

THIRTEENTH ANNUAL REPORT

OF THE

Agricultural Experiment Station

OF THE

ALABAMA POLYTECHNIC INSTITUTE,

AUBURN, ALABAMA.

JANUARY 25, 1901.

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ALABAMA POLYTECHNIC INSTITUTE.

Auburn, Ala., Jan. 26th, 1901.

GOVERNOR WM. J. SAMFORD,
Executive Department,
Montgomery, Ala.—

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

The report of the Treasurer, herewith included, is for the fiscal year ending June 30th, 1900.

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 Director, Botanist, the Chemist, and the Veterinarian, the Agriculturist, and Biologist, and the Horticulturist, for the year ending December 31st, 1900.

Respectfully,

WM. LEROY BROWN,
President.

TRUSTEES:

<i>His Excellency</i> , Wm. J. SAMFORD, President	<i>Ex-Officio</i> .
JNO. W. ABERCROMBIE, Superintendent of Education ..	<i>Ex-Officio</i> .
R. F. LIGON, JR.....	Montgomery, Ala.
TANCRED BETTS ..	Huntsville, Ala.
W. C. WHITAKER, ..	Tuscaloosa, Ala.
JONATHAN HARALSON, ..	Selma, Ala.
THOMAS WILLIAMS ..	Wetumpka, Ala.
J. A. BILBRO, ..	Gadsden, Ala.
J. M. CARMICHAEL, ..	Ozark, Ala.
W. K. TERRY, ..	Birmingham, Ala.
T. H. FRAZER, ..	Mobile, Ala.
I. F. PURSER.....	Opelika, Ala.

AGRICULTURAL EXPERIMENT STATION.

COMMITTEE OF TRUSTEES ON EXPERIMENT STATION,

THOS. WILLIAMSWetumpka, Ala.
JONATHAN HARALSONSelma, Ala.

STATION COUNCIL.

WM. LEROY BROUNPresident.
P. H. MELLDirector and Botanist.
B. B. ROSSChemist.
C. A. CARY, D. V. M.Veterinarian.
J. F. DUGGARAgriculturist.
F. S. EARLEBiologist and Horticulturist.
J. T. ANDERSONAssociate Chemist.

ASSISTANTS.

C. L. HARE.....First Assistant Chemist.
J. Q. BURTONSecond Assistant Chemist.
H. S. HOUGHTONThird Assistant Chemist.
T. U. CULVERSuperintendent of Farm.
R. W. CLARKAssistant Agriculturist.
C. F. AUSTIN .. .Assistant Horticulturist.

REPORT OF TREASURER.

Treasurer of Alabama Polytechnic Institute.

In account with United States Appropriation Hatch Fund for the year 1899 and 1900.

To cash received from U. S. Treasurer for the fiscal year ending June 30th, 1900	\$15,000.00
By amount paid salary account	\$8,528.31
By amount paid Labor Account	1,229.25
By amount paid Publications	1,160.00
By amount paid Freight and Express.....	284.71
By amount paid heat, light and water.....	134.73
By amount paid Chemical supplies.....	506.54
By amount paid seeds, plants & supplies.....	644.29
By amount paid Fertilizers	369.31
By amount paid Feeding stuff	208.61
By amount paid Library	437.03
By amount paid tolls, implements and machinery	78.48
By amount paid Scientific apparatus.....	233.09
By amount paid live stock & animal industry..	1,185.34
By amount paid Contingent	10.00— 15,000.00

E. T. GLENN,
Treasurer, A. P. Institute.

State of Alabama,
Lee County.

Personally appeared before me Charles Gachet, a Notary Public in and for said county, E. T. Glenn, known to me as treasurer of the Alabama Polytechnic Institute of Alabama, who being duly sworn, deposes and says that the above and foregoing account is true and correct.

Witness my hand this, the 24th day of January, 1901.

CHAS. GACHET,
N. P. and Ex-off. J. P.

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 the same.

WM. LEROY BROUN,

REPORT OF DIRECTOR.

DR. WM. LEROY BROWN, PRESIDENT,

SIR:—I have the honor as Director of the Station to submit the following report concerning the work under my charge during the year 1900.

