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ALABAMA
Agricultural Experiment Station

OF THE

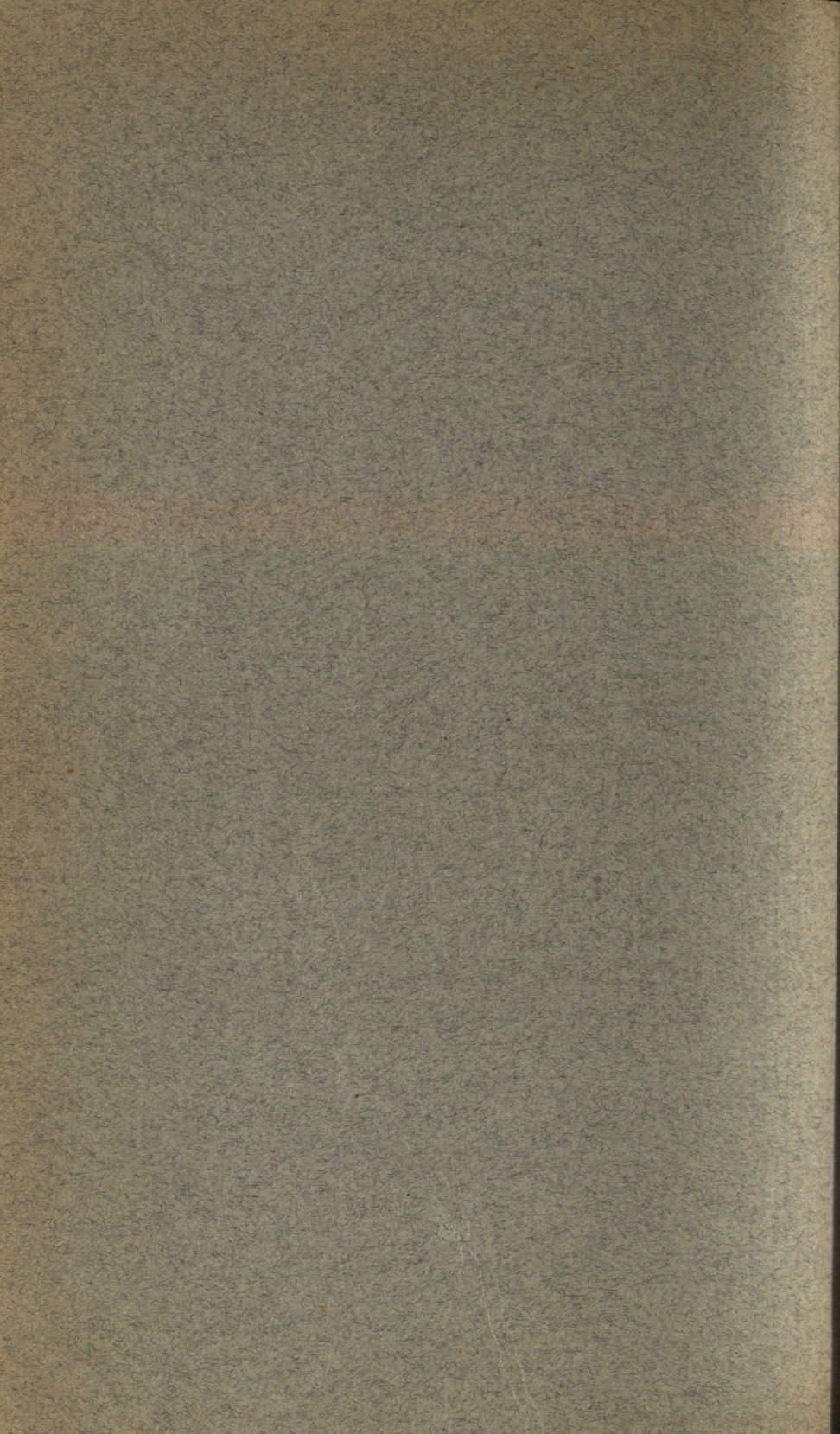
Alabama Polytechnic Institute

AUBURN

**Annual Report of the Director of the Ex-
periment Station on Work Done under
the Local Experiment Law in 1912**

BY
J. F. DUGGAR
Director

Opelika, Ala.
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Auburn, Ala., Feb. 25, 1913.

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 1912, with the request that you transmit this report to his Excellency, Governor Emmet A. O'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.

J. F. Duggar, Director.

Agriculture, Plant Breeding and Farm Machinery.

*J. F. Duggar, in charge.

- *E. F. Cauthen.....Associate Agriculturist
- *M. J. Funchess.....Assistant Agriculturist
- J. T. Williamson.....Field Agent in Agriculture
- L. J. Hawley.....Field Agent in Agriculture
- *J. F. Duggar, Jr.Assistant in Agriculture
- *L. T. Rhodes.....Acting Field Agent

Livestock and Poultry Investigations.

*D. T. Gray, in charge.

- *L. W. Shook.....Assistant in Animal Industry
- *L. W. Summers.....Assistant in Animal Industry
- **S. S. Jerdan.....Assistant in Beef Industry
- A. R. Gissendanner.....Assistant in Swine Husbandry
- *C. D. Allis.....Assistant in Poultry

Entomology.

*W. E. Hinds, in charge.

- J. A. Dew.....Field Assistant in Entomology

Horticultural Investigations.

*P. F. Williams, in charge.

- H. M. Conolly.....Field Assistant in Horticulture
- *J. C. C. Price.....Assistant in Horticulture

Agricultural Extension.

**L. N. Duncan, in charge.

- **J. B. Hobby.....Assistant in Extension Work
- **S. I. Bechdel.....Dairy Extension
- **Mrs. Birdie L. Robinson.....Tomato Clubs

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 1912 UNDER THE LOCAL EXPERIMENT LAW.

(Submitted 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 made under the same local conditions of soil and climate that surround the farmer growing crops in all parts of the State.

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
For combatting the cotton boll weevil and other injurious insects.....	\$2300
For plant breeding of field and forage crops	\$1200
For work in drainage, irrigations 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 1912 was \$27,000.00 in addition to a 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 1912, 5 bulletins, 8 circulars, and 6 press bulletins, making an aggregate of 19 publications. The total number of pages in these aggregates 294, and the total number of pages in all of the copies printed amounts to 4,216,000. It has been possible by reason of this small appropriation for publication and administration to print more than double the usual number of publications that was heretofore possible from the small amount of the Federal appropriation that could be thus used. Moreover, it is legitimate to print from this State fund publications of a more popular character than are admissible under the Federal funds. The following is the list of publications of the Alabama Experiment Station, issued in accord-

ance with the Local Experiment Law in the calendar year 1912:

- Bulletin No. 162:**—Local Fertilizer Experiments with Cotton in North Alabama in 1911; by the Director and his Assistants.
- Bulletin No. 164:**—Cotton Worm or "Caterptllar"; by the Entomologist.
- Bulletin No. 165:**—Southern Bur Clover; by the Associate Agriculturist.
- Bulletin No. 166:**—Curing Meat on the Farm; by the Animal Husbandman and Assistant.
- Bulletin No. 167:**—Wintering Pregnant Ewes; by the Animal Husbandman and Assistant.
- Circular No. 5:**—The Boll Weevil Advance in Alabama; by the Entomologist.
- Circular No. 6:**—Fighting the Boll Weevil; by the Entomologist.
- Circular No. 7:**—Destroying Boll Weevils by Clean Farming; by the Entomologist.
- Circular No. 14:**—Part I—Vegetable Growing in Alabama; by the Horticulturist and Assistant.
- Circular No. 14:**—Part II—Vegetable Growing in Alabama; by the Horticulturist and Assistant.
- Circular No. 15:**—The Southern Pine Beetle and Its Control; by the Entomologist.
- Circular No. 16:**—Rules and Regulations of the Alabama State Board of Horticulture Governing the Transportation of Articles Liable to Contain the Mexican Cotton Boll Weevil; by the Entomologist.
- Circular No. 18:**—1—Feeding and Managing Dairy Cattle. 2. Feed and Care of the Calf. 3. The Bull. 4. Silos and Silage; by the Assistants of the Animal Husbandman.
- Press Bulletin No. 54:**—Cotton Boll Weevil Infested Area in United States and Quarantine Line in Alabama, 1911 to 1912; by the Entomologist.
- Press Bulletin No. 55:**—Mosquito Control; by the Entomologist.
- Press Bulletin No. 56:**—Fight the Fly; by the Entomologist.
- Press Bulletin No. 57:**—Grass Worm or Fall Army Worm; by the Entomologist.
- Press Bulletin No. 59:**—The Boll Weevil Advances; by the Entomologist

A large proportion of the published matter was from the Departments of Entomology and Animal Industry because of the outbreak of grass worms and the demand for information regarding other injurious insects, and because it was considered desirable to publish as much as practicable of the data on feeding before Professor Gray, who had charge of that work, should leave the Station, as he did in December, 1912, to take up experimental work in another State.

