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

William Rufus Dodson

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TWENTIETH ANNUAL REPORT

OF THE

AGRICULTURAL EXPERIMENT STATIONS

OF THE

LOUISIANA STATE UNIVERSITY AND
A. & M. COLLEGE

FOR 1907

TO THE GOVERNOR

By W. R. DODSON, Director

BATON ROUGE:
1908.
Louisiana State University and A. & M. College

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J. T. TANNER, Secretary and Stenographer, Baton Rouge.
IVY WATSON, Farm Manager, Calhoun.
J. G. LEE, JR., B.S., Charge of Feeding Experiments, Hammond.
To His Excellency, Newton C. Blanchard, Governor of Louisiana.

Sir: An act of the National Congress of March 2, 1887, commonly known as the Hatch Act, and an act of March 16, 1906, known as the Adams Act, providing appropriations for agricultural experiment stations of the several States and Territories, prescribe that each station shall make to the Governor of the State or Territory an annual report of the work done and render a statement of the financial receipts and disbursements for the government fiscal year. In compliance therewith, I submit to you a report of the work of the Experiment Stations of the Louisiana State University and Agricultural and Mechanical College for the year 1907, and a statement of the receipts and expenditures from July 1, 1906, to July 1, 1907, and shall send copies to the Secretary of Agriculture and the Secretary of the Treasury, Washington, D. C., as required by law.

I also submit similar reports regarding State provisions for experiment station work; for that portion of the fertilizer and feed stuffs work of the State Board of Agriculture, which is done by the experiment stations, and for the work of the Geological and Agricultural Survey. I have not included the financial statement of the last named funds. These reports are published twice annually and submitted to the State Auditor, as required by law, as a part of the permanent records of his office.

Respectfully,

W. R. DODSON, Director.
Station No. 1, Sugar Experiment Station

Audubon Park, New Orleans, La.

The work of this station has continued under the immediate charge of Mr. R. E. Blouin, who has carried the work forward with much credit to himself and the station. The following is a summary of his report for the year: The work in field, sugar house and laboratory has contributed much additional valuable information that will be serviceable to the sugar interests of the State. The winter of 1906-7 was very mild, and spring weather came unusually early, starting early crops into vigorous growth. Cold, wet weather later, followed by dry weather, neutralized much of the good effect of early growth. The season as a whole was favorable, and cane tonnage was above the average. Tonnage on plant cane was reduced by the prevalence of the Pou-a-poche (Pséudococcus calceolariae), which pest destroyed the germinating eyes to an extent that greatly reduced the stand. The sugar content of the cane on the station was about up to the average, being better than in many portions of the State. D 74 was again the highest in sugar content, followed by D 95, both standing higher than the home canes.

IRRIGATION.

While preparations were made several times to irrigate, rains came before drouth became excessive, and no irrigation was resorted to during the year.

FERTILIZER EXPERIMENTS.

The lines of work reported in 1906 have been continued, and additional experiments inaugurated to secure more extended information on the best combination of available materials to force the early growth and maturity of cane. Experiments in succession cane, with and without the use of leguminous crops in the stubble, and varying the source and quantity of fertilizer, have been inaugurated. A careful and systematic study of the fertilizer requirements of D 74 cane has been completed and will form a portion of a bulletin in preparation.
SEEDLING CANES.

Seedlings D 74 and D 95 have continued to show superior qualities. In some sections there has been a disposition this year to prefer D 95, but we believe the D 74 will continue to show its superiority under normal conditions.

A number of new varieties have been secured the past year, and introduced into our testing plots, bringing the total number of varieties to over three hundred.

The results from cane seed last year were much beyond our expectations and we have planted out this fall 110 new varieties of canes obtained from seed germinated in Louisiana, and this year we have now approximately 1,000 plants which we have obtained from the germination of seeds in the horticultural hall adjoining the station here. This is entirely a new feature started with some little encouragement in our attempts in 1905, augmented by those of last year, of which mention was made in our report, and considerably further advanced by our remarkable success in germinating the seed this year. In these experiments credit should be given to Mr. A. E. Weller, the horticulturist in charge of the hall at Audubon Park, who has given them very careful attention under the supervision of the station and has been untiring in his work to make this method of obtaining new varieties in Louisiana a success.

Of the varieties produced last year from the seed, a number have attained a size which indicates some possible future for them, and we hope to succeed in securing a large number this year, and from them the varieties which will be readily adaptable to our conditions here.

