

NINTH ANNUAL REPORT

OF THE

Agricultural Experiment Station

OF THE

A. & M. COLLEGE,

AUBURN, ALABAMA,

*

MONTGOMERY, ALA.:

THE BROWN PRINTING CO., PRINTERS AND BINDERS.

1897.

AGRICULTURAL EXPERIMENT STATION.

COMMITTEE OF TRUSTEES ON EXPERIMENT STATION.


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J. G. GILCHRIST	Hope Hull.
H. CLAY ARMSTRONG	Auburn.

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P. H. MELL.....	Botanist.
B. B. ROSS.....	Chemist.
C. A. CARY, D. V. M.....	Veterinarian.
J. F. DUGGAR.....	Agriculturist.
F. S. EARLE.....	Biologist and Horticulturist.
C. F. BAKER.....	Entomologist.

ASSISTANTS.

J. T. ANDERSON.....	First Assistant Chemist.
C. L. HARE.....	Second Assistant Chemist.
R. G. WILLIAMS.....	Third Assistant Chemist.
T. U. CULVER.....	Superintendent of Farm.

 The Bulletins of this Station will be sent free to any citizen of the State on application to the Agricultural Experiment Station, Auburn, Alabama.

TRUSTEES.

His Excellency, JOSEPH F. JOHNSTON, *President*..... Ex-Officio.
J. O. TURNER, Superintendent of Education..... Ex-Officio.

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ALABAMA POLYTECHNIC INSTITUTE, A. & M. COLLEGE,

AUBURN, ALA., Feb. 5, 1897.

Governor JOSEPH F. JOHNSTON,

Executive Department,

Montgomery, Ala.

SIR:—I have the honor herewith to transmit to you the Ninth Annual Report of the Agricultural Experiment Station of this College.

The report of the Treasurer, herewith included, is for the fiscal year ending June 30, 1896.

This report is made in accordance with the provisions of the act of Congress (approved March 2nd, 1887), establishing Agricultural Experiment Stations in the several States and Territories.

It contains the report of the Botanist, the Chemist, the Veterinarian, the Agriculturist, the Biologist, the Horticulturist and the Entomologist, for the year ending December 31st, 1896.

Respectfully,

WM. LEROY BROUN,
President.

REPORT OF TREASURER.

TREASURER OF A. & M. COLLEGE,
 In account with United States Appropriation
 Hatch Fund for the year 1895-96.

To cash received from U. S. Treasurer for the fiscal year
 ending June 30th, 1896.....\$ 15,000 00

CR.

By Salaries.....	\$ 8,950 77	
Labor.....	1,038 64	
Publications.....	417 61	
Postage and Stationery.....	126 57	
Freight and Express.....	256 28	
Heat, Light and Water.....	187 40	
Chemical Supplies.....	485 88	
Seeds, Plants and Sundry Supplies.....	509 26	
Fertilizers.....	306 99	
Feeding Stuffs.....	59 01	
Library.....	676 11	
Tools, Implements and Machinery.....	114 11	
Furniture and Fixtures.....	95 14	
Scientific Apparatus.....	639 65	
Live Stock.....	170 00	
Travelling Expenses.....	167 04	
Contingent Expenses.....	136 35	
Building and Repairs.....	663 19—	\$ 15,000 00

E. T. GLENN,
 Treasurer A. & M. College.

THE STATE OF ALABAMA, }
 Lee County, } Personally appeared before me, W.
 S. J. Lampkin, a Notary Public in and for said county and State, E. T.
 Glenn, known to me as Treasurer of the A. & M. College of Alabama,
 who, being duly sworn, deposes and saith that the above and forego-
 ing account is true and correct.

Witness my hand, this 5th day of February, 1897.

W. S. J. LAMPKIN, Notary Public.

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

WM. LEROY BRUN,
 President A. & M. College.

REPORT OF BOTANIST.

