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Twenty-Second annual report of the agricultural experiment stations of the Louisiana State University and A. & M. College.

W R. Odson

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TWENTY-SECOND ANNUAL REPORT

OF THE

Agricultural Experiment Stations

OF THE

Louisiana State University

AND

Agricultural & Mechanical College

FOR 1909.

TO THE GOVERNOR

By W. R. DODSON, Director.

BATON ROUGE
THE NEW ADVOCATE, OFFICIAL JOURNAL
1910
Louisiana State University and A. & M. College

Louisiana State Board of Agriculture and Immigration.

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SAM'L FRYE, in charge of Dairy, Baton Rouge.
V. L. ROY, B. S., in charge of Boys' Demonstration Work.
Louisiana State University

AND

Agricultural and Mechanical College.

Office of Experiment Stations,
Baton Rouge, La., Feb. 1, 1910.

To His Excellency, Jared Y. Sanders, Governor of Louisiana.

Sir: In compliance with the provisions of an act of the National Congress of March 2, 1887, commonly known as the Hatch Act, and of March 16, 1906, known as the Adams Act, providing for federal appropriations for agricultural experiment stations of the several states, I submit herewith a report of work done by the stations during the year 1909, and a financial statement for the government fiscal year, July 1, 1908, to July 1, 1909.

While the receipts and expenditures of the various funds received from the State of Louisiana have been published twice annually, June 1 and December 1, as provided by state law, I have combined these two reports and submit them along with the statement of federal funds, so as to show the total receipts and expenditures for twelve months.

Respectfully,

W. R. Dodson,
Dean and Director.
STATION NO. 1.

SUGAR EXPERIMENT STATION.
AUDUBON PARK, NEW ORLEANS.

Mr. H. P. Agee, Assistant Director, in charge of this station, has performed his duties faithfully. Much of the work of the year has been a continuation of what has been outlined in previous reports. Much valuable data has been added to that previously obtained. The more important phases of work are briefly discussed herein under appropriate headings.

Sugar Cane Seedlings.

My last report outlined the method of securing seedlings of sugar cane. We were much encouraged by the success achieved in 1907-8, and during 1908-9 we secured seed from a much wider geographical range. These seed were again entrusted to Mr. A. E. Weller, of the Horticultural Hall, Audubon Park, who was the first party to succeed in germinating sugar cane seed in this country. For kind assistance in this work, in sending us seed, we are indebted to Mr. Francis Watts, Government Chemist and Superintendent of Agriculture of Antigua, B. W. I.; Mr. J. C. Waldron, Antigua, B. W. I.; Mr. Noel Deerr, Acting Director, Sugar Experiment Station, Honolulu, T. H.; Mr. D. W. May, special agent in charge of Experiment Station, Mayaguez, P. R.; Mr. J. T. Crowley, Director Estracion Central Agronomica, Santiago de las Vegas, Cuba; Mr. John R. Bovel, Superintendent Department of Agriculture, Bridgetown, Barbados, B. W. I.; Mr. F. Evans, Acting Superintendent, Port of Spain, Trinidad; Mr. David Fairchild, Bureau of Plant Industry; Mr. Robert M. Grey, Harvard Botanical Station, Cienfuegos, Cuba; Department of Agriculture, Jamaica, B. W. I.; Department of Agriculture, Trinidad, B. W. I.; Director Treub, Buitzenzorg, Java, and Colonial Sugar Refining Co., Ltd., Sydney, New South Wales.

We were able to make laboratory tests this year of the new seedlings secured in 1908. Out of this number four were superior in sugar content to the celebrated seedling D. 74. The Louisiana seedling, No. 92, that surpassed D. 74 last year, fell below it this season in sugar content, but it may regain its position an-
other year. It seems reasonable to expect the discovery of a cane that will be superior to the canes now cultivated, if we persist long enough in this work.

CHEMICAL DEPARTMENT.

Work in chemistry falls into three classes. First, that which is necessary to determine the sugar content and purity of the juices from cane for the field experiments, such as fertilizer tests, variety tests, merits of seedlings, etc., and the analyses necessary for the control of the sugar house. Many hundreds of analyses of this kind have been made during the past year. Second, miscellaneous analyses for the public, including analyses of sugar cane products, soils, waters, etc. One hundred and eighty-seven analyses of this character have been made during 1909. Many requests for analysis have to be declined, as they are of private character and should be referred to commercial chemists. Mr. J. A. Hall and Mr. A. B. Joffrion were employed for the grinding season to assist in this work. Mr. R. E. Graham was engaged in this work until he was assigned to field work. Third, analyses connected with purely scientific research. Dr. P. A. Yoder and Mr. W. G. Taggart have had charge of this work. Time has been devoted primarily to a study of the minor constituents of sugar cane and its products. The organic acids have received most attention. It was found that the methods of determining some of these acids had been worked out for wine and fruit juices only, and were not sufficiently accurate when applied to cane juices. Some progress has been made in improving these methods. Specialists tell us that we have advanced about as far as we may expect to in our methods of handling cane juices, either for sugar or syrup, until we know more of these minor constituents. Progress in this kind of research is necessarily slow. Several years' work may be necessary before much that is helpful is obtained, and it is possible that we may not find immediate application for the knowledge gained of these things.

Some work has also been done on formaldehyde in sugar products, and methods of its detection and determination.

Some analyses have also been made in work in co-operation with the bacteriological laboratory in determining the nature
and amount of fermentation products from cane juices and sugars.

Some time has also been given to work referred to this laboratory by the official association of American agricultural chemists.

Sugar Trade Laboratory.

