

AGRICULTURAL EXPERIMENT STATION

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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 1919**

By
J. F. DUGGAR,
Director

1920
Post Publishing Company,
Opelika, Ala.

Auburn, Ala., Feb. 18, 1920.

HON. M. C. ALLGOOD,

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 1919, with the request that you transmit this report to his Excellency, Governor Thomas E. Kilby.

Yours very truly,

J. F. DUGGAR,

Director Experiment Station of
the Alabama Polytechnic Institute.

AGRICULTURAL EXPERIMENT STATION
OF THE
ALABAMA POLYTECHNIC INSTITUTE

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J. F. DUGGAR, *Director*

AGRICULTURE AND PLANT BREEDING

* J. F. DUGGAR, in charge

- * E. F. Cauthen.....Agriculturist
- * M. J. Funchess.....Agronomist
- J. T. Williamson.....
.....Supt. Co-operative Experiments 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
- * G. L. Burleson.....Assistant in Animal Husbandry

ENTOMOLOGY

* W. E. Hinds, in charge

- * F. L. Thomas.....Assistant in Entomology

HORTICULTURAL INVESTIGATIONS

* G. C. Starcher, in charge

- * C. L. Isbell.....Assistant Horticulturist

JUNIOR AND HOME ECONOMICS EXTENSION

**L. N. Duncan, in charge

- **Miss Mary Femeinar, State Agent Home Demonstration Work
- **J. L. Herron.....Assistant in Boys' Clubs

PLANT DISEASES

* G. L. Peltier, in charge

- * E. F. Hopkins.....Associate

DRAINAGE AND FARM MACHINERY

M. L. Nichols.....Agricultural Engineer

* Devoting only part time to Local Experiment Work.

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

REPORT OF WORK DONE DURING 1919 UNDER THE LOCAL EXPERIMENT LAW

PART I

DIRECTOR'S SUMMARIZED REPORT OF WORK IN ALL DEPARTMENTS.

By

J. F. DUGGAR, Director of Experiment Station.

All of the work reported in this publication was done under the terms of the Local Law passed by the Legislature of Alabama in 1911.

This Law provides for a class of experimental work not sufficiently technical nor sufficiently under the immediate and constant supervision of trained experimenters to be supported by the Federal Hatch or Adams funds, even if the whole of those funds were not required for the experimental work conducted in the fields, barns, and laboratories at Auburn.

The local experiment work thus provided by the Legislature is more popular and more localized than experiment station work proper, and differs from extension or demonstration work in that the local experiment work requires well chosen check or untreated plots and the keeping of careful records for publication for the guidance of farmers cultivating similar soils.

PUBLICATIONS

The publications issued from the Local Experiment Fund for the fiscal year ending June 30, 1919, consist of the following:

Bulletin No. 206: "Grazing Peanuts With Hogs, Versus Marketing a Crop of Peanuts."

Bulletin No. 207: "Local Fertilizer Experiments with Cotton in South Alabama 1914-1918, Inclusive."

Circular No. 39: "The Argentine Ant and How to Control It."

Circular No 40: "Annual Report of Director of Experiment Station on the Work Done Under Local Experiment Law in 1918."

FIELD CROPS AND FERTILIZERS.

Among the lines of experimental work conducted on 274 farms throughout the state by picked farmers working under the supervision of a representative of the experiment station, the following experiments, among others, were conducted.

Corn: Fertilizer experiments, including soil and crop requirements; best combinations; best time of applying nitrate of soda; effects of lime; tests of varieties; breeding for increased yield; and multiplication tests to increase for local use the supply of seed systematically bred up by years of careful plant-to-row breeding at Auburn.

Cotton: Fertilizer requirements of cotton on each of the principal soil types found in Alabama; best time for applying nitrate of soda; and variety tests.

Forage Crops: These include testing, in a number of localities, of an extensive list of forage plants and combinations of grasses and clovers, and in addition the testing, in a larger number of localities, of smaller numbers of forage plants believed to be especially suited to those localities.

Miscellaneous: In addition to the above the following tests, among others, were also made with staple field crops; fertilizer experiments with peanuts, sweet potatoes, and sugarcane; variety tests of peanuts, oats, rye, wheat, and velvet beans.

Lime Requirements of Soils: In addition to field tests intended to throw light on the needs of a number of crops and soils for lime, a large number of samples of soil has been collected for examination in the laboratory by a method which indicates the approximate amounts of lime required to overcome the acidity in each soil. On a special trip for this purpose samples were collected during the past year from four counties in south Alabama. In the preceding year the samples collected and examined had been taken from counties in the northern part of the state.

These lime surveys and examination of samples will be continued, with a view to testing soils from all counties, and with a hope that the data will afford a basis for the publication of a lime map of the entire state.

PLANT BREEDING.

Only a part of the time of the plant breeder is given to the local experiment work. He has conducted extensive breeding experiments in four localities in the southern part of the state, with a view to the testing of varieties and strains of cotton as to their relative resistance to the cotton wilt.