Dr. Wm. LeRoy Broun, President :

SIR:—I have the honor to submit herewith the annual report of the work accomplished during the past year (1896) in the department under my charge.

The experiments conducted on the improvement of the cotton fiber during the past several years have been continued throughout the past season in the following manner :

1. Replanting of 16 varieties mentioned on page 21 of bulletin number 56 with special conditions of fertilization to determine the relative values of the forms after several years careful selection and elimination.

2. Planting of 73 varieties of hybrid foreign and native cottons. A large amount of valuable data has been secured from the results of this planting and a bulletin is nearly ready for the printer. Many photographs were made of these plants and various portions of the plant at intervals during the season to preserve the peculiar features of each special form under development.

The Botanical Garden has been steadily growing, particularly in the matter of grass cultivation. A number of foreign and native grasses were planted the past season. I have received this winter for this garden a large supply of the most interesting native plants of Australia sent to me through the kindness of Mr. John Musson of Sydney, New South Wales. This gentleman has become greatly interested in the cultivation of cotton in Australia and has received from this department several packages of the improved seed developed by crossing. A letter from him a few days since indicates that these seed will be highly appreciated by the government authorities of Australia. The Botanist of New South Wales, Mr. Maiden, has also placed

me under obligations for a fine collection of plants from the Botanic Gardens over which he is director. This donation is also due largely to the personal influence of Mr. Musson. The Agricultural College of New South Wales has sent a supply of the cultivated seeds of Australia which will be a valuable addition to our American plants. I am also under obligations to Prof. T. H. Middleton of Baroda College, India, for valuable supplies of seeds from that country. These seeds will be all carefully cultivated during the opening season and the species found adapted to our climate will be turned over to the Professor of Agriculture for cultivation on a sufficiently large scale to produce seeds for distribution among the farmers of the State if desirable.

The bulletins issued by this department the past year are as follows :

1. Part V. The Flora of Alabama. Issued March, 1896. This was Bulletin number 70 of the current series. It consists of a list of the genera and species of the two orders leguminosæ and rosaceæ. Under the first is mentioned 42 genera and 113 species ; under the latter 15 genera and 46 species. The counties of the State in which these plants have been found are mentioned. As material is collected in sufficient amount to complete the number of species of any other orders additional bulletins will be issued.

In this connection it will be proper to say that the officers of the station have organized a Biological Survey of Alabama and the collection of the native plants of the State will rapidly grow so that data may be published at frequent intervals in the near future specifying the character of the flora of Alabama.

2. Experiments with Foreign Cotton. Issued April, 1896, and contains a description of a number of forms cultivated the previous years for the purpose of acclimatization. A Botanical classification is also included in this bulletin, and a table giving the results of microscopical examination of the fiber secured from the cultivation.

The Herbarium has steadily grown by the addition of

many pressed plants from Florida, Alabama and other States. These specimens have been carefully labeled and mounted for study and examination.

As Librarian of the Station Library I have the following report to make: The list of periodicals has been carefully revised by the committee and all those journals have been dropped which were considered to be of only indirect use to the workers in the station. The list as now revised consists of 29 American journals, 22 German, 18 English and 7 French. We are also receiving in exchange for the bulletins of the station 55 papers and publications of scientific societies in this country and Canada. During the year 303 volumes of papers, scientific journals and other publications have accumulated and are now waiting the work of the binder to place them in condition for permanent place on our shelves. Since the last annual report of the station eight bulletins have been turned into the library by the various departments, and volume IV of the station's publications has been thus completed. These eight bulletins are as follows:

Number 68, issued January, 1896. "Pig Feeding Experiments." Made for the purpose of securing a ration (of which cotton seed or cotton seed meal should be one of the principal ingredients) that would not kill pigs and yet be a profitable food. Also a review of tests made at other stations.

Number 69, issued February, 1896. "Treatment of some Fungous Diseases." A compilation of the knowledge on the subject intended as a ready reference for practical farmers. The nature of fungi. Spores different from seeds. Definition of a fungus. Classes of parasitic fungi. Other causes of plant diseases. Formulas for fungicides. Diseases of cultivated plants.