The station has realized the need of a laboratory in which all sugars sold by polarization could be polarized by disinterested parties. New York established such a laboratory in 1907, and it has met with much favor. The matter was presented to the Sugar Planters' Association by Mr. Agee and Mr. Hall, in exhaustive papers on the subject. It is hoped that the sugar trade will make provision for such a laboratory in New Orleans. The Experiment Station has offered its services as referee in cases of disagreement between the polarization of the chemists of buyers and sellers, until a referee laboratory may be established at the expense of the trade.

Bacteriological Department.

The bacteriological work outlined in my last report as planned for has been prosecuted throughout the year by Mr. W. L. Owen. We believe the data secured will be of material aid in working out plans to reduce the losses from inversion in stored sugars, and from fermentation during the process of manufacture. The bacteriological flora of yellow clarified and low-grade sugars of Louisiana, and other sugar countries sending sugar into the United States, has been fairly well determined. The number of species of organisms capable of inverting sugar is comparatively small in Louisiana. These species are being carefully studied as to their morphological and physiological characters. Study is being made of the conditions that predispose sugars to fermentation. For instance, careful determinations are being made of the influence of moisture and reducing sugars on bacterial inversion.

In order to determine the persistence of inverting species of bacteria in the sugar house, cultures were made from the raw and clarified juices, the syrups, masquitte sugars and molasses of ten runs during the grinding season, at the Experiment Station sugar house. It was evident that many of the organisms in the raw juice survived the entire milling process and formed a
considerable part of the bacterial flora of the finished sugar. Another year this work will be repeated under conditions calculated to destroy these organisms more completely, as might be the case where superheating the juice is practiced, or where formaldehyde is used in the juice.

In connection with this work a number of the most active yeasts and moulds is being collected and studied. While these do not seem to be of great importance in the inversion of dried sugars, we will have use for all obtainable knowledge of these when we begin the manufacture of denatured alcohol.

This department rendered service to some members of the Referee Board in securing data that would bear on the application of the national pure food law to the use of sulphur as a clarifying agent in the sugar house by running fermentation tests on sulphured juices, showing that the sulphur is used as a clarifying agent only, as it is not effective as a preservative against fermentation.

ENTOMOLOGICAL WORK.

Arrangements have been made by the Bureau of Entomology of the United States Department of Agriculture to establish on the station grounds their headquarters for Investigations on Insects Injurious to Sugar Cane and Rice. A laboratory will be established in a portion of one of the station buildings, and such other facilities as the station may afford will be offered. The Bureau will bear the entire expense of these investigations. The work will be under the direct charge of Mr. D. L. Van Dine, who was for eight years entomologist of the Federal Experiment Station of Hawaii. Mr. T. C. Barber will assist in this work. We will thus be relieved, to a large extent, of expense of conducting investigations that are becoming imperative, and to which we have already devoted considerable time.

FIELD WORK.

The various lines of work in the field previously reported have been continued. With most of this work it is necessary to get results for a long series of years to enable one to deduce the most reliable conclusions. The fertilizer experiments with cane will be enlarged, in an effort to eliminate variables made evident in previous work.
We now have over a thousand canes, of different origin, on the station. A very large per cent of these are new seedlings, as previously referred to. It is probable that most of them will have to be discarded as inferior when put under field test. Many cuttings of these canes have been sent in response to requests to various countries, covering almost the entire cane sugar producing world.

*Forage and fiber crops* have received some attention at this station, as has also truck gardening, but the work has been more in the way of testing varieties and no scientific work has been undertaken.

**Demarara Seedling Cane No. 74.**

This cane, which was introduced by the Experiment Station, was damaged to an apparently serious extent by the hurricane of September 20, 1909. This station sent members of the staff to a number of plantations to determine by accurate counts the extent of the damage. The results of these investigations were published at the time in the agricultural papers. The damage was much less than had been supposed. For a while it looked like D. 74 had lost its popularity, but before the grinding season was over it was apparent that the estimate of damage to D. 74 was excessive, and the less apparent damage to the home canes was greater than estimated, so that the D. 74 gave, as usual, a larger sugar yield per acre than the home canes, and this seedling is probably more popular today than it has ever been.

**THE SUGAR HOUSE.**

The Experiment Station sugar house has been a good investment for the sugar planters, some of whom subscribed the funds for its original equipment. However, it is now in dire need of extensive repairs, and the installation of modern machinery. The boilers that have furnished the power for the sugar house since its establishment, are two that were installed for the machinery building of the New Orleans Exposition in 1884. They have recently been condemned, and we will not be permitted to use them again. New pumps are also necessary. Extensive improvements will be necessary if the station is to continue its sugar house investigations, and the sugar students of the university are to secure from it their practical experience in sugar-house operation.
We have put the sugar house at the disposal of several inventors, who seemed to have devices of merit, for the purpose of testing the efficiency of their apparatus in sugar-house work. Of these, the following are worthy of mention: Mr. Miguel Espard has devised a method of accomplishing centrifugal filtration. The inventor proposes to make his apparatus take the place of clarifiers, settling tanks and filter presses. He seems to have largely overcome the previous objections to centrifugal filtration.

A new design of water weigher was installed at the expense of the inventors, Wilcox Engineering Company, for the purpose of testing its adaptability to use in the sugar house.

During the early part of the season a preliminary test of Barrios patent process of clarification was made, but the work was not completed, as the inventors were called to a sugar plantation to make a test on a large scale.

**CANE HARVESTERS.**

During 1909 four inventors were at work in New Orleans on cane harvesting machines. Much improvement was made over the machines of 1908, but the prostrated canes offered unusual difficulties to successful work of the harvesters. This work has partly been carried out at the station, as we have been glad to assist so worthy an effort. It now begins to look like we may have a successful cane harvester before long.