The routine duties of the office have been steadily increasing since the responsibilities were placed on me. The correspondence is very large, showing a great interest on the part of the people of the State in the work of the Station, and the demand for the back numbers of the bulletins has been greater than the supply. Many of the earlier numbers of these publications have been long exhausted, and yet there are farmers of Alabama still asking for them to complete files and furnish information on questions that are constantly occurring. The Director's office is rapidly resolving itself into a general information bureau; the questions asked relate to all matters pertaining to the science of agriculture, investments, climate, laws, engineering, economic questions and laws, of health. The rule of the office is to answer every letter although the information desired by the writer is not in every instance fully supplied, because this is impossible in some cases, since the list of subjects above given covers a large portion of human knowledge and the Director is quite limited in the extent of his information. It is gratifying, however, to note this increased activity on the part of the farmers of Alabama after instruction on subjects relating to their welfare, it is a healthy sign of prosperity for the State.

The work of a first class Entomologist is greatly needed by the Station and the State and your attention is called to this fact with the hope that you will bring

the matter before the Board of Trustees at their next meeting and urge the election of an Entomologist for the Station. Alabama is of special interest as a field for entomological work and I am sure the interests of the farmers demand that this Station should do something definite in the study of insect pests.

The Station was awarded a silver medal by the Paris Universal Exposition for the contribution to the general exhibit made by the Stations of the United States. Alabama's share in this general exhibit was entirely on the subject of cotton—what the Station had accomplished during the period of its existence on improving, cultivating and developing the cotton and on the studies relating to the insects, diseases and the chemistry of the cotton.

The names on the mailing list have greatly increased in number for individual bulletins during 1900 and 761 new names have been added to the regular list for the serial bulletins. The mailing list now numbers 8,771 names.

LIST OF BULLETINS WITH CONTENTS ISSUED BY THE STATION IN 1900, COMPRISING VOLUME 8.

No. 108. Tomatoes.

Contents: Soils and fertilizers; plant growing; cultivation and training; pruning; diseases and insects; varieties; marketing.

No. 109. Strawberries.

Contents: Variety notes; Arkansas Traveler, Aroma, Barton, Bismark, Brandywine, Bubach, Cloud, Clyde, Cobden Queen, Earliest, Everbearing, Gandy, Gardner, Glen Mary, Haviland, Hoffman, Howell, Lady Thompson, Meek's Early, Michel, Murray's Extra Early, Nick Ohmer, Patrick, Pride of Cumberland, Rio, Ridgeway,

Seaford, Sharpless, Star, Tennessee Prolific, Tubbs, West Lawn, Wm. Belt, and Wilson.

No. 110. Grapes.

Contents: General considerations; soils; planting and cultivating; pruning and training; diseases; the origin of our cultivated grapes; marketing; notes on the varieties fruiting in the Station vineyard during 1900.

No. 111. Corn Culture.

Contents: Varieties; northern versus southern seed; tip, butt, and middle kernels for seed; cultivation experiments; methods of harvesting; comparison of stubble and vines of cowpeas, velvet beans, hairy vetch, rye, &c. as green manures for corn; and fertilizer experiments.

No. 112. Orchard Notes.

Contents: Remarks on the character of the season; apples, condition of Station orchards and methods of cultivation, apple rot, apple aphid, apple rust, varieties adapted to Alabama; figs—varieties &c.; Kahi or Japanese persimmon; peaches—races and varieties, season of blooming; pears; plums,—discussion of races and varieties adapted to Alabama, records of blooming season; San Jose Scale—experiments with during 1900, crude petroleum for.

BOTANICAL EXPERIMENTS.

The work in this department has been mainly in the direction of substantiating certain results secured in the improvement of the cotton by crossing and selecting. These experiments have been under way for some years and several bulletins have been issued on the results of the work.

Grass cultivation is still under consideration especially the cultivation of the wild species and foreign varieties to determine their adaptability to Alabama soils and climate and their value for feeding and for lawns.

A large number of experiments are under way on the foreign trees and shrubs and valuable data have been obtained which will be published some time in the near future.

Respectfully,

P. H. MELL,
Director and Botanist.

REPORT OF CHEMIST.

DR. WM. LEROY BROUN,

President Alabama Polytechnic Institute.