Number 70, issued March, 1896. "The Flora of Alabama." Introduction, specifying the need of such a publication. List of orders treated. List of genera and species of Leguminosæ, with the localities in the State mentioned.

List of Rosaceæ genera and species with localities in the State.

Number 71, issued April, 1896. "Experiments with Foreign Cotton." List of foreign varieties tested. The importance of continued and careful experiments with these cottons. Botanical classification. Results of microscopic examination of the fiber, and compared with American cottons.

Number 72, issued July, 1896. "A study of skin Tumors of Horses and Mules in Alabama." The location of tumors on the body. What the tumors are. Their shapes. Classification of tumors. Microscopical characteristics. Treatment. Appendix. Classified list of tumors taken from the Free Clinic Records for the four years ending July 1st, 1896.

Number 73, issued October, 1896. "Edible Fungi: A Wasted Food Product." General discussion of the importance of the subject to the people of the State. The field Agaric or field mushroom (*Agaricus campestris*). Cæsar's Amanita (*Amanita cæsarica*). The puff balls. Literature.

Number 74, issued October, 1896. "Flour considered from the Standpoint of Nutrition." The amount and quality of food directly affects man's mind and body. The purpose of the bulletin is to call attention to the constituents of wheat flour that have resulted not only from a study of the structure and composition of the wheat kernel itself, but from a long series of practical experiments respecting the bread produced from various flours.

Number 75, issued December, 1896. "Experiments with Corn." Rainfall during the growing season of 1896. Variety test of corn 1896. Seed corn from different latitudes. Butt, middle and tip kernels for seed. Distance for upland corn. Cotton seed meal versus crushed cotton seed for corn. Burning weeds versus plowing them under.

Respectfully,

P. H. MELL,

Botanist.

REPORT OF CHEMIST.

Dr. Wm. LeRoy Broun, President:

SIR:—I have the honor to submit the following statement with regard to the work of the Chemical Department for the past year.

The volume of analytical work performed in this laboratory since the date of the last report has been unusually large and has occupied the entire time and attention of the laboratory staff. Not less than 530 quantitative analyses have been made and reported during this period, and, in addition, numerous qualitative examinations of minerals, ores, waters and various miscellaneous materials have been made.

The samples analyzed quantitatively include fertilizers forwarded by the State Department of Agriculture and also by private parties; feed stuffs, marls, mucks, natural phosphates, agricultural products, etc., and also comprise quite a number of food materials analyzed in this laboratory in co-operation with the Division of Nutrition Investigations of the U. S. Department of Agriculture. This latter work is a continuation of a series of investigations commenced during 1895, the results being embodied in two reports presented to the Department of Agriculture and it is presumed that the data contained therein will be published at an early date. It is also hoped that the results of these investigations with comments thereupon can be issued as a station bulletin after its appearance as a Department publication.

The first years work of investigation of this subject was devoted chiefly to the study of the composition and nutritive properties of meats, cereal products, etc., while during the past year especial attention has been given to the examination of the principal vegetable foods in use in this State

during the spring and summer months, and some of the results secured will doubtless be of interest to the general public.

During the past spring a series of experiments was inaugurated under the direction of Dr. J. T. Anderson, First Assistant Chemist, with a view to arriving at the relative availability of the chief fertilizing constituents as they occur in the soil, and to that end the cotton plant is being grown in soil placed in large metallic cylinders, the experiments being conducted according to the method employed for other crops by Dr. Paul Wagner, the German investigator.

These experiments are to be continued for a number of years successively, and, in addition, another set of experiments has been commenced with a view to determining the water requirements of the cotton plant at various stages of growth and under varying conditions of fertilization. (See detailed report of Assistant Anderson.)