He has supervised the multiplication, in numerous neighborhoods, of wilt-resistant seed, previously bred up at Auburn or elsewhere.

It is a source of gratification that in some localities the progeny of seed systematically bred up at the experiment station at Auburn, and subsequently tested out locally under the Local Experiment Law, has to a large extent supplanted other varieties on the farms of the most progressive farmers.

ENTOMOLOGY.

In this department one of the principal lines of work has been the poisoning of cotton boll weevils with calcium arsenate.

In three, out of the four, localities in which the results of dusting were carefully investigated, there was notable net profit from this operation in 1919, in spite of almost continuous rainy weather.

The method of experimental work consisted in placing a representative of the station on a selected farm to conduct the tests and make the records throughout the late summer and the fall.

The entomologist reports that the sweet potato weevil, the occurrence of which some years ago in the extreme southern part of the state caused justifiable uneasiness, is no longer to be found in Alabama. He also reports that extensive examinations show that there are no pink boll worms in Alabama, as the result of three shipments of cotton made some years ago to Alabama fields from the infested region in Texas.

ANIMAL HUSBANDRY.

The experimental work with beef cattle has continued in cooperation with Judge B. M. Allen on his plantation at Allenville. Last year's work consisted of experiments to determine the cost of wintering cattle of various ages, the value of peanut meal as compared with cottonseed meal, and the value of low-grade John-

son grass hay as compared with sorghum silage. One hundred twenty head of cattle were used in these tests, and, as usual, repetitions will be necessary before the results are sufficiently conclusive for publication.

On sandy land at Union Springs experimental work in feeding hogs was continued as heretofore. The third year's results were secured as to the amount of pork produced per acre by grazing on peanuts. The second year's results were secured in feeding to harden the pork of hogs previously grazed on peanuts. In this test a period of seven weeks of exclusive grain feeding was not sufficient to harden all of the hogs, according to the requirements of the St. Louis market.

Several lines of feeding and management with poultry have been continued on a poultry farm at Citronelle.

HORTICULTURE.

A part of the time of one man has been available for supervising local experiment work in horticulture. Among the activities of the past year were fertilizer experiments with apples in north Alabama; with peaches in Butler County; and with Satsuma oranges in Baldwin and Mobile Counties. A spraying experiment with pecans and the testing of a number of standard and known fruits and nuts were among the local activities of this department.

PLANT DISEASES.

This department has been concerned with observations and experiments relative to certain diseases of cotton and other economic plants.

During the fall the associate pathologist has been engaged in an intensive study of the leaf spot that is very injurious to bur clover. These studies, not yet completed, seem to indicate that the disease may be prevented by a very simple and inexpensive treatment of the seed.

BOYS' CLUB WORK.

Before the passage of the Smith-Lever Act of Congress in 1914 extension work with boys' clubs was chiefly dependent for support upon an item in the Local Experiment Law. Now boys' club work is chiefly supported by extension funds provided under the Smith-Lever Act of Congress and state laws related thereto.

The total enrollment in 1919, including duplicate membership in more than one kind of boys' agricultural clubs, was reported as 7227.

DRAINAGE.

Cooperation has been continued as heretofore with the Federal Department of Agriculture, whose drainage engineers, Messrs. Guy A. Hart and Lewis A. Jones, with headquarters at Montgomery, have been successively in charge.

They report having made surveys for drainage or terracing systems on 32 properties in 14 counties. They have also made preliminary examinations of 6 large tracts of bottom land with a view to the reclamation and drainage of 40,500 acres of swamp land located in 6 counties.

AGRICULTURAL ENGINEERING.

After an interim, the position of agricultural engineer was filled September 1, 1919, by the appointment of Professor M. L. Nichols. In the remaining four months of the year he has made plans for future work, and has made a beginning in some lines of experimental inquiry. One of these is a determination of the most practicable methods of repairing and roofing old tenant houses and other farm buildings. Some work has been done in adapting machinery to the hulling of bur clover seed as a means of improving its germinating power and in order to make more practicable the treatment of the seed for the prevention of the leaf disease of bur clover.

TREASURER'S REPORT, LOCAL EXPERIMENT
FUND FOR THE YEAR 1919.

Receipts

To cash balance from 1918.....	\$ 4,715.69
To cash from State 1919.....	27,000.00
Total.....	\$31,715.69

Disbursements

By amount paid Agriculture	\$ 8,928.21
By amount paid Animal Husbandry.....	4,233.90
By amount paid Extension (Junior and H. E.)	4,623.99
By amount paid Drainage and Farm Machinery.....	135.00
By amount paid Entomology	2,348.26
By amount paid Horticulture	1,837.53
By amount paid Plant Breeding	1,290.78
By amount paid Plant Pathology.....	985.32
By amount paid Poultry Husbandry.....	779.77
By amount paid Printing and Administration.....	2,249.40
By balance carried to 1920.....	4,303.53
Total.....	\$31,715.69

Respectfully,

M. A. GLENN,

Treasurer Alabama Polytechnic Institute.