During the year the mailing list of the Station was com-

pletely overhauled, revised, and changed from an alphabetical arrangement to an arrangement by counties. This will hereafter permit economy in printing by making it possible to send each bulletin only to those counties in the State in which the subject treated is especially important. There is now in use the stencil system of mailing instead of the old clip system, which proved unsatisfactory.

The data for publications in all departments accumulate rapidly, so that the funds available for printing, including both the items from State and Federal sources, are insufficient to publish all the bulletins, circulars and brief articles that are ready for publication, and which the farmers need at once.

For 1913 this fund will be even smaller than in 1912, because a balance from the preceding year was used in 1912 to supplement the printing fund, as permitted under this law, while no such balance is available for printing in 1913. The Station is confronted with the embarrassing situation of having on hand experimental information of much value, which it cannot now publish because of insufficient printing funds.

One of the most urgent needs in all Departments of work under this law is for this item in the Local Experiment bill to be increased as soon as the condition of the State Treasurer permits. Indeed an increase for each line of work could be most profitably expended. The results now on hand will keep and will grow more valuable as they are supplemented by similar data accumulated each year, but can the farmers of Alabama afford to be deprived for several years longer of profitable information on fertilizing cotton in all parts of the State, on the different varieties of cotton, on sweet potatoes, corn, peanuts, on fruits, vegetables, injurious insects, on feeding cattle and hogs, and on many other subjects?

Organization.

As indicated in the first report on the work done under the Local Experiment Law (Circular No. 19, Alabama Experiment Station), work under the various items in the Local Experiment Law was assigned to the heads of the Departments of the Experiment Station conducting the corresponding lines of work. Recommendations relative to the work of each year are submitted to the Board of Trustees of the Alabama Polytechnic Institute, and when approved by them, these become the directions for conducting the work in the ensuing year. Under a regulation adopted by this Board it is required that each head of a department

doing work under this law shall submit "project statements" for approval by the Director of the Experiment Station, and that upon approval of these "project statements" the heads of departments may spend the sums appropriated for the lines of work assigned.

Fertilizer Experiments and Other Experiments With Field and Forage Crops.

In 1912, as in the preceding year, the leading line of experimental work under this head was in fertilizing cotton, growing on each of the principal soils of Alabama. While there are other subjects which in the end are just as important, the question on which farmers are now most generally demanding an immediate answer is this: "How may I most profitably fertilize cotton on my special soil?" More than 100 experiments in fertilizing cotton were made in 1912; these were distributed throughout the State in such a way that practically every county contained one or more.

The fertilization of corn also received much attention. Twenty-three experiments in fertilizing this crop were made, the results of which are available for publication as soon as the fund for printing permits. It is believed that these fertilizer experiments with corn, which whenever possible are made adjacent to similar fertilizer experiments with cotton, will in a few years afford a reliable answer to the question, "What are the **relative** fertilizer requirements of corn and cotton?" If this be true, then when by the larger number of fertilizer experiments with the cotton crop we shall have learned what are its fertilizer requirements on each of the principal soil belts of Alabama, we shall be able to conclude what combinations of fertilizers will also be needed by corn on the same soils. But even if it be found that there is no constant relation between the fertilizers required for the two crops, we shall in a few years have the data on which to advise farmers what is the best fertilizer for corn on each of the principal soil belts of Alabama.

The results of one class of fertilizer experiments on cotton, namely, those made with fertilizers in which nitrogen was supplied to certain plots in the form of cotton seed meal, have been published in Bulletins Nos. 169 and 170 of the Alabama Experiment Station. These give the results obtained in fertilizing cotton in this way in South Alabama and North Alabama respectively. Two similar bulletins giving results with corresponding fertilizer experiments with cotton in 1911 were also printed near the end of

that year. These are Bulletins Nos. 160 for South Alabama, and 162 for North Alabama.

It is thought best to publish these results as promptly as possible since most of them contain suggestions of immediate value for farmers tilling the same kind of soil. However, the ultimate aim is to repeat these experiments for several years, thus affording reliable averages and positive conclusions as to the fertilizers most profitable on each of the principal soils.

For example, when these yearly results accumulate in sufficient number we shall be able to publish one bulletin giving positive recommendations for the fertilization of cotton in the pine lands of the southeastern part of Alabama, and another for the fertilization of this crop in the hill lands of East Alabama, and another for the prairie region, and so on for the principal soil belts of the State. This is a large undertaking, and will require years of patient and uninterrupted experimentation without change of plan. But its accomplishment will be worth the price, since it should result in the saving of several million dollars per year in fertilizer bills, or an increase in the State's cotton crop of many millions of dollars in excess of what would then be possible from the indiscriminate or unguided use of fertilizers.

Varieties of cotton have been tested in a number of localities with a view to determine the kinds best suited to the different sections of the State. Moreover, special local tests on soil invaded by black root or wilt have been made with a view to ascertain the varieties most resistant to this destructive disease, and as a means of laying the basis for breeding up wilt-proof varieties, which shall have the advantage over the few varieties now found to be wilt-proof, in greater earliness and adaptability to boll weevil conditions. Similarly, varieties of corn have been tested in many different parts of the State.

Peanuts have been the subject of fertilizer experiments and of variety tests in a number of localities. This crop is being studied with a view of encouraging its cultivation, both as a hog crop and for commercial purposes as a partial substitute for cotton on certain soils in regions invaded or soon to be invaded by the boll weevil. Fertilizer experiments with sweet potatoes, made in a number of localities, have afforded information that should save growers of this crop considerable money in the use of fertilizers, which according to these results are now not generally ap-

plied in the proportion in which the sweet potato requires the different fertilizing constituents. These results also await publication when the printing fund shall permit.

Local experiments with varieties of wheat were made in a number of localities throughout the central and western part of the State. The yields in some cases justified the hope that in time wheat may be made a profitable crop on certain of these soils, thus increasing the farmer's resources in the boll weevil region.

The following is a list of the experiments conducted with fruit and forage crops under this item of the Local Experiment Law in 1912.

- Cotton, regular fertilizer experiments.
- Cotton, complete nitrate of soda experiments.
- Cotton, special phosphate experiments.
- Cotton, time of applying nitrate of soda.
- Cotton, variety tests, extensive.
- Cotton, variety tests, extensive,—wilt resistant kinds.
- Cotton, variety tests, short.
- Cotton, variety tests, short,—wilt resistant kinds.
- Cotton, isolation tests (plant breeding).
- Corn, regular fertilizer experiments.
- Corn, complete nitrate experiments.
- Corn, time of applying nitrate of soda.
- Corn, variety tests, extensive.
- Corn, short variety tests, soft varieties.
- Corn, short variety tests, hard varieties.
- Corn, isolation tests (plant breeding).
- Oats, special nitrate experiments.
- Cowpea, variety tests, extensive.
- Cowpea, variety tests, short.
- Peanuts, regular fertilizer experiments.
- Peanuts, variety tests, extensive.
- Sugar cane, regular fertilizer experiment.
- Sugar cane, special fertilizer experiment.
- Sweet potatoes, regular fertilizer experiment.
- Sweet potatoes, variety tests.
- Soy bean tests.
- Lime experiments (various crops).
- Wheat experiments.
- Lyon bean and velvet bean experiments.
- Johnson grass, fertilizer experiments.
- Winter forage crop test, extensive.
- Bur clover test.
- Vetch test.
- Forage crops, miscellaneous (clovers, etc.)
- Alfalfa, inoculation test.
- Oats, methods of seeding.
- Oats, variety test.

