Thirtieth Annual Report

OF THE

Agricultural Experiment Station

OF THE

Alabama Polytechnic Institute

1916 - 1917

Auburn, Alabama

January, 1918

ALABAMA POLYTECHNIC INSTITUTE

Auburn, Ala., Jan. 30, 1918.

Governor Charles Henderson,
Executive Department,
Montgomery, Ala.

Sir:

I have the honor herewith to transmit to you the Thirtieth Annual Report of the Agricultural Experiment Station of the Alabama Polytechnic Institute.

This report is made in accordance with the Act of Congress approved March 2, 1887, establishing agricultural experiment stations, and the Act of Congress approved March 16, 1906, known as the Adams Act.

Respectfully,
CHAS. C. THACH,
President.

Auburn, Ala., Jan. 29, 1918.

Dr. C. C. Thach, President,
Alabama Polytechnic Institute,
Auburn, Ala.

Sir:

I herewith submit the Thirtieth Annual Report of the Experiment Station of the Alabama Polytechnic Institute for the fiscal year ending June 30, 1917.

It contains the detailed report of the Director and Agriculturist, the Treasurer, the Chemist, The Veterinarian, the Botanist, the Horticulturist, the Entomologist, the Plant Pathologist, and the Animal Husbandman, for the year ending December 31, 1917.

Respectfully submitted,
J. F. DUGGAR,
Director, Experiment Station.

AGRICULTURAL EXPERIMENT STATION

His Excellency, Charles Henderson, President.....Ex-Officio
Spright Dowell, Superintendent of Education.....Ex-Officio
A. W. Bell.....Anniston, Ala.
Harry Herzfeld.....Alexander City, Ala.
Oliver R. Hood.....Gadsden, Ala.
C. S. McDowell, Jr.....Eufaula, Ala.
W. K. Terry.....Birmingham, Ala.
W. H. Oates.....Mobile, Ala.
T. D. Samford.....Opelika, Ala.
R. F. Kolb.....Montgomery, Ala.
J. A. Rogers.....Gainesville, Ala.
C. M. Sherrod.....Courtland, Ala.
P. S. Haley.....Corona, Ala.

COMMITTEE OF TRUSTEES ON EXPERIMENT STATION

R. F. Kolb.....Montgomery
A. W. Bell.....Anniston
J. A. Rogers.....Gainesville
C. S. McDowell, Jr.....Eufaula

STATION STAFF

C. C. THACH, President of the College
J. F. DUGGAR, Director of Experiment Station

AGRICULTURE:

J. F. Duggar, Agriculturist.
E. F. Cauthen, Associate.
M. J. Funchess, Associate.
J. T. Williamson, Field Agt.
H. B. Tisdale, Associate Plant Breeder.
O. H. Sellers, Assistant.
M. H. Pearson, Assistant.

VETERINARY SCIENCE:

C. A. Cary, Veterinarian

CHEMISTRY:

————, Chemist, Soils and Crops.
C. L. Hare, Physiological Chemist.

BOTANY:

W. A. Gardner, Botanist.
A. B. Massey, Assistant.

PLANT PATHOLOGY:

G. L. Peltier, Plant Pathologist.

HORTICULTURE:

G. C. Starcher, Horticulturist.
J. C. C. Price, Associate.
C. L. Isbell, Assistant.

ENTOMOLOGY:

W. E. Hinds, Entomologist.
F. L. Thomas, Assistant.
D. C. Warren, Field Agent.

ANIMAL HUSBANDRY:

G. S. Templeton, Animal Husbandman.
H. C. Ferguson, Associate.
E. Gibbens, Assistant.
V. W. Crawford, Assistant.

AGRICULTURAL ENGINEERING:

R. U. Blasingame, Agricultural Engineer.

REPORT OF HATCH AND ADAMS FUNDS FOR 1916-1917

Receipts.