Subscribed and sworn to before me, this the sixth day of February, 1920.

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.

B. B. Ross,

Acting President, Alabama Polytechnic Institute.

PART II
DETAILED REPORTS OF HEADS OF DE-
PARTMENTS

REPORT OF SUPERINTENDENT OF COOPERATIVE
EXPERIMENTS IN AGRICULTURE

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

Sir:

The following is submitted as a report on the work carried on under the Local Experiment Fund in 1919 by the Agricultural Department of the Alabama Experiment Station:

Lines of Experiments: Three or more experiments with some field crop were conducted in every county in the state, with the exception of Lee. The total number of experiments arranged for 1919 was 422, with 268 experimenters.

Lines of Experimentation: Below are listed the thirty-nine distinct lines of experiments which were conducted during the year, 1919:

- 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, wilt breeding experiments.
- Cotton, multiplication.
- Cowpeas, extensive variety experiments.
- Fertilizer-Rotation experiments.
- Forage crop experiments, extensive.
- Forage crop experiments, miscellaneous, winter.
- Forage crop experiments, miscellaneous, summer.
- Medicago, short variety, experiments.
- Kudzu, multiplication.
- Oats, extensive variety experiments.

Oats, multiplication.
 Peanuts, complete fertilizer experiments.
 Peanuts extensive variety experiments.
 Rice, short variety experiments.
 Rye, extensive variety experiments.
 Soybeans, short variety experiments.
 Sudan grass experiments.
 Sugar cane, complete fertilizer experiments.
 Sweet potatoes, complete fertilizer experiments.
 Velvet beans, short variety experiments.
 Vetch, short variety experiments.
 Wheat, extensive variety experiments.
 Wheat, multiplication.

Forage Crop Experiments: Special attention is being given to winter forage crop experiments. The results from this line of experimentation during the past season give very valuable information in regard to some of the vetches, true clovers, wheat, oats and rye. Detailed notes and pictures were secured of each of the tests.

Soil Acidity Studies: Continuing the soil acidity work, started in 1916 in cooperation with the Division of Soils, many soil samples were taken in Butler, Conecuh, Escambia and Mobile counties during the summer of 1919. These samples are to be used for laboratory studies, especially with reference to their need for lime. Further sampling of the various soils of Alabama will be done from time to time.

Publications and Papers: Bulletin No. 207, "Local Fertilizer Experiments with Cotton in South Alabama, 1914-1918, Inclusive," has been printed and distributed since the last report of this kind. Other bulletins showing the results of the experiments made by this Division will be published this season.

A paper, on the "Need of Cotton for Potash on Coastal Plain Soils, giving an average of the one hundred conclusive experiments in South Alabama, 1911-1918, inclusive, was presented at the meeting of Southern Agricultural Workers in Birmingham last year.

Experimenters: When Local Experiment work was begun by this Division it was very difficult to secure men who were both satisfactory experimenters and in position to make experiments more than one year. Much of this difficulty has now been eliminated. In 1919 more than 74 percent of the experiments located by the Superintendent of Cooperative Experiments in Agriculture were on farms of men who had previously conducted experiments. These men, as well as the other 25

or 26 percent, are almost without exception men who are interested in the experiments for the actual benefit they will derive from them in their farming operations. These experimenters are men who are capable, responsible and careful; and quite a number of the 268 experimenters have conducted the same experiments on their farms from five to eight years. They realize the value of persistent repetitions, of carefulness and of accuracy in making experiments and are usually willing to inconvenience themselves, if need be, in order to get the information from these experiments.

Respectfully submitted,

J. T. WILLIAMSON,

Supt. of Co-operative Experiments in Agriculture.

REPORT OF ASSOCIATE PLANT BREEDER

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

Sir:

I submit the following report of the work done in Plant Breeding under the Local Experiment Fund during the year 1919.

The breeding of cotton for wilt resistance under boll weevil conditions was continued with additional attention to a better staple. Plant-to-row tests and increase plots from previous row tests of wilt resistant varieties were conducted cooperatively with farmers in four counties as follows: Cook 307-6 wilt-resistant, in Macon county; Cook 307-6 wilt resistant, in Barbour county; Toole wilt resistant in Henry county, and Dixie wilt resistant in Crenshaw county. The planting of these row tests was personally supervised, and they were visited several times during the year and comparative notes made on the rows. In the fall about thirty individual plant selections were made from each of the row tests and increase plots.

A few individual plant selections were made from cotton multiplication experiments. The best strains from the plant-to-row tests of the several varieties are isolated, multiplied rapidly and offered for sale by local breeders, thus bringing into general cultivation the best strains bred up by the Experiment Station.

