45.00 per acre. There is considerable interest in favor of drainage in these two districts but outlet conditions are such that it is doubtful if either will be put through at present.

A preliminary examination was made of the Blue Girth and Beech Creek Swamp, a district of about 5,200 acres a short distance east of Selma in Dallas County. The cost of the drainage of this area promises to be very reasonable and, because of the improvement of health conditions so close to Selma, the co-operation of the city is anticipated.

In addition to the above a survey was made of the Gulf water front at Coden, in Mobile County, and recommendations made regarding the building of a seawall for the protection of the agricultural lands and other property against erosion from high water during storm periods.

FARM DRAINAGE

Surveys, with plans and recommendations for drainage have been made for the following tracts, some of them having proceeded with the installation of the proposed improvements:

Judge B. M. Allen	Ohatchee, Calhoun	County.
F. A. Ames	Mobile, Mobile	County.
J. O. Banks	Eutaw, Greene	County.
H. C. Bankston	Albany, Chambers	County.
Black Belt Stock Farm	Bates, Perry	County.
Henry T. Bouchelle	Boligee, Greene	County.
Dr. W. R. Chisholm	Florence, Lauderdale	County.
J. R. Christopher	Athens, Limestone	County.
W. E. Davis	Opelika, Lee	County.
W. Durall Dobbins	Marion, Perry	County.
J. J. Douglas	Florence, Lauderdale	County.
Dr. Gaston J. Greil	Montgomery, Montgomery	County.
W. B. Harrison	Talladega, Talladega	County.
W. C. Harrison	Gallion, Marengo	County.
A. J. Hendricks	Coden, Mobile	County.
D. G. Holloway	Repton, Conecuh	County.
W. E. Hotchkiss	Courtland, Lawrence	County.
J. T. Kirk	Tuscumbia, Colbert	County.
H. C. Marks	Montgomery, Montgomery	County.
W. H. Mead	Autagaville, Autaga	County.
W. G. Mitchell	Demopolis, Marengo	County.
Mrs. Harriet A. McKay	Union Springs, Bullock	County.
T. E. McKinley	Demopolis, Marengo	County.
J. G. Pettyjohn	Hartsell, Morgan	County.
John S. Pollard	Selma, Dallas	County.
S. A. Scott	Lillian, Baldwin	County.
F. R. Smith	Newbern, Hale	County.
Sugar Valley Farms, Inc.	Athens, Limestone	County.
A. C. Summerford	Falkville, Morgan	County.
John H. Thigpen	Uchee, Russell	County.
S. E. Washburn	Bolling, Butler	County.
J. H. Wilson	Lincoln, Talladega	County.
R. E. Wright	Creola, Mobile	County.

An inspection trip was made covering practically every tile drained tract in the State and data were gath-

ered concerning the success of, and the benefits to land and crops, derived from the installation of the drains. The data are to be used in the preparation of a bulletin covering the subject of drainage in this state.

Terracing demonstrations were made on several farms in different parts of the State. Six different tracts of land were examined in connection with proposed irrigation, four of these have been surveyed and plans drawn up showing the proposed improvements.

The bulk of the work done by this Office was during the first six and the last two months of the year, while during the dry season, from July to October, very little field work was required.

Very truly yours,

P. ST. J. WILSON,
Chief Engineer, U. S. Dep't. Agr.

REPORT OF JUNIOR AND HOME ECONOMICS EXTENSION DEPARTMENT

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

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' PLANT CLUBS

C. E. NEWMAN, Assistant Boys' Club Agent.

The following figures show the enrollment in the various Plant Clubs in Alabama in 1917, with the number and percentage of reports from members in each club.

<i>Kind of Club</i>	<i>Number Enrolled</i>	<i>Number Reported</i>	<i>Percent Reported</i>
Corn Club Members	4560	471	10.3
Cotton Club Members	835	51	6.0
Oat Club Members	817	110	13.4
Peavine Hay Club Members ..	817	51	6.0
Peanut Club Members	51		
Potato Club Members	58		
Total	7138	683	

Corn Club members were enrolled in every county in Alabama. The work reported was very satisfactory, despite the unfavorable seasons in many parts of the State. The average yield from the acres reported was 46.41 bushels at a cost of \$0.41 per bushel; with an average profit of \$50.69 per acre.