It is also designed to make a number of experiments both with plants, and in the laboratory with some of the typical "black belt" soils with a view to ascertaining if possible some of the conditions connected with the failure of such soils to respond readily to the application of the more important fertilizing constituents. This is a question of no little importance, and it is hoped that some results may be secured that may possibly throw some light on the lack of success attendant upon the use of certain forms of commercial fertilizers on such soils.

The experiments in the making of syrup from sugar cane which were begun some two years ago have been continued during the past fall and winter, with even better results than heretofore. In addition to the experiments conducted at the station, the outfit described in Bulletin 66 has been employed practically, under my supervision, on several farms in this vicinity and with good results in all cases. A small steam evaporator and clarifier have also been constructed here, at small cost, and have been practically tested in the manufacture of syrup, highly satisfactory results being secured.

The results of these experiments will be embodied in a bulletin to be issued shortly, and it is to be hoped that the practical tests made here will lead to improved methods and to greater economy in the manufacture of syrup from sugar cane.

The results of analysis of some 500 samples of fertilizers and fertilizing materials, together with comments upon same, were published in a bulletin issued by the State Department of Agriculture in July last, in compliance with the provisions of the fertilizer law.

Respectfully submitted,

B. B. ROSS,

Chemist.

EXPERIMENTS CONDUCTED

—BY—

JAS. T. ANDERSON,

1st Assistant Chemist.

1. Determination of *available plant food* in soils.

The method employed consists of (1) Determining by practical cultivation tests, the amount of each fertilizing ingredient present in the soil in actual *available* form, and (2) Finding by analytical tests in the laboratory *chemical methods* which shall yield identical results with those obtained by the cultivation tests.

The practical part of this investigation is conducted in zinc cylinders imbedded in the ground. These cylinders are arranged in groups—one set devoted to the study of available nitrogen, one to potash, and another to phosphoric acid. Cotton plants are grown in each set, and the cultivation is continued as long as the soil can furnish to the plant the ingredient in question. When this ingredient in its assimilable form is thus known to be exhausted from the soil, the crop gathered from the set of cylinders is weighed and

analyzed, and the weight of the given ingredient, taken from the soil, is thus practically determined, and the result is reserved for comparison with the *chemical* tests of the soil, afterwards to be made.

These practical tests have been conducted through one season, and will need to be continued through another season to insure complete exhaustion of the soil.

2. A study of the Water Requirements of the Cotton Plant, or the Relation of Soil Moisture to the healthful growth of the Cotton Plant.

Conducted by J. T. Anderson with the co-operation of Prof. Earle.

The purposes of this study are to determine (1) What amount of soil moisture is best adapted to the vigorous growth of the cotton, and (2) What relation (if any) the amount of soil moisture bears to certain well known diseases, such as shedding, rust, etc.

This investigation is conducted in galvanized iron pots in the plant house. The maximum water capacity of the soil used in these pots was determined by experiment in the laboratory. The pots are divided into seven groups, and different amounts of water are to be added to each group. At stated intervals the pots are to be re-weighed, and the loss of water by evaporation from the surface and by the transpiration of the plant is made good by restoring to each pot the requisite amount of water. Thus one set of pots will contain constantly from 10 per cent. to 20 per cent. of their full water capacity, another 20 per cent. to 30 per cent. and so on to the last which will contain 70 per cent. to 80 per cent. A full and complete record of the life history of each plant, together with the conditions under which it has grown, will be kept, and thus will be furnished the data required for the purposes of this investigation.

REPORT OF VETERINARIAN.

Dr. Wm. LeRoy Brown, President :

DEAR SIR:—The following is a brief statement of the work done during the year 1896 :

In January this department issued a bulletin giving the results of three series of pig-feeding experiments.