Extensive variety tests of wilt resistant cotton were conducted co-operatively with farmers in Macon, Russell, Autauga, Henry and Crenshaw counties. In each of these experiments sixteen varieties of wilt resistant cotton collected from different parts of Alabama and other states were tested. All varieties used in 1918 were repeated in the 1919 experiments when possible.

Eight short variety tests consisting of three of the best wilt-resistant varieties of cotton were conducted in different parts of the wilt infected area of Alabama. The few best varieties as shown by the extensive variety tests are the ones used in the short tests.

A number of isolation experiments of wilt resistant varieties of cotton were placed with farmers with a view of rapidly multiplying the seed of varieties particularly suited to the different localities.

Respectfully submitted,

H. B. TISDALE,
Associate Plant Breeder.

REPORT OF ENTOMOLOGIST

W. E. HINDS

Auburn, Ala., Dec. 20, 1919.

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

Sir:

Herewith I submit a brief report of the principal Entomological activities under Local Experiment Funds for the calendar year of 1919.

1. *Boll Weevil*: Soon after the beginning of the 1919 season it became apparent to us that the boll weevil was likely to survive hibernation in large numbers and the situation appeared to be favorable for heavy damage during the season of 1919. We therefore, undertook to warn farmers to this effect and to cooperate in the general campaign for reduction of acreage planted in cotton, through meetings with the bankers, farmers, and others, in every way possible. Of course, we could not anticipate the unusually heavy rainfall occurring during July and August 1919. This rainfall however, not only favored the multiplication of the weevils, but prevented the setting of cotton even more effectively than the weevil would have done without the rainfall.

Our principal work with the weevil this year has been in connection with the demonstration of the possibility and practicability of controlling the weevil by dusting the cotton with Calcium Arsenate, according to plans recommended by the U. S. Bureau of Entomology. This work was first started in 1918, and in that season did not give us profitable results, mainly due to dry weather occurring in the early part of the fruiting season and continuing for several weeks. This drouth controlled the weevil to such an extent that poisoning was not necessary to secure a practically normal crop. In 1919, however, the situation was radically different, and we found that farmers were deeply interested in the question of poisoning cotton, but comparatively few of them were willing to take steps to provide the machinery and the poison necessary until the matter had been proven to their satisfaction. We considered therefore, that this project was of larger financial importance than any other to which we could

devote our attention. Naturally, a matter of this kind required the entire season to put through the test. This work was planned and carried on to cover as many representative points in the State as possible, and to apply to as many varied soil and cultural conditions as we might be able to cover within the limits of our funds.

As a general result from this work, we can state that at Dothan, Alabama, on Spann Bros' Plantation, the increased yield as a result of dusting showed a value ranging up to better than \$20.00 per acre. At Allenville, on A. M. Collins' plantation similar results were obtained. At Orrville, on J. E. Dunnaways plantation, where the progress of the work was in charge of a special agent, working for the Niagara Sprayer Co., but who cooperated by keeping records and giving us a report regarding his work, we find that on an area of 75 acres dusted there is an average profit of better than \$22.00 per acre. At Prattville on the McQueen Smith Plantation, the expense of conducting the work ranged somewhat higher and the results were somewhat less than at other localities, so that it is probable that little, if any profit will be realized at that point. However, for the work as a whole, we can state definitely that the results are extremely encouraging in spite of the most difficult season, so far as late fall conditions are concerned, that we have had in many years. During the period of the dusting work, rain fell upon from two-thirds to three-fourth of the days during the dusting period, thus making it extremely difficult to keep the poison upon the plants long enough to secure a control effect. This work must be continued through the coming years to secure a reliable basis through an average of several seasons, and in many localities before making recommendations regarding dusting work for the general cotton plantation.

2. *Corn Insect Control*: This project has been continued to some extent, but the main advanced step has been to secure the inclusion of this in the demonstration program of the County Agents through the Southern two-thirds of Alabama. The principal point in connection with corn insect control is to secure the selection of a weevil-resistant type of seed ear and the utilization of the trap plot method of concentrating the first generation of these insects so that they may be

easily and economically controlled by proper handling of this small trap plot of corn.

3. *Red Spider*: The Red Spider again appeared in large numbers at numerous localities scattered through the State, and did considerable damage. It appears now that the type of dusting machinery used in connection with boll weevil control can be utilized for the distribution of finely-powdered sulphur for the control of the red spider. This matter is of sufficient importance to call for further experimentation, and this will be possible as the boll weevil control work becomes more common, so that machinery is available.

4. *Sweet Potato Weevil*: The Sweet Potato Weevil, occurring in the vicinity of Grand Bay, appears to have been brought under complete control, and we trust has been exterminated in that section. In connection with the U. S. Bureau of Entomology, inspection has been continued under the immediate supervision of Dr. O. F. E. Winberg. The owners of properties on which the weevil was found in 1918 were induced to adopt such methods that the spread of the weevil was checked, and its existence seems now to have been eliminated by these measures. The weevil has not been found at any other point in the State of Alabama.