	Hatch	Adams
To amount from U. S. Treasury (Net)	$15,000.00	$15,000.00

Disbursements

By Salaries	$ 7,437.35	$10,183.69
By Labor	1,996.02	1,540.38
By Publications	1,229.77	
By Postage and Stationery	214.46	109.37
By Freight and Express	268.43	314.78
By Heat, Light, Water and Power	464.70	294.20
By Chemicals and Laboratory Supplies	22.13	133.08
By Seeds, Plants and Sundry Supplies	431.96	137.56
By Fertilizers	491.92	150.25
By Feeding Stuffs	682.97	543.59
By Library	335.27	11.00
By Tools, Machinery and Appliances	339.50	15.09
By Furniture and Fixtures	311.10	100.10
By Scientific Apparatus and Specimens	.80	797.55
By Live Stock	24.30	259.00
By Traveling Expenses	218.31	334.07
By Contingent Expenses	20.00	
By Buildings and Land	511.01	76.29
Total	$15,000.00	$15,000.00

Respectfully,

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

State of Alabama:
Lee County.

Personally appeared before me, B. L. Shi, a Notary Public in and for said county, M. A. Glenn, known to me as Treasurer of the Alabama Polytechnic Institute, who, being duly sworn, deposes and says the above foregoing account is true and correct. Witness my hand this 29th day of January, 1918.

B. L. SHI,
Notary Public, Lee County.

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

CHAS. C. THACH
President Alabama Polytechnic Institute.

REPORT OF DIRECTOR AND AGRICULTURIST

J. F. DUGGAR

Auburn, Ala., January 28, 1918.

Dr. C. C. Thach, President,
Alabama Polytechnic Institute,
Auburn, Ala.

Sir:

I respectfully submit the following report for the past year of the work under my charge as Director and Agriculturist of the Alabama Experiment Station:

PUBLICATIONS

The publications of the Alabama Experiment Station for the fiscal year ending June 30, 1917, consist of the annual report, five bulletins, two circulars and five press bulletins, making a total of thirteen publications. Below I give their titles and authors:

Bulletin No. 192: "Cottonseed Meal Compared with Velvet Beans for Fattening Steers;" by the Animal Husbandman and Assistant.

Bulletin No. 193: "Peanuts; Tests of Varieties and Fertilizers;" by the Director and Assistants.

Bulletin No. 194: "Growing Peanuts in Alabama;" by the Director and Assistants.

Bulletin No. 195: "The Cause of the Disappearance of Cumarin, Vanillin, Pyridine and Quinoline in the Soil;" by the Botanist.

Bulletin No. 196: "The Nitrification of Pyridine, Quinoline, Guanidine, Carbonate, etc., in Soils;" by the Associate Agriculturist.

Circular No. 35: "Annual Report of the Director of the Experiment Station on Work Done Under the Local Experiment Law in 1916." (From the Local Experiment Fund.)

Circular No. 36: "Preserving Eggs for Home Use;" by the Animal Husbandman. (From the Local Experiment Fund.)

Press Bulletin No. 85: "Separation of Corn Cockle Seed from Commercial Narrow Leaf Vetch Seed;" by the Assistant in Agriculture.

Press Bulletin No. 86: "Tests of Varieties of Corn in 1916;" by the Associate Agriculturist.

Press Bulletin No. 87: "Varieties of Fruit for the Home Orchard in Alabama;" by the Associate Horticulturist and Field Agent in Horticulture. (From the Local Experiment Fund.)

Press Bulletin No. 88: "Tests of Varieties of Cotton in 1916;" by the Associate Agriculturist.

Press Bulletin No. 89: "The Home Orchard; Setting and Care;" by the Associate Horticulturist and Field Agent in Horticulture. (From the Local Experiment Fund.)

Bulletin Index for Volume 22. (1914.)

Bulletin Index for Volume 23. (1915.)

Between July 1st and December 31, 1917, there were also published the following:

Bulletin No. 197: "Harvesting and Storing Sweet Potatoes;" by the Associate Horticulturist.

Bulletin No. 198: "Velvet Beans Compared with Cottonseed Meal for Fattening Steers. Velvet Beans, Cottonseed Meal and Corn as Feeds for Dairy Cattle. Velvet Bean Pasture Compared with Corn and Dried Blood; Velvet Bean Meal Compared with Corn for Fattening Hogs;" by the Animal Husbandman and Assistants. (From the Local Experiment Fund.)

Press Bulletin No. 90: "How to Save Alabama's Corn Crop;" by the Entomologist.

Press Bulletin No. 91: "Tests of Varieties of Corn in 1917;" by the Associate Agriculturist.

Press Bulletin No. 92: "Tests of Varieties of Cotton in 1917;" by the Associate Agriculturist.