**AUDUBON SUGAR SCHOOL.**

The facilities of the station sugar house and laboratories have again been at the service of the students of the Audubon Sugar School. The students were under the constant supervision of an instructor from the university, and good work was done by them.

**PLANTERS’ MEETING AT THE STATION.**

We are probably now justified in considering an annual meeting of the Sugar Planters’ Association on the grounds of the station as an established programme. The second meeting of this kind was held in June, 1909, and was even a greater success than the first one. The following is taken from one of the journals giving an account of the meeting:

"Thursday, June 10, will go down as a red-letter day in the annals of the Louisiana Sugar Planters’ Association, for then
was held the second annual field day affair of the Association, as inaugurated June, 1908, by the new president, Mr. Charles V. Moore, in the nature of an experiment, to determine whether the sugar planters of the state would welcome such as innovation. So pronounced was the success of the meeting last June, when scores of planters, their managers and overseers and others interested in the sugar industry attended, that it was seen the field day event was to be firmly established as an annual institution of the Association, but none could foresee the enthusiasm with which the planters and others interested would take to the meeting this month, when fully one hundred visitors came in from the parishes and about half as many again that were present who live in New Orleans.”

STATION No. TWO.

STATE STATION.

BATON ROUGE.

The office of the director and the laboratory for analysis of feed stuffs, fertilizers and Paris green for the State Board of Agriculture and Immigration are maintained on the University campus, in the Experiment Station building. The work has been carried on under the various departments as hereafter described.

FARM DEPARTMENT.

The field work has been continued under Mr. S. E. McClendon, Assistant Director. The results from fertilizer tests as applied to corn, cotton, oats and root crops have been added to our cumulative data on these topics. Variety tests of standard crops have been continued.

Root Crops.

Increased areas have been devoted to experiments in growing root crops during the winter for stock feed with good results. Stock carrots, mangel wurtzels, turnips, and rutabagas have given good yields planted after corn and cotton stalks are de-
stroyed in early fall. These crops are destined to be of great importance to diversified agriculture in Louisiana. A bulletin will soon be issued giving the results of this work.

**Fibre Crops.**

There is renewed interest in *ramie*, and we sent approximately a ton of ramie stalks to various inventors, for trial runs of decorticating machines. We have also distributed roots for propagation, so the plant can be grown in various soils in the state. If a machine is perfected for removing and cleaning the fibre, Louisiana will probably afford the most favorable soil and climate for the profitable growing of this fibre, and it is my opinion that the plant will be extensively cultivated. The roots are perennial and the stalks may be harvested with a mowing machine and hay rake.

*Flax* sown in the winter has given a good crop again. We expect to enlarge experiments with this plant.

Special strains of *jute* secured from the National Department of Agriculture have been grown the past season with usual good yields. The cost of handling this fibre has precluded its cultivation.

Other fibre crops have also been grown that are of less promise.

**Forage Crops.**

A large number of forage crops have been grown, including almost the entire list of forage plants that can be grown successfully in this latitude. Special attention has been given to *soy beans*. This work has been done in co-operation with the National Department of Agriculture, as they secured the seeds from all nations that grow this crop. I regret that results do not indicate that soy bean culture will be very profitable in Louisiana. This subject will be treated at length in bulletin form, when the experiments seem to justify definite conclusions.

We have made special efforts to learn how to grow alfalfa on hill lands but have not yet been successful. The Bureau of Plant Industry of the United States Department of Agriculture has furnished us with varieties from nearly all countries where alfalfa is grown. Peruvian alfalfa has shown conspicuous superiority to other strains, and it is hoped that this strain of
seed can be secured in commercial quantities before many years.

In co-operation with the National Department of Agriculture we have secured a large number of species of bur clover, which thrives on upland, and this work promises good results.

The hog grazing experiments carried on during the past year have given gratifying results, which will be published in bulletin form.

We have on the farm at present about fifty head of sheep, having lost no lambs this year from stomach and intestinal worms.

The silo has again proven perfectly satisfactory.

DEPARTMENT OF MECHANICAL ENGINEERING.

During the spring of 1909 arrangements were made by which sugar-house engineering problems were approved as proper research work under the Adams Fund of the National Grant for Agricultural Research, and this department became a part of the permanent plans of the Experiment Station work. Professor E. W. Kerr, who had already done excellent work in this line for the stations, was therefore able to make more elaborate plans, and arrangements were made so that he could spend half of his time in this work, and half of his time in teaching, the stations paying half of his salary. Mr. E. M. Percy again assisted in this work. The work for 1909 consisted in developing the data secured during the grinding season of 1908, and the publication of this data in bulletin form, and the further experiments with bagasse burners during the grinding season of 1909. This data will be worked up and published during the spring and summer of this year.

The work covers the observations on some twenty boiler tests, in which the feed water was weighed, the amount of bagasse consumed measured, and the temperatures of furnace and stack taken and analyses made of the flue gases and so forth, with varying feed and air supply, with different types of furnaces. The results of this work will bring about a great economy in the fuel of the sugar houses, I am sure.

DEPARTMENT OF PLANT PATHOLOGY.

Dr. C. W. Edgerton has continued the work outlined in the report of last year, with the result that some of the phases of these problems have been elucidated, and new work inaugu-
rated. Special attention has been given to the *pod spot* of the bean, and Bulletin No. 116, giving a preliminary report on this disease was published in June, for the benefit of those who wished to avail themselves of the information obtained in the production of a fall supply of seed free from the disease. The technical bulletin on this subject is now ready for the press, and is only awaiting sufficient funds in the treasury for its publication. The work on this disease should be of exceeding value to the bean growers. Losses have hitherto been very heavy during seasons favorable for the growth of the fungus, and it will now be possible to reduce the damage from the pod spot to a very small amount.