In July a bulletin was issued on the Skin Tumors of Horses and Mules in Alabama. This bulletin was prepared by Mr. S. L. Coleman, a post-graduate student in the Veterinary Department during 1895 and 1896. It gave the results of extended study and microscopical investigation. The macroscopical and microscopical characteristics of the tumors, their classification, and their clinical peculiarities were fully discussed. Simple and practical methods of removing these common skin tumors were suggested. An appendix to this bulletin gave a classified list of a majority of the different tumors that were treated at the Saturday free clinic during a period of four years.

During the year 1896, this department has prepared considerable quantities of *tuberculin* and *mallein*. These diagnostic agents have been furnished free of charge to Veterinarians of the State and to the City Physician of Montgomery, upon the condition that all test records be sent to the Veterinary Department. As was anticipated, the reports of the diagnostic tests with these agents have brought returns showing the presence of tuberculosis among some herds of dairy cattle in Alabama. This work will be continued. I have given my services to the health department of the city of Montgomery, as occasion required, in order to help establish a system of meat and milk inspection in that city. At present the work is almost established and is proving to be a valuable means of protecting the public health of that city. It is to be hoped that many other cities in this State will soon adopt similar measures.

We have in preparation a bulletin on meat and milk inspection. It will be our aim to suggest a system that can be employed by many of the smaller as well as the larger cities of the State.

During the year 1896 there were 560 cases handled at our Saturday free clinic. I have delivered a number of lectures in various counties of this State, and have also investigated outbreaks of infectious diseases among domestic animals, during the past year.

Some pig-feeding tests are now in progress, the object of which is to determine why cotton seed or cotton seed meal kills pigs. This difficult and puzzling problem will be studied until some definite knowledge is obtained concerning it; and, if possible, its complete solution.

Respectfully submitted,

C. A. CARY.

REPORT OF THE AGRICULTURIST.

Dr. Wm. LeRoy Brown, President :

SIR:—In the Agricultural Department numerous lines of investigation have been begun during the past year, but prominence has been given to three main questions that are believed to be the subjects in which the majority of the farmers of the State are most immediately and directly concerned. Accordingly numerous experiments have been conducted with the hope of throwing more light on the following subjects :

(1) The economical improvement of worn soils, involving an extended study of the most promising leguminous or renovating plants.

(2) Cotton culture.

(3) Pork production.

A fourth division might be created to embrace experiments made in 1896 with miscellaneous plants, including corn, oats, rye, tobacco, cowpeas, peanuts, sweet potatoes, artichokes, chufas, Kaffir corn and other sorghums, etc., etc. More than 100 plots were used for experiments with cotton on the station farm and a fertilizer test with cotton conducted in 27 localities required more than 250 plots.

Despite unfavorable weather conditions in 1896, causing the failure of some experiments and reducing the yields of all crops, results have accumulated even more rapidly than they could be properly prepared for publication,—the time of the *Agriculturist* being so largely occupied with routine and clerical duties.

The first bulletin giving the results of work done in 1896 was Bulletin No. 75, published in December. It was entitled, "Expérimentations with Corn." Bulletin No. 76, "Expérimentations with Cotton," is now in print. Another bulletin

giving the results of fertilizer tests with cotton on many different soils within the State is now ready for publication.

Plans for work in 1896 were formed only after careful deliberation with a view to permanency in lines of investigation. Hence the proposed work for 1897 is largely a repetition of that of the past year, for in many experiments repetition is more fruitful than new undertakings. The most important departure from last year's experiments consists in the enlargement of the work with renovating plants, in which investigations valuable practical results have already been obtained. While the cowpea in its place has probably no competitor in soil improvement, yet there is a place for other renovating plants, for example to cover the soil in winter with growing vegetation. To fill this need, crimson clover is well adapted for some localities and it is now being extensively experimented with by this department. Again, there is need for a substitute for cowpeas on soils infested with nematode root worms, a condition which occurs on many parts of the station farm and elsewhere in the State, and that prohibits the profitable culture of cowpeas in such fields. The result of a test made by this department the past year points to the possible utilization of the beggarweed (*Desmodium*) as a restorative crop for such infested fields.