(Reprint) Press Bulletin No. 67: "Oat Smut;" by the Director and Agriculturist. (From the Local Experiment Fund.)

This shows that the publications for the calendar year 1917 have been six bulletins, two circulars, three press bulletins and a reprint of one press bulletin, making a total of twelve publications. These show that a total of 236,500 separate copies have been distributed. These contained a total of 2,748,000 pages in all editions.

STAFF

Professor Ernest Walker resigned as Horticulturist September 1, 1916, in order to enter on private horticultural work. He had devoted three years of intense application to his duties as Professor of Horticulture, Horticulturist of the Experiment Station, and to the trying duties of State Horticulturist. The growth and progress of the latter work during this period is a monument to his industry and zeal. His death occurred shortly afterward.

On January 1st, 1917, Professor G. C. Starcher entered on his duties as Horticulturist. P. O. Davis resigned as Assistant in Horticulture March 15, 1917, and was succeeded by Otto Brown who left the employment of the Station soon after the close of the fiscal year.

In September, 1917, Dr. Wright A. Gardner became Botanist of the Experiment Station, succeeding Dr. W. J. Robbins, who resigned to enter commercial work.

During the past fiscal year the Experiment Station suffered the loss by death of Dr. J. T. Anderson. For many years he had been Chemist of the Station devoting special attention to soils and crops. Near the close of the last fiscal year O. L. Howell and F. E. Boyd resigned as Assistants in Agriculture. The duties formerly discharged by them were rearranged and assumed by H. B. Tisdale as Associate Plant Breeder, whose connection with the Station had been interrupted by a year's leave of absence for graduate study in Cornell University.

REPORTS OF DEPARTMENTS

On the following pages appear the reports of the Botanist, the Horticulturist, the Plant Pathologist, the Animal Husbandman, the Physiological Chemist, and the Veterinarian, which record the nature of the experimental work in their respective departments.

AGRICULTURAL DEPARTMENT

Auburn, Ala., January 30, 1918.

(Work under Hatch and Adams Funds.)

The field work has been conducted by the Associate Agriculturist, E. F. Cauthen.

Plant breeding continues to be one of the lines of work that occupies much of the time of the members of this Department.

The large amount of data accumulated on correlations between yield and various qualities of the corn plant and corn ear have been to a large extent summarized and put in shape for publication.

The breeding of oats has been continued and field tests indicate its practical value. It is hoped that at an early date there may be prepared for publication a part of the data accumulated by a number of years' breeding of cotton and oats. Field tests both at Auburn and other parts of the State continue to give increasing evidence of the value of the strains of cotton, corn, and oats evolved as a result of the breeding work at Auburn.

It is believed also that the results when fully analyzed will throw important light on some of the details of plant breeding that are important from a scientific standpoint.

The following is a list of the principal field experiments conducted on the Station farm in 1917:

Alfalfa, fertilizer, variety and culture experiments.
Barley, variety tests.
Cotton, effects of planting light and heavy seed.
Cotton, variety tests of short staple and long staple.
Cotton, breeding with Cook and hybrids.
Cotton, culture experiments, including thick and thin plantings and subsoiling.
Cotton, time of applying nitrate of soda.
Corn, variety tests, early and late plantings.
Corn, Williamson versus other methods of culture.
Corn, methods of planting velvet beans in.
Corn, best rotation for.
Cowpeas, variety and culture tests.
Cowpeas, for soil improvement.
Cowpeas, rate of seeding for hay.
Crops, residual effects of different kinds.
Clovers, tests of species and varieties.
Clovers, best plants for sowing with legumes.
Grains, as forage crops.
Forage crops, tests of many species and varieties.
Grasses, tests of species and varieties.
Hog crops, chufas, peanuts, soy beans, etc.
Hemp.

Kudzu for hay and for smothering nut grass.
Lime, effects of lime as a fertilizer on different crops.
Nitrogen, different kinds of meal as a source of.
Oats, variety tests, methods of seeding, and time of sowing.
Oats, breeding experiments.
Oats, fall sown versus spring strains.
Phosphates, raw versus acid, versus basic.
Peanuts, variety tests, early and late plantings.
Peanuts, rate of seeding and spacing.
Peanuts, shelled versus not shelled for planting.
Peanuts, different kinds of fertilizers for.
Rotation experiments.
Rye, variety tests.
Silage, yield of different crops for.
Soybean and cowpea mixtures for hay.
Soybeans, tests of varieties for seed, for hay, and for oil.
Soybeans, rate of seeding.
Sorghum, tests of varieties for forage and for syrup.
Subsoiling, for corn, cotton, cowpeas, and alfalfa.
Sudan grass, alone and with legumes.
Sugar Cane, Japanese, as a forage crop and for syrup.
Velvet Beans, varieties for seed and for hay.
Vetches, varieties.
Vetches, best mixtures.
Wheat, breeding experiments.
Wheat, varieties.