SIR:—As Acting Chemist, in the absence of the Chief Chemist, Prof. B. B. Ross, who is in Europe on leave, I respectfully submit the following report of the work of this Department during the year 1900:

1. *Analysis of Fertilizers.*

Bulletin No. 14 issued by the State Department of Agriculture in August, 1900, publishes the results of analysis of 581 fertilizers made by this Department, the bulk of which was done within the period embraced in this report. Since the issuance of that Bulletin and the beginning of the new fertilizer season in August, we have analyzed 19 fertilizers, the results of which will be published in Bulletin 15 of the State Department of Agriculture to be issued in August, 1901.

2. *Analysis of Phosphate Rock.*

In the spring and summer of 1900, the Chief Chemist visited a number of localities in the northern part of the State for the examination of the beds of phosphate rock known to exist there and to collect for analysis samples of these rock. Some forty samples altogether were collected and analyzed by this Department. The results of

analysis, together with a general discussion by the Chief Chemist of the phosphatic deposits visited by him, were issued in Bulletin No. 14 of the State Department of Agriculture, to which allusion has already been made.

3. *The Cotton Plant.*

The previous Annual Report refers to the work of this Department, then in progress, on the Cotton Plant. As the greater part of this work was done within the time embraced in this Report, it is deemed proper to refer to it again here. Samples of the plant were carefully selected at five different periods during the season of growth, and each particular portion of the plant was analyzed with a view to noting the variation in composition of the different parts of the plant during the different stages of plant development. The purpose of the investigation was, as stated, to ascertain whether the results would supply important information with regard to the food requirements of the plant at various periods of growth, and at the same time throw some light upon the subject of the transfer of certain constituents from one part of the plant to another during the progress of its growth. The analytical data obtained, together with a discussion of these results, were published in the Station Bulletin No. 107, forming, with some previous work relating to the composition of the cotton plant, this Department's contribution to that Bulletin.

4. *Composition of Silage.*

In conjunction with the Agricultural Department of the Station, the Chemical Department is making some investigation on the composition of silage from various crops and at different stages, to ascertain what effect the process has on their forage value. The work is in its incipiency, and no results can yet be given.

5. *Miscellaneous Work.*

A considerable portion of the time of this Department is consumed in what may be called, for want of a better designation, Miscellaneous Work. From all parts of the State come for analysis or identification, samples of water, soils, minerals, coals, medicines, etc., requiring more or less time in proportion as they are to be analyzed completely or specially, quantitatively or qualitatively. Under this head may be included, also, a considerable amount of work done by this for the other Departments of the Station, such special analysis of soils, farm products, fertilizers, etc.

A report on the work of this Department would not be complete without the mention of the Correspondence which it conducts. Almost every mail brings letters seeking information, technical and practical, on subjects relating to applied chemistry. Every effort is being made to encourage the extension of this branch of the work, believing, as we do, that it serves to bring the Department and the Station into closer touch with the citizens of the State.

Respectfully submitted,
JAS. T. ANDERSON,
Acting Chemist.

REPORT OF ASSOCIATE CHEMIST.

DR. WM. LEROY BROUN,
President Ala. Polytechnic Institute.

SIR:—In addition to discharging the duties of acting head of the Department of Chemistry, and the performance of the usual routine work connected with the analysis of fertilizers, etc., the Associate Chemist reports in

outline the following original work which was projected and is now being conducted by him:

1. A Study of the Availability of Plant Food in Soils.
2. A Study of the Sources from which Leguminous Plants Derive their Nitrogen.
3. The Determination of the Availability of the Phosphoric Acid in the Several Forms in which that Constituent is commonly applied in the Fertilization of Soils.

A detailed statement of the purposes of the work and the plans of procedure is contained in a former report and need not be repeated here. The nature of the work is such that several seasons are required for its completion, and in the nature of the case definite results cannot be reported until the work is completed. It will be sufficient to state that satisfactory progress is being made.

Respectfully submitted,

Jas. T. Anderson,
Associate Chemist.

REPORT OF VETERINARIAN.

TO DR. WM. LEROY BROUN.