In the production of seedling canes (owing to their long supposed lack of fertility) it need not be expected, either now or in the immediate future, that it will be possible to grow seed on a commercial scale for the production of sugar cane in the field. In fact, the method and care necessary to successfully germinate the seed would prohibit its use for commercial purposes on any of our plantations. As is well known, cane rarely tassels with us in Louisiana, though a few tassels this year have been observed from D 74 in the lower section of the sugar belt—that is, those sections bordering the gulf, as well as in Florida and in southwest Texas. None of these tassels have so far pro-
duced any fertile seed or seed showing evidences of complete maturity, and we will have to depend upon our supply of the seed of the cane from the tropies. This year we were kindly supplied by friends in the British West Indies, the Hawaiian Islands and other tropical sugar-producing countries.

SUGAR HOUSE WORK.

The sugar house work the past year was devoted largely to experiments in clarifications and determining the amounts of clarifying agents remaining in the products, particularly with relation to sulphur and its compounds. We have also experimented with new clarifying agents, which will be mentioned in the report of the laboratory work. Differentiations were made in different runs as to the yields of the different varieties of cane, special attention being paid to the seedlings D 74 and D 95 and home canes, determining their yields and value as sugar-producing plants when grown under the same field conditions. These results will appear in bulletin form at an early date, as we are only awaiting the recovery of the final products.

LABORATORY WORK.

Under this head, investigations have been continued from the grinding season of 1906-07 and the laboratory investigations have been both of an original and practical character. The report of the laboratory work, which has been submitted by Dr. Fritz Zerban, our chief chemist, with the assistance of Messrs. H. P. Agee, J. A. Hall, Jr., and W. P. Naquin, will show the merit of the work and the scope which we have attempted to cover. The general summary of this is as follows:

The investigations begun during the grinding season of 1906-07, on the use of sulphur as a clarifying agent in the sugar house and on the elimination of the sulphur dioxide during the process of manufacture, have been continued during the past grinding season. Experimental runs were made with varying quantities of sulphur, with lime alone and with other clarifying agents, two of which have only recently been put on the markets. In addition to the regular chemical control, determinations of sulphur in its different forms were made in all products. The results of this part of the research work will soon be published in bulletin form. (See also list of publications below.)
The studies just mentioned necessitated a thorough investigation of the methods for determining sulphurous acid in sugar products. A preliminary report on this was published at the Jamestown meeting of the Association of Official Agricultural Chemists. Methods for the detection of hydrosulphites in sugar products were also tested.

Attention was also paid to the occurrence of certain metallic substances like tin and zinc, which have at varying times been used in the sugar or molasses industry and the data collected will also be published in the bulletin. (See also list of publications below.) In connection with this an investigation of the mineral constituents of the cane was carried out, paying particular attention to the detection of heavy metals like copper, tin, lead and zinc.

A large part of the time was taken up by complete sets of analyses of the products which were used in the experiments on the influence upon the human system of Louisiana syrups and molasses.

A considerable amount of work has again been done in cooperation with the Association of Official Agricultural Chemists. The use of different clarifying agents in the determination of the different sugars, and methods for the elimination of reducing sugars were studied and the results are embodied in the report of the referee on sugar, submitted at the Jamestown meeting, October 9-12, 1907.

The study of the effects of the different fertilizing ingredients on the composition of cane has been completed.

An investigation on certain non-sugars of the cane, especially on the organic acids and on the different organic combinations of sulphur in cane and cane products has been begun and will be continued during the coming year.

The very interesting case of a Cuban raw sugar which gave a smaller yield of refined sugar than expected was also investigated. (See list of publications.)

In addition to these scientific researches, which necessitated several thousand analytical determinations, considerable work was done in connection with the field work, and 154 analyses of different samples from outside sources were made.
The following publications have been issued during the past year:


Determination of Sulphites; Tin and Zinc in Molasses. By Fritz Zerban, Ph.D. Read before the Louisiana section of the American Chemical Society, March 22, 1907.


On the Determination of Sulphurous Acid in Molasses. By Fritz Zerban, Ph.D., and W. P. Naquin, B.S. Read before the Jamestown meeting of the Association of Official Agricultural Chemists, October 9-12, 1907.


**CANE LOADERS.**

It will be remembered that during 1905-06, the station gave special attention to securing demonstration tests of cane loaders. At these trials a great majority of the inventors exhibited the work of their machines, and the planters attended in very large numbers from every sugar-producing parish in the State to determine from their own observation the relative character, make and efficiency of the different machines for loading sugar cane from the field to the cart or wagon. Practically all of the inventors placed large numbers of their machines and a large portion of the crop the past season was loaded on the cane carts by machines, thus alleviating to a considerable extent the labor conditions existing on our plantations.