The large number of letters of inquiry regarding a wide range of agricultural topics received and answered by this department is gratifying. For while replies to such communications require much time, it is highly desirable that correspondence of this kind be increased and that an ever-increasing number of farmers should look to this station not only for helpful reading matter, but for special information and counsel.

In addition to the discharge of his duties on the station farm and in the college, the Agriculturist has delivered three public lectures and inspected nine of the twenty-seven fertilizer experiments with cotton conducted in different parts of the State. This work of placing the station in

closer touch with communities of farmers is well worthy of all the time that can be spared from other duties.

As regards permanent improvements, the most important single item of the past year was the guttering of the residence of the Agriculturist. Fences have been repaired and built as necessity has required.

Respectfully submitted,

J. F. DUGGAR,

Agriculturist.

REPORT OF THE DEPARTMENT OF BIOLOGY AND HORTICULTURE.

REPORT AS HORTICULTURIST.

During the Spring of 1896 a small new orchard was planted, at some little distance from the old one, on soil that it was hoped would be free from the nematode root trouble, and other diseases, that had proved troublesome at the old location—49 peach, 104 plum, 260 pear, 26 Japan persimmon, and 18 nut trees were planted. The Spring proved very unfavorable for young trees, April and May being exceptionally hot and dry, causing some loss; but a fairly good stand was secured and most of the trees made a satisfactory growth.

The old strawberry plots were plowed under during the Summer, as they were too old to be useful, and a number of the varieties proved to be untrue to name. During the Fall a new planting of forty or more kinds was made; part of each variety being planted on stiff red clay soil on a moist north hill side, and part on a sandy southern slope, to note their comparative behavior in the two locations.

The peach and plum crop was almost an entire failure this year; and the apple crop was light and poor so that no notes of value were secured on these fruits.

Examination of the vineyard in January showed that all but a small per cent. of the vines were affected by a white coating on the roots, causing the disease known as root rot. A number of vines were dead, that had made a good growth during the previous season. The dead vines were removed and the others carefully pruned, sprayed and cultivated. Contrary to expectation, most of the varieties matured a fine crop. A few vines gave out and died just before the crop ripened, and some others died during the Fall, but the

loss has so far been much less than expected. An experiment is underway to test the effect of different fertilizers in controlling this disease; or rather in enabling the vines to outgrow it.

During the Spring the work with vegetables was confined to experiments toward controlling certain plant diseases. Some facts reported by the farm superintendent as to the dying of tomato plants on the Horticultural grounds led to the belief that the land was infested with the Bacterial, or Mississippi tomato blight, and an elaborate experiment with tomatoes, peppers, egg-plants and potatoes was planned and carried out, for treating this disease with Bordeaux mixture, lime and kainit. The expected disease did not develop; but instead there was a mild outbreak of Rolf's Florida tomato disease. The very dry season prevented much damage; but this is doubtless the cause of the trouble in previous years.

A number of experiments were undertaken with a view of finding some practical means of controlling the nematode root knot that is so troublesome in many parts of the South. These experiments included rotations, clean fallow, and applications to the soil of heavy dressings of lime, kainit and tobacco stems. The first two lines of work are not completed; but the third gave no hopeful result. The roots of okra and other vegetables were as badly knotted on land that had received at the rate of 3,000 lbs. per acre each of lime and kainit, as where no application was made.

A number of observations on pear blight were made, and three trips were taken to inspect the work of the members of the South Alabama Horticultural Society at Citronelle, Mobile county, in attempting to control the disease by pruning. The good effects of this work, where most thoroughly done, was very apparent; but the great practical difficulty of getting the work done with sufficient thoroughness to entirely suppress the disease, was also evident. It is a very important subject and much more careful work is needed on it.

During the late Summer and Fall some miscellaneous work with vegetables has been done with a view to determine the possibility of securing a larger and more varied supply of fall vegetables for the farmer's table and for home markets; and some special work is underway with turnips, including the testing of over forty varieties, with a view of calling attention to the importance of this crop to the southern farm and garden.