Oats, plant breeding.
 Canada peas vs. Oregon vetch.
 Rotation experiments.
 Phosphate, best forms of.
 Lime, best forms of.
 Tile drainage.
 Subsoiling with dynamite.
 Cotton choppers, tests of.
 Grain drills, tests of.

The total number of tests which were begun in 1911 was 471, of which about 400 were carried to a conclusion.

Plant Breeding.

The first effort under this item was to test the suitability and comparative yield in different parts of the State of varieties of cotton, corn, and oats, which had been bred up in previous years on the Experiment Station farm at Auburn. Such tests were made in sixty-five localities. It is planned in 1913 to extend this work, especially in the matter of personal selections by a member of the Station staff of plants showing special excellence in these local experiments, with a view of breeding up varieties that should be of special value for the locality where the selections are made.

Work In Drainage and Farm Machinery.

As the means of getting the greatest amount of work accomplished with the few hundred dollars available for drainage, arrangements were made for co-operation with the Office of Experiment Stations, U. S. Department of Agriculture, by which means this Station has been able to utilize the services of an expert drainage engineer. Thus each dollar contributed by the State through the Local Experiment Fund brings to Alabama a much larger amount from other sources.

In the early part of 1912, Mr. S. H. McCrory, U. S. Drainage Engineer, was immediately in charge of this work until, on his promotion, he was succeeded by Mr. L. A. Jones, Montgomery, Ala., who is now continuing the co-operative drainage work.

The first problem attacked was that of tile drainage of prairie soils. For this purpose tile drains were laid on five small experimental fields in the counties of Wilcox, Montgomery, Sumter, and Dallas, as mentioned in my former report. Four of these projects were completed in time for crops to be grown on the land in 1912. Observations were

made on the increase in the crops due to drainage, and the Engineer in charge estimates that the value of the increased crop was great enough in most cases not only to pay a good interest on the investment, but to pay within a few years the entire cost of drainage. One of the parties on whose land one of these experiments was made, J. T. Adams, Pine Apple, Ala., writes as follows:

"I planted this land in cotton last year. It made a bale per acre. Previous to tiling, it was too wet to make anything."

Work in 1912 consisted chiefly in completing the laying of tile in the experiment field at Marion Junction, in making observations on the other four fields, in making examinations of a number of localities to determine where future experiments could be most advantageously conducted, and in rendering expert assistance to land-owners by correspondence, by visits, and in special cases, by making drainage plans.

It is planned for the next experimental drainage fields to be on different characters of soil, so that after these investigations have proceeded for several years there will be available valuable data regarding the expense of drainage under different conditions, the resulting increase in the yields of a number of crops, and the profits resulting from the drainage of different kinds of soil.

The work with farm machinery in 1912 has consisted chiefly of the following:

(1) Further tests of machines for sowing oats by the open furrow method and the effects of this method in extending further north into Alabama the general practice of sowing oats in the fall instead of after Christmas.

(2) Tests of three machines for chopping cotton.

(3) Collection of data relative to labor-saving implements occasionally found in Alabama, but not in general use. This implement survey is intended as a basis for future experimental work with farm machinery, and as a means of determining the implements to be recommended to farmers making inquiries on such subjects.

Data is being collected on irrigation in Alabama, but conditions have not yet justified the actual beginning of any experimental work on irrigation, though plans have been made for some work in this line in 1913.

Work With Injurious Insects.

The demands on the Department of Entomology have been extremely heavy in 1912 for the class of work con-

templated by the Local Experiment Law. The Entomologist and his Assistant have been engaged in the enforcement of the quarantine regulations against the boll weevil to prevent the spread of this insect by artificial or preventable means; in determining the best means of controlling the grass worm, which was so injurious in parts of Alabama in 1912 as an enemy of corn and other plants; in conducting spraying experiments against the white fly on the Satsuma orange, against scale, the codling moth, and against other insect pests of orchard and nut trees; in preparing publications on these and other injurious insects, and in furnishing information relative to the best means of controlling troublesome insects.

As the result of a single one of the many spraying experiments conducted, the owner gathered more than \$100.00 worth of good peaches from a small orchard which he had been about to cut down before being advised that it might be saved by spraying.

Live Stock Investigations and Poultry Industry.

The work with poultry, as well as with live stock, was assigned to the Department of Animal Industry. By having the same assistants attend to both lines of work some economy was effected.

The work with cattle was conducted on the farm of O. E. Cobb, Sumterville, Sumter county. This work with cattle was in co-operation with Mr. Cobb and with the Bureau of Animal Industry of the U. S. Department of Agriculture. Hence for each dollar contributed by this State fund, several dollars were contributed by other agencies. It consisted in 1912 of the following feeding experiments:

1. Fattening Calves in Winter; comparing cotton seed meal with a grain ration of 2-3 cotton seed meal and 1-3 corn and cob meal, and with a grain ration of 1-3 cotton seed meal and 2-3 corn and cob meal.

2. Fattening Steers on Pasture. In this a comparison was made of pasture alone, with pasture supplemented by cotton seed cake, and also with pasture supplemented by a mixture of cotton seed cake, corn and cob meal.

3. Fattening Calves in Winter; which is now in progress.

The work with hogs has been conducted in the following localities:

On the farm of O. E. Cobb, in Sumter county, to determine the profit in raising hogs in the prairie region, and to compare various pasture crops for pork production.

Near Columbia, on the farm of Dr. C. C. Yarbrough, in Henry county, to determine the profits in raising hogs under conditions where the chief pasture crops are peanuts, rape, Bermuda grass, etc.

At Hamilton, Marion county, in co-operation with the Sixth District Agricultural School, feeding experiments with hogs.

At Jackson, Clarke county, in co-operation with the First District Agricultural School, to investigate pasture crops and other feeding and breeding problems.

At Abbeville, Henry county, in co-operation with the Third District Agricultural School; feeding and grazing experiments, especially with rice polish, velvet beans, etc.

The experimental work with poultry was conducted on the farm of C. D. Allis, Pinson, Jefferson county. The results of one feeding experiment made on that farm are summarized on page 26. The death of a number of his fowls made it necessary to carry the work to another locality in 1913, plans for which transfer are well advanced. A beginning in poultry experimentation was also made at Hamilton, where feeding experiments and tests of two breeds were conducted. The first efforts to organize a co-operative egg marketing association resulted in the farmers getting a higher price for their eggs than heretofore, but for local reasons it was considered best by the head of the Department concerned to discontinue this particular line of poultry work, at least for the present.

Local Work in Horticulture.

The local work of the Horticultural Department may be classified as follows:

- (1) A general horticultural survey of the State.
- (2) Collecting the experience of growers in order that this may be combined with experimental results obtained at Auburn and elsewhere, so as to constitute the foundation for conclusions that may guide the growers of fruit and vegetables as to the best horticultural practices.
- (3) Fertilizer and variety experiments made on truck crops in the principal horticultural centers to determine what varieties and fertilizers are most profitable on each soil.
- (4) To digest and disseminate results from exact experiments, from experimental data obtained by visits to growers, and from other sources.

Dissemination of horticultural information has been effected in 1912 by means of letters, public lectures, publica-

tions, and by personal visits. Prior to 1911, the horticultural work at Auburn was deprived of much its value because of the inability of its representatives to visit the principal centers of truck and orchard crops for the collection of data accumulated by individual experience. Now, under the provisions of the fund, a trained investigator from Auburn on his visits to growers may not only carry information and suggestions, but may collect data which, combined with the results of exact experiments, will be profitable for other growers of truck and fruit. Indeed one of the main aims of the work under this appropriation is to ascertain the varieties of fruits and vegetables best adapted to the different soils of Alabama,—thus justifying a horticultural survey as a basis for horticultural investigations and as a means of partially solving local problems that cannot be worked out at Auburn.

Agricultural Extension.