5. *Pink Bollworm of Cotton*: Through information received from the tracing service of the Pink Bollworm Agents, working under the Federal Board of Horticulture in Texas, it appeared that three cotton mills in Alabama had received cotton from pink bollworm infected territory in Mexico at sometime about the fall of 1916, and before the insects were discovered in Texas and quarantine measures applied by the Federal Board of Horticulture. Accordingly, in keeping with the liberal policy of the Federal authorities, it seemed advisable to conduct inspection work at each of these cotton mill localities. This has been done in cooperation with the Federal Horticultural Board, which has sent inspectors to two of these cotton mill localities, while the Department of Entomology has furnished the inspection for the third location. Several inspections have been made and additional work will be done during the present winter. However, we are glad to report that no trace of the pink bollworm has been found in Alabama thus far.

The situation in Southeastern Texas is now more

threatening than during the season of 1918. At that time, through the control work conducted by the Federal Horticultural Board and the Texas Department of Agriculture, cotton growing was eliminated throughout the pink bollworm-infested area in Southeastern Texas. During 1918 inspectors covering that entire non-cotton territory found and destroyed more than three million volunteer cotton plants, upon which the pink bollworm might have continued had the destruction not occurred. No trace of the worm was found in that territory during 1918, and therefore, the culture of cotton under close supervision was permitted during the season of 1919. In the late fall of 1919, it was found that the worm had survived, probably in buried particles of cotton of the 1917 crop, and infestation was found in some twenty-five or thirty fields located within the known 1917 area. Control work through the complete destruction of stalks, bolls, seed cotton, etc., and the exportation of all lint ginned in this territory to non-cotton growing sections is now under way. A recent visit to this territory indicates that the control work is being done with such effectiveness that there is little danger of the the pest spreading from Texas into Alabama. At the present time, therefore, we do not consider a quarantine by Alabama gainst the pink bollworm of cotton to be necessary.

Respectfully submitted,

W. E. HINDS,
Entomologist.

REPORT OF ANIMAL HUSBANDMAN

Auburn, Ala., Jan. 15, 1920.

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

Sir:

I respectfully submit the following report for the Local Experiment work conducted by the Animal Husbandry Department during the past calendar year:

BEEF CATTLE

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

A test was started this past winter to determine the following points:

1. The cost of wintering beef cattle of various ages under Alabama conditions.
2. The comparative value of an inferior quality of Johnson-grass hay and sorghum silage as the roughage part of the ration, for wintering mature breeding cattle.
3. The comparative value of high grade cottonseed meal and peanut meal as the concentrate part of the ration for wintering yearlings and calves when sorghum silage is used as roughage.

One-hundred-twenty head of cattle were used and fed daily as follows:

- Lot 1. Twenty head mature cows, fed 1 pound cottonseed meal and Johnson-grass hay.
- Lot 2. Twenty head mature cows, fed 1 pound cottonseed meal and sorghum silage.
- Lot 3. Twenty head yearlings, fed 1½ pounds cottonseed meal and sorghum silage.
- Lot 4. Twenty head yearlings, fed 1½ pounds peanut meal and sorghum silage.
- Lot 5. Twenty calves fed 1½ pounds cottonseed meal and sorghum silage.
- Lot 6. Twenty head calves fed 1½ pounds peanut meal and sorghum silage.

It is planned to continue this work for several years so that the average length of the feeding period for the winter can be obtained, and that the cost of wintering three ages of cattle may be determined definitely.

Hogs

The cooperative experimental work with hogs at

Union Springs, Bullock County, Alabama, was continued throughout the year. The work with this class of animals was conducted on the farm of Mr. T. R. Martin. Mr. Martin furnished the hogs, feed, and equipment, and the Alabama Experiment Station furnished a trained man, Mr. G. L. Burleson, to live on the farm and have personal supervision of the work.

The third test was completed during the year in the experiment comparing grazing of peanut pasture with harvesting the crop and selling it on the market. The report for the first two years of this experiment will be found in Bulletin No. 206 published by this Station.

This past year the peanut crop was very short, due to an excessive amount of rain. About seven bushels of peanuts to the acre were produced, and they yielded about 81 pounds of pork to the acre, as compared with a yield in 1917 of 39½ bushels to the acre, producing 668.2 pounds of pork to the acre.

A second test to determine whether or not a dry lot feeding period following peanut pasture would be profitable, and to determine the effect of a dry lot feeding period on the quality of the carcass, was finished during the year. A bulletin will be issued giving a summary and all the details of the experiment conducted for three years on this subject.

This past year forty hogs were used in the experiment. They were allowed to graze peanut pasture for seven weeks. At the end of the grazing period the hogs were divided into three lots and fed as follows:

Lot No. 1. Eight hogs, seven additional weeks on peanut pasture.

Lot No. 2. Sixteen hogs, fed a ration of forty percent tankage and corn for seven weeks.

Lot No. 3. Sixteen hogs, fed a ration of sixty percent tankage and corn for seven weeks.