The large number of letters of enquiry reaching this department from all parts of the State indicate increasing interest in horticultural matters, especially on the part of new comers who are settling in considerable numbers in some sections. This correspondence has added materially to the work of the department.

The most important addition to the working equipment of the department during the year has been the completion of a new greenhouse, 20 x 80 ft. besides boiler and work room.

Bulletin 69 on "Treatment of Some Fungous Diseases," was issued jointly with Dr. Underwood from the Department of Biology during the early part of the year.

REPORT AS BIOLOGIST.

Since assuming the duties of Biologist in July, the study of the Fungous Flora of the State, begun by my predecessor, Dr. L. M. Underwood, has been continued; and the results are nearly ready for publication as a "Preliminary List of the Fungi of Alabama." This will appear over our joint names, as much of the work has been done by Dr. Underwood. We will enumerate between eight and nine hundred species as occurring in the State; and will quote descriptions of all that have been first described from Alabama material. The preparation of this list has involved a much greater amount of work than was at first expected. This has necessarily delayed its publication; but we feel sure that its greater completeness will more than justify the delay.

Much time and labor has been given to re-arranging our collections of Fungi; and getting them in shape for ready reference and study.

At the present time the collection consists of the following material:—

Alabama Fungi, collected by Dr. Atkinson and assistants.....	553	specimens
Louisiana Fungi, collected by Rev. A. B. Langlois	184	“
From various scattered sources.....	35	“
Indiana Fungi, collected by Dr. L. M. Under- wood.....	50	“
Illinois and Mississippi Fungi, collected by F. S. Earle.....	87	“
Colorado Fungi, collected by C. F. Baker... ..	42	“
Alabama Fungi, collected by G. W. Carver..	64	“
Fungi from the Herb, of the Div. of Veg. Phys. & Path. Dep. of Ag.....	319	“
Alabama Fungi, collected by Underwood & Earle	613	“
Ravenel's Fungi Americani Exsiccati, Cent. 5, 7, & 8.....	300	“
Briosa & Cavara, Funghi Parassiti &c, Fasc. 1-11.....	275	“
Ellis' North American Fungi, Cent. 1-35... ..	3500	“
Seymour & Earle, Economic Fungi, Fasc. 1-9.	450	“
Kellerman & Swingle, Kansas Fungi, Fasc. 1 & 2.....	50	“
De Thueman's Mycotheca Universalis, Cent. 1-23.....	2300	“
Sydow's Uredineen, Fasc. 1-21.....	1050	“
Pringle's Mexican Fungi, Decade 1.....	10	“
<hr/>		
A total of.....	9882	“

These are all mounted on half size herbarium sheets ; and are arranged according to the Saccardian system. A Host Index of the collection has been prepared on regular library cards, so that a moments inspection will show what Fungi are represented as occurring on any given host plant.

Observations have been made on a number of plant diseases ; but these studies have none of them progressed far enough for detailed publication. Among the more interesting points noted may be mentioned the occurrence in our experimental grounds of what is known as "Rolfs' Sclerotium Disease" of the potato and tomato. This blight has not heretofore been reported outside of Florida. The bacterial disease of potatoes and tomatoes known as the "Southern Blight" or "Mississippi Blight," was observed at Deer Park in Washington county, and at Mobile. Both diseases produce a sudden wilting and death of the tops ; but they are caused by very different organisms. Diseased cabbage plants from the seed bed, received from Citronelle, Mobile county, were found to be attacked by *Peronospora parasitica*. This is a common parasite of many Cruciferous weeds ; but it has not heretofore been reported as a cabbage disease in this country. The root disease of the grape, mentioned in Bulletin 69, page 270, as being probably identical with the French "Pourridie," proves on further investigation not to be this disease. It is usually much less virulent and slower in its work than Pourridie ; and is caused by some obscure, as yet undetermined organism. Careful observation of the fertilizer test with cotton, made by the Agricultural Department, failed to show during this rather abnormal season, any connection between the presence or absence of Leaf Blight, and the fertilizer used. The disease suddenly made its appearance and spread from certain well-defined centres, seemingly without reference to cultural or other ascertainable conditions. This was an unexpected result and does not accord with other published observations. It may, in part, be due to the peculiar climatic conditions of last season.