*Cotton boll rots* have also been studied, and important scientific data obtained on this subject. Special attention has been given to the infection through the flowers, and the presence of the disease in the seed. While we have little to suggest in the way of remedies as yet, distinct progress has been made in the knowledge of the organisms producing boll rot, and no doubt some remedial measures will be developed on this information.

A paper entitled "The Perfect Stage of the Cotton Anthracnose" was published in the May number of the Mycologia.

*Sclerotium wilt disease* was very destructive the past season to several crops, including alfalfa, garden peppers, artichokes and some other "truck crops." Some work was done on this disease, but no especially noteworthy results were secured. Other diseases have been studied as opportunity and time would permit.

*Alfalfa* has received special attention during the past summer. This crop would be much more extensively grown were it not so difficult to carry a stand through the summer. Investigations the past summer have shown that the loss of a stand may be due to a number of causes. An insect that girdles the stem at the surface of the ground, and a stem rot are among the important things that had not previously been known.

A large number of strains of alfalfa from different countries were secured through the co-operation of the U. S. Department of Agriculture for the purpose of testing their resistance to all the unfavorable conditions that may be met with here. Some of these strains have shown marked superiority to our common
varieties. Unfortunately these seed cannot now be secured in commercial quantities, but it is likely that these experiments, if verified by more extended observations, will help to develop a supply of seed of the desirable kind.

HORTICULTURAL DEPARTMENT.

Mr. Geo. L. Tiebout has given one-half of his time to this work and one-half to teaching in the University. In the early part of the season a well equipped greenhouse was completed, at an expense of about six thousand dollars, twelve hundred of which was paid by the University. The west wing of the building is devoted to horticultural experiments, and the east wing to experimental work on plant diseases and insect propagation. The central section is intended for ornamental plants and types for laboratory service of the students of the University.

Greenhouse cucumbers have received special attention this winter, the work being mainly tests of varieties for greenhouse work in Louisiana.

In co-operation with the U. S. Department of Agriculture we are testing obtainable varieties of the chayote or vegetable pear, with the purpose of determining the best varieties for this climate, and then undertaking a propaganda for the popularization of the cultivation of the plant. A few people have cultivated these plants for many years in Louisiana, but it is not generally known. It is a vegetable of highly commendable qualities.

We are also working in co-operation with the U. S. Department of Agriculture in growing Globe artichokes. A number of varieties have been imported by the Division of Seed and Plant Introduction, and considerable seedling work is being done. At the price that prevails for this vegetable, a remunerative industry should be built up in Louisiana.

A considerable number of new citranges, orange hybrids, have been secured from the U. S. Department of Agriculture. The past year there was a fair crop of the older citranges produced, and the fruit made a refreshing drink of good quality. A few varieties of other new plants have been secured, but no noteworthy results have yet been secured.
The experiments on general truck crops have been very satisfactory and the results will be published in bulletin form when sufficient repetition has been obtained.

The general interest in trucking has greatly increased throughout the state, and there has been considerable demand for the horticulturist to visit different portions of the state to aid in the organization of truck growers' associations. Quite a number of trips have been made, the traveling expenses of which have been met by the Commissioner of Agriculture, as farmers' institute work.

DEPARTMENTS OF VETERINARY SCIENCE AND ANIMAL PATHOLOGY.

Work in these lines has been carried on by Dr. W. H. Dalrymple, assisted by Dr. T. C. Paulsen. The correspondence of the department has been very heavy and has been taken care of mainly by Dr. Dalrymple, while Dr. Paulsen has given his time to research work. Dr. Dalrymple has also devoted some of his time to research work with Dr. Paulsen in consultation and planning experimental work. Dr. Paulsen began his work in April, 1909, having spent all of the latter part of 1908 and the first three months of 1909 in post graduate study in the University of Pennsylvania, along the lines of research that he was to take up here.

This department has given special attention to further investigations on the subject of hyperimmunization of sheep to the anthrax organisms for the purpose of using the serum from these hyperimmunized animals to hasten the production of immunity of other animals through inoculation. This work involves considerable delays in waiting for the effects of the successive inoculations, and no results are yet ready for publication.

A great many tests of anthrax vaccines have been made. In general the results have shown that the vaccines to be obtained on the market are exceedingly unreliable, a very large percent of them proving to be absolutely worthless. In a few instances they have shown sufficient virulence to be a source of danger. This work has greatly emphasized the necessity of either federal or state supervision of the preparation of vaccines of this kind.
The purchaser has no protection at the present time. Although the vaccine may have been made by a reputable house, it may become absolutely worthless from improper handling or from being held on the market too long. Thousands of animals in the southern part of the state would be saved every year if reliable vaccines could be had to meet all requirements. A great many specimens of blood from animals dying with symptoms of anthrax have been sent in and have been examined here for the benefit of the public. Probably one-half of these cases, or more, have proved to be genuine anthrax and we have been able to suggest measures for restricting the spread of the disease. Many other pathological specimens are sent in for examination by the department. Dr. Paulsen has also made several trips into various parts of the state for the purpose of investigating outbreaks of fatal diseases among cattle, and in several instances has found these losses to be due almost wholly to anthrax. We also had the misfortune of an outbreak of anthrax on the Experiment Station farm during the past year, from which we lost a number of valuable animals. At the time of the outbreak we did not know of the existence of any contagious or infectious disease in the vicinity, and, since there had been no anthrax here for about ten years, our animals had not been vaccinated to protect them. On making investigation for the possible source of infection we found that a number of animals had died in the vicinity and some in town, and the carcasses drawn to a region that drained into the Experiment Station grounds. We believe that these animals died with anthrax and that the infection was brought to the station either through drainage or through other means of contamination from the animals that were destroyed by the disease, no report of which was made to any public official. This experience emphasizes the necessity of providing some properly constituted authority to deal with outbreaks of contagious diseases in the state.