All of the work in this department is done in co-operation with the United States Department of Agriculture, which has similar work under way in a number of states. The dairy expert of the U. S. Department of Agriculture, who was at first connected with the Department of Animal Industry of this Institution, has been transferred to the Extension Department. His work consists largely in rendering assistance in the building of silos and dairy barns and in giving instruction to farmers in dairy subjects.

As heretofore, the principal work of the Extension Department of this Station in 1912 has consisted in the organization of Boys' Corn Clubs and Girls' Tomato Clubs. This work has grown rapidly, the enrollment in 1912 being 9784 boys in the corn clubs and 1758 girls in the tomato clubs. Corn clubs were maintained in every county and tomato clubs in fourteen.

Liberal prizes offered by Boards of Revenue, firms and private parties greatly increased the interest and made it possible for 100 Alabama boys and eight girls to attend the National Corn Exposition, at Columbia, S. C.

At that Exposition Alabama won the sweepstakes prize for excellence in boys' and girls' club work. The yields obtained by the boys and girls who made the highest records are detailed on a latter page of this report. The 20 boys making the largest yields in the State averaged 165 bushels per acre.

When a boy makes a higher yield than anyone else in the neighborhood or when a girl learns by experience that

canning offers a source of revenue to the girls on the farm, the good effects are not confined to the profits secured nor to the one individual. The community too, receives a benefit.

Diseases of Plants.

On account of being unable to promptly secure the services of a suitable expert, this work was not begun until November, 1911. Hence, a large part of the first year's work has consisted in a general survey by the Plant Pathologist so as to acquaint himself with the diseases which are most destructive to crops in the different parts of the State. The Pathologist, using funds from Federal sources, is making a study of some of the diseases of field crops, including peanut diseases. Under the Local Experiment Fund he has made spraying experiments as a means of controlling the brown rot of peaches, and has in progress studies on certain diseases of vegetables, flowers, etc.

It should be noted that the breeding of varieties of cotton resistant to cotton wilt, or black root, and some other work conducted under this fund by the Agricultural Department of the Station and heretofore mentioned is aimed at lessening the injury from this destructive disease of cotton.

Financial.

Since this fund did not become available in time for a full year's work to be done with a full staff in 1911, there was accumulated in that year a balance, which, in accordance with the law, was brought over to help support the work in 1912. A large part of this balance was used in publishing a larger number of bulletins and circulars in 1912, than would otherwise have been possible.

The report of the Treasurer is attached and reports are also attached and hereby made a part of this report from the heads of the Departments of Entomology, Animal Industry, Horticulture, Agricultural Extension, and Plant Pathology, and from the Drainage Engineer.

Respectfully submitted,

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

TREASURER'S REPORT, LOCAL EXPERIMENT FUND,
FOR THE YEAR 1912.

RECEIPTS

To cash balance from 1911	\$ 6,472.86	
To cash from Animal Industry	317.29	
To cash from extension	27.42	
To cash from Entomology	78.77	
To cash from State	<u>\$27,000.00</u>	<u>\$33,896.34</u>

DISBURSEMENTS

By Departments—		
Amount paid Agriculture	\$ 7,958.31	
“ “ Horticulture	2,255.39	
“ “ Animal Industry and Poultry	6,462.91	
“ “ Extension	6,408.95	
“ “ Publication and Administration	4,188.52	
“ “ Entomology	3,770.16	
“ “ Drainage and Farm Machinery	1,141.33	
“ “ Plant Pathology	549.75	
“ “ Plant Breeding	525.51	
By balance carried to 1913	<u>635.61</u>	<u>\$33,869.34</u>

Respectfully,

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

Sworn to and subscribed before me this, the 19th day of Feb'y, 1913.

W. D. MARTIN, Notary Public.

My commission expires May 7th, 1913.

REPORT OF ENTOMOLOGIST.

Prof. J. F. Duggar,
Auburn, Ala.

Dear Sir:—

Herewith I beg to submit a report of the work done during the year 1912 by the Department of Entomology, under Local Experiment Fund.

An orchard survey was conducted in February and March including a study of citrus, peach and apple orchards preliminary to the location of experimental work.

Citrus spraying, experimental and demonstrational, has been conducted in Mobile and Baldwin counties, particularly at Battles Wharf, Fairhope, Irvington, Grand Bay and Spring Hill, involving from one to three sprayings in each locality. The results of this work have been extremely satisfactory and showed the feasibility of controlling white flies and scale pests on satsuma oranges at an expense of from one to three cents per tree annually. In one locality as a result of our initial spraying, our co-operator received calls for commercial spraying in thirteen other orchards and now has orders for spraying in more than twenty-five orchards. Two parties have undertaken commercial spraying as a result of our work.

In the southern part of the State also, considerable attention has been given to the study of pecan insects and many growers have been advised in regard to methods of control.

Spraying, experimental and demonstrational work for the control of San Jose scale, plum curculio and brown rot on peach, was conducted particularly at Camp Hill, East Lake and Eden. In this work, Dr. F. A. Wolf has co-operated as part of it bore directly upon the control of fungus diseases. All the results have been highly satisfactory and much interest has been aroused in the matter of spraying. In one small orchard that was about to be cut out because it was heretofore unprofitable, the owner this year gathered over \$100.00 worth of good peaches as the result of spraying work.

In one locality east of Birmingham, spraying work has been done for the control of scale and coddling moth on apple.

Throughout the summer a great deal of time was given to the study of the grass worm or fall army worm which appeared early in May in the southern part of the State and spread far beyond the boundaries of Alabama. The

life history of this pest, heretofore but little known, has been quite fully worked out, methods of control tested and found practicable and the manuscript for a bulletin on this species is practically ready for publication.

The cotton worm was found in several localities this year even earlier than in 1911 and a serious outbreak was at first anticipated. This, however, did not materialize throughout the State but was quite severe in the southern part of Alabama. A study of this pest made during the latter part of the summer, showed that it had been checked very materially by the attack of parasites which, in all certainty, had developed upon the grass worms appearing and developing earlier in the season. A Bulletin, No. 164, presenting information collected through our work with the cotton worm of 1911, has been published and given wide distribution.

The advance of the boll weevil has been followed closely. This pest has done a large amount of damage in the southwestern part of the State in territory extending through six or seven counties. This fall it has spread into new territory ranging from fifteen to seventy-five miles in width. The advance up to the end of the season is outlined in Press Bulletin No. 60.

Other lines of work, such as the administration of the boll weevil quarantine, the attendance upon institutes, etc., have also been conducted at the expense of this fund. The Local Experiment Fund has borne the major part of the salary of Field Agent, J. A. Dew, who has been principally concerned with the lines of work outlined above. The correspondence work has also been largely developed during the last year and the expense for a stenographer is also met principally from this fund.

Respectfully submitted,

W. E. HINDS,
Entomologist.

REPORT OF ENGINEER IN CHARGE OF DRAINAGE INVESTIGATIONS.

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

Dear Sir:—

In July, 1911, an agreement was made between the Alabama Agricultural Experiment Station and the Office of Experiment Stations, U. S. Department of Agriculture, which provided for co-operation in the investigation of drainage problems of Alabama and in the installation of a number of experiment tracts of tile drains. The Alabama station agreed to furnish the sum of \$600.00 for conducting these investigations, and the Office of Experiment Stations agreed to furnish not less than \$600. It was deemed advisable to confine the work to the central and southwestern parts of the State during the fiscal year of 1912. The writer was assigned to this project by the Chief of Drainage Investigations.

After a conference with Mr. J. F. Duggar, Director of the Alabama Station, a preliminary study of the situation was begun and an examination was made of drainage conditions in Pickens, Sumter, Greene, Hale, Marengo, Perry, Dallas, Lowndes, Autauga, Montgomery and Macon counties. During this examination particular attention was given to the need for underdrainage. A number of fields that had been underdrained were examined, particular attention being given to those systems which were not completely successful and wherever possible the cause of failure determined. In connection with this work an examination was made of Calebee and Cubahatchee creeks near Shorter, Macon county; of Letohatchee or Big Swamp, in Lowndes county; and of a small swamp near Gordo, Pickens county. The examination showed that when the tile drains were properly laid under competent supervision they were giving excellent results, but when they were laid by men not familiar with this work little benefit was received. In order to secure data regarding the best methods to use in tile draining the lands in the prairie section, it was decided to underdrain five experimental tracts of about 5 acres each. These tracts were selected with a view to securing the widest possible range of conditions.