Bulletins issued from this department during the year include the joint Bulletin 69 on "Treatment of Some Fungous Diseases;" Bulletin 73 on "Edible Fungi: A Wasted Food Product," by L. M. Underwood; and Bulletin 74, on "Flour Considered from the Standpoint of Nutrition," by L. M. Underwood.

Respectfully submitted,

F. S. EARLE,

Biologist and Horticulturist.

AUBURN, ALA., Feb. 1, 1897.

REPORT OF ENTOMOLOGIST.

Dr. Wm. LeRoy Broun, President:

SIR:—I have the honor to submit the following report of work done in the Department of Entomology during 1896:

The office of Entomologist was founded by the Board of Trustees in June of 1896. I entered upon the duties of that office on the 16th day of September. As the office was a new one to the Experiment Station staff, a start from the very foundation was necessary. The small brick building formerly used as a Phyto-pathological Laboratory, together with a portion of the greenhouse attached thereto, was turned over to the uses of an Entomological Laboratory. With the exception of some empty insect cases, I found practically nothing here in the form of entomological apparatus or library, nor had any especial appropriation been made for the purpose of giving the department a start. However, the small sum placed at my disposal was used to good advantage in obtaining initial supplies of the most urgently needed necessities. The two great desiderata of an Entomological Laboratory—a good reference collection and a library of special works on entomological subjects—were entirely wanting. Hence my first efforts were applied to getting the laboratory into working order, and starting a good representative collection of our indigenous insects, the latter being the most absolutely essential appurtenance of an Entomological Laboratory.

Although the seasonal period of greatest activity among insects was over when I arrived, yet work in connection with the habits, life histories, and economic importance of the insects of this locality, was immediately begun, and prosecuted with all the vigor possible.

In the very brief opportunity afforded me, among many observations of minor importance, the following more salient points were noted. Nothing was seen of the Cotton Worm, the Boll Worm being not uncommon, especially in tomato patches, but happily it was not abundant. On several places plant lice were swarming on cucumber and cotton. The "Pickle Worm" was found not uncommonly eating into the cucumber fruit. The Tomato Worm worked severe injury to many tomato patches. On late tomatoes also was found a minute lively little insect (a species of *Dicyphus*) in injurious numbers, sucking the juice from the plant, causing the leaves to turn yellow and drop off. This species has not before been noticed by entomologists as an injurious insect, so will be made the subject of a special study. Ailanthus trees were found commonly defoliated and covered with the webs of the Ailanthus Worm. In many spots in lawns and meadows of Bermuda grass, the Southern Grass-worm was found in enormous numbers, eating away every green blade. In corn cribs and granaries several kinds of weevils and grain and meal moths were "having things their own way."

Many notes were made on these and various other insects, while in numerous instances the living insects were brought into the laboratory and studied in vivaria. In short, the foundations were laid for a complete study of the inter-relations of plants and insects in the State of Alabama.

But very little work in general, on the insects of the State, could be even begun, as no facilities for visiting other localities were afforded me. It was, however, learned that the worst of all orchard pests, the much feared San Jose Scale, had become colonized in several portions of the State.

Active steps were taken towards getting this office into communication with the farmers of the State, to be accomplished by means of personal letters, through the press, and by occasional bulletins. A bulletin was prepared, call-

ing the attention of fruit-growers to the presence of the San Jose Scale in the State, and giving information relative to several other insect pests, advising remedies for each.

Respectfully submitted,

C. F. BAKER,

Entomologist.