The percentage of reports received was disappointing, and can be attributed largely to unfavorable seasons and inadequate supervision.

Four Crop Clubs were organized in the twenty-one counties traversed by the Central of Georgia Railway, this company offering a registered Shorthorn bull as a prize in each county. To qualify for membership each boy agreed to grow an acre of corn, an acre of cotton, and an acre of oats followed by peas. This

year calf clubs are being organized instead on a community basis; the Shorthorn bulls being again offered by the Central of Georgia Railway to the community in each county doing the best work.

Peanut and Potato Clubs received very little attention.

The Clubs were organized chiefly through the schools by the combined efforts of County Agents, County Superintendents, and teachers. The various clubs were organized separately, and in many instances were combined to make the Junior Community Agricultural Club. 247 of these clubs were organized in 41 counties of the State. Monthly meetings were held and programs containing timely instructions and suggestions for carrying on the club work were supplied from the office at Auburn. Furthermore, bulletins and letters of instruction were sent from time to time to each member. The County Agents in most counties aided greatly in instructing the members by personal visits and lectures at the club meetings.

Another means of instructing members was the county short courses held in forty counties in 1917 in connection with the teachers' institutes. These short courses usually lasted about three days and consisted of lectures and demonstrations in the various phases of Club Work; such as fall breaking, cover crops, seed selection, seed testing, preparation of seed bed, fertilization, cultivation, swine judging, feeding, grazing crops, diseases of swine, etc.

The Annual State Short Course for club boys also aided greatly in instruction and created a stronger sentiment for community organization.

REPORT OF HOME DEMONSTRATION WORK IN ALABAMA

MARY FEMINEAR

State Home Demonstration Agent.

STATE ORGANIZATION

The past year witnessed a notable and most satisfactory growth in the Home Demonstration Work in Alabama. During part of the time one general agent and two assistants supervised the work, but under the present organization there is one State Agent, whose duties are largely administrative, and four assistant state agents, Mary E. Keown, Louise Thomas, Gladys Tappan, and Mrs. Marjorie P. Trafford. Each assistant is a specialist in her line and will supervise some particular phase of the work—Miss Keown, the Home Demonstration Clubs for Women; Miss Thomas, the clubs for girls; Miss Tappan, the poultry clubs; and Mrs. Trafford, the development of the city work made possible by the passage of the new Food Production Bill of August, 1917. Mrs. Trafford has headquarters at the Alabama Girls' Technical Institute, Montevallo, which institution cooperates with the Extension Service in employing an assistant state agent. The other state workers have their headquarters at Auburn.

DEPARTMENT OF EDUCATION COOPERATES WITH HOME DEMONSTRATION WORK

The State Department of Education cooperates actively with the Home Demonstration Work conducted by the Extension Service. Herbert Spencer says the function education has to discharge is to prepare us for complete living. From his viewpoint, Home Demonstration Work is educative in the highest degree, for it trains its members in the "Four-Square" needs of citizenship and home life. The four H's, emblematic of the girls' work, represent the equal training of the head, heart, hands and health—the head to think, plan and reason; the heart to be kind, true and sympathetic; the hands to be useful, helpful and skillful; the health to resist disease, enjoy life and make for efficiency. The canning club products, therefore, are labeled the 4-H brand.

The center of education is the school system of the State. The demonstration work, to make it most effective, needs the school system. The school system, to make it most effective, needs the home demonstration work. Just to the extent that the school system puts its energy into this phase of education, so much will the energy return to the school to vitalize its course of study. Not only will the pupils exhibit greater zeal in their daily tasks, but their influence will radiate from the school throughout the whole community of which it is the center. There is a constantly increasing demand for club organization each year. One county agent alone cannot answer all the calls, but with the assistance of teachers and other local leaders efforts will be put forth to reach many more communities in 1918.