Tract No. 1 is located on the farm of J. T. Adams near Pineapple, Alabama, in the valley of a small stream. The top soil is a sandy loam, which is underlaid by a very stiff

waxy clay. The field was so wet before drainage that it was used only for hay.

Tract No. 2 is located on the farm of R. G. Ennis, about 1 1-2 miles north of Livingston. The soil is a yellow Houston clay underlaid by soft limestone in places. The tract selected is rolling land and there was much seepage along the hillside, and in one place a small spring was found. There were terraces on the hillsides and the ground just above the terraces was too wet for proper cultivation. The entire field showed the need of better drainage.

Tract No. 3 is on the farm of Frank McLean, near Montgomery, Alabama. The soil is a black Houston clay with yellow subsoil full of lime concretions. The field was very wet.

Tract No. 4 is located on the farm of W. E. Ellsberry, Jr., near Montgomery, Alabama, on a gently sloping hillside. The soil is a gray to black Houston clay, the black soil underlaid by a yellow clay subsoil full of lime concretions, and the gray soil underlaid by hardpan. The field was very wet and hard to cultivate.

Tract No. 5 is located near Marion Junction, Alabama, on the farm of M. F. Smith. The field is nearly level; the soil is a reddish-brown Houston clay, with reddish-brown subsoil mottled with red and yellow and containing a small amount of fine gravel. The field was very wet when first examined after a long dry spell, and so soft that walking over it was almost impossible.

The construction of the experimental drains was started on Tract No. 5 in October, 1911, but the heavy rains occurring during the fall and winter of 1911 interfered so much with the work of construction that it was found necessary to stop the work on this tract until the summer of 1912. The drains on the other four tracts were completed in time to allow the fields to be cultivated during 1912.

Excellent results have been secured in every case. The yields secured in 1912 appear to show that the cost of installation would be more than repaid by the increased yield in two seasons. Investigations are still in progress to determine the methods best adapted to the soils of that section, and a full report will be prepared as soon as the data will warrant.

Several large drainage projects involving the interests of a number of property owners were called to the attention of the engineer in charge, but owing to the lack of a drainage law it was not considered advisable to undertake these at the present time. The need for such a State drainage

law is rapidly becoming more apparent, and there is much valuable land in Alabama that could undoubtedly be reclaimed if there were such a law.

S. W. McCRORY,
Engineer in Charge of
Drainage Investigations.

REPORT OF ANIMAL HUSBANDMAN.

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

Dear Sir:—

The Animal Industry Department, during the year 1912, had the following local experimental work under way:

With Beef.

This work is being done on the Cobb farms, at Sumterville, Alabama, in co-operation with Mr. O. E. Cobb and the Bureau of Animal Industry, at Washington, D. C. Mr. Cobb, a farmer living at Sumterville, furnished the cattle and the feed for this work, while the Alabama Experiment Station and the Bureau of Animal Industry provided a man, Mr. S. S. Jerdan, to live on the farm and have personal supervision of the experimental work. During the year 1912 the Bureau of Animal Industry paid all of Mr. Jerdan's salary. The Alabama Experiment Station has been paying the small and incidental expenses of this work.

During the year 1912 two separate beef feeding tests were carried through:

First—Fattening beef calves. These calves were divided into three lots and fed the following rations:

- Lot 1—Cottonseed meal.
Cottonseed hulls.
- Lot 2—Cottonseed meal $\frac{2}{3}$.
Corn and cob meal $\frac{1}{3}$.
Cottonseed hulls.
- Lot 3—Cottonseed meal $\frac{1}{3}$.
Corn and cob meal $\frac{2}{3}$.
Cottonseed hulls.

Satisfactory profits were made on all of the calves. They were sold at Meridian, Miss., in March. A full report of this work will be made in a forthcoming bulletin.

Second—Fattening beef steers on pasture. Three car loads of steers were divided into three lots and fed the following rations:

- Lot 1—Pasture alone.
- Lot 2—Pasture.
Cottonseed cake
- Lot 3—Pasture.
Cottonseed cake $\frac{1}{2}$.
Corn and cob meal $\frac{1}{2}$

They were fed for approximately 120 days and sold in September at Meridian, Miss., for from \$4.00 to \$4.75 per

hundredweight. Excellent profits were made on all of these cattle, but the most profitable lot was Lot 3, when the pasture was supplemented with both cake and corn. This work will also be reported in detail in a forthcoming bulletin.

Third—Fattening beef calves during the winter months. This work was inaugurated in November, and, of course, is not completed at this time. The calves will probably be sold in March. They are divided into three lots and are being fed as follows:

- Lot 1—Cottonseed meal.
Cottonseed hulls.
Hay.
- Lot 2—Cottonseed meal.
Corn silage.
Hay.
- Lot 3—Cottonseed meal $\frac{2}{3}$
Corn and cob meal $\frac{1}{3}$.
Corn silage.
Hay.

This work will also probably be reported in a forthcoming bulletin, as it takes this to complete the line of work which we had in mind when the tests were inaugurated.

With Hogs.

The local experimental work for 1911 is now in press and will come out as a part of Bulletin 168. The work for 1912 is as follows:

First, work on Cobb farm under immediate supervision of Mr. S. S. Jerdan and the Bureau of Animal Industry, to determine the profit, if any, in keeping a bunch of sows when a liberal use of pasture crops is made. The intention is to make, later on, careful comparisons of different hog crops. This work was inaugurated June 1st, 1912, with one boar and eight sows. The intention, of course, is to keep it in progress for several years.

Second—On the Yarbrough farm. The Cobb hog work was undertaken in an alfalfa region and on an alfalfa farm. The Yarbrough work was undertaken in a sandy region where alfalfa will not grow. On the Cobb farm, alfalfa, sweet clover, and Bermuda are to be the main pasture crops. On the Yarbrough farm Bermuda, rape, and peanuts are to constitute the basal pasture crops. This work, which is in charge of A. R. Gissendanner, is done in co-operation with Dr. C. C. Yarbrough, of Columbia, Ala. It was inaugurated September 1st, 1911, and should continue

for six to eight years if perfectly reliable data are to be gathered. No report has so far been made of this work. At the present time there are in the herd 15 sows, 10 gilts, 1 boar, 40 hogs to be killed or sold this winter, and several litters of small pigs.

District School Work.

The work was at first undertaken with four of the District Schools, namely, Hamilton, Abbeville, Albertville, and Jackson. At Albertville the work was terminated at the close of the first test in 1911.

First—Hamilton School. The following rations are being tested this year:

- | | |
|-----------------------------|-------------------------------------|
| Lot 1—Corn $\frac{9}{10}$. | } in dry lot. |
| Tankage $\frac{1}{10}$. | |
| Lot 2—Corn $\frac{9}{10}$. | |
| Tankage $\frac{1}{10}$. | |
| | Cowpea pasture followed by peanuts. |
| Lot 3—Corn. | |
| | Cowpeas followed by peanuts. |

Second—Jackson School. The work with this school, at the present time, is a study of the cost of raising pure-bred hogs with a system of pasture crops as a basis. The work was inaugurated with three sows and one boar. The plan is to enlarge this work to include some lot feeding. This work, of course, should be continued several years.

Third—Abbeville School. The primary object in selecting this school was to do some thorough work in grazing velvet bean pastures. A part of this work is reported in bulletin 168. At the present time the following test is being carried on:

- | |
|------------------------------------|
| Lot 1—Corn $\frac{9}{10}$. |
| Tankage $\frac{1}{10}$. |
| Lot 2—Rice polish $\frac{9}{10}$. |
| Tankage $\frac{1}{10}$. |
| Lot 3—Corn $\frac{9}{10}$. |
| Tankage $\frac{1}{10}$. |
| Velvet bean pasture. |

This school was also selected as the best place for thoroughly working out the comparative values of corn and rice polish.