During the year only one serious outbreak of the so-called blind staggers was reported, and investigations on this outbreak added very little to our knowledge of this elusive disease.

A very serious, though local, outbreak of the intestinal disease of cattle occurred in one of the alluvial parishes, among a lot of cattle imported from Texas. This is a comparatively
unknown disease in this state, and one about which very little is known and for which very little can be done. The owners of the herd in which this outbreak occurred were very energetic to stop the spread of the disease and were finally successful.

There have been a good number of cases of symptomatic anthrax or "black leg" reported to the station authorities, though losses from this cause have not been very heavy. This is a disease that is pretty well understood, and provision for its control would properly fall under the work of the State Livestock Sanitary Board.

There are frequent demands for the services of a veterinarian to investigate outbreaks of diseases that we are not able to meet.

ENTOMOLOGICAL DEPARTMENT.

Mr. Wilmon Newell has had charge of the entomological work of the stations, as well as that of the Crop Pest Commission. We have paid one-half of Mr. Newell's salary. He has made a study of the rice insects his special line of work for the year, particularly the rice maggot, the corn root worm, the rice grain weevil, and some of the insects that sting the grains while in the young stage. He has accumulated considerable helpful data on these insects. He has also conducted an experimental apiary and has handed me a bulletin covering the question of bee growing in Louisiana. I hope to be able to publish this some time during the coming summer. As noted elsewhere, the Bureau of Entomology of the U. S. Department of Agriculture has established a laboratory at the Sugar Station, and we will no doubt be able to secure some assistance for the study of rice insects, so that no provision has been made for Mr. Newell's successor for the present. Mr. Garrett, succeeding Mr. Newell as Secretary of the Crop Pest Commission, will devote all his time to the Crop Pest work.

THE DAIRY.

Mr. J. G. Lee, Jr., continued in charge of the dairy work until September first, when he resigned to take charge of the instruction in agriculture in the Southwest Louisiana Industrial Institute at Lafayette. On account of lack of funds to carry all the work undertaken the previous year, we have not
employed a successor to Mr. Lee. This work has been entrusted to Mr. Samuel Frye, our efficient dairyman and herdsman. Experiments have been conducted to determine the food value of sweet potatoes and sweet potato vines, for milk production. Stock beets have also been fed under careful experiments. The results of this work have been prepared for publication.

The University Dairy was turned over to the stations on the first of July, 1909, and several hundred dollars were spent in equipping a milk room and providing machinery for chopping and grinding hay. Before the close of another year we will be well provided for conducting almost any kind of feeding tests that we may desire, under favorable conditions for keeping accurate records. If we had more cows the work could be carried on to greater satisfaction.

CORN CLUBS. AGRICULTURAL SCHOOLS.

The past year marks the definite organization of the corn club movement into a statewide effort. The Director assisted to some extent in 1908 in the organization of the first corn clubs, and delivered some twenty lectures on teaching agriculture in the public schools of Louisiana. In September, 1909, Professor Victor L. Roy, Parish Superintendent of Education of Avoyelles Parish, became a member of our staff, for the purpose of devoting his entire time to the work of promoting agricultural education. He has organized a large number of corn clubs and has been of great assistance to the ten agricultural schools that have been established in the state. One-third of his salary and expenses is paid by the U. S. Department of Agriculture, one-third by the Commissioner of Agriculture, and one-third by the Experiment Stations. Colonel Schuler has also furnished a good many corn clubs with seed corn. No agricultural work has been more enthusiastically received throughout the state. The police juries in a large number of parishes have appropriated money to help the work in their respective parishes. Public-spirited men have subscribed money for premiums for the best corn grown by members of the clubs. I know of no work that is calculated to produce a more wholesome effect on the agriculture of the state than that which is being done by Professor Roy and his supporters. Before the corn planting season of 1910 is over we
believe he will have seven or eight thousand boys studying corn, and we hope to have ten thousand. Before the close of your administration we should have twenty thousand enlisted in this work.

The organization of agricultural schools no doubt will be epoch-making in the agricultural education of the state.

EXHIBIT AT THE STATE FAIR.

The Experiment Station again made an exhibit at the State Fair of the work being done, as far as this could be done without undue expense. A large number of photographs of crops, livestock and farm machinery were exhibited and samples of the rarer crops were exhibited. Graphic illustrations of the composition of feed stuffs, especially of forage and grain crops, were exhibited. Likewise, graphic illustrations of the amount of fertility removed from the soil by different farm crops and the amount of fertilizer required to restore this fertility. Where possible, tabulated statements regarding experiments were given. An exhibit of parasitic diseases of farm animals was made.

The exhibit no doubt did much good in acquainting the public with the nature and scope of the work of the stations.

FARMERS' INSTITUTES.

The Director and the various members of the staff have attended in all more than fifty farmers' meetings, and given addresses. In most instances the expenses of travel to these meetings has been paid by the Commissioner of Agriculture. There has been a demand for men to attend additional meetings that could not be met, owing to conflicting engagements. It is believed that more good is accomplished when the farmers voluntarily get together and call for a speaker than where the meetings are arranged by schedule and the farmers requested to attend. For this reason we have tried to meet all special requests, even though it has interfered at times with station work.
LABORATORY FOR THE ANALYSIS OF FEED STUFFS, FERTILIZERS AND PARIS GREEN.