DEAR SIR:—The following is a brief report of the work done in the Veterinary Department of the Experiment Station during the year 1900:

During the year northern bred calves were inoculated to produce immunity to Texas fever, for the Experiment Station, for R. B. Barnes of Opelika, for W. G. Little of Livingston and for Joel Dumas of Arlington, Ala. A complete report of the results of this new method of acclimating northern bred cattle will be published in a bulletin some time this year.

In August this department issued a press bulletin on Texas or acclimating fever. The object of the bulletin

was to present to stockmen the common characteristics of the disease so that they could readily recognize it and properly handle affected animals.

Farmers Institutes, which are almost entirely supported by funds derived from a source outside of the Hatch fund, were held in the following places during 1900:

At Brewton, Escambia County, April 30.

At Atmore, Escambia County, May 1.

At Sylacauga, Talladega County, May 25.

At Grand Bay, Mobile County, June 18.

At Citronelle, Mobile County, June 19.

At Camden, Wilcox County, June 21.

At Marion, Perry County, June 23.

At Greensboro, Hale County, June 25.

At Eutaw, Green County, June 26.

At Livingston, Sumter County, June 27.

At Northport, Tuscaloosa County, June 28.

At Carrollton, Pickens County, June 30.

At Fayette, Fayette County, July 2.

At Vernon, Lamar County, July 3.

At Lafayette, Chambers County, July 26.

At Citronelle, Mobile County, Oct. 27.

The 16 institutes were held in 12 counties.

The total attendance of farmers was 614.

The average attendance at each institute was 38.

Eleven of the sixteen institutes were held during the very rainy season of June and July; consequently, the attendance for the year was much below that of the previous year. The active interest manifested by the farmers in attendance assures us that plain talks on the latest and best methods of using fertilizers, planting, cultivating, improving soil, feeding and handling and judging stock, etc., are doing good—are leading farmers

into the employment of improved and better methods of farming.

Professors Duggar, Hare and Earle have done good work at the institutes. Prof. Duggar has worked in all of them except two; Prof. Hare worked in eleven; Prof. Earle conducted one institute by himself at Citronelle and helped in three other institutes. Besides arranging, conducting and working in fifteen of the institutes I worked in one at Wetumpka, under the direction of the Commissioner of Agriculture.

The Veterinary Department has supplied tuberculin of its own make to the cities of Montgomery and Birmingham and to responsible veterinarians in Alabama, upon the condition that records of all tuberculin tests be reported to this department. These reports give us an idea of the extent of tuberculosis in the tested herds of cattle in Alabama.

I am continuing investigations in order to determine why cotton seed or cotton seed meal will kill pigs, but have no positive results to report.

Search is also being continued for the cause of osteoporosis (big-head) in horses and mules.

In the near future I hope to print some material resulting from investigations relating to infectious cerebritis ("Blind Staggers") in horses and mules.

Additions have been made during the year to our collections of animal parasites and to anatomical and pathological museums.

Respectfully submitted,

C. A. CARY,
Veterinarian.

REPORT OF AGRICULTURIST.

DR. W. L. BROUN,
President:

SIR:—I respectfully submit the following report of the Agricultural Department of the Alabama Agricultural Experiment Station for the past year.

In the early months of the year a large amount of time was spent in the preparation of a report of all experiments with cotton conducted by this Department since the establishment of the Station. The three articles on Varieties of Cotton, Preparation and Cultivation of the Soil for Cotton, and the Manuring of Cotton have been published in Bulletin No. 107. This publication brought us to a realization of the need of additional investigations relative to the manurial needs of cotton grown on different soils and to the necessity of perfecting some plan for the classification of the numerous varieties and so-called varieties of cotton. Our work with cotton during the past year has been concentrated on these two lines of investigation.

The crops with which the greater portion of our field experiments were conducted in 1900 were corn and sorghum. Fertilizer, variety, and culture tests were made with both.

The results of experimental work with corn in 1898, 1899, and 1900 are now in press, under the title of "Bulletin No. 111—Corn Culture."

Corn was used in 1900, very much as we had used cotton in previous years, to measure the extent of soil-improvement effected by the plowing in of the stubble or entire growth of cowpeas, velvet beans, hairy vetch and other leguminous crops.