**CANE HARVESTERS.**

The station has offered every facility for the continued testing of cane harvesters by the different patentees who have built machines, and this year we have had four machines tried.
at the station. It is gratifying to note that all of them show marked improvements. The inventors are very hopeful of the completion of a machine in a short time that will harvest canes in Louisiana that remain erect. All of the harvester inventors seem to give marked preference to the D 74 cane, closely followed by the D 95. Whereas, home canes, when erect, have been handled with equally as great facility as either of these two varieties, none of them so far have extended their investigations as to the handling of those canes which are more or less prostrated in our fields—a common occurrence, that is, where home canes are grown.

IMPROVED IMPLEMENTS.

Quite a number of improved agricultural implements have been tried at the station this year, and our entire force has discussed with the various manufacturers their merits and consulted with them as to alterations increasing their efficiency or remedying defects of the implements tried. The proposition of the steam plow has again come to us from several sources, and the chances are extremely bright in the near future of having several manufacturers making experiments as to the adaptability of these implements in the breaking and bedding of our alluvial lands in Louisiana. Several have promised implements for this purpose this year, as well as others with modifications, as to the drafting power, from steam to gasoline, and we feel extremely interested in the ultimate outcome of this marked advent in both the rapidity and the thoroughness of our preparations of soils and other usages to which this motive power can be applied on sugar plantations. The station has extended to all manufacturers, inventors and agents a cordial invitation to test their implements here and every courtesy and assistance that is possible to render will be given to them. Visitors to the station are always welcome to witness any operations that are performed here.

CORN AND COTTON.

Cotton has been tested here as usual with standard varieties, and a number of new tests introduced. The corn and cotton crops at the sugar station were both up to the average. The yields for a series of years, of the varieties tried, are being tabulated for publication.
Mr. Hadley, of Cincinnati, inventor of the corn shucker and many other improved agricultural machines, has spent considerable time at the station, perfecting his corn shucker. He also has a cane harvester in course of construction and development at the station.

FORAGE CROPS.

In addition to continuing experiments with a great number of varieties of these crops, new varieties have been introduced through the United States Department of Agriculture and experiments conducted in co-operation with this department on alfalfa, clovers, soy beans, cow peans, phaseolus, vetches, etc., and some of these varieties are showing prominence here with us. A new bean, known as the Sword bean, proved a remarkable growth with us this year. It has not proven to be a good plant for feeding purposes, but is excellent as a soil renovator.

FIBER CROPS.

Our experiments with these have been continued, maintaining small plots of ramie, jute and hemp, and introducing new varieties of these. The character of growth and quality proved very satisfactory this year, but all of these crops are anxiously awaiting the development of a practical decorticator, which as yet has not been developed in this section.

OLIVE ORCHARD.

The olive orchard still maintains its vigorous and healthy growth, though no fruit has been produced this year. We are hopeful, however, of eventually obtaining some results from these, as some of the trees have attained a magnificent size and show every indication of vigorous and healthy growth.

CITRUS FRUITS.

Experiments with these have been continued along the line of variety tests only as to growth, and whereas our crop this year was very small, the evidences show that some of the varieties have been more resistant to the attacks of scale insects and the white fly than others. Methods of spraying for the extermination of this scale and the white fly were tried in co-operation with the Crop Pest Commission, as mentioned in our report of last year, and the results show no positive method of
exterminating these pests completely by spraying, our location being infected from all places with any quantity of scale insects and white flies renders us comparatively hopeless as to the complete eradication here unless similar methods are carried on throughout this section. The Crop Pest Commission is vigorously at work on them and it is hoped that in the near future some marked advance will be made along this line.

MISCELLANEOUS.

We have also conducted experiments here, with the aid of the Crop Pest Commission, as to the habits and character of an ant which has proven a great pest to our agricultural, floricultural and domestic conditions. This is now a serious problem and with its rapid spread, as is particularly noted in reports from the Crop Pest Commission, we are led to look forward to rather alarming consequences from this industrious and indefatigable insect. With the assistance of Prof. J. B. Garrett, assistant entomologist of the station, investigations have been carried on as to the character and habits and methods of attack of the Pseudococcus calceolariae, or the Pou-a-poche, commonly called by us "mealy bug."