This work has been continued under the immediate charge of Mr. J. E. Halligan, assisted by six chemists, the greater portion of the time. A comparatively small number of fertilizers and feed stuffs failed to meet the guarantee. On account of the high price of nitrogen-bearing materials for fertilizers there has been a strong temptation to the manufacturers to use materials that contain a high per cent of chemical nitrogen that is not readily available for plant food. Some of the larger and more reliable companies have submitted samples of these products to us for analysis with request that we advise them as to the propriety of their using them in mixed fertilizers. Where the availability has been low we have stated to the companies that we did not consider the use of these materials as legitimate, and this has generally been sufficient to prevent their use. Special determinations have to be made in the laboratory to determine available nitrogen. These tests have been run at frequent intervals, and there is no reason to suspicion that any considerable amount of fraudulent material has been used.

Paris green. Only five samples of Paris green were officially sent in during the past season. Some Paris green compounds have been sold for poisoning the boll weevil, but these are not subject to inspection under the law. There is probably no necessity at this time to take special notice of boll weevil poisons. However, if the arsenate of lead proves to be of sufficient value in the hands of the average farmer to bring about a large sale of this chemical for poisoning boll weevils on young cotton, it will be important to have proper police power over the sale of this product, as it will offer an excellent field for adulteration and fraud.

A mixture of oats and barley has been extensively put on sale for the past year. This was occasioned by the exceptionally high price of oats. Barley has been cheaper per pound than oats, and a mixture of the two grains would cheapen the product per hundred pounds, and fraud would not be detected by the average man. As whole grain is not inspected, the general vigilance of the inspection service was evidenced in this discovery. The Commissioner of Agriculture, after look-
ing into the matter thoroughly, ruled that a mixture of this kind was a mixed feed, and should be properly labeled, and required that this mixture be labeled "mixed oats and barley feed," and we have accordingly made analysis of 414 of these samples.

More analyses have been made the past year than during any previous year of the work. Five thousand six hundred and thirty-eight analyses were made during the fiscal year for this work, covering 10,672 samples. This is more than twice the work done two years ago in this department, when the work was then considered most excellent for the number of men employed and the expense involved. The increased amount of work turned out has been due to a number of things, chief among them being the increased hours of laboratory work, increased convenience of laboratory equipment, long service of most of the men in a special line of analysis, and to the greatly increased efficiency of the inspection department of the service. No other state undertakes to make as many analyses, in proportion to the amount of fertilizer and feed stuffs sold.

The amount of feed stuffs manufactured from home raised material has greatly increased, though the total sales have decreased, which fact is to be noted with gratification, as it means that Louisiana is spending less money for feed stuff imported into the state.
Mr. J. B. Garrett, assisted by Mr. T. I. Watson, again had charge of this station throughout the year. In the early spring all conditions were favorable to a fine crop from all experiments, but on the 26th of April a severe hail and wind storm destroyed completely all field and truck crops and did great damage to fruit trees, completely destroying a fine crop of peaches and grapes. It was the first of May before replanting could be done, and prospects for crops were very gloomy, especially for cotton, as a mild winter had permitted many boll weevils to hibernate. Rains were excessive during May and June, and at that time it looked like no cotton would be made, as all the forms were punctured by the weevil as fast as they appeared. However, hot, dry weather began about the first of July, and the boll weevils rapidly disappeared, and fairly good crops of cotton were made. A larger yield was secured than the average farmer secured before the boll weevil made its appearance. Very interesting data was secured from the experiments in check planting, in planting with several stalks in the hill, etc., but these results should be verified by repetition before they are published.

The oat crop was destroyed by hail, and did not recover. The corn and cotton crops on the rotation experiments again showed the great superiority of production under unfavorable conditions of soil where this system is adopted.

Soy beans also received special attention at this station. Better results were secured than were obtained at Baton Rouge. Under the most adverse conditions imaginable, fairly profitable returns were secured from one or two, out of more than eighty, varieties. It is possible that the hill section of Louisiana may produce a soy bean crop at a profit.

Peanuts were extensively planted for tests of fertilizer requirements, and for grazing experiments. The season for these
was exceptionally adverse, and only about half average yields were secured, and very little return was shown from the application of fertilizers, as there was insufficient moisture to enable the plants to use the fertilizer. At the same time, poor land produced about forty bushels of nuts and a ton of hay per acre. Crimson clover sown as a winter crop after peanuts has shown marked increase in vigor of growth. A striking example of the superior merit of the peanut in adverse seasons was shown in our grazing experiment where a comparison was made of the pork, produced from grazing hogs on peanuts, cowpeas and soy beans. On sandy land of fair quality peanuts sown in June, after oat stubble was plowed up, made a good growth throughout the dry weather, and gave a fairly good crop of hay and nuts. It is believed that peanut culture will become quite extensive in North Louisiana, and for that reason attention was given to the testing of varieties and to methods of curing.

Feeding experiments have been conducted on a smaller scale than the previous two years, but excellent results were again secured from feeding native cattle on corn silage, and cotton seed meal. Some peanuts, including tops and nuts, were fed to steers with good results, though at the present price it is better to sell the nuts than to feed them, but the fact is established that we can afford to grow these nuts to feed to beef cattle.

The herd of Red Polled cattle have done well, thirteen head of cattle, all practically grown, were unable to consume all the grass grown in twenty acres of average hill land set in Bermuda. They grazed on this from early spring until nearly Christmas without any other feed, and have been fat all the time. North Louisiana would be a splendid cattle raising country if the ticks were eliminated.

The flock of grade Southdown sheep have done well. We had lambs that weighed 60 to 65 pounds at three months old, 85 pounds at five and a half months old. Feeding the lambs ground tobacco leaves has been a satisfactory remedy for the stomach worms. If the farmers of the hill sections would universally avail themselves of this remedy, it would greatly multiply the number of sheep grown in the state. We can put early lambs on the Chicago market in April when they will bring from four to eight dollars to the head. If once the industry
were established on a sufficient scale to justify buyers to come for them, every small farmer could very profitably keep a flock of sheep. I regard this demonstration of very great importance to the state.

