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Agricultural Experiment Station

OF THE

Alabama Polytechnic Institute

AUBURN

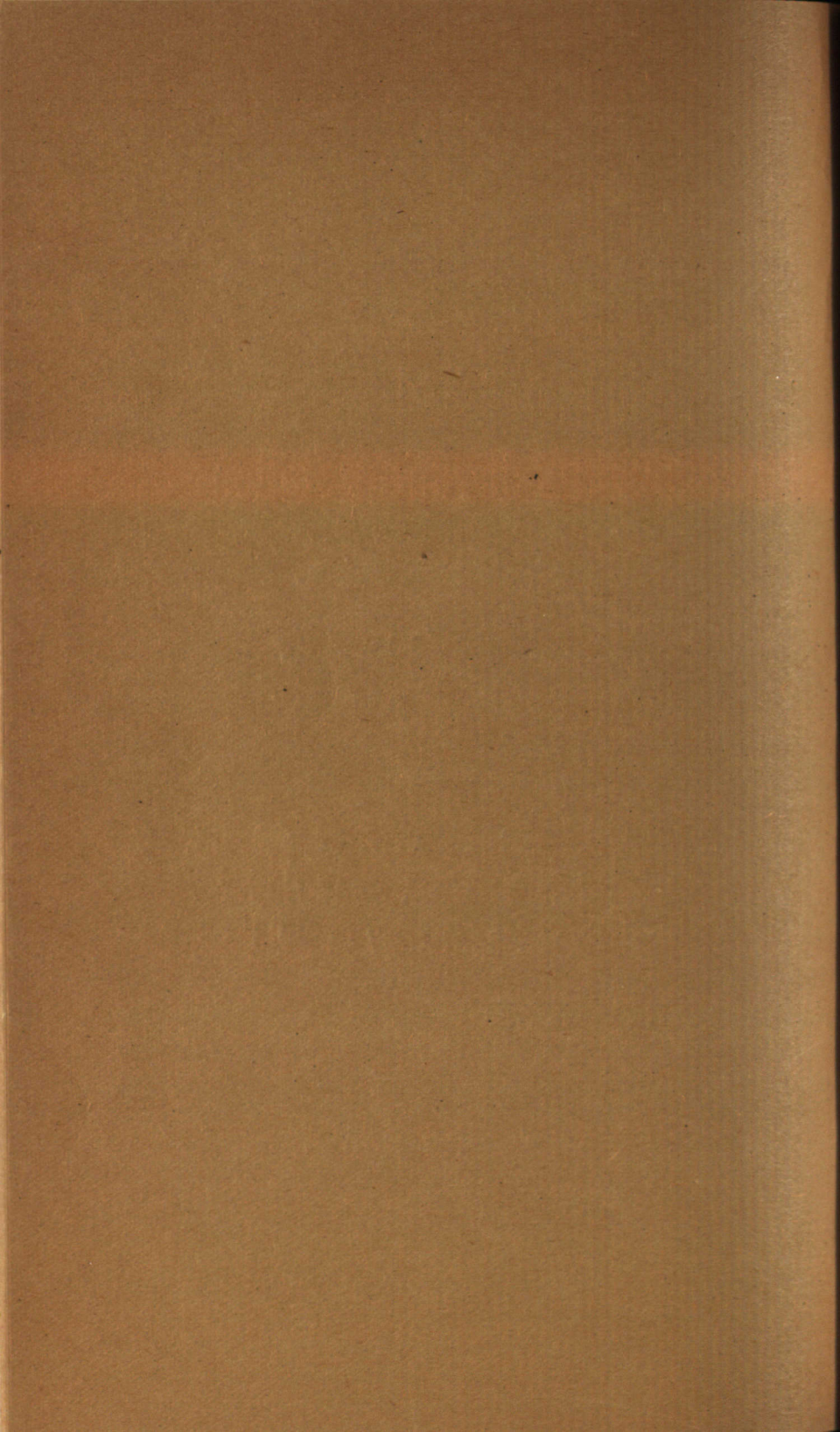
**Annual Report of the Director of the Ex-
periment Station on Work Done Under
the Local Experiment Law in 1913**

BY

J. F. DUGGAR

Director

Opelika, Ala.
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1914



Auburn, Ala., Feb. 20, 1914.

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

Dear Sir:—In accordance with Section 5 of the Local Experiment Law, requiring me, as Director of the Experiment Station of the Alabama Polytechnic Institute, to make a full and complete annual report through the Commissioner of Agriculture to the Governor of Alabama, I herewith hand you my report of work done under the Local Experiment Law in the calendar year 1913, with the request that you transmit this report to his Excellency, Governor Emmet A. C'Neal.

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

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

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Agriculture, Plant Breeding and Farm Machinery.

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- *E. F. Cauthen Associate Agriculturist
*M. J. Funchess Assistant Agriculturist
J. T. Williamson Field Agent in Agriculture
L. J. Hawley Field Agent in Agriculture
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Livestock and Poultry Investigations.

*George S. Templeton, in charge.

- *E. S. Girton Assistant in Animal Industry
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- *G. W. Ells..... Field Assistant

Horticultural Investigations.

*Ernest Walker, in charge.

- *J. C. C. Price..... Assistant in Horticulture
G. V. Stelzenmuller..... Field Assistant in Horticulture

Agricultural Extension.

**L. N. Duncan, in charge.

- **J. B. Hobdy..... Assistant in Extension Work
**N. A. Negley..... Dairy Extension
**Mrs. Birdie I. Robinson..... Assistant in Extension
**Chas. S. Jones..... Assistant in Extension

Plant Diseases.

*F. A. Wolf, in charge.

*Devoting only part of time to Local Experiment work.

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

REPORT OF WORK DONE DURING 1913 UNDER THE LOCAL EXPERIMENT LAW.

Part I. Director's Summarized Report of Work in All Departments.

By

J. F. DUGGAR, Director of Experiment Station.

This report is submitted in compliance with Section 5 of an Act of the Legislature of Alabama, approved February 9, 1911, under which provision is made for local experiments to be conducted throughout the State, and for other agricultural services to be rendered to the farmers of Alabama. The work contemplated and thus far done under this law is of a more popular nature than would be permitted by the funds appropriated by Congress for the support of the scientific work of an experiment station in each State. The purpose in the execution of this law has constantly been to extend to all parts of Alabama the advantage of having field experiments, feeding experiments, etc., made under the same local conditions of soil and climate that surround the farmer growing crops in all parts of the State.

The main idea in all of the lines of investigation undertaken under this Act has been to accumulate a body of knowledge that would lead to a more diversified and a more profitable agriculture, thus placing the farmers of Alabama in a better position to withstand the reduction in acreage in cotton which is likely to follow the advent of the boll weevil and to enable them to so modify their practices in fertilization and cultivation of cotton as to be able to continue to grow this crop in the presence of the cotton boll weevil. Whether the local experimental work has been concerned with the fertilization of cotton, the feeding of cattle, hogs, or poultry, or the combatting of insect pests and plant diseases, or other line of activity, it has all been a part of an anti-boll weevil campaign.

The Act under which this Local Experiment Work is provided for is printed below:

AN ACT

For the advancement of agriculture and to prepare the farmers of Alabama for the coming of the boll weevil by providing for local agricultural experiments in the several counties of Alabama to ascertain the best fertilizers for each class of soils and crops, to investigate the best methods of producing cotton profitably in the presence of the boll weevil and of the black root disease, to determine the most effective methods for controlling the boll weevil

and other insect pests, to determine the most profitable field crops for each soil and the best system for growing and marketing them, to ascertain the grasses and clovers best suited to each soil, to ascertain the best varieties of fruits and vegetables and the best horticultural practices, to determine the best means of growing, feeding and marketing livestock and poultry, to investigate other agricultural problems, to provide for the publication of results and of related agricultural information and for other expenses of agricultural experiments, to provide for agricultural extension work, and to make an appropriation for these purposes and to prescribe how these funds shall be expended.