Again the station has been actively engaged in aiding to protect the sugar interests of the State against arbitrary rulings in regard to the National Pure Food Law. The assistant director has made several trips to Washington and New York this year as one of the representatives of the sugar interests in our State, presenting positively our findings and investigations, as well as the conditions existing in Louisiana, to those in charge of the formulation of rules, etc., under this law. In these hearings we have succeeded in securing an immunity from the action of the law for the crop just grown, and, as far as we know at present, for the crop now growing. The use of sulphur is not prohibited in the clarifying of juices, if used as we have ordinarily used it in Louisiana, and along this line an extensive and elaborate experiment was conducted in co-operation with the State Board of Health on subjects as to the value of Louisiana syrups and molasses on the human system, published as Bulletin No. 91.
The conducting of these experiments and the co-operation of the sugar interests in this State has greatly encouraged us in this work and has materially assisted us in maintaining the high standard of the products manufactured in Louisiana from sugar cane.

CHANGES IN STAFF.

Since our last report, Mr. Alien E. Dodson has resigned as farm manager, and he was succeeded by Mr. J. A. Hall, Jr., as chemist and farm manager. Mr. Hall recently resigned, and his successor is Mr. A. Scheer, who is now occupying this position. Mr. W. P. Naquin, a graduate of the Audubon Sugar School, has succeeded Mr. Hall as assistant chemist, and Mr. P. H. Doherty, also a graduate of the Audubon Sugar School, has been installed as an assistant chemist.

AUDUBON SUGAR SCHOOL.

The demand for graduates of the Audubon Sugar School of the Louisiana State University and Agricultural and Mechanical College this year has been markedly in excess of the supply, and a number of the seniors of this school have taken positions on several of our sugar plantations during the last grinding season. The demand from the tropics still continues great, and our graduates are eagerly sought after. It is still the policy of this division of the University to continue in requiring their junior and senior students to take a practical course of instruction in the agriculture, chemistry and manufacture of sugar at the station here, and our class this year was a marked increase over recent sessions.
Station No. 2, State Experiment Station  
Baton Rouge, La.

The office of the Director and headquarters for all the stations are maintained at the Experiment Station building, on the University Campus at Baton Rouge. All the bulletins are issued from this station. The analyses of fertilizers and feed stuffs are made here. The work of this station is more comprehensive than that at either of the other stations, as will be seen by the reports of the various departments.

FARM DEPARTMENT.

The work at the Station farm has continued under the management of Mr. S. E. McClendon, Assistant Director, who has faithfully and energetically discharged his duties. Our studies have covered a great diversity of topics, the most important ones are as follows:

CATTLE FEEDING.

We have continued our experiments in cattle feeding, mostly with satisfactory results. We have not yet completely exterminated the intestinal parasites of cattle, disastrous results of which have been discussed in a previous report, though we thought at one time that this pest had been brought under control. We have sold from the station, during the year, a number of high-grade cattle that we believe would have topped the market in Northern cities, but we did not have sufficient number to justify shipment. These animals were born and raised on the station, and we believe were superior to the steers shipped by us to Chicago three years ago, "topping the market" at that time, at $5.65 per hundred pounds.

The best results in feeding have been secured by feeding cotton seed meal and hay and silage.

The results from increased fertility of land on which cattle ranged while fed have been very striking. Data on this subject will be secured for a number of years before publishing.
GRAZING EXPERIMENTS.

Efforts to determine more accurately the value of grazing crops have been continued. Results have again shown fall sown oats to give the best results for winter grazing for hogs and sheep. Records of these experiments will be published when all results have been sufficiently verified by repetition.

STOCK BREEDING.

We are constantly improving our herds of Angus and Hereford cattle, by retaining the best individuals for breeding purposes. The fine calves secured just previous to the last annual report survived the immunization fever, and passed the summer successfully, and are now beautiful animals, growing rapidly.

SHEEP.

A herd of sheep are now on our pasture. Our purpose is to give a demonstration of "breeding up" a good herd, and also to put under practical test the method of combatting the stomachal and intestinal worms, that are commonly destructive to sheep. Another feature of this experiment is to get the data on the practicability of producing early lambs for market.

HOGS.

Hogs are raised at the station, partly as a demonstration, partly to furnish good animals with which to carry on feeding experiments, and to help to supply the demand for improved blood.

SILO.

The silo was filled with a variety of crops, including sorghum, corn, pea vines and cane tops. Cane tops proved inferior to corn as silage, but were kept in perfect condition and made excellent feed. Chemical analyses and results of feeding will be given in bulletin form.

IMPROVED IMPLEMENTS.

Improved implements for handling hay and grain crops were added to our equipment the past year. A hay loader which gathers the hay from the ground and loads it onto the wagon has proven entirely adaptable to our conditions. We now have all the most modern implements for handling hay and grain crops, and have comparatively little trouble in securing labor to successfully operate all of them.
FORAGE AND ROOT CROPS.