In counties where well trained women are secured as agents to serve the greater portion of the year, financial assistance is given by the Boards of Education as well as by the Boards of Revenue. During the past year the Boards of Education in each of the following counties assisted in the employment of a Home Demonstration Agent: Autauga, Baldwin, Coosa, DeKalb, Escambia, Jefferson, Lauderdale, Macon, Madison, Marshall, Pickens, Shelby, St. Clair, Tallapoosa, Walker, and Perry. After combining the funds from all sources, there are not then enough funds to put the work in this state on the same financial basis as that of other states, but steady improvement is being made. Many of the counties that have voted the three-mill tax have been able to increase their appropriations and are cooperating with the Extension Service in employing home demonstration agents that are second to none in the United States. The people in these counties point with pride to the excellent results accomplished.

GIRLS' AND WOMEN'S CLUBS

On July 1st, 1917, the following twenty-nine counties were doing regularly organized home demonstration work: Autauga, Baldwin, Calhoun, Chilton, Conecuh, Coosa, DeKalb, Elmore, Escambia, Etowah, Franklin, Jefferson, Lauderdale, Lee, Macon, Madison, Marengo, Marshall, Mobile, Monroe, Perry, Pickens, Pike, Shelby, St. Clair, Talladega, Tallapoosa, Tuscaloosa, and Walker.

GIRLS' CLUBS

In the above counties 4,595 girls between the ages of ten and eighteen grew one-tenth acre gardens according to Government instructions and were taught how to successfully preserve the products from their own gardens as well as those from the home farms and orchards. This was an increase of 100 per cent. over the previous year.

About 70 per cent. of these girls sent in their records and report:

Number pounds of tomatoes grown on tenth-acre gardens	1,021,132
Number containers tomatoes canned from tenth-acre gardens	309,512
Number containers other products from tenth-acre gardens	154,152
Number containers canned from farm and orchard	205,800
Total number containers canned by girls	669,464
Total value of products from tenth-acre gardens	\$ 92,732.80
Total value all products	113,892.89
Average profit per tenth-acre	22.25

Many of the girls were more successful and report profits of \$65.00, \$70.00 and even greater amounts.

Beside the growing and canning of fruits and vegetables, the girls' clubs include various activities as shown below:

Number girls growing winter gardens	864
Number perennial gardens established	142
Number girls making demonstrations in cooking club products	1,264
Number girls making demonstrations in homes	317
Number caps and aprons made	2,968
Number dresses made	188
Number towels and holders made	191

WOMEN'S HOME DEMONSTRATION CLUBS

In the regular home demonstration clubs 2,818 women were enrolled. These carried on demonstrations in cooking, canning, poultry management and dairying in their homes according to instructions by the county agent. While we have not a complete record of their activities, the following will give an idea of some of the work done by them:

Number members enrolled in poultry clubs	298
Number making demonstrations in cooking	2,108
Number carrying on bread demonstrations	1,283
Number fireless cookers made	315
Number iceless refrigerators made	56
Number fly traps made	413
Number kitchen cabinets made	26
Number ironing boards	151

Number shower baths	37
Number houses screened	36
Number improved equipment for dairies	293
Number pounds of butter made	26,416
Number women growing winter gardens	1,252
Number containers fruits and vegetables packed ...	1,538,194
Number gallons brined vegetables stored	16,284
Number pounds dried fruits and vegetables stored...	124,601
Total value canned products	\$307,639.00

Often the best work done by a County Agent cannot be recorded in mathematical terms showing either an increased food production or greater financial returns. If, for only a few of her members, she has lifted the daily routine of housekeeping from the category of drudgery into the realm of art, she has rendered incalculable service. Hence it cannot be said with any degree of certainty that one county surpassed all others. Each has its strong points. This year, however, food conservation measures have been emphasized and it may be interesting to note from the table below some of the results accomplished in seven different counties:

CLUB GIRLS

	No. Enroll- ed	No. Report- ed	No. Con- tainers	Value of Pro- ducts	Prof- its	Winter Gardens
Chilton	256	192	32,037	\$6,714.63	\$4,476.42	0
Coosa	102	73	29,557	5,750.46	3,833.64	25
Elmore	125	85	23,148	6,601.85	4,401.27	75
Etowah	250	196	41,339	9,455.66	6,303.76	100
Lee	300	130	38,344	6,702.00	3,910.40	200
Talladega	280	286	24,529	4,835.43	3,223.86	65
Tuscaloosa	468	293	90,865	10,586.24	7,050.82	40
Total	1781	1091	279,819	50,646.27	33,200.17	505

WOMEN

	No. En- rolled	No. Contain- ers Put Up	Value of Cann- ed Products	Winter Gardens
Chilton	68	25,964	\$ 4,743.41	0
Coosa	28	20,000	4,400.00	40
Elmore	150	50,000	8,334.00	150
Etowah	9	88,000*	14,667.00	0
Lee	300	53,995	9,792.00	250
Talladega	177	22,754	4,450.00	0
Tuscaloosa	123	50,975	11,245.11	100
Total	855	311,688	\$57,631.52	540

*There are only nine regular home demonstration members in Etowah County, but there were more than 200 women who followed instructions given by the county agent who kept record of their canning activities.

DAIRY WORK WITH FARM WOMEN

Through the efforts of the home demonstration agents in a few counties, not only a better grade of butter has been produced, but the housewives have learned to prepare it for market in the commercial one-pound package. The result is that higher prices have been obtained. In Coosa County the advance was 28 cents; in Elmore, 10 cents; in Lauderdale, 35 cents; Lee, 20 cents; Macon, 15 cents, and Tuscaloosa, 15 cents; an average increase in these six counties of about 20 cents per pound.

POULTRY WORK

Last year some definite work was started with the girls and women of the State to increase and improve farm poultry.

Clubs were organized in each of twelve counties with a total enrollment of 610 girls, women, boys and men.

Decided improvement has been made along the following lines: Flocks increased, poultry houses built and repaired, more feed planted, pure bred poultry purchased and improved methods of feeding and management practiced. Better prices for poultry products have also been reported.

The record for Chilton County, which ranks first in poultry work the past year, is given below:

No. members enrolled	102
No. demonstrators taking charge of entire flock	98
Average number of fowls in flock	40
No. demonstrators purchasing pure bred stock	15
Approximate number of chickens raised	4,500
No. cooperative egg circles organized	5
No. dozen eggs sold cooperatively (8 months)	4,271
Value of eggs sold cooperatively	\$ 741.12
Total number of eggs sold	6,986
Total value of eggs sold	\$2,554.21

Under the direction of Miss Gladys Tappan, Poultry Specialist, this important phase of Home Demonstration Work will be emphasized and definite plans in poultry husbandry undertaken in each county of the State.

STATE AND COUNTY SHORT COURSES

The Annual State Short Course for club girls was held in Montevallo at the Alabama Girls' Technical Institute June 13-23. This was attended by 115 girls from 23 counties and by 18 county agents. The latter with the teachers of the school very materially assisted

the state workers in making this course a success. The girls entitled to attend the State Short Course are the first prize winners in their respective counties.

County Short Courses were also held in twenty-one counties for an average period of three days. These were attended by 1004 girls and a large number of visitors.

At both State and County Courses, special instructions were given in canning, drying, brining, preserving, jelly making, and the uses of Alabama grown products, potatoes, corn meal, peanuts and soy beans, as well as practical lessons in sewing, cooking, care of the sick and poultry raising. Model club meetings were held at which the girls presided. New plays and games furnished the necessary recreation.

Girls who have the benefit of attending these courses develop into splendid local leaders and return to their communities not only instructed along the lines of better home making, but each one is fired with enthusiasm and a desire for a broader and better education than is possible for her to obtain in the average rural school. She therefore resumes her duties with renewed determination to succeed in her year's work and earn sufficient funds to put her through high school at least. There are approximately 75 students in the various county high schools and other state schools who are paying all or part of their expenses with funds earned through club activities.