Be it enacted by the Legislature of Alabama:

Section 1. That in order to aid in acquiring and diffusing among the people of Alabama useful and practical information on the subjects connected with agriculture, it is hereby made the duty of the Experiment Station of the Alabama Polytechnic Institute to conduct, in as many of the counties of Alabama as advisable and practicable with the funds hereby provided, experiments to acquire agricultural information on the following and on closely related subjects, and to publish and disseminate the results, namely: The most profitable fertilizers for each class of soils, especially for cotton, corn, and other staple field crops; the best varieties and strains of cotton, corn, oats, wheat and other field crops and the best grasses, clovers, and related forage plants for the principal soil regions of Alabama, and the best means of growing each; the best varieties and strains of cotton for cultivation in the presence of the boll weevil and on soils infested by cotton wilt or black root disease; investigations to devise the best means for controlling the cotton boll weevil and other insect pests, including the giving of assistance in the destruction of colonies of boll weevils that may be accidentally introduced in advance of the general invasion; the best practice in drainage and irrigation, including the lending of expert assistance to land owners by inspection, advice, and plans for the drainage and irrigation of land; tests and demonstrations of labor-saving farm machinery; investigations of boll rot and other diseases of cotton and diseases of other plants; the breeding or improvement at any point or points in Alabama of improved strains of cotton, corn, and other field or forage crops; the breeding of strains of cotton for resistance to cotton wilt or black root; and the study of methods of management for the control of cotton wilt and other diseases; investigations of horticultural problems in any part of the state, including the lending of assistance and advice to settlers and others; experiments in animal industry; demonstrations in and other means of promoting the poultry industry; and to provide for agricultural extension work in all parts of the State.

Section 2. For the purpose of carrying into effect the provisions of this act and to be expended therefor, there shall be, and there are hereby appropriated to the Agricultural Experiment Station of the Alabama Polytechnic Institute, out of any money in the Treasury not otherwise appropriated, the following sums annually for the purposes mentioned below, namely:—

For local fertilizer experiments in the several counties and for the investigation and introduction of new or improved field crops and forage plants. . . . \$7000

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| For combatting the cotton boll weevil and other injurious insects | \$2300 |
| For plant breeding of field and forage crops | \$1200 |
| For work in drainage, irrigation and farm machinery | \$1500 |
| For preparing, printing, illustrating, and distributing bulletins, circulars, and other publications of the Experiment Station and for correspondence and general administrative expenses incurred in connection with the furtherance of the purposes of this act, including any additional equipment and facilities rendered necessary by this Act | \$2500 |
| For horticultural investigations | \$2000 |
| For livestock investigations | \$3500 |
| For investigations of and assistance in combatting black root and boll rot of cotton and other diseases of plants | \$1000 |
| For promoting the poultry industry | \$1000 |
| For agricultural extension work | \$5000 |

All of these sums shall be expended under the direction of the Board of Trustees of the Alabama Polytechnic Institute on the recommendation of the Director of said Experiment Station; provided that any balance not needed in any year for any of these lines of work may be expended in the support of any of the other purposes of this Act or used in meeting the expenses of the next ensuing year; and provided further that any revenue that may be incidentally derived from the sale of any apparatus or implement no longer needed, or from any other sale, shall be applied as heretofore provided to any of the lines of work authorized by this Act.

Section 3. There is hereby further appropriated for the same purposes, provided the Governor shall certify that the condition of the Treasury warrants the additional expenditure, an equal amount for each of the calendar years 1912, 1913, and 1914, to be expended as heretofore provided in the same proportions as above for the further support and enlargement of each of the lines of work authorized by this Act.

Section 4. The sums appropriated by this Act shall be paid in quarterly payments in advance on the first day of January, April, July, and October, respectively, to the Treasurer of the said Experiment Station upon the approval and warrant of the Commissioner of Agriculture and Industries of the State of Alabama.

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

Section 6. All laws and parts of laws in conflict with this Act are hereby repealed.

The amount received for this work in 1913 was \$27,000.00 in addition to a small balance brought over from the preceding year, as shown by the report of the Treasurer, which constitutes a part of this report.

Publications Under the Local Experiment Law.

From the funds provided under the Local Experiment Law there were published in 1913 five bulletins, six circulars, and four press bulletins, making a total of fifteen publications. The number of pages in these was 335, and the total number of pages in all of the copies printed amounted to 2,392,000 pages. This State appropriation has enabled the Alabama Experiment Station to print several times as many publications as would have been possible from Federal funds alone. Moreover, this State appropriation enabled the Station to publish bulletins of a more popular and immediately practical character than is permitted under Federal funds.

The following is the list of publications of the Alabama Experiment Station issued from the funds provided by the Local Experiment Law in the calendar year 1913:

- Bulletin No. 168.**—Fattening Hogs in Alabama; by the Animal Husbandman and Assistants.
- Bulletin No. 169.**—Local Fertilizer Experiments with Cotton in South Alabama in 1912; by the Director and Assistants.
- Bulletin No. 170.**—Local Fertilizer Experiments with Cotton in North Alabama in 1912; by the Director and Assistants.
- Bulletin No. 174.**—Fertilizer Experiments with Cotton in South Alabama in 1913; by the Director and Assistants.
- Circular No. 19.**—Annual Report of the Director of the Experiment Station on Work Done Under the Local Experiment Law in 1911.
- Circular No. 20.**—Annual Report of the Director of the Experiment Station on Work Done Under the Local Experiment Law in 1912.
- Circular No. 21.**—Boys' Pig Clubs; from the Extension Department.
- Circular No. 22.**—Alabama Boys' Corn Club Day; from the Extension Department.
- Circular No. 23.**—How to Organize and Conduct a Girls' Canning Club; from the Extension Department.
- Circular No. 24.**—Information on Corn Growing for Corn Club Boys; from the Extension Department.
- Press Bulletin No. 60.**—Cotton Boll Weevil Infested Area in United States and Quarantine Line in Alabama. 1912-1913; by the Entomologist.
- Press Bulletin No. 63.**—Control of White Fly and Scale Insects on Citrus Fruits; by the Entomologist.
- Press Bulletin No. 64.**—Boll Weevil Control in Early Summer; by the Entomologist.
- Press Bulletin No. 65.**—Fall Campaign Against the Boll Weevil; by the Entomologist.
- Reprint of Bulletin No. 159.**—Heading Off the Boll Weevil Panic; by the Entomologist.

Fertilizer Experiments and Other Experiments With Field and Forage Crops.

More than 35 district lines of experimentation were conducted under this head in 1913.

The most extensive single one of these 35 lines of experimentation was the determination of the best combination of fertilizers for cotton, growing on the various soils found within the State. In a study of this question, which has now been in progress on a large scale for three years under the Local Experiment Law, 94 separate experiments were conducted in as many localities in 1913, representing practically every cotton producing county in the State. In the few counties that produced extremely small amounts of cotton, fertilizer experiments with other crops were substituted for those with cotton.

There are few more productive lines of agricultural work than this, when we consider that the amount of fertilizer annually used in the State of Alabama represents an annual investment of many millions, and that a large part of its possible benefit is lost through a want of knowledge as to what combination of fertilizer is needed on a given soil. For example, one party who conducted one of these fertilizer experiments with cotton wrote that by applying the lessons which it taught him to the purchase of next year's supply of commercial fertilizers, he estimated that he could save about \$800 annually in his fertilizer bill. Another farmer reported that by using the fertilizer formula in 1913 recommended by the Station (as the result of knowledge gained from local experiments conducted in that part of the State in previous years), he produced excellent crops of cotton on land which for twenty-five years in succession had afforded only poor crops.

A few examples selected from the results of the fertilizer experiments with **cotton** in 1913, (as recorded in full in Bulletins No. 174 and 175) illustrate the large profit that may be made by farmers by applying the results of fertilizer experiments and show very plainly the need to make these experiments in a number of additional localities and under all possible conditions for a number of years:

Example 1.—Acid phosphate alone on a certain phase of black postoak soil near Linden, recently brought into cultivation, afforded a net profit of \$16.98 per acre due to the fertilizer alone. Contrast this with the slight profit of only \$2.54 per acre obtained from exactly the same fertilizer

on a different soil less than 25 miles away, at Bashi, Clarke County.

Example 2.—In Wilcox County, near McWilliams, the addition of 200 pounds of kainit to a mixture of phosphate and cotton seed meal resulted in increasing the profit by \$7.41, a net profit of \$8.81 per acre, or 629 per cent. on the investment in kainit.

On the other hand, near Bashi, in the adjoining county of Clarke, and scarcely 30 miles away, the addition of the same amount of kainit to the mixture just mentioned, resulted in a financial loss of 53 cents per acre.

Example 3.—Note the contrast between two different soils near Atmore and Brewton, in the same county, Escambia, and within a distance of 30 miles of each other. At Atmore, the addition of 200 pounds of kainit per acre to a mixture of cotton seed meal and acid phosphate increased the profit per acre with cotton by \$13.73. On the other hand, at Brewton, the addition of kainit to the cotton seed meal did not sufficiently increase the yield to pay the cost of the kainit, thus affording a financial loss.