DIVISION OF SOILS

In this division Prof. M. J. Funchess has secured results from his laboratory and field experiments that promise great practical as well as scientific value.

A continuation of the experiments to determine the lasting effect of certain organic toxins indicates that most compounds lose their toxicity after being in contact with soil for a time.

At this date, there is no indication of a toxic effect of vanillin, cumarin, or quinoline added in July, 1917, to the soil from the Arlington farm.

The work on the development of soluble manganese in acid soils is yielding very interesting results. It has been very clearly shown that nitrification of dried blood may bring into solution relatively large amounts of manganese. Further, it

has been shown that it is not necessary for added sulfate of ammonia to be nitrified to cause an increase in the amount of this element in solution. Soil extracts which are toxic because of soluble manganese have been made productive by the additions of either calcium, sodium, or potassium hydroxides. For the growth of garden peas, the addition of pure calcium carbonate to such extracts markedly reduces the toxicity. The addition of lime to an acid soil prevents completely the solution of manganese.

A manuscript relative to manganese for publication is nearing completion.

Respectfully submitted,

J. F. DUGGAR,

Director and Agriculturist.

REPORT OF BOTANIST

WRIGHT A. GARDNER

Auburn, Ala., January 15, 1918.

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

Sir:

Having taken charge of this department September 1, 1917, I make a report from notes left by my predecessor, Dr. William J. Robbins.

(1.) Under the Soils Toxin Project, which is carried on under the Adams Fund, Bulletin 195, The Cause of the Disappearance of Cumarin, Vanillin, Pyridine and Quinoline in the Soil, was published in June, 1917. An investigation has been made which shows that bacteria decompose vanillin. Studies are in progress to show the effect of the addition of vanillin on the bacteria flora of soil, and on the conditions determining the digestion of vanillin.

(2.) No projects have been definitely outlined under Hatch funds. Some work has been done on each of the following:

1st. Control of nematodes by the application of formaldehyde and carbon bisulphide.

2nd. The effect of aluminum nitrate on the root growth of red clover and sorrel.

3rd. The effect of certain factors on the digestion of cellulose by Penicillium species.

(3.) The list of Station projects are:

1st. Soil Toxin Projects, Adams Fund.

2nd. Miscellaneous Botannical Investigations, Hatch Fund.

Respectfully submitted,

WRIGHT A. GARDNER,
Botanist.

REPORT OF PLANT PATHOLOGIST

G. L. PELTIER

Auburn, Ala., October 25, 1917.

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

Sir:

I am herewith submitting a brief statement relative to the projects now in progress in the Department of Plant Pathology for the past year.

1. Under the Adams Fund only one project, Citrus Canker, is being carried on. The citrus canker organism has been isolated directly from the soil and a method is being developed by which this can be done with ease and consistency. One of the most important factors to be determined is to find out how long the organism causing the Citrus Canker can persist in the soil, after the infected trees are destroyed, so that the development of a successful method for the isolation of the organism from the soil is of the utmost importance.

Through an agreement with Dr. W. T. Swingle, of the Bureau of Plant Industry, a series of plants representing the more important wild relatives and species of Citrus, together with the more common species and hybrids, have been obtained and placed in the field at Loxley and in the greenhouse at Auburn, for use in determining the relative susceptibility and resistance. These plants have been inoculated with virulent strains of canker and already some of them give promise of immunity. If resistant, they can replace the more susceptible Citrus plants in the orchards now destroyed and also replace the plants now in use as stock in South Alabama. A number of other important phases in the life history of Citrus canker organism are also under way.

During the summer a well equipped field laboratory was maintained for the study of Citrus Canker at Loxley, in charge of Mr. D. C. Neal, formerly a fellow at the Missouri Botanical Garden. Through an agreement with Dr. K. F. Kellerman, Mr. Neal will continue the work at Loxley during the coming year.