Consequently eight pigs of this experiment were on peanuts for fourteen weeks. Thirty-two head had a pasture period of seven weeks, then a dry lot finishing period for seven weeks according to the ration indicated for lots 2 and 3.

At the close of the finishing period the experimental hogs were shipped to St. Louis and sold. The peanut fed (oily) hogs sold for 8½ cents. Part of the hogs in lots 2 and 3 were sold to Swift & Company on the basis of the way the carcasses appeared when chilled out. One half of the hogs from these two lots (fed a hardening

ration for seven weeks) were classified as soft and were paid for on the basis of 8½ cents live weight. The other half were classified as firm and sold for 13½ cents live weight. Samples of kidney fat from these hogs were sent to the Department of Chemistry at Auburn for determinations of melting point and iodine value.

A third experiment was conducted during the year to make a preliminary test in feeding velvet beans to brood sows. Many reports have come to the Station from farmers who use velvet beans indicating that velvet beans are not a satisfactory ration for bred sows and sows suckling pigs. This test has not continued for a sufficient length of time to afford any definite conclusions.

POULTRY

The cooperative experimental work with Mr. Herman Schlueterbusch at Citronelle, Mobile County, Alabama, was continued. The experiments conducted were as follows:

1. A study of several feeds to determine their relative efficiency and economy in egg production.
2. A study of several feeds—beef scraps, skim milk, peanut meal and velvet bean meal—as a source of part of the protein in the ration to determine the relative efficiency of each feed as influencing the egg yield and the cost of egg production.
3. A study to determine the best age to market poultry.
4. A study of the influence of selection on egg production.

Respectfully submitted,

GEORGE S. TEMPLETON,

Animal Husbandman.

REPORT OF THE HORTICULTURIST

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

Sir:

We submit herewith a report on the work being done with Local Experiment Funds in this Department.

1. Variety tests of the following plants have been continued during the year away from Auburn, and notes have been taken on their condition and adaptation:

Apricots	Loganberry
Butternuts	Nectarines
Calomandin	Olives
Caraca	Peaches
Papaya	Pistachio
Feijoa	Prunes
Figs—Smyrna, Capri	Quince
Grapes	Sapota
Guava	Walnuts
Almond	Chestnuts

2. The nitrate of soda experiment, using various amounts per tree, has been continued in the apple orchard of Kelly Bros., at Jeff, Alabama. Late spring frosts killed most of the fruit, so no yield record could be made. Comparative growth notes were made.

3. Fertilizer experiments have been continued 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 have been injured by freeze.

4. The experiment has been continued in the orchard of Mr. R. L. Brown, Irvington, Alabama, in which trees that had been neglected and injured by freeze were treated with different amounts of fertilizers in an effort to learn which would be most valuable. Results are so outstanding that people in the entire citrus belt of South Alabama are following our suggestions on fertilizers for Satsuma oranges.

5. A fertilizer experiment was started on vegetables with C. B. Blodgett, near Montgomery. Stock destroyed the crops.

6. Fertilizer test with peaches at Bolling has been continued. Results of this test are very satisfactory, and will be published later.

7. A spraying experiment for the control of pecan scab, was started with J. B. Clements, Benton, Ala.

8. All experimental notes since 1912 have been collected and summarized preparatory to publication, in the form of a report of progress.

9. As funds for Local Experiment Work in Horticulture are so limited that one man cannot spend full time on this work, it is thought best to reduce the number of experiments and place larger ones in fewer places. Plans for this change are worked out and will be carried on as present experiments are closed and published.

Respectfully submitted,

G. C. STARCHER,

Horticulturist.

C. L. ISBELL,

Assistant Horticulturist.

REPORT OF THE PLANT PATHOLOGIST

Auburn, Ala., Jan. 11, 1920

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

Sir:

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

In cooperation with the Plant Disease Survey, U. S. Department of Agriculture, an intensive survey of the State was made by Mr. L. E. Tisdale for the dreaded European Potato Wart, which was recently discovered in Pennsylvania. In spite of the fact that shipments of European potatoes, similar to those which carried the disease into Pennsylvania, had been made to Mobile, Birmingham, and Huntsville, no signs of this disease were found in Alabama.

Observation and some experiments have been continued on the more serious diseases of corn, cotton, cereals, forage, truck, and horticultural crops.

Owing to a cooperative agreement entered into with the Bureau of Plant Industry, U. S. Department of Agriculture, on July 1, 1919, the Pathologist will devote almost his entire time to a study of Citrus canker. This agreement has made possible the employment of an Associate Pathologist, who can devote much of his time to Local Experiment work.

On Sept. 15, 1919, Mr. E. F. Hopkins, accepted this latter position and immediately took up a study of the diseases of forage crops and their control. He is giving special attention at this time to the diseases of bur clover, vetches, soy and velvet beans.

Respectfully submitted,

GEO. L. PELTIER,
Plant Pathologist.