Example 4.—On a gray, sandy soil, near Andalusia, a well balanced complete fertilizer increased the profit by \$27.54 per acre, as compared with unfertilized land. This is a profit of 453 per cent. on the investment in fertilizers. In the same experiment an increase of the kainit from 100 pounds per acre to 200 pounds per acre as a part of the complete fertilizer increased the profit by \$11.01 per acre, as the result of an investment of only 70 cents for the additional kainit, this is a profit of 1,573 per cent. on the extra amount of fertilizer.

Example 5.—Relative to the best time at which to apply nitrate of soda, note the wide contrast in the two experiments mentioned above as conducted at Linden, Marengo County, and near Thomasville, or Bashi, Clarke County. In Clarke County, nitrate of soda gave a larger profit than an equal amount invested in cotton seed meal by \$7.21 per acre; at Linden, on the other hand, cotton seed meal afforded a larger profit than a nearly equal value of nitrate of soda by \$7.66 per acre. The difference is evidently due largely to a difference in the date of application of the nitrate of soda, which was applied early at Thomasville (June 10), with favorable results, and applied late (July 10), at Linden, with unfavorable results.

Example 6.—In Shelby County, two experiments, located on different soils, within a distance of 12 miles, showed for the one soil an extreme need of acid phosphate with practically no need for potash; on the other soil there was urgent need for potash and but little necessity for using acid phosphate. For example, in the experiment near Calera, the addition of 200 lbs. of kainit to a mixture of the other two fertilizers increased the profit per acre by \$11.80, or a profit of 843 per cent. on the investment in kainit, but there was a financial loss from the use of phosphate.

On the other hand, on a different soil, at Columbiana, the addition of 200 pounds of kainit increased the profit by only \$3.00 per acre, while the addition of 240 pounds of acid phosphate per acre to the other two fertilizers increased the profit by \$11.27 per acre, or a profit of 670 per cent. on the investment in phosphate.

Such examples taken from individual fertilizer experiments might be multiplied almost indefinitely. They show plainly the need for making field experiments with fertilizers. Not by chemical analysis, nor in any other way, can the fertilizer requirements of the soil be ascertained.

Six bulletins have thus far been published, giving results of fertilizer experiments with cotton. The plan for developing this line of work is, when a sufficient number of experiments shall have been made, to bring together the results on each particular type of soil, to study these carefully, and then to publish a separate bulletin for each kind of soil, giving specific recommendations of fertilizer formulas for that particular soil. To accumulate sufficient data for this purpose will necessitate the repetition of these experiments through several years and the making of similar experiments in a large number of localities not yet represented.

In somewhat the same way as with cotton, fertilizer experiments have been made throughout the State with **corn**. Already accumulated results show that the corn plant requires very different fertilization from the cotton plant growing on the same soil.

Varieties of cotton have been tested in a number of localities to determine the kinds best suited to the soils and climatic conditions of the different counties. More than 37 such tests were made in 1913. Among these were three experiments located within the boll weevil region to determine the relative yield and the **relative earliness** of 16 varieties, and hence to determine the **varieties that can best be grown in the presence of the boll weevil**.

On soils severely infected with the disease, cotton wilt or black root, experiments have been made in several counties to ascertain the varieties most resistant to this disease and also to develop a new variety of wilt-resistant cotton having more desirable qualities than the kinds heretofore found resistant.

Sweet potatoes and peanuts are other field crops on which fertilizer experiments have been conducted.

Special attention has been paid to testing forage plants, under as widely different conditions as possible and in all parts of the State. Among the winter forage crops tested are three varieties of vetches: white, Ladino, Alsylke and crimson, clover; two species of bur clover; red top and orchard grasses; and alfalfa. Among summer-growing forage crops on which numbers of tests have been made are soybeans, several varieties of cowpeas, and kudzu.

A special campaign was conducted by the Experiment Station in 1913 with a view to arousing increased interest in the culture of oats and with the aim of increasing the acreage and securing a larger average yield of this crop. One bulletin and two press bulletins on this subject were widely distributed, and in connection with them experiments were undertaken with several hundred farmers for testing in all parts of the State strains of oats bred up at Auburn, and for eliminating oat smut, which disease is responsible for a large amount of loss to growers of oats. For the latter object several hundred samples of formalin were supplied to parties who agreed to test the treatment of the seed oats with this chemical as a means of preventing smut.

The variety tests of wheat, conducted in nine counties, are intended to secure data by which we may know whether to recommend the culture of this plant on certain soils in Central Alabama as a partial substitute for cotton under boll weevil conditions.

The following is a list of the local experiments undertaken in the Agricultural Department of the Alabama Experiment Station during the calendar year 1913.

- Cotton, fertilizer experiments.
- Cotton, complete nitrate experiments.
- Cotton, time of applying nitrate of soda.
- Cotton, variety tests, extensive.
- Cotton, variety tests, short.
- Cotton, extensive tests of wilt-resistant varieties.
- Cotton, short tests of wilt-resistant varieties.

Cotton breeding, tests of hybrids and pedigreed strains bred up at Auburn.

Corn, fertilizer experiments.

Corn, time of applying nitrate of soda and amount.

Corn, complete nitrate experiments.

Corn, variety tests, extensive.

Corn, variety tests, short.

Corn breeding, tests of Auburn pedigreed strains.

Forage crop tests, extensive.

Alfalfa, fertilizer experiments.

Alfalfa, lime experiments.

Cowpeas, tests of wilt-resistant varieties.

Clover, bur, California versus Southern variety.

Clover, crimson, best method of inoculation.

Clover, Alsike, for acid soils.

Clover, Ladino versus White clover.

Grasses, varieties.

Machinery, notes on tractors, ditching machinery, etc.

Kudzu, as a forage crop.

Oats, breeding experiments (local tests of Auburn strains).

Oat smut, prevention of, by treatment with formalin.

Oats, variety tests.

Oats, methods of seeding.

Peanuts, fertilizer experiments.

Peanuts, variety tests.

Rotation experiments.

Soybean tests.

Sugar cane, Japanese, in North Alabama and as a forage crop.

Sweet potatoes, fertilizer experiments.

Tile drainage, results of.

Vetch, tests of varieties.

Wheat, tests of varieties.

Velvet beans versus Lyon and Yokoham beans.

Plant Breeding.

The first effort under this item of the Local Experiment Law was to test the comparative yields and suitability in different parts of the State of varieties or strains of cotton, corn, and oats, which had been bred up in previous years on the Experiment Station Farm in Auburn. Such tests were made in 1913 in five localities with oats, in 47 with corn and in 53 with cotton.

Another purpose of the plant breeding work was to mul-

tiply as rapidly as possible the most valuable strains thus bred up, so that in all parts of the State there might be growers able to furnish the seed of any of these improved varieties for sale to their neighbors. In the nature of the case, the Experiment Station cannot devote the farm at Auburn to the mere multiplication of valuable varieties. Its policy is to place the growing and distribution of new strains in the hands of private parties as rapidly as possible.

One example showing the rapidity with which valuable strains can thus be multiplied is afforded by the following instance: About half a peck of seed of an Auburn-made hybrid between the King and Triumph varieties of cotton was sent to a careful farmer for experiment in the spring of 1912. The farmer was so well pleased with this cotton that he saved all the seed from his small patch and with these he planted about eight acres of this hybrid in 1913. It is estimated that the 1914 crop, from this half peck of seed sent out two years before, will be about two hundred acres.

Likewise, from about half a peck of pedigreed Cook cotton (No. 588), sent out in the spring of 1912 were grown the next year twelve acres, which, at the gin, afforded more than 42 per cent. of lint, and the staple of which was commended by local buyers, though the Cook variety is not usually characterized by an especially good staple.

In a third case, eighty-five acres of a certain strain of Cook were grown in 1913 from a very small lot of seed produced in one of these local experiments in 1911.

In corn breeding, two varieties have been tested out. These are a pedigreed strain of Henry Gray, developed at the Experiment Station, and more suitable for North Alabama than for the regions where much damage is done by weevils in corn. The other variety is the Experiment Station Yellow, which has been developed by systematic breeding at Auburn for a number of years with special reference to increasing its weevil resistance and yield. This latter variety, in spite of its hard, short grains, has received much favorable comment from farmers who have tested it in all parts of the State. Private growers are now able to supply the demand for seed of this latter variety.

Work in Drainage and Farm Machinery.

The Experiment Station entered into a co-operative arrangement with the Office of Experiment Stations of the U. S. Department of Agriculture, by which all experimental

drainage work would be done by a skilled drainage engineer. Under the terms of this co-operation the small amount available for drainage from the Local Experiment Fund of the Station has resulted in the investment of a much larger sum by the U. S. Department of Agriculture.