2. Several projects are now in progress under the Local Experiment Fund, including a study of the roots of dasheen both in the field and in storage, a new disease of the pecan, Japanese persimmon, and cherry, plum and peach.

Five fungi causing a rotting of dasheen in storage have been studied in the laboratory. In an experiment now in progress, an attempt was made to determine what fungi causing rots in storage would develop in the field from the use of diseased corms. To date, all results have been negative, showing that these fungi, while they are very destructive in storage, do not seriously affect the germination of the corm and are unable to attack the growing plants.

A Diplodia and Botyrospharia have been isolated from diseased material of pecan and other hosts mentioned above. Many field observations were made during the course of the year. Some inoculation work has been attempted in the greenhouse and field at Auburn. A study of these troubles will be continued.

Field and laboratory observations have also been made on the anthracnose of cereals, Physoderma disease of corn, peanut yellows, and several spot diseases of the legumes.

3. List of projects:

Adams Fund—Citrus Canker.

Local Experiment Fund—Storage and Field Rots of the Dasheen. Wilt and Die Back of Pecan, Japanese Persimmon, Plum, Cherry and Peach. Miscellaneous Phytopathological investigations.

4. The Department of Plant Pathology is cooperating to some extent with Dr. W. T. Swingle, of the office of Crop Physiology and Breeding Investigations, Bureau of Plant Industry, Dr. K. F. Kellerman, Associate Chief of the Bureau of Plant Industry, and Dr. E. C. Stakman, of the office of Cereal Investigations and Minnesota Agricultural Experiment Station. All three of these agreements are of recent date so that no results have been obtained as yet.

Respectfully submitted,

GEO. L. PELTIER,

Plant Pathologist.

REPORT OF HORTICULTURIST

G. C. STARCHER

Auburn, Ala., October 31, 1917.

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

Sir:

In response to your request, I herewith submit a report on the progress of the work in this Department.

We are completing our work on varieties of apples and will be ready for publication as soon as the notes can be compiled.

Persimmons—We have completed our variety notes on persimmons. This data will be ready for publication as soon as it can be compiled.

Peaches—We have continued our variety notes on peaches.

Grapes—We have completed variety tests of grapes and have this data ready for compilation.

Sweet Potatoes—We will complete, with this season, variety notes on sweet potatoes and will have this data ready for publication as soon as it can be compiled.

We completed our first series of experiments on sweet potato storage and have published same.

We have continued certain other experiments on fertilizers and vine cuttings vs. slips, etc. for sweet potatoes.

Sweet Corn—We have completed our variety tests of sweet corn and this data will be ready for publication as soon as it can be compiled.

Tomatoes—Due to disease, our variety notes on tomatoes were a complete failure this year.

Pears—We have abandoned our fertilizer experiments on pears for the prevention of Fire Blight due partially to the fact that potash can no longer be secured and partially to the fact that Fire Blight has practically destroyed the orchard.

Variety tests which have been carried on with pepper, okra, egg plant and cucumbers were abandoned for the present year on account of climatic conditions.

Yours very truly,
G. C. STARCHER,
Horticulturist.

REPORT OF ENTOMOLOGIST

W. E. HINDS

Auburn, Ala., November 13, 1917.

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

Sir:

Herewith I give you a report of Entomological work in hand.

Adams Projects: 1. Rice Weevil. Continued investigations in field and laboratory, confirming conclusions as to simple, practicable, effective methods of control aside from insecticidal methods. Indications that over half of prospective loss of over $10,000,000 in present Alabama crop of 80 to 90 million bushels of corn might be saved by general practice of (A) gathering all early maturing corn with husks on within six weeks after it reaches "roasting ear stage" so as to remove practically all of first generation before spread can occur to later maturing corn. Use trap rows or plots to concentrate this first generation. (B) Selecting seed ears from the stalks in the field in the fall, keeping only such as have (a) good, long, tight-fitting husk, (b) of prolific type, (two or more ears per stalk) (c) ears pendent when mature, (d) more careful selection later for grain and all other characters. (C) Harvesting main crop corn as soon as thoroughly mature, breaking ears from the shuck as they are gathered, thus leaving 75 per cent. of adult insects in the field, separating infested from uninfested ears as they are thrown into wagon body and storing separately later. Feed out, fumigate or otherwise dispose of infested corn first. Uninfested ears may be stored in even open pole cribs with good roofs, with little damage. (D) Avoid storing with shuck on and, especially, using salt which increases, instead of decreases, insect damage. (E) Fumigation with carbon disulphide in tight room or bin or barrels for seed corn, cowpeas, wheat, etc. in early storage season—on warm days only.