REPORT OF DRAINAGE ENGINEER

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 1919, under the cooperative agreement between this Office and the Alabama Experiment Station.

From January 1st to March 31st, and from September 16th to December 31st, Mr. Guy A. Hart, Drainage Engineer, was in charge of the Office at Montgomery. From April 1st to September 15th, Mr. Lewis A. Jones, Senior Drainage Engineer, was in charge of the Office with Mr. Hart assisting.

SWAMP AND OVERFLOW

At the request of Hon. Edward B. Almon, U. S. Representative from the Eighth District of Alabama, preliminary examinations were made upon two proposed drainage districts in Jackson County. The Roseberry-Dry Creek District, south and east of Scottsboro, embraces an area of approximately 9000 acres. The project is entirely feasible, the cost being estimated from \$10 to \$15 per acre. In the report on this District it is recommended that the District be organized and the surveys made. The Sauta Creek District is located a few miles west of Scottsboro and embraces an area of approximately 6000 acres. Plans with the estimated cost of construction were made for this District, the cost being about \$13 per acre. This District has proceeded to organize under the Alabama Drainage District Law and will soon reach the point where they will be able to issue bonds and start the construction work.

Preliminary examinations were also made on the following proposed districts: The Double Creek district in Marengo County, near Demopolis, area of district approximately 7000 acres. Recommended that a complete survey be made of the district and the cost of the improvements determined. The Haysop Creek Drainage District in Bibb County with an area of approximately 6000 acres has recently taken the first steps toward the organization of the district under the Drainage Law. This project appears to be quite feasible, the

cost very reasonable, the lands exceedingly fertile, and the people anxious to proceed. The Cubahatchee Creek district in Macon and Bullock Counties involves an area of approximately 9000 acres. A survey of the proposed district was recommended in order to determine the probable cost of the drainage improvement. The Freeman Creek bottoms, with an area of about 3500 acres, were examined and a survey recommended in order to determine the best location for the necessary channel to effect the desired drainage.

The proposed district of the Mobile Bay View Growers Association in Mobile County, for which plans and estimates were made by this Office in 1916, has taken on new life and an effort is now being made to reorganize this district under the new Drainage District Law passed by the last session of the 1919 Legislature.

FARM DRAINAGE AND TERRACING

Assistance in tile drainage, involving surveys, plans and recommendations for drainage, or in laying off terrace systems have been given to the following tracts, some of them having completed the improvements:

R. G. Arrington	Montgomery, Montgomery County
R. R. Banks	Smithsonia, Lauderdale County
A. C. Barnes	Summerdale, Baldwin County
H. P. Brown	Uniontown, Hale County
Benoit Coal Company	Benoit, Walker County
Dr. C. F. Chandler	Montgomery, Montgomery County
A. M. Collins	Allenville, Hale County
H. T. Collins	Allenville, Hale County
J. D. Collins	Gallion, Hale County
C. F. Crawford	Gallion, Marengo County
Gid Dearman	Ward, Sumter County
J. J. Dinsmore	Falkville, Morgan County
R. L. Dolbey	Summerdale, Baldwin County
Chas. Ford	Gallion, Hale County
Leo Frank	Magnolia Springs, Baldwin County
A. B. Hall	Benton, Lowndes County
F. P. Hall	Florence, Lauderdale County
Sam Harrison	Gallion, Marengo County
W. C. Harrison	Gallion, Marengo County
Hicks Brothers	Autaugaville, Autauga County
B. F. Hughes	Faunsdale, Marengo County
W. C. McKnight	Faunsdale, Marengo County
Dr. J. J. Pettus	Belle Mina, Limestone County
J. T. Reeder	Smithsonia, Lauderdale County
J. W. Rutland	Cherokee, Colbert County
F. T. Richardson	Mooreville, Limestone County
F. G. Sharretts	Summerdale, Baldwin County
W. H. Smith	Prattville, Autauga County
B. F. Sullivan	Summerdale, Baldwin County
Miss C. R. Thorn	Calhoun, Lowndes County

Miss Mary Wilson.....Fort Davis, Bullock County
 Gilbert G. White.....Belle Mina, Limestone County
 John R. Witt.....Belle Mina, Limestone County

Several inspection trips were made to observe the effect of previously installed drainage systems. Some of these were found to be in poor or inoperative condition and recommendations were made to the owners that the outlets be improved and better care taken of the systems. The benefits to land and crops, derived from the installation of the various drainage systems, were carefully noted and brought to the attention of others in the vicinity of those doing drainage. Considerable more interest is now being shown toward drainage than has ever been shown before and it is hoped that the work will proceed as well as it now promises.

Very truly yours,
 P. ST. J. WILSON,
 Chief Engineer.

REPORT OF JUNIOR AND HOME ECONOMICS
EXTENSION DEPARTMENT.

Auburn, Ala., Jan. 6, 1920.