SPECIAL MEASURES TO MEET FOOD EMERGENCY CONDITIONS

Canning and other food conservation methods were the chief subjects for conservation among all the girls and women of the State, both rural and city. Many of the club women have laid aside literary studies for awhile to become soldiers of the commissary, and are now studying home economics. It is gratifying to note that many of the wealthiest are practicing the most rigid economy in their homes. Some are using the "Ten Lessons on Food Conservation" and other material furnished by the Food Administration and Home Economics Department, and others are following the course outlined in the "Twelve Lessons on Food Thrift for the Housekeeper," published by the U. S. Department of Education, Washington, D. C., as a basis for their studies. Each federated club in the State has at least one meeting during the year on subjects pertaining to home economics.

Special Courses Given: Early in the spring of 1917, to help meet the urgent demands for instruction along the lines of food production and conservation, a special school of instruction was given at the Alabama Polytechnic Institute, Auburn, by the Horticultural and Home Economics Departments. The course was attended by 171 persons from 33 counties of the State, not to mention the local residents who were regular attendants at all meetings and demonstrations. The courses given embraced lectures and demonstrations on the following subjects: Canning, Drying, Brining, Gardening, Bee Culture, and Poultry Husbandry. This course was given by the same instructors at the several state schools. Numbers of students in attendance at these schools went back to their home communities and instructed not only their families and neighbors in the art of canning and other methods of food conservation, but they also offered their services free to those counties desiring their assistance. We have no definite report as to what was thus accomplished but a number of students did splendid work along this line. The State Normal School at Florence conducted special training classes for students who volunteered to give their services to any community or county that desired help in methods of food preservation. Many Alabama girls served their State in this way and helped to store numberless pantries with wholesome products for winter use.

In Montgomery and Tuscaloosa cooperative canneries were established by the club women to care for the surplus produced by the city gardens and that brought in from the surrounding country. Both these canneries proved very successful and filled a need long felt by the people. In Montgomery, committees from various women's clubs supervised the work at the cannery, each committee serving on certain days of the week, and most excellent results were accomplished.

In Tuscaloosa one of the prominent women personally supervised the work during the whole season and succeeded in operating the cannery on a successful business basis. The output of this cannery was 30,000 cans of fruits and vegetables valued at \$6,900.

Besides these two canneries undertaken for philanthropic purposes, there have been forty commercial canneries established in Alabama the past year, with an approximate output of 5,000,000 containers valued at \$750,000.

THE HOME DEMONSTRATION AGENT

The work done in these twenty-nine counties has been supervised by earnest and efficient county home demonstration agents.

Better trained agents have been employed. Seven are college graduates, twenty-two have attended college, five are normal school graduates, and all twenty-nine have had special training in home economics and agriculture. Twenty-one hold teachers' certificates.

In a number of counties this year's contracts have been written for ten or eleven months instead of twelve, to enable the agents to make further preparation for more efficient service.

Twenty-one agents own cars for travel, and two have horses and buggies. Sixteen new cars have been purchased this year, eighteen offices fitted up at the court house or other convenient places, and thirteen women's rest rooms established.

These agents have traveled 109,496 miles over all kinds of roads in all kinds of weather and given 1,725 demonstrations. These demonstrations were attended by 538,146 persons. In addition to these regular meetings, 2,198 others were held with an attendance of 81,578, making a total of 3,975 meetings with a total attendance of 619,724 persons.

EMERGENCY HOME DEMONSTRATION AGENTS EMPLOYED

Since the passage of the new Food Production Bill of August, 1917, the State Home Demonstration Department has been enabled to greatly increase its sphere of usefulness. Beginning September 1st, there were 52 county agents in the State instead of 29, the number on duty the 1st of July. By the middle of February, 1918, the work will have been carried to every county in the State. Where local financial cooperation is not secured it is necessary to group two counties under the direction of one agent.

During the early fall months the new emergency agents organized their respective counties, gave demonstrations in canning, brining, drying, and stressed winter gardens and improved poultry flocks. Numbers of demonstrations were also given in the uses of corn, potatoes, peanuts, soy beans, wheat, and meat substitutes.

COUNTY FAIRS

Seventeen counties put on attractive exhibits of the club products at their county fairs. The county agents also gave demonstrations at the fairs in different methods of preserving foods.