Results of this project work are applicable throughout cotton belt especially and if generally practiced might easily save corn, etc. worth this year something like $10,000,000. I consider this now one of the most important subjects for Extension Work in the South.

2. Arsenate of Lead project held in abeyance this year on account of scarcity of peach crop which was the principal subject in use in field work heretofore.

3. Fumigation: Continued investigations. Subject of applicability of Cyanide fumigation to Satsuma Orange insect control under Alabama climatic conditions is now under way.

OTHER PROJECTS

1. Boll weevil has now advanced so it occurs in all of Alabama except for a distance of about fifteen miles southwest from the extreme northeastern corner.

2. Argentine ant located at other points in Mobile County.

3. Citrus Insects: Greatly reduced in numbers this year following most severe cold experienced since 1899, except soft brown scale which has been more abundant than ever before and has also proven harder than usual to control. Fumigation investigations will be extended to include this subject.

4. Sweet potato root borer presence in Alabama suspected but quite extensive inquiry and field and shipping shed inspection have failed to give as yet a single positive proof of the presence of this pest in Alabama.

No special results from cooperative work. The death of Dr. J. T. Anderson has delayed our getting reports on some cooperative Arsenate of Lead analytical work.

Respectfully submitted,

W. E. HINDS,
Entomologist.

REPORT OF ANIMAL HUSBANDMAN

G. S. TEMPLETON

Auburn, Ala., October 30, 1917.

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

Sir:

I respectfully submit the following report for experimental work conducted by the Animal Husbandry Department for the past year.

The experiments conducted at Auburn, Alabama, were supported by the Hatch and Adams Funds appropriated by Congress. The experimental work conducted in Marengo, Mobile and Dale counties was supported by the State appropriation provided by the Local Experiment Law.

ADAMS PROJECT

A study of the influence of some of the southern feeds on the properties (melting point, iodine value, keeping qualities and color) of lards. This experiment was conducted in co-operation with the Department of Chemistry. Six lots of hogs were fed the following rations:

Lot I. Five pigs. Corn alone.

Lot 2. Six pigs. Velvet bean meal.

Lot 3. Six pigs. Corn, one-half, velvet bean meal, one-half.

Lot 4. Six pigs. Velvet bean and pod meal.

Lot 5. Six pigs. Peanut meal one-half, corn one-half.

Lot 6. Six pigs. Peanuts one-half and corn one-half.

Samples of kidney fat from each individual in all of the lots were given to the Chemistry Department for laboratory work. The Chemistry Department will make a report on these analyses.

Briefly, the velvet bean meal produced a carcass as firm as the corn fed carcass, but it showed a slightly darker fat than the corn fed carcass.

The lot fed velvet bean and pod meal did not put on sufficient flesh to make the analysis of the lards very satisfactory.

The lot fed one-half peanut meal and one-half corn produced a carcass somewhat softer than the corn carcass, and would be discriminated against by the packer at the rate of about one cent per pound as compared with the corn fed hogs.

The ration of one-half corn and one-half peanuts produced a carcass with an average melting point of 39.5 degrees C, and and iodine value of 81.12. The carcasses in this lot were considerably softer than those fed a ration of one-half peanut meal and one-half corn.

The ration of peanut meal one-half and corn one-half produce a carcass with an average melting point at 39.39 degrees C., and an iodine value of 70.15.

HATCH PROJECT

With dairy cows there was made a comparison of velvet bean and pod meal versus cottonseed meal for milk and butterfat production. The results were published in Bulletin No. 198 of this Station.

With dairy cows an experiment was also made comparing ground velvet beans and pods with soaked beans and pods.

The ground beans and pods gave better gains than the soaked ones. The difference can be explained in part at least by the fact that the ground beans were more palatable and more of them were eaten. The results are presented in the bulletin just mentioned.

Respectfully submitted,

G. S. TEMPLETON,

Animal Husbandman.

REPORT OF VETERINARIAN

C. A. CARY

Auburn, Ala., January 28, 1918.