Not only was the immediate fertilizing effect of these plants investigated, but numerous experiments of the past year threw light on the permanency of the benefit resulting from the use of these plants as fertilizers.

The study of the legumes as forage plants has also been continued. The results of several years experiments with cowpeas await publication, and a large amount of experimental data relative to rye, wheat, oats, peanuts, and crimson clover have accumulated.

In connection with the Associate Chemist, we have continued the investigation in the greenhouse relative to the proportion of air-derived and soil-derived nitrogen taken up by the cowpea when grown on soils of different degrees of fertility.

The experiments in pork production have been continued along the same lines as heretofore, looking to the perfecting of a system by which the maximum proportion of the hog's food shall consist of farm-grown products other than corn—as peanuts, cowpeas, chufas, sorghum, rape, etc.

Mr. R. W. Clark, Assistant in Animal Husbandry, is conducting in the dairy some experiments in methods of butter making and is ascertaining the quantity, quality, and cost of the milk and butter produced by each cow in our herd. Together we have conducted some feeding experiments with dairy cows and have mapped out a permanent line of investigation, the aim of which is to learn the best means of reducing the cash expenditure for purchased feeds by the substitution of home-grown products.

In connection with the chemical department the investigation of the effect of food on the quality of pork has been continued and a study has been begun of the losses and changes which occur when various forage crops are placed in the silo.

During the past year the Agriculturist has conducted the usual large correspondence and has participated in most of the Farmers Institutes of the year.

Respectfully submitted,

J. F. DUGGAR,

Agriculturist.

REPORT OF THE BIOLOGIST AND HORTICULTURIST.

DR. WM. LEROY BROUN, *President*:

SIR:—I have the honor to make the following report on the work of the Departments under my charge.

In the Horticultural Department work in the orchard consisted in making notes and studies on the different varieties as to comparative time of blooming, adaptability to our conditions, desirability for home use or market and susceptibility to, or immunity from, diseases and insect attacks. These studies have been put in shape for publication and are now in the hands of the printer as Bulletin No. 112. Strawberry experiments have been continued and a report on them was published in July as Bull. 109. The new vineyard planted in 1898 bore its first crop this season. Notes on the varieties by my assistant, Mr. Austin together with brief directions for planting and training grapes and a discussion of races and diseases by myself have been prepared for publication as Bull. 110. Work with vegetables during the spring was mostly confined to Irish potatoes, tomatoes and cabbage. Bulletin 108 on Tomatoes was issued in April.

In the Biological Department continued study has been given to various diseases. An extensive experiment planned to demonstrate the supposed agency of thrips or other small insects in spreading the Bacterial Rot of tomatoes gave only negative results, and we are forced to conclude that the agency by which the disease spreads in the field is still entirely unknown and that unfortunately no remedy can as yet be suggested. The Bacterial Black Rot of the cabbage was observed for the first time at this place. It occurred abundantly in a small irrigated field of cabbage causing the loss of nearly

25 per cent. of the crop. Associated with it was another bacterial disease causing the browning and dying of the outer leaves of the head. This makes the cabbage unsightly and in a short time it penetrates so deeply as to render it unfit for food. This disease has been frequently noted before in the South but no careful study has been made of it. No bulletins have been published during the year entirely devoted to Biological studies but notes on diseases are included in all of the Horticultural bulletins mentioned above.

In connection with the Biological Survey work has been continued on the study of the fungi occurring in the State, special attention being given to the neglected fleshy species; and the special study of the flora of the Granitic Region has been continued. It is hoped that the latter may be gotten in shape for publication during the coming year.

The Herbarium continues to show a satisfactory growth. Its condition on Jan. 1, 1901, is as follows:

	Fungi	Lichens	Mosses, &c	Algae	Flowering Plants, &c	Total
Previously Reported	15,580	734	470	884	17,514	35,182
Added during 1900	1,370	272	118	100	3,092	4,952
Total Jan. 1..	16,950	1,006	588	984	20,606	40,134

During the year it has been possible to poison and mount the greater part of the flowering plants so that they are now safe from destruction by insects, and are in a convenient condition for study.

Respectfully submitted,

F. S. EARLE,
Biologist and Horticulturist.