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

Sir:

I submit herewith a brief report on the Boys' Club
Work for the calendar year 1919:

REPORT OF BOYS' CLUB WORK IN 1919.
State Organization

L. N. Duncan, Superintendent Junior and Home Economics
Extension Department.

J. C. Ford, State Pig Club Agent.

P. O. Davis, Assistant Boys' Club Agent.

J. L. Herron, Assistant Boys' Clubs Agent.

In addition to the above force Mr. C. E. Newman and
Mr. C. R. Bowers were with us for a short while during
the early part of the year 1919 and added valuable as-
sistance.

Plan of Work.

Below is given in brief the plan of work which we
try to follow as nearly as conditions will permit.

Club work belongs to the county agent and our busi-
ness is to assist him. All club literature and reports,
both to and from the club members, pass through his
hands.

In order to make the work systematic and to save
the time of the agents, we are pushing a definite plan
of work for each county according to the following
outline:

1. With the County Agent and the County Superintendent
of Education we select about ten schools where organized
club work is to be done.

2. Explain this plan to the teachers concerned and secure
their active cooperation.

3. Call a general meeting at each of these schools and ex-
plain the purpose of club work to parents and children to-
gether.

4. Enroll and organize the boys into a Club and select about
three progressive, public-spirited men for an Advisory Com-
mittee.

5. After explaining the purposes of an Advisory Committee
to the members they are each urged to attend all meetings, en-
courage and advise the boys and assist them with their re-
cord books, etc.

6. Close the year's work in the fall with a community or
County Fair or Club Show and sell together the club products
for sale.

The above plan will be extended and made to fit in

the new Boys' and Girls' Club Act passed by the 1919 Legislature.

ENROLLMENT AND ACTIVITIES OF MEMBERS.

Boys were enrolled in all of the 67 counties of the State as in previous years.

The activities and the number of boys enrolled in each activity are as follows:

Pig Club	Corn Club	Calf Club	Peanut Club	Grand total
4269	1997	218	593	7227

During the year there were 163 organized clubs that made full reports. There were a great many more organized clubs that met regularly and used the programs prepared by our office but did not report.

SHORT COURSES,

During the year county short courses were held in the counties indicated below:

	Attendance
Cullman	44
Lauderdale	28
Morgan	28
Madison	28
Lamar	29
Jackson	30
Winston	10
Limestone	25
Shelby	30
Jefferson	14

The regular Annual Short Course was held at Auburn, August 11-16, and was pronounced the best one that we have ever held. There were 175 boys from 41 counties.

HOME DEMONSTRATION WORK

A full detailed account of this phase of our work has been submitted. Since this work is supported by general Extension Funds and not from Local Experiment Funds this report is not printed here.

Summary

Counties organized (11 months)	35
Counties organized (less than 6 months)	5
Agents employed (11 months)	36
Agents employed (less than 6 months)	7
Total number of organized clubs for girls and women in 35 counties	434
Total enrollment of girls and women	5886
Total value of all club products	\$596,374.46

Respectfully submitted,

L. N. DUNCAN,
Superintendent Junior and Home Economics Department.

REPORT OF AGRICULTURAL ENGINEER

Auburn, Ala., Jan. 9, 1920.

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

Sir:

After the interim when the position of Agricultural Engineer was vacant, the work in Agricultural Engineering was commenced under the writer on September 1, 1919, and at the present date can only be said to be fairly started. Since most of the problems are related to crop production, the greater part of the work falls of necessity during the growing season.

Several projects have been started but in no case has there been gathered a sufficient amount of data for a report on results obtained.

A problem of considerable importance in Alabama is that of housing farm labor. There are thousands of cabins in various stages of disintegration in this state and with the present price of materials it is an important item to put them into a sanitary and comfortable state for the laborers. In this connection screening and suitable water supply must be considered. One of the most important phases of this is the repair of the roof.

A great deal of material has been gathered and studied, and arrangements made for field tests on this subject, but as yet work is in progress on only one building.

A problem of importance particularly in the southern part of the state is the cooling of meats in the summer months. Plans are being prepared of smokehouses which can be temporarily converted into cooling rooms and the pork or other meats thus cured without moving them from one building to another. A study of materials and methods of cooling is under way and arrangements have been made for the construction of several such houses during the coming summer.

Some time has been given the problem of separating bur clover seed from the pods or burs, since the use of hulled seeds apparently increases the stand. It is considered by many that some means should be available for the farmer to separate these seeds from the pods on the home farm. Several means were tried but the saws on an ordinary cotton gin were found to work

most satisfactorily. Experiments in this line will be continued.

Arrangements have been made for some experimentation to determine the adjustability of different plows and soil-preparation tools on different soils when the planting season opens.

Some work of an experimental nature is needed in terracing land, first to determine the cost of these operations; second, to determine types of terraces and grades best suited to our different soils. A number of fields have been terraced in seven counties by different methods but as yet no results have been gathered to permit the drawing of any definite conclusions.

Respectfully submitted,

M. L. NICHOLS,
Agricultural Engineer.