The Horticultural work has been continued under Mr. E. J. Watson, and a number of lines of very interesting work is being followed. Great injury was done to the trees and vines by the April hail storm, and some of the trees will never recover. Some four hundred seedling peaches were put out the past year.

Mr. Watson has made some valuable demonstrations in the production of fall planted Irish potatoes, and also some excellent work along the line of selection for the fixation of desirable characters in potatoes. In a considerable number of truck crops a study has been made of the merits of individual plants and their transmission of desirable characters to their progeny. This work has especially been carried on for cantaloupes, watermelons, tomatoes and a number of other vegetables.

The North Louisiana Agricultural Society has continued to hold its meetings at the Station. These meetings are generally well attended and the farmers derive much good from them. Through the efforts of the Station, a number of the best agriculturists of the country have addressed the association during the year.

The Calhoun Agricultural Camp Meeting and Fair, which is held under the auspices of the North Louisiana Agricultural Society, was held this year in September and was said to be the best fair yet held. Although it was generally a very poor crop year, the farmers had engaged in greater diversification than ever before, and the exhibits were exceptionally numerous and of excellent quality. The livestock exhibits were good, especially the exhibit of hogs. The production of well bred hogs is coming to be a very important industry in North Louisiana, especially in the hill lands, and were it not for the fear of the hog cholera, the number of hogs raised in that portion of the state would multiply rapidly. There is considerable interest in the possibility of having the state provide for a hog cholera serum plant, and if the State Livestock Sanitary Board, or other organization, is provided with the proper means for undertaking this work, swine production will receive a wonderful impetus.
Mr. Garrett, Mr. T. I. Watson and Mr. E. J. Watson have delivered a number of addresses to farmers, attended meetings meeting of truck growers' associations, and have otherwise contributed to the discussion of agricultural problems of vital concern to the people of North Louisiana.
STATION No. 4.

Rice Experiment Station, Crowley.

This station was established at Crowley in the spring of 1909, by a Committee appointed from the State Board of Agriculture for the purpose. The Committee visited the different places seeking the location of the station, and after thorough consideration of the sites and their adaptability for the work contemplated, Crowley was selected. The community there donated sixty acres of land and gave $3,500 in money to aid the enterprise. The land was secured in time to plant a crop the past year. The National Department of Agriculture is working in hearty co-operation with us in this line, and have established a man permanently at Crowley to take charge of their part of the work, having made this provision to become operative in July, 1909. We secured as Assistant Director, Mr. F. C. Quereau, who took up his residence at Crowley and took charge of our part of the work the first of August: Mr. Quereau is a product of the rice section, a graduate of this institution, a post graduate of the University of Illinois, and was at the time of the election to this position, Professor of Animal Husbandry at the University of Tennessee.

The land secured is favorably located, and a good laboratory building has just been completed on the exterior, with the money given by the people of the rice section. The building is not furnished on the inside. It is hoped that the legislature will make a provision for completing the laboratory and equipping it for work.

A residence for the Assistant Director is also urgent.

The rice growers are enthusiastic in their support of the work here, and we hope it will become worthy of liberal financial support on the part of the state.

CHANGES IN STAFF OF STATIONS.

Dr. G. D. Harris and Mr. E. L. Whitney are no longer with the stations, owing to the discontinuance of the Geological Survey
Mr. F. C. Quereau was appointed Assistant Director of the Rice Experiment Station at Crowley.

Mr. J. G. Lee, Jr., resigned to enter another field, and no one was appointed to succeed him.

Mr. J. C. Summers resigned position as assistant chemist and Mr. P. S. Doherty was appointed a member of the staff to take the place of Mr. Summers.

Mr. A. Sheer, farm manager at Audubon Park, resigned and was succeeded by Mr. R. E. Graham.

PUBLICATIONS ISSUED DURING THE YEAR 1909.

Twenty-first Annual Report.
Bulletin No. 117—An Experimental Study of Bagasse and Bagasse Furnaces. (106 pages).
Bulletin No. 118—Corn, with special reference to selecting, grading, preserving seed, preparing exhibits, rules and regulations for judging, etc. (16 pages).
Circular:
Notes on planting and cultivation of corn.

The fertilizer and feed stuffs reports have become so voluminous that they encumbered the files of station publications, and, complying with the suggestion of the National Department of Agriculture, and with the approval of the Commissioner of Agriculture, and the custom that is being adopted in the other states, we have ceased to number these publications as a part of the serial set of station publications, and in the future they will be designated as reports for the year in which the analyses were made.

A large number of scientific and popular articles and papers have been published by the various members of the station staff. Considerable space would be consumed in enumerating them here.
GEOLOGICAL SURVEY.

As noted in our last report the geological survey work has been discontinued. However, the publication of the report on salt, a volume consisting of 260 pages, was issued during the past year; also report of 52 pages on the Caddo Oil Fields. The publication of these reports consumed all the funds on hand, and the Geological Survey Account has accordingly been closed.

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FINANCIAL STATEMENT.

(Receipts and Disbursements of all funds).