With Poultry.

The poultry work was first taken up in a co-operative way with C. D. Allis, of Pinson, Ala., who furnished all of

the chickens and feed and kept complete and full records of the work done. Some satisfactory results were obtained on this farm. The work was first outlined to gather full and complete data on the profits that could be made on a flock of hens in the South. This part of the test soon terminated, however, on account of the death of practically all of the hens in this test.

Some exceedingly satisfactory results were secured, however, in a winter feeding test which was concluded in the spring. The value of the various rations was measured in terms of the number of eggs laid. The test was closed on May 28th, 1912. The following table gives a very short summary of the test:

Ration	Lot	No. Hens	No. eggs laid by each hen in 130 days.	Total amount of feed eaten by each hen in 130 days.		Cost of each doz en eggs
				Corn	Dry Mash	
				Lbs.	Lbs.	Cents
Rye pasture and grains mixed	1	28	41	13.8	14.8	13
Dry lot	2	63	34	11.8	12.5	14
Grain and cut bones	3	28	52	13.8	13.4 and 4 cut bones	10

Poultry work is also being done with the Hamilton School. Excellent equipment has been provided at the expense of the Local Fund. The work was inaugurated in September of this year. The experiment consists of a breed test between Black Minorcas and Rhode Island Reds, together with various tests of dry lot feeding and U. S. pasture systems of feeding. The test was inaugurated with 25 excellent hens in each lot and will be very materially enlarged as time goes on.

An attempt has also been made in Cullman and Crenshaw counties to organize an egg shipper's association. We have experienced no trouble in organizing this association and it is now receiving an increased price for eggs, but it seems impossible for some farmers to keep local and neighborhood quarrels out of such organizations. I would recommend that these tests be discontinued until the farmers ask for this character of assistance.

In conclusion, I wish to heartily thank the members of the Department: Messrs. Shook, Ward, Jerdan, Gissendanner, Summers and Allis for their earnestness in the

work, for their original and independent thinking, and for their loyalty. I wish also to thank you personally for the many valuable suggestions offered when the work was being inaugurated, and for the freedom you have given the Department in its efforts to carry out its plans.

Yours very truly,

(Signed) DAN T. GRAY.

REPORT OF HORTICULTURIST.

Auburn, Ala., Feb. 3, 1913.

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

Dear Sir:—

I respectfully submit the following report of the work done in horticulture under the local experimental fund during the year 1912.

The work embodied in this report was done by Mr. H. M. Conolly of the Horticultural Department. My own connection with the department has been of too recent date for me to take any part in the work and all credit is due Mr. Conolly for its execution.

This work has been planned with two ends in view: primarily, it consists in properly testing out, in every section of the State, the great number of varieties of vegetables and the fertilizers that are best adapted to their growth on the different types of soils.

Secondarily, it consists in studying the methods of production of the horticultural crops of the State, aiding in the more economical raising of some crops, dissuading men from growing crops which cannot be successfully grown, and the spread of accurate information among growers that will tend to raise the standard of horticulture in the State.

With above ends in view sixty counties have been visited, over ten thousand miles have been covered by railroad and fifteen hundred miles by other conveyance. Twenty-two farmers' institutes and farmers' meetings have been attended during the year and much valuable information has been brought straight home to the grower. Fertilizer and variety tests were carried on in fourteen different counties at twenty-three different places, namely, Mobile, Dawes, Creola, Irvington, Tolmanville and Citronelle in Mobile county; Fairhope, Foley and Bay Minette in Baldwin county; Canoe in Escambia county, Catherine in Wilcox county, Flatwood in Marengo county, Cuba in Sumter county, Marbury in Autauga county, Dothan in Houston county, Bessemer and Birmingham in Jefferson county, Carbon Hill and Jasper in Walker county, Haleyville in Winston county, Cullman in Cullman county, Alabama City in Etowah county and Madison in Madison county. Most of these experiments were concentrated in sections of the State where horticultural crops formed the main source

of income and where information was needed by the great number of newcomers from the north. Many of these variety and fertilizer tests did not produce the results that were expected due to the unfavorable weather conditions of last spring; still they taught the grower many valuable facts in crop production.

Other work taken up during the year consists of the following: Plans for the improvement of the grounds at fifteen High Schools have been drawn up and directions given for the carrying out of the same. Some time has been given to the collection and study of promising seedling fruits and nuts of the State and this work will prove of great value as the studies progress. The study and demonstration of the use of a commercial storage house for the keeping of sweet potatoes over winter, has been carried on quite extensively and the results are very gratifying. Spraying demonstrations for the control of insect pests and diseases have been carried on in many localities and they have stimulated considerable interest in the raising of good fruit.

Two bulletins on the growing of truck crops have been issued under the local experimental work and we have on hand much valuable data for other bulletins which will be published as soon as funds permit. These bulletins will be of great aid in spreading popular information among a great number of people and thus aid in the production of larger crops and improved living conditions.

The following lines of work have been undertaken and considerable progress made:

- (1) Truck and fruit survey of the State.
- (2) Fruit and vegetable region of the State with varieties suited to each region.
- (3) Collection and study of the promising seedling fruits and nuts of the State.
- (4) Developing the home vegetable garden and the home fruit orchard.
- (5) Demonstrations in spraying.
- (6) Improving school grounds and farm homes.
- (7) Testing of varieties of vegetables and fertilizers.
- (8) The use of a commercial storage house for the keeping of sweet potatoes.
- (9) Testing the keeping qualities of various varieties of sweet potatoes.
- (10) The economical production of cabbage in the Mobile district.

Respectfully submitted,

E. P. SANDSTEN,

Horticulturist.

EXTENSION.

Auburn, Ala., Feb. 18, 1913.

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

Dear Sir:—

Below I am giving you a brief report on what is being done by the Extension Department of the Alabama Polytechnic Institute and Experiment Station.

You will observe that \$5,000.00 was appropriated by the State of Alabama for the purpose of carrying on Agricultural Extension work. It is the last item in the Bill appropriating money for local experiments. This Bill was approved February 9, 1911.

I might add that the above appropriation by the State of Alabama has enabled this Department to secure the following funds to be used in co-operation with us:

From the Federal Government	\$2,980.00
From the General Education Board.....	2,000.00
From the U. S. Dept. of Agri., Dairy Division....	2,200.00
From the U. S. Dept., Animal Industry Division	2,000.00

Total

Total\$9,180.00

In our plan of work in the Girl's Tomato Clubs it is necessary for us to secure local funds in the counties where the work is organized. We employ a local lady worker in each county, whom we pay \$50.00 a year, the rest of her salary coming from local funds raised in the county. We are working fourteen counties according to this plan. The total amount of local funds raised in these counties is \$1,560.00 and in most cases this money is appropriated by the County Board of Revenue.

In addition to the above funds we raise a large number of prizes to be offered to the boys and girls for excellence in their Corn Clubs and Tomato Clubs. It is impossible for me to tell exactly the total amount of this sum, as a great many of these prizes are raised by school clubs and local or district clubs. I think a conservative estimate of the amount would be \$10,000.00.

In other words the \$5,000.00 appropriated by the State of Alabama puts us on our feet and enables us to secure from the National Government \$9,180.00; from County Boards of Revenue and private sources \$1,560.00; from Boards of Revenue, bankers, business men and other public spirited people about \$10,000.00. This makes a grand

total of \$20,740.00. To state this same idea in another way, for every one dollar appropriated by the State of Alabama for this work we are enabled to raise four dollars and seventeen cents.

It seems to me that the work done in this department may be classed under the five following heads:

1. Boys' Corn Club.
2. Girls' Tomato Club.
3. Dairy Work or Dairy Field Investigation.
4. Pig Clubs, (which we are just beginning).
5. General Work, such as helping in institutes, visiting and working with teachers, and High Schools and answering a large number of letters pertaining to general questions on school and agricultural work.

Boys' Corn Club.

We started the Boys' Corn Club Movement in Alabama four years ago with 265 members in two counties. The second year we had 2100 members in seventeen counties; the third year, 3800 members in fifty-two counties; and below I am giving a tabulated statement by counties showing the enrollment as revised for 1912.