Mr. Lewis A. Jones, U. S. Drainage Engineer, has been in charge of this line of work. His necessary absence from the State for a part of the past year made the amount of work completed, and, therefore, the State expenditures, less than originally contemplated, and much less than planned for the ensuing year, during which period this engineer will devote his entire time to drainage work in Alabama.

The first drainage experiment undertaken consisted in the installation of a system of tile drains on small areas, usually three to five acres, on five selected farms in the counties of Sumter, Montgomery, Wilcox and Dallas. The results of these earlier experiments, as shown in increased yields of the crops produced in 1913, amply justify the expenditure. For example, on the tile drained land at Pine Apple, Wilcox County, the yield of corn in 1913 was 70.8 bushels per acre, the only fertilization being 150 pounds of nitrate of soda per acre.

The owner writes: "I planted some similar land so as to give a comparison, but it made a failure. The tiled field before it was tiled, was worthless for cultivation. I noticed this year that on the tiled land, the crop suffered less from drought than on land where there was no tile." This tiled area produced cotton in 1912 at the rate of a bale per acre in contrast with adjacent undrained land that was too wet for cultivation.

In 1913 fields were tiled on the farms of the following:

J. S. Harper, Neenah, Wilcox County.

Martin Investment Company, near Bessemer, Jefferson County, Alabama.

Frank Holman, York, Sumter County, Alabama.

T. B. Hill, near Montgomery, Montgomery County, Alabama.

J. F. Suttle, Felix, Perry County, Alabama.

The bearing of improved drainage on the boll weevil situation is apparent when we recall that in the presence of the boll weevil it will not be practicable to grow cotton on poorly drained land, since the want of drainage on naturally wet soil is usually accompanied by a late start and late maturity.

The work with farm machinery in 1913 has consisted

chiefly of the collection of data on plowing with traction engines, on cotton choppers, additional to those tested in the field in 1912, investigation of the work of corn elevators for the economical unloading of corn on the farm, of power ditching machines, and a continuation of the study of machines for the drilling of oats by the open furrow method.

Experiments planned for the testing of machines for the picking and threshing of cowpeas was necessarily postponed because of the inability of the manufacturers to supply the machines in time.

Work With Injurious Insects.

The Entomologist and his Assistants have given a considerable proportion of their time to the enforcement of quarantine regulations connected with the spread of the boll weevil and in preparing publications regarding the best means of overcoming its injuries. Three press bulletins on the general subject of the boll weevil have been issued during the year, one showing the infested area in Alabama and in the United States, one giving suggestions for boll weevil control in early summer, and the third indicating preventive measures that may be taken in the fall.

Studies of the grass worm, which was so destructive to corn and other plants in 1913 in many parts of Alabama, have been continued, and a manuscript is now ready for publication as a bulletin on this subject.

The control of the white fly, the most serious insect pest that interferes with the growing of satsuma oranges and other citrus fruits, has continued to engage the attention of this department, and recommendations on this subject have been published as a press bulletin. Studies of insects injuring pecans, have been continued, and spraying experiments have been conducted in Macon County for the control of the curculio on peaches.

Livestock and Poultry Investigations.

This work is conducted by the Department of Animal Industry of the Alabama Experiment Station.

The increasing prices now obtainable for beef cattle and the increasing interest in the production of beef in Alabama have justified the large amount of attention which this department has given to feeding and grazing experiments with beef cattle. This work has been done in Sumter County, where there are a larger number of improved cattle than probably in any other county in the State, and

hence, where feeding experiments would be most useful. The beef feeding experiments have been conducted in co-operation with the United States Department of Agriculture. Had there been no local experiment fund with which to finance such co-operation, the stockmen of Alabama would have lost not only the experimental work done through State funds, but also all of the experimental work supported in part by Federal funds. Several bulletins, giving the results of beef feeding experiments, have heretofore been published and arrangements have been made for the early issue of another bulletin on this subject.

In 1913, the experimental work consisted of a study of the economy or profit from feeding cotton seed cake and a mixture of cotton seed cake and corn to beef cattle on pasture, and of a winter feeding experiment to study the practicability of substituting corn silage for cotton seed hulls. The increasing importance of this latter question is evident when we consider that the production of cotton, and hence the supply of cotton seed hulls, is rapidly diminishing in the counties infested by the boll weevil.

Local experimental work with dairy cattle has been conducted in Bullock County in 1913 to determine the relative values of certain foods and the cost of raising dairy heifers.

Experimental work in hog feeding has been conducted on three farms located respectively in Sumter, Marion and Henry Counties.

Poultry experiments are in progress in Marion and Mobile Counties.

A new line of work undertaken by this department in 1913 was the feeding of mules on different rations, which experiment was conducted in Chambers County. In this experiment cotton seed meal was successfully introduced as a portion of the ration of working teams.

Local Work in Horticulture.

The work of this department has been continued in making a general horticultural survey of the State and in making field experiments with varieties of vegetables and with fertilizers for truck crops.

Fertilizer and other experiments have been conducted with pecans. The storage of sweet potatoes under various conditions and in several widely separated parts of the State has been studied with a view to determining the best methods of keeping sweet potatoes through the winter.

It is expected that as the result of experiments made by

this department and of notes collected by it based on the experience of growers, a body of knowledge will be collected which will enable those who enter on horticultural work in any section of Alabama to know definitely what are the varieties best adapted to their particular region and to their special needs. I need scarcely call attention to the increasing need of the State for definite experimental information on horticulture, since truck crops, fruits and nuts should be grown on rapidly increasing areas as the boll weevil makes cotton culture the less exclusive reliance of the land owners of the State.

Agricultural Extension.

As in former years, the principal work of the Extension Department of the Alabama Experiment Station has consisted in the organization of Boys' Corn Clubs and Girls' Canning and Poultry Clubs. This work has all been done in co-operation with the Farmers' Co-operative Demonstration Work of the U. S. Department of Agriculture, and in accordance with the general plan of such work, which the U. S. Department of Agriculture is conducting in a number of States.

The report of the Superintendent of Extension Work gives the following enrollment in 1913:

| | |
|---------------------------------------|------|
| In Boys' Corn Clubs | 5499 |
| Girls' Canning and Poultry Clubs..... | 1881 |
| Boys' Pig Clubs | 327 |

The organization of Boys' Pig Clubs is a line of work undertaken in 1913 in co-operation with the Bureau of Animal Industry, U. S. Department of Agriculture, which furnishes a man for this purpose. The Dairy Division of the U. S. Department of Agriculture also furnishes an expert, who is assigned to the Department of Extension. He has given his attention chiefly to encouraging the building of silos and the keeping of the records of milk production. By means of the latter, he was able to show that in the herds where such records were kept more than 20 per cent of the cows were being fed either without profit or at a loss.

Diseases of Plants.

The Pathologist has undertaken experimental work on the control of boll rot (anthracnose) of the cotton plant by the selection for planting of seed of disease-free cotton seed, in co-operation with farmers.

He reports very satisfactory results in connection with

his experiments on the control of rots affecting the egg-plant.

Spraying experiments have been made for the control of the black rot of the apple.

The Department of Plant Pathology has published articles on the important diseases of potatoes and cabbages, on the black spot of roses, and on the fungus diseases of the Satsuma orange.

In the Agricultural Department work undertaken a number of years ago in the testing and breeding of varieties and strains of cotton resistant to cotton wilt, or black root, has been continued in a number of localities. This has not only resulted in a more definite knowledge of the relative resistance to wilt of certain well-known resistant varieties, but has also resulted in the development of certain strains of Cook cotton which have proved largely resistant to wilt, but which require some years of further selection before they can be disseminated as thoroughly resistant. The importance of breeding up new and earlier wilt-resistant varieties of cotton is evident when we remember that the varieties which have heretofore been chiefly relied upon as wilt resistant, namely, Dillon and Dixie, are so late as to be probably unsuitable for boll weevil conditions.

**Treasurer's Report, Local Experiment Fund, for the Year
1913.**

RECEIPTS.

| | |
|-----------------------------------|--------------|
| To cash balance from 1912..... | \$ 635.61 |
| To cash from Agriculture | 9.00 |
| To cash from Animal Industry..... | 188.75 |
| To cash from State | 27,000.00 |
| | <hr/> |
| | \$ 27,833.36 |

DISBURSEMENTS.

| | |
|---|-------------|
| By amount paid Agriculture | \$6,606.47 |
| By amount paid Horticulture..... | 1,767.52 |
| By amount paid Animal Industry..... | 3,527.04 |
| By amount paid Extension | 5,086.99 |
| By amount paid Publication and Administration.. | 2,412.57 |
| By amount paid Entomology..... | 2,300.00 |
| By amount paid Drainage and Farm Machinery. | 933.48 |
| By amount paid Plant Breeding | 895.72 |
| By amount paid Plant Pathology..... | 949.05 |
| By amount paid Poultry | 395.46 |
| By balance carried to 1914..... | 2,959.06 |
| | <hr/> |
| | \$27,833.36 |

Respectfully,

(Signed) M. A. GLENN, Treasurer.