SUMMARY

The Extension Work in Home Economics and Agriculture now being conducted by the United States is a great piece of educational work and is destined to be one of the most potent factors in the uplift and general improvement of rural life in America.

In Alabama this work has continued to grow from year to year, both in interest and numbers. For 1917:

The canning club girls numbered	4,595
Home demonstration members	2,818
Poultry club members	610
Total	7,023
Total number of containers of canned products by club members	2,207,658
Value	\$421,531.89

This work is receiving the loyal support and cooperation of the business men and women of the State, as well as the educational forces. In Jefferson County, the Birmingham Civic Association advanced money to the club girls to purchase cans and accepted the girls' notes as a guaranty of payment. These notes were all met at maturity. Similar arrangements have been made in other counties.

The past year has proven that people in general are awaking to the fact that "Alabama must feed herself." Men and women, girls and boys, are beginning to pride themselves on being of some real use in the world work. So, in the confidence that all pantries will be well stocked with home preserved products, plans on a larger and broader basis than ever before are being outlined for 1918.

BOYS' PIG CLUBS

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

The following report shows some concrete results of the pig club work during the year 1917.

1. Number of counties reporting	53
2. Total number members enrolled	3,428
3. Total number of members reporting (feed phase) ..	325
4. Average weight of meat and pure bred hogs at beginning (brood sows and litters not included) ..	52.5
5. Average weight at close of work (brood sows and litters not included)	192.6
6. Average profit made on each meat hog	\$12.31
7. Average profit made on each meat hog when pasture was used	\$14.23
8. Average profit made on each meat hog without pasture	\$ 9.37
9. Average initial value of meat hogs	\$ 7.62
10. Average final value of meat hogs	\$32.23

Again the slogan adopted for the pig club work has been "Good Pastures on Every Farm, and Good Hogs in Every Pasture." The value of good pastures has been kept before the club members.

Through short courses for club members and appeals to the teachers in various institutes a special effort was made to reach the greatest number of members and to increase the enrollment. These visits to institutes were in most cases followed by a week's work in the counties with the County Agents and County Superintendents in the interests of club work.

In October two agents, Messers. Wise and Bowers, were stationed in this State by the Bureau of Animal Industry, to help in club work.

In nearly all the counties bankers have agreed to let boys and girls borrow money with which to buy pigs for club work. The money to be repaid when the members have made money from their work. Many members are taking advantage of this offer. In several counties the County Agents have ten well organized Community Agricultural Clubs. The idea has been to coordinate and unify club work having a well organized active Agricultural Club in each community made up of members doing various phases of club work instead of having separate pig club, corn club, etc., in each community. Each club, if possible, has adopted one breed of pigs and every member owns a registered pig.

A feature of the work has been the school pig. In Franklin County about forty schools own registered

Duroc-Jersey pigs. Prizes of \$50.00 will be given to the schools of Franklin County that do the best with their school pig. A show of these school pigs will be held at the end of the contest.

A picture of a community club with their registered gilts, in Limestone County, is to appear in the Year Book of U. S. Department of Agriculture.

The Southern Bell Telephone Co. gave out six registered, bred gilts worth \$75.00 each to club boys in Tallapoosa County. The boys are to return pigs to the Company to pay for the gilts given them.

Respectfully,
L. N. DUNCAN,
Supt. Junior and Home Economics Dep't.

REPORT OF PLANT PATHOLOGIST

Auburn, Ala., January 23, 1918.

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

Sir:

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

A large share of the time devoted to Local Experiment work was used in answering letters of inquiry. These letters were much more numerous than in previous years, due to the increase in the number of plant diseases, caused in part by the unusual weather conditions prevailing during the past season. It may be stated that the greater part of these letters had to deal with the diseases of tomatoes, especially Fusarium wilt, blossom end rot, and root knot. The unusual weather during the early part of the season was one of the contributing factors to the destructiveness of wilt.

The loss from blossom end rot can be traced directly to the extreme dry weather at the time the fruit was setting. As usual, root knot was reported from all parts of the State.