Autauga	60
Baldwin	120
Barbour	96
Bibb	120
Blount	75
Bullock	128
Butler	102
Calhoun	278
Chambers	98
Cherokee	38
Chilton	171
Choctaw	23
Clarke	104
Clay	318
Cleburne	125
Coffee	304
Colbert	81
Conecuh	136
Coosa	147
Covington	256
Crenshaw	170
Cullman	136
Dale	280
Dallas	18

DeKalb	371
Elmore	129
Escambia	88
Etowah	151
Fayette	93
Franklin	165
Geneva	207
Greene	48
Hale	2
Henry	72
Houston	208
Jackson	77
Jefferson	142
Lamar	106
Lauderdale	117
Lawrence	174
Lee	75
Limestone	163
Lowndes	80
Macon	66
Madison	122
Marengo	24
Marion	112
Marshall	505
Mobile	90
Monroe	220
Montgomery	96
Morgan	255
Perry	102
Pickens	82
Pike	279
Randolph	319
Russell	40
St. Clair	225
Shelby	146
Sumter	58
Talladega	358
Tallapoosa	216
Tuscaloosa	170
Walker	281
Washington	45
Wilcox	70
Winston	51

Total Number of Boys.9784

Results of the Work.

In 1911 we had 100 boys in Alabama who averaged 97 bushels per acre at a cost of about 30 cents per bushel. The average yield of corn in the State for the same year was 18 1-2 bushels. The average increase of these boys was 78 1-2 bushels per acre. Valuing corn at \$1.00 per bushel and deducting 30 cents, which it cost each boy to make his corn, leaves a profit of 70 cents per bushel. Each boy made an average profit of \$54.95 on his acre, and the 100 boys made a total profit of \$5,495.00. The profit of these 100 boys for 1911 is very nearly equal to the total amount of money spent in promoting the club work in the State for the same year.

In 1911 Eber A. Kimbrough of Alexander City, made 224 75-100 bushels of corn at a cost of 19 cents per bushel, which is an increase of 206.25 bushels above the average yield for Alabama in the same year. Valuing corn at \$1.00 per bushel and deducting 19 cents, which it cost him to make each bushel, leaves him a profit of 81 cents per bushel or a total profit of \$167.06 from his prize acre. He sold all his corn that was good for seed at \$2.50 per bushel and actually realized far more than the above figures indicate. He won in prizes between \$800.00 and \$1,000.00.

Junius Hill of Attalla made 212 1-2 bushels of corn on his acre in 1911 and the cost was eight and six-tenths cents per bushel. His profit, valuing corn at \$1.00 per bushel and deducting his cost, was 91 1-2 cents per bushel, or a total for the acre of \$177.51. He sold all the good seed corn from his acre except some to plant at \$2.00 per bushel and really made more than the above would indicate. He also won a great many valuable prizes.

In 1912 we had 137 boys in the State who made over 100 bushels of corn on their prize acres. The average of these boys was something over 121 bushels per acre.

At the National Corn Exposition each state was allowed to enter 20 boys and five girls to contest for the grand sweepstakes prize for the 'best boys' and girls' club work for the year 1912. The prize was a large bust of the late Dr. Seaman A. Knapp. Below I am giving the names, postoffice addresses, yields and cost per bushel with the averages of the 20 Alabama boys who were entered in the contest for this prize:

Name	Postoffice	Yield	Profit	Cost per Bu.
J. P. Leach,	Union Grove.....	195.58	\$175.25	.10
Willie Atchison,	McCalla, R. 1...198.25		162.75	.17
Junius Hill,	Attalla	171.71	148.21	.13
Belton Hatchett,	East Tallassee..	181.00	148.20	.18
Cecil Adams,	Eclectic	176.64	147.84	.16
Fant McElroy,	Cuba, R. 1.....	184.50	146.00	.20
Walker Dunson,	Alex. City, R. 6.	172.00	146.00	.15
Thos. J. Worthy,	Boaz.....	175.00	143.75	.19
Rowan McElroy,	Cuba, R. 1.....	161.50	141.10	.12
Cecil Chandler,	Searight	165.75	137.00	.17
W. H. Ruffin,	West Point, R. 5..	156.48	131.26	.16
Naman Forehand,	Enterprise, R.4.	145.75	128.80	.10
Edgar H. Jarrell,	Opelika, R. 6...156.33		124.83	.20
Clifton Mathis,	Vincent, R. 2....	148.73	123.23	.17
Harvey Appling,	Samantha	149.50	122.75	.17
Roy Holley,	Eclectic	147.75	119.25	.15
Stanley Boswell,	Inverness	161.08	118.48	.25
Jones Brown,	Jacksonville	140.00	118.20	.15
Mack Sawyer,	Jones Mill.....	155.92	118.07	.24
Henry Williams,	Pyriton	158.75	115.92	.26
Total		3302.22	\$2716.89	
Average per acre or boy.....		165.11	135.84	.172

It will be observed that these 20 boys made a total of 3302.22 bushels on their 20 acres, and valuing corn at \$1.00 per bushel and deducting all expenses incurred in making the corn, these boys have a total profit of \$2,716.89. You will also notice in this same connection that the average yield of each boy per acre was 165.11 bushels, and the average profit \$135.84, and the average cost per bushel 17 cents. I wish to say just here that the nearest State to Alabama in this contest was Mississippi, and the average yield of the 20 boys contesting was about 150 bushels.

The five girls, who were entered in this contest, were as follows:

- Bertha Campbell, Gallant, Alabama.
- Meta Grace, Oakman, Alabama.
- Donnie Lu High, Albertville, Alabama.
- Mamie Davis, Troy, R. 5, Alabama.
- La Lu Booth, Bay Minette, Alabama.

In deciding the winner of this trophy the judges had to

consider the following points in the Boys' Corn Club work:

Yield	500
Profit	300
Exhibit	300
Percentage of boys reporting in each state..	200
Written history of how the acre was made...	200
	<hr/>
Total	1500

In reference to the girls' exhibit the grading was as follows:

Quality of exhibit	200
Variety of products	100
Written account	100
Percentage reporting in the state.	100
	<hr/>

Total: 500

It will be seen that it was possible for a state to make 2000 points. After the judges had carefully considered the exhibit, reports and all other points, Alabama's record was 1672 points or more than 200 points above any other state in the contest.

In connection with this I might say that Mr. J. B. Hobdy of this department was superintendent of this exhibit or rather of this Boys' Corn Club School. There were in attendance from all the states something like 350 boys and Alabama had a delegation of 100 boys and eight girls. It is interesting to note that practically all the money for this Alabama delegation was raised by subscription, through banks, donations by public spirited people and in other ways. It took a total of between \$3500.00 and \$4000.00 to take these boys and girls to this Exposition and back. The entire delegation traveled a total of 120,000 miles. They heard some of the best lecturers on agriculture that this country affords, saw the greatest agricultural show that has been held in America, and I feel that these boys and girls brought back with them enough inspiration and information to make them leaders in their community along lines of better farming.

At the conclusion of the year's work for 1912 our department awarded a number of certificates of merit or diplomas to boys making certain records. We gave to every boy making over 100 bushels of corn one of these diplomas, and also to every boy making 75 or more bushels on his prize acre at a cost of not more than 30 cents per bushel. There were 203 boys who received these certificates. They made a total of 22,777.10 bushels at a total profit, counting corn

at a dollar per bushel, of \$16,491.89. The average of each boy was 112.16 bushels per acre, with an average profit of \$81.24 and an average cost per bushel of 27 cents.