Subscribed and sworn to before me this day, the 30th of
January, 1914.

(Signed) W. D. MARTIN, Notary Public.

PART II. DETAILED REPORTS OF HEADS OF DEPARTMENTS.

Report of Entomologist.

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

Dear Sir:—

Herewith I submit a report of the work done under the Local Experiment Fund in the Department of Entomology for the year 1913:

Some continuation of the pecan insect studies and the control of citrus pests, begun in the southern part of the State in 1912, was possible in 1913. The feasibility of controlling the most important citrus pests at a very moderate expense has now been fully demonstrated for the benefit of Satsuma orange growers in Alabama. It was impossible to carry on an extensive study of pecan insects as we desired to do. Press Bulletin No. 63, entitled "Control of White Fly and Scale Insects on Citrus Fruits," contains a brief outline of this insect's life history and methods for its control.

Orchard spraying with lime-sulphur wash for the control of San Jose scale and with arsenate of lead for the control of plum curculio, was conducted at Franklin. This work began an extensive investigation of various forms of arsenate of lead to determine their general effectiveness and economy in orchard work. This has now developed into an Adams' Fund project and the expense will be borne mainly from that fund in the future.

The grass worm which was so abundant in 1912, appeared in numbers in the vicinity of Mobile rather late in the season and gave opportunity for continuing our study upon the fall life history of that species. These studies were made by Field Assistant J. A. Dew, who has the manuscript for a report upon that insect ready for publication.

The cotton worm appeared in a few localities in Central Alabama, but, fortunately, did not become serious this season. In some other States west of us, the cotton was stripped, but in Alabama the worms were rather late in appearing, and, probably on account of extremely hot, dry weather, did not become abundant in more than a few localities.

The major portion of our work under this fund for the season has necessarily been connected with the Mexican cotton boll weevil. Three Press Bulletins have been issued

dealing with this cotton pest. The first, Press Bulletin No. 60, outlined the weevil infested area in the United States and especially in Alabama for 1912. Press Bulletin No. 64, entitled "Boll Weevil Control in Early Summer," contains in brief form a statement of the steps that are most effective in reducing weevil injury during the growing season of the crop. Press Bulletin No. 65, entitled "Fall Campaign Against the Boll Weevil," states the steps that are advisable in handling the cotton crop and the cotton fields for the latter part of the season. The Alabama Bankers' Association, through its Agricultural Committee, co-operated with the Experiment Station by supplementing the edition of Press Bulletin No. 65 with an extra edition printed at their own expense and distributed by them through the members of the Association.

Field Assistant J. A. Dew resigned October 31st and this position in the Department has been filled by the appointment of G. W. Ells.

Respectfully submitted,
W. E. HINDS,
Entomologist.

Report of Drainage Engineer.

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

Dear Sir:—

Herewith I respectfully submit a brief synopsis of the work done by the Office of Experiment Stations, U. S. Department of Agriculture, during the year 1913. The work done was under the co-operative agreement with the Alabama Agricultural Experiment Station.

During the year particular attention was given to the need of under-drainage; five experimental tilled tracts, of about 10 acres each, being installed in various parts of the State.

Tract No. 1 is located on the farm of J. C. Harper at Neenah, Wilcox County, Alabama, in the valley of a small stream. The soil is a fine yellow alluvial loam with traces of sand in it, underlain at a depth of 3 to 6 feet by a stiff drab clay. Before drainage the field could not be successfully cultivated because of its wet condition.

Tract No. 2 is located on the property of the Martin Investment Company, near Bessemer, Jefferson County, Alabama. The surface soil to a depth of 6 to 24 inches is a light brown loam with traces of sand, underlain with a light brown or mottled clay that is practically impervious. The tract selected lies in the valley of a small creek at the foot of a steep hill. Before drainage the seepage from the hillside made the area too wet for cultivation.

Tract No. 3 is located on the farm of Frank Holman, at York, Sumter County, Alabama. The soil is a brown, sandy loam containing considerable fine sand, underlain, at a depth of 1 to 3 feet by a red or yellow clay, containing a small amount of lime precipitates. The sandy loam is deepest in the low swales, its thickness gradually diminishing toward the higher ground. Before drainage improvements were made the land was very wet.

Tract No. 4 is located on the farm of Dr. T. B. Hill, on the Woodley road, 13 1-2 miles S. E. of Montgomery, Alabama. The soil is a black Houston clay with a yellow subsoil. Before drainage improvements were made, the field remained wet for a long period after each rain.

Tract No. 5 is located on the farm of J. F. Suttle, at Felix, Perry County, Alabama. The soil is a brown sandy loam,

containing considerable fine sand, underlain with a subsoil of yellow clay. The field is slightly rolling, with low ridges and shallow swales. Before drainage the lower portions of the field were very wet and hard to cultivate.

The five experimental tiled tracts described above, together with those constructed during the year 1912, were under cultivation during the cropping season of 1913. The season was unusually dry, the crops, in general, suffering severely from lack of moisture; yet, the crops on the experimental tiled tracts were, without exception, greater than (in some instances more than double) those obtained from similar untiled areas.

The results obtained illustrate that underdrainage improves the condition of the soil in dry as well as in wet seasons, and that the cost of such improvement would be more than repaid by the increased yield in 2 or 3 seasons. The benefits obtained during wet seasons were illustrated by the experimental tiled tracts installed and farmed during 1912 and described in our report for that year.

The investigations made have created a great deal of interest in drainage. Some of the direct results of the work are: the establishing of a tile factory at Montgomery, Alabama, very materially reducing the cost of drain tile in the central and southern parts of the state; the locating at Montgomery of a drainage engineer and contractor owning a tile trenching machine; and the tiling of large tracts of land on the farms of W. E. Elsberry, Jr., Dr. T. B. Hill and W. G. Henderson, all of Montgomery, Alabama.

There are numerous large drainage projects in the state, involving the interests of two or more property owners, which could undoubtedly be profitably reclaimed if there were a State drainage law under which to organize the work. The need for such a law has become very apparent, it being necessary to limit all drainage work to the smaller projects until an adequate law has been enacted.

LEWIS S. JONES,
U. S. Drainage Engineer.

Report of Animal Husbandman.

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

Dear Sir:—

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

The writer did not enter on his duties until September 1st, 1913, and the changes in the staff, both at this time and earlier in the year, interfered somewhat with the continuity of the experimental work.

BEEF CATTLE.

This work is being done on the Cobb-Norwell Farm, Norwell Station, Sumter County, in co-operation with Mr. O. E. Cobb and the Bureau of Animal Industry of the United States Department of Agriculture. Mr. Cobb, a farmer, living at Sumterville, furnishes the cattle and the feed for the work, while the Alabama Experiment Station and the Bureau of Animal Industry provide a man, Mr. S. S. Jerdan, to live on the farm and have personal supervision of the experimental work.

During the year 1913 two separate beef feeding tests were conducted, as follows:

First. Fattening beef steers on pasture. The steers were divided into three lots and fed the following rations:

Lot 1—Pasture alone.

Lot 2—Pasture, cotton seed cake.

Lot 3—Pasture, cotton seed cake 1-2, corn and cob meal 1-2.

The results of these experiments will be published in due time as a bulletin of this station.

Second. Fattening beef steers during the winter months. The steers were divided into three lots and are being fed as follows:

Lot 1—Cotton seed meal, cotton seed hulls.

Lot 2—Cotton seed meal, corn silage.

Lot 3—Cotton seed meal, cotton seed hulls 1-2, corn silage 1-2.

This feeding test will be closed in the early part of February, 1914. Other experiments in feeding beef cattle will be undertaken.

DAIRY CATTLE.

The work with dairy cattle is being done on the farm of M. W. Hall & Sons, James, Bullock County. The work was started in April, 1913, and will be continued for some time. The problems being studied are as follows:

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

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

SWINE.

The hog work is located in three sections of the state as follows:

First. Work on the Cobb-Norwell farm in Sumter County is conducted in co-operation with the Bureau of Animal Industry, United States Department of Agriculture, under the immediate supervision of Mr. S. S. Jerdan. The object is to determine the profits in producing pork under farm conditions, making maximum use of the forage crops suitable to the soils of this region.