In the northern part of the State, black rot of apples causes more loss to the grower than all the other diseases of the apple combined. Due to neglect and carelessness, black rot canker is being allowed to go on unchecked, and it is just a question of a few years, unless rigid measures are taken, that the apple industry will be destroyed.

During the last five years cabbage "drop" has been spreading rapidly in the Gulf Coast section, especially in Mobile County. Owing to the very severe weather prevailing early this year, the loss from drop was very large. Unless precautions are adopted by the grower this trouble will increase each year until the grower will either be forced to use new land or discontinue raising cabbage.

Cabbage "yellows," a very serious trouble in the cabbage growing districts of the North, is just beginning to make its appearance in Alabama, and undoubtedly it will spread rapidly in the sandy loam of the

trucking section. Seed of three varieties resistant to "yellows" were obtained from the Wisconsin Station for testing in the infected sections last winter. Unfortunately, the severe freezes killed the young plants so that the tests were not completed.

Because of the propaganda which is now at its height to greatly increase the production of cereals in the South, much more attention must be devoted to the diseases of these crops. Since the South cannot, as yet, supply the demand for seed, Northern seed is being shipped in, and new diseases are introduced. This point can be well illustrated by the finding of the stripe, net blotch, and *Rhynchosporium* diseases of barley for the first time in Alabama last spring, the seed of which was obtained from the North.

Another trouble which developed last spring on the cereals was anthracnose. Associated with this trouble was some scab and a septoria. On mammoth rye anthracnose was very severe, on the nodes, heads, and roots. Further observations will be made this coming season and some treatment devised to prevent this trouble.

The Physoderma disease of corn was observed for the first time in Alabama last spring. During the summer this trouble was found in practically every corn field in the State. In the majority of the fields it was causing no apparent damage, although in two or three counties infection was more severe, one to five per cent. loss being recorded. The consensus of opinion is that the trouble has been present for many years, and that it has been confused with other diseases.

The anthracnose of Sudan and Johnson grass was very severe in some sections of the State, causing a partial crop failure. These two grasses are widely grown in the South for hay, and some seed treatment is being worked out to prevent it from developing in the field. A seed borne anthracnose is also prevalent on the various varieties of vetch and the clovers, bur and crimson. Some seed treatment must be worked out for the control of this trouble also.

Fusarium wilt of soybeans is now reported for the first time in Alabama. It may become as destructive as other wilts in the South. Some work should be started in developing resistant varieties. A leaf spot has also caused considerable defoliation of the early maturing varieties. The late maturing varieties are,

as a rule, more resistant. Mammoth, the variety commonly grown, is quite susceptible.

This past season two leaf spots and a root rot have been found on velvet beans. The velvet bean has heretofore been regarded as resistant to all plant diseases.

The two outstanding diseases of the potato were reported from the southern section of the State, where a large acreage of early potatoes was planted. Late blight was general throughout this section, in some fields causing a loss of forty per cent or more. A new stem end rot was also observed. At some shipping points the tubers had to be regraded, because of the abundance of this end rot.

A study of the storage rots of the dasheen has also been made. Five fungi causing rots of dasheen in storage were studied in the laboratory. During the summer an attempt was made to determine what rots on the dasheen would develop in the field, from the use of diseased corms. All results were negative, showing that while the rots are very destructive in storage they do not seriously affect the germination of the corm and are unable to attack the growing plants. Some attempt is being made to find some method of storing the dasheens to hold the rots in check.

The peach industry has suffered severely from the abnormal weather conditions of the past two seasons. Coupled with the weakened vitality of the trees a fungus reported on last year has appeared. A study of this trouble is still in progress, together with a study of a second fungus associated with the former on Japanese persimmons and plums. Apparently the same fungus is associated with frost injury, which was very severe on the pecan this past spring.

In going over the report it will be seen that the majority of diseases discussed are reported for the first time. Most of these troubles are also found on crops which are of extreme importance in the present scheme of crop rotation and diversification. As time and facilities will permit, they will be investigated, with a view of preventing or controlling them so that they will not be a menace to the successful and profitable growing of these important crops.

Respectfully submitted,
GEO. L. PELTIER, Plant Pathologist.