The following is a copy of the statement already rendered to the Federal authorities, showing the receipts and expenditures of the Hatch Fund and the Adams Fund for the year ending June 30, 1909:

### Hatch and Adam Funds.

<table>
<thead>
<tr>
<th>Dr.</th>
<th>Hatch Fund. Adams Fund.</th>
</tr>
</thead>
<tbody>
<tr>
<td>To receipts from the Treasurer of the United States, as per appropriations for fiscal year ended June 30, 1909, under acts of Congress, approved March 2, 1887 (Hatch Fund) and of March 16, 1906, (Adams Fund).....</td>
<td>$15,000.00 $11,000.00</td>
</tr>
<tr>
<td>Cr.—</td>
<td></td>
</tr>
<tr>
<td>By Salaries.........................</td>
<td>$15,000.00 $8,105.51</td>
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<tr>
<td>Labor ..................................</td>
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<td>Freight and express ..................</td>
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<tr>
<td>Heat, light, water and power ........</td>
<td>104.66</td>
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<tr>
<td>Chemical supplies ....................</td>
<td>226.88</td>
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<tr>
<td>Seeds, plants and sundry supplies ..</td>
<td>26.65</td>
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<tr>
<td>Feeding stuffs ......................</td>
<td>16.85</td>
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<tr>
<td>Library ................................</td>
<td>462.54</td>
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<tr>
<td>Scientific apparatus ...............</td>
<td>1,238.94</td>
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<tr>
<td>Traveling expenses .................</td>
<td>256.30</td>
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<td>Contingent expenses ...............</td>
<td>4.10</td>
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<tr>
<td>Buildings and land .................</td>
<td>519.16</td>
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<tr>
<td>Total ..................................</td>
<td>$15,000.00 11,000.00</td>
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We, the undersigned members of the State Board of Agriculture and Immigration, to whom is entrusted the disbursement of the above funds, do hereby certify that we have examined the accounts of the Experiment Stations of the Louisiana State University and Agricultural and Mechanical College for the fiscal year ending June 30, 1909, and have found the above classification to be correct, and the receipts for the time named are shown to be $15,000.00 for the Hatch Fund, and $11,000.00 for the Adams Fund, and the corresponding disbursements are $15,000.00 for the Hatch Fund and $11,000.00 for the Adams Fund, for all of which the proper vouchers are on file, and have been examined by us and found correct.

(Signed) CHAS. SCHULER.
Commissioner of Agriculture and Immigration.

HENRY FUQUA,
Vice-President Board of Supervisors of the Louisiana State University and Agricultural and Mechanical College, and Ex-Officio Member of the State Board of Agriculture.

The following is a combined statement of the receipts and expenditures from December 1, 1908, to November 30, 1909, of funds other than those secured through Federal appropriations, statements covering same having been reported to the State Auditor after the accounts and vouchers for the above period had been examined and found correct by Mr. Henry Fuqua, Vice-President of the Board of Supervisors of the Louisiana State University:

STATE FUND.

Cash on hand, Dec. 1, 1908 .................. $ 458.98
Received from State Treasurer .............. 12,666.65
Received from State University ............. 900.00
Received from Farm Products ............... 2,685.43
Received from Miscellaneous sources ....... 338.74
Cash deficit, Nov. 30, 1909 ................. 2,976.52
Transferred from Fertilizer and Feed Stuffs Funds for experimental purposes ......................... 5,846.65
Transferred from Geological Survey Fund, account Labor .................. 320.87—$26,194.18
Cr.

By Salaries ........................................ $ 3,235.35
Labor .............................................. 6,939.66
Publications ....................................... 1,431.02
Postage and stationery .......................... 466.38
Freight and express ............................. 385.89
Heat, water and light .......................... 115.53
Chemical supplies ................................ 55.42
Seeds, plants and sundry supplies ........... 1,211.19
Fertilizers ....................................... 383.45
Feeding stuffs ................................... 1,146.48
Library ........................................... 573.17
Tools, implements and machinery ............ 1,153.86
Furniture and fixtures ........................ 156.05
Scientific apparatus ............................ 242.23
Livestock ......................................... 680.70
Traveling expenses ............................. 1,221.84
Contingent expenses ............................ 781.39
Building and repairs ........................... 5,240.82
Rent .............................................. 647.50
Exhibits ........................................... 126.25—$26,194.18

FERTILIZER, FEED STUFFS AND PARIS GREEN FUND.

Dr.

Cash on hand, Dec. 1, 1908 .................. $ 1,251.02
Received from State Treasurer (through Commissioner of Agriculture) ............. 26,000.00
Received from Miscellaneous sources ...... 53.90—$27,304.92

Cr.

By Salaries ........................................ $10,771.58
Labor .............................................. 2,231.16
Publications ...................................... 642.85
Postage and Stationery ........................ 502.64
Freight and express ........................... 150.46
Heat, water and light ........................ 463.37
Chemical supplies ................................ 1,026.59
Seeds, plants and sundry supplies ........ 307.75
Fertilizers ...................................... 95.35
Feeding stuffs ................................... 542.73
<table>
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<tr>
<th>Description</th>
<th>Amount</th>
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<td>Library</td>
<td>35.82</td>
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<tr>
<td>Tools, implements and machinery</td>
<td>730.67</td>
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<tr>
<td>Furniture and fixtures</td>
<td>77.75</td>
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<tr>
<td>Scientific apparatus</td>
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<tr>
<td>Livestock</td>
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<td>Traveling expenses</td>
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<td>Contingent expenses</td>
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<td>Rent</td>
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<td>Transferred to Experiment Stations account State Fund</td>
<td>5,846.65</td>
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<tr>
<td>Cash on hand, Nov. 30, 1909</td>
<td>416.15</td>
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</tbody>
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$27,304.92

GEOLOGICAL SURVEY FUND.

**Dr.**

- Cash on hand Dec. 1, 1908: $728.55
- Received from the State Treasurer: 2,000.00

**Cr.**

- By salaries: $275.00
- Publications: 1,868.70
- Field expenses: 263.98
- Transferred to State Fund, acct. Labor: 320.87

$2,728.55

The books and vouchers for all these accounts have been examined by an expert, who has made his report to Mr. Henry L. Fuqua, to whom the books are submitted for approval.