Second. The work on the Yarbrough farm, in Henry County, near Columbia, is under the immediate supervision of Mr. J. A. McLeod and is similar in purpose to that being conducted in Sumter County. The Sumter County work is being conducted on a soil well adapted to alfalfa, while the Henry County work represents a sandy soil adapted to Bermuda, rape, and peanuts. It will require several years to complete these experiments.

Third. The work at the Sixth District Agricultural School at Hamilton, Marion County, consists of a test of the following rations:

Lot 1—Corn 9-10, tankage 1-10.

Lot 2—Corn 2-3, wheat shorts 1-3.

Lot 3—Corn.

POULTRY.

Experimental work with poultry has been conducted in co-operation with the Sixth District Agricultural School at Hamilton, during the year. Two pens each of Black Minorcas and Rhode Island Reds were used. The value of different rations and the influence of pasture crops will be determined in terms of the number of eggs laid.

During May arrangements were made with Mr. H. Schluterbusch at Citronelle, Mobile County, Alabama, to

conduct an experiment to test the following feeds as rations for laying hens, which experiment is still in progress:

Lot 1—Dry mash, cracked corn, oats.

Lot 2—Dry mash, cracked corn.

Lot 3—Purina chowder.

Lot 4—Dry mash, cracked corn, oats.

MULES.

An experiment was started March 1st, 1913, on the farm of Montgomery Bros., at Cusseta, Chambers County, Alabama, to test the value of various rations for mules engaged in farm work.

Lot 1—Corn 1-2, oats 1-2, hay.

Lot 2—Corn, cotton seed meal, hay.

The mules in lot 2 were started on a grain mixture of 1 part cotton seed meal to 6 1-4 parts by weight of corn, and the cotton seed meal was gradually increased until by May 1st the mixture consisted of 1 part cotton seed meal to 4 1-6 parts of corn. In this latter ration each mule consumed about 1 1-4 lbs. of cotton seed meal per day. All the mules were in good condition at the close of the experiment August 1st. It is planned to continue feeding experiments with mules.

Yours very truly,

GEO. S. TEMPLETON,

Animal Husbandman.

Report of Horticulturist.

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

Dear Sir:—

The following is a report of work carried on under the fund provided for local experiments and for investigations in various localities in the State other than Auburn. Dr. E. P. Sandsten, Horticulturist, resigned last summer. The writer, as his successor, entered upon his duties in October. Mr. G. V. Stelzenmuller was elected to the position of Field Agent last June in place of Mr. H. M. Conolly, who resigned.

The work of the preceding year was continued and embraced the following lines:

- (1) Truck and fruit survey of the State.
- (2) Adaptabilities of the several sections of the State, and the varieties of vegetables and fruits best adapted to each.
- (3) Collection and study of the promising seedling fruits and nuts of the State.
- (4) Developing the home vegetable garden and the home orchard.
- (5) Demonstration in spraying.
- (6) Improving school grounds and farm homes.
- (7) The use of a commercial storage house for keeping sweet potatoes.
- (8) Testing the keeping qualities of the various varieties of sweet potatoes.
- (10) The economical production of cabbage in the Mobile District.

The sweet potato work was directed toward the following points:

- (1) The demonstration of a commercial storage house in comparison with the use of banks, sheds, etc.
- (2) A comparison and thorough test of the various methods of storage in potato houses; such as bins, shelves, hampers and crates.
- (3) An accurate test of the keeping qualities of the varieties of potatoes commonly grown.
- (4) Experiments to show the percentage of shrinkage

during curing period and during the storing period, under the different methods of storage.

(5) Keeping the records of the moisture content and the temperature of the house during the storing period.

(6) Comparison of the carefully handled potatoes with those handled in the ordinary manner.

(7) Experiments to show if the loss is greater in potatoes that are not sorted than in those that have been sorted from time to time as decay takes place.

(8) Experiments to show if potatoes diseased when stored can be kept successfully.

(9) Experiments to determine when decay takes place.

(10) Tests to show if cut or bruised tubers can be kept.

(11) Comparison of the keeping qualities of large, fully matured tubers and small, immature ones.

(12) Comparison of large round Dooleys with long, thin Dooleys, as to keeping qualities.

Data and notes along the several lines were gathered and will prove valuable. In the case of the sweet potato work notes were obtained in storage houses at four different points in the State representing different climatic conditions and including temperature records in storage, humidity, shrinkage and other points of value. The work is being pushed. No difficulty, as a rule, is found in finding individuals ready to co-operate in the work as its value is fully appreciated by intelligent people.

It seems best to undertake work at a limited number of typical points rather than to attempt to carry it on in a large number of counties. With but a single field agent available for the work the latter plan entails a large expense for travel, and is less practicable than the other plan.

For the coming year work is planned along other lines of interest in the State, including experiments with fertilizers in relation to the hardiness and ripening of satsuma oranges, nematode troubles, cover crops, fertilizers for pecans in relation to imperfectly filled nuts, quality, bearing, etc.

Respectfully submitted,
 ERNEST WALKER,
 Horticulturist.

Report of Superintendent of Extension.

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

Dear Sir:—

I am herewith submitting a report of the work done by the Extension Department of the Alabama Polytechnic Institute.

The work is classified under heads as follows: Boys' Corn Clubs, Girls' Canning and Poultry Clubs, Boys' Pig Clubs, and Dairy Extension Work. The two first named are carried on through a co-operative arrangement between the College and the Bureau of Plant Industry, U. S. Department of Agriculture. The two last named through a similar arrangement with the Bureau of Animal Industry of the U. S. Department of Agriculture.

This office force consists of a superintendent and four assistants, each assigned to some specific work, besides two stenographers, and, from time to time, several mailing clerks.

BOYS' CORN CLUBS.

(L. N. Duncan and J. B. Hobdy.)

The Season.

Alabama's Corn Club suffered materially from general unfavorable weather conditions during the season of 1913. With the exception of a few limited areas scattered over the State continuous drouths at the critical stage of the growth cut the corn crop off materially. Such weather conditions proved discouraging to numbers of the club members. However, the lesson learned by those who prepared their acres in the fall of 1912 will do much to prepare our farmers for another such season. Great numbers of our boys have learned once for all the value of thorough fall preparation, and such acres scattered over the State have proven valuable demonstrations of effective and timely preparation.

National Corn Exposition School for Prize Winners.

Alabama's business men sent to the National Corn Exposition School for Prize Winners, held at Columbia, S. C., during the early part of February, 1913, one hundred county prize winners for the crop year 1912. These young

fellows spent a very profitable week at the school and in addition to getting many valuable lessons, a team of twenty members, together with a team of five members from the Girls' Canning Clubs of the State, won the National Corn Exposition trophy—a bronze bust of the late Dr. Scaman A. Knapp, making a combined score of 1,601 points out of a possible 2,000, the next highest score being 1,400. The record of the twenty boys was an average yield of 165 bushels at an average cost of 17 cents per bushel. Of the five best records reported by club members to this office for 1913, four were made by boys who attended the Columbia Corn School.

Club Enrollment for 1913.

Profiting by an experience of the season of 1912 when we enrolled the names of every boy sent to this office by teachers, county superintendents and county demonstration agents, we have this year forwarded cards to the boys immediately upon receipt of their names, asking their signature if they desired to enter earnestly into the work of the club. In this way we were enabled to eliminate in the very beginning numbers of boys who were not really interested, and many whose names were sent in by those who failed to impress the boys with the real objects of club membership. As a final result we had a more faithful membership. The total enrollment was 5,499, representing an organization in each of the 67 counties of the State.

Summer Campaign.

The school laws of Alabama require that a four-day Teachers' Institute be held in each county during the summer months. We took advantage of these meetings to present the club work to every teacher in the State. Someone from this office appeared in person at each institute, with one exception, and addressed the teachers. In the case of the exception the work was presented by the State Supervisor of Rural Schools. In the talks to the teachers we showed from charts the results of the work for 1912, explained the real objects of the work, and impressed upon them the importance of fall enrollment, club exhibits in each school, the offering of local prizes, and the value of club work as a vitalizing agency in teaching agriculture from the text. As a result of these talks, we received signed agreements to aid in the work from 61 per cent. of the teachers present and over 76 per cent. of the rural teachers,

giving a grand total of 4,172 teachers committed to the work.

Exhibits.

Having spent much time during January and the early part of February in organizing Alabama's Corn Exposition team and collecting exhibits for same, we deemed it unwise to spend more time in making State exhibits, so devoted much time in the fall to encouraging county exhibits, especially in those counties in which fairs were held. In this way we feel that the results of the work in a concrete form were brought before a much larger number of people. We are somewhat partial now to the county rather than the State exhibit plan, though we hope to develop a practical dual scheme of exhibiting the products of the club members.