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

Sir:

During 1917 the following lines of work were conducted:

(1.) Attempts were made to determine whether the eggs of the kidney worm (Strongylus pinguicola) passed into the ureters and bladder and out to the ground with the urine. In a number of pigs the eggs were found in the urine in the bladder.

Also the urine infested with eggs was placed under the following tests to determine if the eggs hatched outside of the body in water, soil and urine.

Test 1. A sample of highly egg-infested urine was mixed with 10 c. c. of tap water to which was added one drop of formalin. This was kept at room temperature and examined daily for 17 days. Gradual development of embryos occurred and on the 17th day an embryo 0.42 m. m. in length was found.

Test 2. .5 c. c. of egg-infested urine was added to 10 c. c. of branch water. Daily examination revealed no eggs after the 15th day and on the 17th day embryos were found .4 to .5 m. m. in length.

Test 3. One drop of formalin was added to 15 c. c. of egg infested urine. No eggs present on the 17th day and embryos over .5 m. m. in length were found.

Test 4. 5 c. c. of egg infested urine was added to 10 c. c. of plain tap water. Eggs were found on the 17th day. These eggs showed developing embryos in the egg shell or capsule and there were a few small free embryos.

Test 5. Urine from egg infested bladder was spread over small box of dirt. This was kept moist with tap water and on the 17th day small embryos were found and no eggs.

This seems to prove that eggs of the Strongylus pinguicola will hatch at ordinary temperature in about 17 days in urine, water and moist soil. Also there is no doubt that the eggs pass out with the urine.

In all cases where post mortem examination was made on hogs having paralysis of the hind quarters or limbs we have found the kidney fat worm (Strongylus pinguicola) in the kidney fat, the kidney, sublumbar muscles and in one instance in the spinal canal under the dura mater. This does not declare it the actual cause of the paralysis but it may be the real or an associate cause.

The Senior Veterinary Medical students under my direction collected 180 specimens of horse flies of the Tabanidae family, all of which were collected from September 18 to October 20, 1916. This period covers the life of longevity of the adult Tabanidae at Auburn, Ala. The egg laying period has not been determined for this place, but it appears to extend from June until some time in August.

A test of the action of the bitter weed (Hellenium tenuifolium) on cattle, dogs and horses was made. No distinct effect was apparent in cattle except the bitter taste in milk. In the dog it produced nausea, vomiting and depression of temperature. In the horse in one case it produced dullness, dry mouth, depressed the pulse from 38 to 28, temperature from 100 to 99 and respiration from 11 to 7 and in four hours it produced purgation. The animal remained sluggish for several days thereafter. This horse was fed 2½ gallons of the plant mixed with 2½ gallons of oats. Another horse was fed three gallons of the bitter weed and the pulse became weak and slow, respiration retarded, mucous membranes pale, soft feces passed frequently, cold sweat appeared and the horse became sleepy and sluggish. From these and other tests it appears that bitter weed is toxic for horses, mules and dogs but apparently not toxic for cattle.

Another series of tests were made to determine the toxic effects of Eupatorium ageroides. Apparently it produces progressive degenerative change in the red blood cells, polymorphonuclear cells, and eosinophiles, and in the cat, dog and goat it failed to produce any symptoms resembling "trembles."

Quite a large number of ovaries from sows and gilts that had been fed peanuts were examined to see if any changes were produced by this feed that might produce sterility. No definite results have been determined.

One Farmers' Leaflet on Infectious Keratitis was issued.

On account of the war disturbing the available men for Institute work during the Summer 1917 few institutes were held. The Farmers' Summer School was held at Auburn, July 29th to August 4th, 1917. The total attendance was 539, and 37 counties and 9 states were represented.

Yours truly,

C. A. CARY,
Veterinarian.

REPORT OF PHYSIOLOGICAL CHEMIST

C. L. HARE

Auburn, Ala., Jan. 29, 1918.

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

Sir:

Work on Adams Fund projects in the Department of Chemistry during the past year has been concerned with determining the effect of peanuts and particularly of velvet beans upon the properties of lard from hogs receiving these rations. This work has been in cooperation with the Department of Animal Husbandry.

Experiments under the Hatch Fund were in part suspended temporarily owing to changes and losses in personnel of the Chemical Staff.

Respectfully submitted,

C. L. HARE.