One point to which I wish to call especial attention in connection with the results of the work is the very great value of the work in interesting not only the boys in the questions of better farming but also the neighbors on adjoining farms and in the surrounding country. I know a farmer who rode a mule 19 miles to see a prize patch of corn which was grown by a Boys' Corn Club farmer. This same man told me that he did not believe in book farming but thought it all foolishness. However, after seeing the boy's fine corn, which made 94 bushels per acre, this farmer returned home and with enthusiasm enlisted in the demonstration work with both corn and cotton, entered two of his boys in the corn club and his little girl in the tomato club. The old farm, which the man said had made a living for his grandfather, his father and himself and had been making about 10 bushels of corn and a third of a bale of cotton per acre, this year has several acres which will produce from 50 to 100 bushels of corn per acre and several acres of cotton that will produce about a bale per acre. Perhaps what is best of all in this story is that the farmer has new interest in this great business and a new outlook on life. According to his own statement to me he wishes that he could call back 40 years of his life in order that he might farm right and do something for himself, his family and his community. The prize acres of corn grown by these boys are like missionaries in a foreign land converting the boy himself, his father and his neighbors to the idea of better farming. They also serve to show the boy that there is money in farming when it is done properly. As a result of this work thousands of boys are engaging in farming as a business instead of moving to town.

Girls' Tomato Club.

The Girls' Canning or Tomato Club work was begun during the season of 1911 with 240 members in two counties, Pike and Walker. In 1912 we had the work well organized in 14 counties with an enrollment of 2630 members. Below is given a tabulated statement of the enrollment in each of these 14 counties revised:

Baldwin	109
Calhoun	65
Chilton	105
DeKalb	93

Etowah	104
Franklin	122
Houston	70
Lowndes	39
Marshall	325
Mobile	73
Monroe	115
Morgan	140
Pike	200
Walker	198

Total: 1758

We have enrolled a great many girls in other counties where the work was not regularly organized, sent the girls instructions, literature and seed, and helped them all we could by correspondence and through the teachers.

When we began the Tomato Club work last year in Pike county I was present when the first can of tomatoes was put up in that county. In July of this year, 1912, we made some investigations to determine the number of cans that had been put up during the season of 1912. Up to the date of this investigation 50,000 cans of tomatoes and other vegetables had been put up as a result of the work. These cans are worth 10 cents each and the total of 50,000 cans is worth \$5,000.00. This represents \$5,000.00 of good wholesome vegetable food products for the home and the market, that would have decayed and gone to waste if it had not been for the Girls' Tomato Club work.

The work in Walker county has been in progress for two seasons, and in July 1912 we made investigations similar to those made in Pike county and found that 400,000 cans of tomatoes, fruits and other vegetables had been put up as a result of the Tomato Club work. In one of the leading business towns of the country where I visited, I asked the merchants where they bought their canned tomatoes, fruits and other vegetables and was told that all of these products were purchased from the girls in the Tomato Club and the homes of these girls. The money which the merchants paid for these products went right back into the homes on the farms. The 400,000 cans referred to above are worth 10 cents each or a total of \$40,000.00. This was all brought about or largely so as a result of the Girls' Tomato Club work.

On September 20th, 1912 I had a letter from Arie Hovate, Russellville, R. 5, a Tomato Club girl. I quote below from her letter:

"I am not through canning yet. I have canned 1467 cans. I think I can get enough out of my patch by Monday or Tuesday to make 1500 cans. I lost 27 half gallon cans, which I had put up in glass, besides we ate some and some rotted before my canner came." This young lady will get 10 cents for each of her cans or a total of \$153.10. It cost her including her cans, canning outfit, all the labor and other expenses about \$50.00. In other words she has a clear profit of \$100.00 from one-tenth of an acre of Alabama soil. This is at the rate of \$1,000.00 per acre clear profit. I neglected to say that at the close of the season this young lady had put up 1531 number 3 cans of tomatoes.

In Cullman county this past summer I was busy holding a canning demonstration for the girls, and to one side I heard one girl tell another why she was a member of the Tomato Club. Her remarks were about as follows:

"My sister and I joined the Tomato Club because we wanted to go to school some more. We have finished the grades in the school near our home in the country. We thought we would grow the tomatoes along with some other vegetables, and can and sell them, then take the money and rent us two rooms in Cullman, where we could keep house on a small scale and go to the County High School in Cullman this winter." A later letter from her stated that they had canned 730 No. 3 cans and that they would be off to the County High School in a few days. The 730 cans at 10 cents apiece brought the girls \$73.00. This sum was sufficient to pay for rent of rooms, buy books, pay school incidental fees and other incidental expenses, and so these two young girls are enabled to continue their education in the High School.

Dairy Extension Work.

Mr. Bechdel, who is in charge of this work, spent the entire year making trips to all parts of the States, with the exception of about two days per week spent in the office. His duties consisted chiefly in silo building, dairy meetings, herd record work, building dairy barns and demonstrations at fairs.

Ten farmers were assisted in building concrete silos, an average of eight days being spent with each. These were located principally in the central, west and northeastern parts of the State. He was responsible for at least five others in south and west Alabama through correspondence. He agitated these, submitted plans, data, etc.

Thirty-five dairy meetings lasting a day each were at-

tended and approximately fifty talks were given on different phases of dairying. On account of its importance the silo was agitated more strenuously than any other subject. Twenty-eight of these meetings were in connection with the Southern Railway Dairy Instruction Car, which was run over all the lines of the Southern system in the State. On an average there were more than 100 persons in attendance on all of the above meetings.

Dairy herd records were kept with ten farmers, located in different parts of the State, for the purpose of demonstrating to the farmer and his neighbors the value of such work. There were approximately 125 cows in the above herds. About 20 of these were sold on account of unprofitableness.

Plans and specifications of dairy barns were furnished about 25 dairymen in different parts of the State. Five or six of these have built and several more will build soon. One party, the Alabama Methodist Orphanage, at Selma, was given over two weeks of Mr. Bechdel's time, in order that he might supervise the construction of a dairy barn costing \$1,696.54.

Demonstrations were given at the Alabama State Fair in Birmingham and the Alabama State Exposition, in Montgomery. In Birmingham the demonstration consisted of the production of clean milk in a sanitary dairy barn, the use of the milking machine, the storing of ensilage, and the exhibition of a concrete silo (home-made) eight by sixteen and one-half feet, costing \$106.00. At Montgomery a sanitary dairy house was fitted up completely with boiler, steam separator and general equipment for handling milk and making butter. Demonstrations in butter making were given daily.

I find upon looking into our records and reports that Mr. Hobdy, Mrs. Robinson and I have traveled and held meetings as follows:

Number of miles traveled by rail....	77,907
Number of miles traveled by team..	2,698
Number of meetings held.....	312
Number of people addressed.....	39,731

Since May the first, 1912 we have been keeping count of the mail which goes out from our office each day, and I find that we have mailed a total of (circular letters, personal letters and other literature) 134,886 pieces of mail.

Very truly yours,

L. N. DUNCAN,
Supt. of Extension Department.

REPORT OF PLANT PATHOLOGIST.

Auburn, Ala., Jan. 16, 1913.

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

Dear Sir:—

The following brief statement of the work under the local experiment fund in the department of plant pathology is herewith respectfully submitted:

Of necessity the local experiment work in this department has been limited in scope during the first year of its existence. Because I was not familiar with the local needs in this field, several trips were made into various parts of the state to acquaint myself with the various diseases of our cultivated crops. The nature and means of control of many of the more common diseases is known so that much good would result if a series of co-operative demonstrative experiments could be conducted. In order to carry on this work properly it would be necessary to have the services of a field agent who could devote his entire time to the work. Under existing conditions this is impossible. However some of this work on the control of the brown rot of peaches has been attempted at Camp Hill and Eden, in co-operation with the Department of Entomology. Adjacent unsprayed orchards of peach trees yielded scarcely any fruit, whereas, an excellent crop of sound healthy fruit was obtained from the orchards in which our spraying experiments were conducted.

Some interesting results have also been secured in the control of lettuce wilt, which will later be published in a bulletin from the station. Work is now in progress relative to egg plant rot, stem rot of asters, leaf blight of Persian Walnuts, and certain persimmon diseases. Some of this work is being conducted during the winter in the green house and will be duplicated under field conditions next summer.

One circular designed to be of help to purchasers of citrus stock has been published. A bulletin upon the black spot disease of roses is in press and will appear soon.

About 350 letters of inquiry relative to plant diseases have come to this office.

Very respectfully submitted,

FREDERICK A. WOLF,
Plant Pathologist.