The co-operative funds secured for the boys' work during the year were used altogether for prize awards. Such funds, including that expended for prize trips to Columbia, S. C., aggregated approximately \$6,000.00.

Some Results of the Year's Work.

| | |
|---|-------------|
| Total enrollment | 5499 |
| Number of boys reporting yields of 100 bushels and over | 56 |
| Number of boys reporting yields of 75 bushels and over | 152 |
| Average yield per acre of all acres reported..... | 57.9 Bu. |
| Average cost per bushel | 39.9 cents. |

I desire to call attention to the fact that the estimated average yield of corn for Alabama for 1913 is less than 18 bushels, and applying the same scale of charges, as is used by the boys, the cost per bushel is approximately 66 cents. You will please make comparison of these figures with the above.

Alabama's Champion Corn Grower for 1913.

After making personal investigations of the yield of all contestants of the prize trip to Washington, which is annually awarded the champion corn grower enrolled in the clubs of the State, we are prepared to announce that Walker Lee Dunson, Route 6, Alexander City, Alabama, has made the best authentic record. His yield was 232 bushels and 39 pounds. An investigation made of his yield showed that all the rules governing the contest were carried out by the boy. His report showed two reliable witnesses, who certified to the measuring of his land, the

harvesting of his crop, including the weighing of all the corn, and the correctness of his yield.

The Central of Georgia Railroad Company has continued its valuable co-operation during the past season. In every county traversed by this road the company awarded a pure bred Berkshire pig, valued at \$25.00, to the boy making the best record, and to the boy making the best record along the entire line, a fine Percheron mare, valued at \$300.00. Walker Lee Dunson, the State champion, won the mare.

Outlook and Plans for 1914.

If we are to judge from the large number of names enrolled at this time for the 1914 clubs, the new year is to show a material growth in the work.

During the month of November this office issued the two bulletins approved by you, Alabama Boys' Corn Club Day, and information on Corn Growing for Corn Club Boys. The former was placed in the hands of the teachers, who, during the summer, pledged co-operation, and the latter has been sent each newly enrolled club member.

The Central of Georgia Railroad Company will continue its liberal and encouraging policy of giving valuable premiums to the prize winners along its line. A Four-Crop-Club contest will be conducted in these counties among those boys who enter a Three-Year Rotation Club. We hope at the end of the season to have worked out in these twenty-one counties something definite in crop rotation to propose for a general plan in the State. I am enclosing a folder showing the Central of Georgia Railroad Company's plan and its offer.

The Alabama Bankers' Association is exerting an organized effort to aid in the agricultural development of the State. Through the Agricultural Committee of this organization, committees are being formed in every county and much encouragement has been given the Boys' Corn Club work through State and county organizations. We are indebted to the State Bankers' Association for \$100.00 to meet the expenses of Alabama's champion corn grower to Washington. This association will aid us greatly in the future.

Girls' Canning and Poultry Clubs.

(Mrs. Birdie I. Robinson.)

During the season of 1913 the Girls' Canning and Poultry Work has been carried on through county organizations in ten Alabama counties. Numerous other counties have organizations directed from this office. The ten counties referred to have regularly paid county agents who give four months during the year to the work of organization, supervising and giving canning demonstrations. Under such leadership we have secured most excellent results. However, those counties without such agents have not shown satisfactory progress. The total membership of all clubs in the State numbers 1881.

The figures here quoted show the reported results in the ten organized Alabama counties:

| Kind of Product | No. put up. | Size of vessel. | Kind of vessel. |
|-----------------------------|-------------|------------------------------|-----------------|
| Tomatoes..... | 147,200 | No. 3 | Tin cans |
| Tomatoes..... | 16,500 | No. 2 | Tin cans |
| String beans..... | 22,500 | Qts. and $\frac{1}{2}$ gals. | Glass jars |
| Corn..... | 20,800 | Qts. and $\frac{1}{2}$ gals. | Glass jars |
| Other fruits and vegetables | 4,684 | | Cans |

The products put up by the Club members represent good, wholesome vegetables and fruits, one-half of which, the official reports show, was consumed at home, and the other half sold at the market price. It is safe to say that in some of these counties, where the work has been in progress for several years, the surplus canned products from the plots of the Tomato Club girls, and the gardens of their homes and others influenced by them, would go far toward supplying the market in the county. The socializing effects of these clubs cannot be reduced to figures; but no one who is at all familiar with conditions can doubt that they are equally as convincing.

Demonstrations given by the several county agents have resulted in a spread of the work to homes in every section of the ten organized counties, and the influence of the work has touched an additional number of homes, which number equals, if not exceeds, the number represented by the club members enrolled. In fact, a careful observation of the work leads me to say that every enrolled girl reaches one or more homes in addition to her own. The above reported results merely show the amount of canned goods put up by the club members reporting. In this, as well as all other

work where reports are required, it is possible to secure same from only a limited number of members. I feel confident that if the above products are increased four-fold we would then begin to approach the real value of the work.

Plans have already been made to organize eight additional counties during the season of 1914. This will give a total of eighteen counties, with paid agents, who will serve four months during the year. The counties to be organized are the following: Autauga, Conecuh, Jefferson, Macon, Marengo, Mobile, Pike, Tuscaloosa. Those in which the work has been carried on during the past season, are Calhoun, Chilton, DeKalb, Etowah, Franklin, Marshall, Monroe, Walker, Baldwin, St. Clair.

In addition to the above eighteen counties we have had applications for the work from fifteen other counties. These have signified their readiness to comply with all co-operative requirements. The fifteen counties referred to are: Barbour, Bibb, Bullock, Coffee, Coosa, Covington, Crenshaw, Cullman, Dale, Lamar, Lauderdale, Lawrence, Talladega, Tallapoosa, Wilcox.

I find the educational and business forces of the State eager to co-operate in the work, and I have been especially helped by assistance received from the Women's Clubs of the State.

In the organized counties \$765.65 were collected and expended in prizes for excellence in club work. This office raised \$551.50, which was expended for general State prizes.

I desire to call attention to the fact that prizes of a useful nature have been purchased with the funds raised for said **purpose**. Among numerous valuable prizes which were offered I mention two—a trip to Washington, D. C., valued at \$100, given by the Business Men's League and Bankers' Association at Mobile, Ala., and a scholarship to a District Agricultural School, valued at \$150, given by the State Bankers' Association.

It would cover entirely too much space to give all interesting results secured. However, I desire to call attention to at least two: An Etowah County Club of one hundred members reported thirty thousand No. 3 cans of tomatoes, valued at \$3,000. Erine Westbrook, of Odenville, St. Clair County, canned 1,855 No. 2 cans, valued at \$148.40. The total expense, covering the growing and canning of same, was \$60.15, netting the young lady \$88.25. This St. Clair County member is Alabama's 1913 Prize Winner.

The work of the Girls' Canning Clubs in Alabama, though

not coming up to our hopes and expectations for the season of 1913, has made material progress. The results, when compared with the work in former years, is very encouraging. That the work is meeting with approval is shown by the demands or requests from counties, not yet organized, which wish to secure the work. I feel safe in saying that fully 50 of the 67 counties in Alabama would comply with the local aid requirements, if we were prepared to go into these counties with the co-operative offer.

Boys' Pig Clubs.

(Chas. S. Jones.)

The organization of Boys' Pig Clubs was started March 1st in ten counties in the States. The counties selected, in which to commence the work, were counties that had county fair organizations and that had done extra good work in their Boys' Corn Club organizations. They were Bullock, Chilton, Colbert, Cullman, Marshall, Pike, Shelby, Tallapoosa, Tuscaloosa, and Walker Counties.

Most of the country schools were out by March 1st when the work was started, so it was not possible to reach the boys, through the schools, to get them interested and enrolled as members. The method used to present the work to the boys was to write each 1913 member of the Corn Club. In this way, and with the assistance of the county demonstration agents, 327 boys were enrolled. Had it been possible to reach the boys through the schools many more boys would have been enrolled.

The plan is to have the boys start with a young pure bred sow pig, and raise her to keep for a brood sow, and sell her off-spring. This many of the boys have done, while others who were not able to get a good sow pig last spring, took the best pig they could get for 1913. Later they have sold or slaughtered this pig and will have a young pure bred sow for 1914. This will result in a great many more good hogs coming into each county.

A large per cent. of the pigs raised last year were Berkshires and Berkshire grades, though many of the boys had Poland Chinas and Duroc Jerseys, and a few had Tamworths. So far as they will, the boys in each county are urged to grow one breed of hogs. They may select any breed they choose.

The importance of pasture in addition to the grain ration for profitable hog raising has been stressed in the instruc-

tions sent out to the boys, and in most cases they have had or will have pastures for their pigs. Reports from the boys show that where the pigs were kept in a pasture and fed an additional ration of grain, the average cost per pound gain was .0338 against .0473 for pen-fed pigs, a difference of over 33 per cent. in favor of the pastured pigs. The average daily grain for all pigs pastured was 1.03 pounds from date of birth; for pen-fed pigs, 0.77 pound from date of birth, a difference of 25 per cent. in favor of the pastured pigs.

Hog cholera killed a great many of the boys' pigs in some sections. In Walker County at least 33 per cent. of the boys lost their pigs from cholera. This could have been prevented had there been a place in the State where the boys could have secured anti-hog cholera serum with which to vaccinate their pigs. The need of an appropriation for the manufacturing of anti-hog cholera serum in the State is very evident.

From time to time, during the year, bulletins and circular letters on some phase of swine raising has been sent to the boys. The bulletins and circular letters sent out from this office were: Farmers' Bulletins Nos. 411, 379, and 164, also Bulletin No. 168, published by this station. The letters were on Feeding of Pigs, General Information on Care of Pigs, Peanuts as a Hog Feed, and Grazing Crops for Hogs.

The boys' pigs were exhibited at the county fairs, where prizes were offered to the boys. While the numbers of pigs exhibited were not as large as had been looked for, the quality of the pigs exhibited was good. In most cases the pigs exhibited by the boys were superior to those exhibited in the general classes.

The Boys' Pig Club exhibits at the various county fairs attracted much attention. Another interesting feature at the fairs was the boys' hog judging contest. The boys were given instructions in hog judging and later were allowed to judge hogs for prizes.

The number of boys enrolled in each county was: Bullock, 27; Chilton, 33; Colbert, 25; Cullman, 21; Marshall, 53; Pike, 31; Tallapoosa, 33; Tuscaloosa, 24; Walker, 68.

The following are some of the best reports made by the boys:

Blanco Durbin, Clanton, Ala.—Pig grade Duroc Jersey sow:

Final weight of pig when 205 days old.....341 lbs.
Average daily gain of pig.....1.87 lbs.

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|---|----------|
| Cost per pound gain | .02 |
| Profit at 7c. per pound..... | \$15.30 |
| Weight when 9 mos. and 19 days old..... | 403 lbs. |

Bennie Hixon, Perote, Ala.—Pig pure bred Berkshire sow:

| | |
|--|-----------|
| Final weight of pig when 8 mos. old..... | 350 lbs. |
| Average daily gain | 1.86 lbs. |
| Profit at 7c. per pound..... | \$12.80 |

Jim Anderson, Albertville, Ala.—Pig pure bred Berkshire sow:

| | |
|--|-----------|
| Final weight of pig when 234 days old..... | 350 lbs. |
| Average daily gain | 1.75 lbs. |
| Cost per pound gain..... | .0313 |
| Profit at 7c. per pound | \$12.47 |

The following is an average of the best report from each county:

| | |
|---|------------|
| Average age of pig when entered in pig club.... | 71.3 days |
| Final weight of pigs..... | 234 lbs. |
| Average age when above weights were taken.... | 236 days |
| Average daily gain of pigs after joining Pig Club.. | 1.271 lbs. |
| Cost per pound gain..... | .0315 |
| Profit at 7c. per pound, each pig..... | \$7.77 |

The Pig Club work will be carried on in 15 counties of the State in 1914. It is the plan to introduce the work in additional counties each year until Pig Clubs are organized in every county in the State. The purpose of this work is to create more interest in the growing of more, better and cheaper hogs in the State and to instill in the boys while young a love for animals that will result in their taking more interest in live stock farming when they are grown. Alabama at present is importing about \$8,500,000.00 worth of pork annually.

This work is not only to get the boys interested in raising hogs, but to help their fathers, as well, to introduce more hogs on their farms. There is now on file in this office a list of the hog breeders in the State and their prices for pure bred pigs. This list is kept for the benefit of those farmers wishing to know where they can buy good, pure bred hogs.

Dairy Extension Work.

(Noel A. Negley.)

Because of a transfer arranged the first of May whereby Mr. S. I. Bechdel, who formerly had charge of the work, was transferred to Washington, I will be able to report only on the work for the nine months since May 1st.

The aim of the Dairy Extension Work is to make dairying more profitable and pleasant for the average farmer and dairyman, and to encourage and assist other farmers to enter the industry. The three general objects in view and the accomplishment along these lines are as follows:

1. The getting of more profitable cows.

Through a system of herd records, eight dairymen having about one hundred twenty-one cows, discovered twenty-six among that number which were either making no profit or being kept at a loss. By selling or slaughtering these "robber cows," their profits were materially increased. Two more dairymen want to begin the work next month.

Calves are being raised only from cows that have proven themselves profitable. Three men have built calf stanchions, and are raising calves more easily and profitably than under the old method of letting them suck the cow.

Four pure bred bulls have taken the place of scrubs and one Bull Breeding Association with two pure bred bulls in it, has been formed.

2. Feeding cows better and cheaper.

The establishment of permanent pastures has been urged at all times and a few dairymen have some of their best land in permanent Bermuda and bur clover pastures.

The raising of feeds, especially those leguminous crops, has enabled a number of dairymen to increase productions at a much less cost. Every dairyman I have talked with in the southern part of the State will have either cowpeas or velvet beans for their herd this year.

I have assisted in building twenty-one silos, and have advised regarding type and size, furnished bills of materials, etc., for a number of others. Assuming silage to be equal to cotton seed hulls in feeding value, and that silage costs three dollars per ton (\$3) and cotton seed hulls \$10 per ton, there is a saving of \$7 per ton in having a silo. Thus, these 21 silos, holding on an average of 143 tons, or a total of 3,000 tons, have saved the farmers of the State approximately \$21,000. Three silos are now being built for the

coming season and others will be begun soon. Because of the greater number to be built for 1914 an assistant will be necessary during the summer.

3. The building of more sanitary and modern dairy buildings.

Bills of materials, blue prints and specifications have been furnished for a number of dairy barns and milk houses and personal assistance given in the construction of three dairy barns and four milk houses.

In addition to these three phases of the work, lectures have been given at a number of Farmers' Institutes during the past summer, and at other meetings held over the State. A few days each month have been spent in the office answering correspondence and getting out circular letters to dairymen and silo builders. During the Birmingham State Fair a silo building and silage cutting demonstraton was given in connection with the Butter Fat Production Contest, the Butter Contest and the exhibition of a model dairy barn, silo, milk house, and modern dairy equipment. A series of one-day dairy schools have been held in Baldwin County with most gratifying results. Arrangements are being made for a Live Stock Special through the boll weevil infested district of the State.

Respectfully submitted,

L. N. DUNCAN,
Superintendent of Extension.

Report of Plant Pathologist.

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

Dear Sir:—

I respectfully submit the following brief statement of the work done in the Department of Plant Pathology under the Local Experimental Fund during the year 1913:

A portion of the work reported as being in progress in the report of 1912 has been completed. Work on egg plant rots, one of which has not previously been investigated, has been finished and is in press. The report includes some very satisfactory results on the control of the more common egg plant rot. The study of a leaf blight of Persian or English walnuts, produced by a new species of fungus, has been completed and sent to press. The work on stem rot of asters is being continued. Nothing has been done on persimmon diseases because no material was available during the past season.

Several additional problems have been undertaken, among which are the control of apple black rot by sanitation and the application of fungicides, and the control of cotton boll rot by the selection of disease-free seed. No experimental data on the control of apple black rot is available in the literature of this malady and nothing has previously been done in the South on its control with fungicides. For this reason some work was conducted during the past summer and a preliminary report in *Phytopathology* 3:288-289, 1913, shows that lime sulphur is ineffective while Bordeaux mixture gives very satisfactory results. It is planned to complete this work during the present year. A number of planters in the southern portion of the State have been interested in co-operating in growing cotton seed free from boll rot.

Bulletin 172, on "Black Spot of Roses," has been issued. A brief treatise on the appearance and control of an important disease of potatoes and cabbage has been prepared and published in the *Proc. of the Alabama State Horticulture Society* for 1913. A bulletin containing a discussion of planting, cultivation, fertilization, insect pests and fungus diseases of the satsuma orange has been prepared by J. A. Dew and myself and issued by the Insecticide

Department of the Van Antwerp Drug Co., Mobile, Ala.
Numerous letters of inquiry relative to plant diseases
have been received and answered.

Very respectfully submitted,
FREDERICK A. WOLF,
Plant Pathologist.