In addition to the forage crops previously grown, we have introduced a number of new varieties that are promising, the most promising new grass being a South American species secured through the United States Department of Agriculture and called "Guinea grass." Some of the large collections of soy beans previously reported have been perpetuated, the most promising varieties being selected. A species of Egyptian clover, also secured through co-operation with the National Department of Agriculture, has promise of being a valuable addition to our forage crops. A new strain of Arabian alfalfa, secured through the same source, seems earlier and more thrifty, but less resistant to freeze than any ordinary alfalfa.

Miscellaneous forage crops have been grown as usual. We have devoted more than ordinary attention to root crops. One variety of stock beets produced the enormous yield of 60 tons per acre. These crops should be more extensively cultivated by small farmers and dairymen.

An important discovery regarding the failure of sorghum to mature seed was made the past season. Some experiments were carried on in co-operation with Mr. Carlton R. Ball of the United States Department of Agriculture, in which it was fully demonstrated that the failure to mature seed was due to the fact that a minute fly deposits its eggs in the young sorghum seed, thus preventing its maturity. Efforts will now be directed toward controlling the insect.

OATS.

We grew about 30 varieties of oats the past season, the home-grown seed proving, as usual, superior to all others. The season was unfavorable to the oat crop throughout the State, owing to excessive rains at harvest time.

JAPANESE CANE SYRUP.

Stimulated by reports from Texas and Florida of excellent results secured from Japanese cane made into syrup, many farmers have inquired regarding the possibility of profitable syrup making from this plant in Louisiana, especially in the hills, where the boll weevils have reduced the production of cotton—this cane doing much better on the poor lands than
the Louisiana cane. To secure additional information on this subject, though the cane has been grown for years, sufficient cane was taken from the station at Baton Rouge to make a run on a small syrup mill near by. The syrup was much inferior in flavor to that from Louisiana cane. In fact, we do not believe that this syrup could be sold in competition with syrup from Louisiana cane.

Department of Animal Pathology.

This department has continued under Dr. W. H. Dalrymple and Dr. H. J. Milks.

The following is a synopsis of the work reported on by Dr. Dalrymple:

During the year the Veterinary Department conducted some interesting experiments in connection with stomachal and intestinal parasites of sheep. The objects aimed at were, first, to test the bare-lot as against the grass-lot method of raising lambs to see the difference, if any, in the results obtained, so far as infestation of the lambs with parasites was concerned.

Second, to test the effect of different medicinal agents on lambs under both bare-lot and grass-lot conditions.

Control, or check, animals were employed in each division of the experiment. The results obtained were very satisfactory, and they have been published as Experiment Station Bulletin No. 95.

It might be stated that as soon as this bulletin was published it was reproduced, in full, including illustrations, in The American Sheep Breeder, the most influential journal devoted to sheep husbandry in America. It was also published in full in two British veterinary periodicals; besides, excerpts from it have appeared in quite a number of the agricultural and live stock publications throughout this country.

The Department, besides attending to veterinary matters connected with the Experiment Station, looks after the correspondence concerning animal husbandry, feeding, etc. The increasing desire on the part of our farmers and planters to go more and more into live stock has occasioned a very considerable
increase in this class of correspondence. And the question of economic feeding of animals has become one of such immense importance to our stock owners, that the inquiries by letter, and otherwise, with regard to the virtues of different classes of feed stuffs and the balancing of rations, etc., have become extremely numerous, and are steadily on the increase. It may be fair to state that through the influence of this department of the Experiment Station, the cost of feeding on the sugar estates of the State alone has been reduced at least 30 per cent, which represents a considerable amount of money in the aggregate.

The purely veterinary correspondence has been quite extensive, and has covered questions of all kinds relating to almost every disease that animal flesh is heir to.

During the year Dr. Dalrymple represented the University and Experiment Station on several occasions. In the early part of May he attended the Second Annual Conference of Health Officers, under the auspices of the Louisiana State Board of Health, at Opelousas, and presented a paper on "The Importance of Meat and Dairy Inspection," besides taking part in a number of the discussions on general sanitary topics. In the end of May he attended the Semi-Centennial Celebration of the Michigan Agricultural College, the meeting of the Association of American Agricultural Colleges and Experiment Stations, and the meeting of the Association of Farmers' Institute Workers of America, at Lansing, Mich. In September he was in attendance at the 44th Annual Meeting of the American Veterinary Medical Association, at Kansas City, Mo., and had the honor of being elected President of that continental organization.

Dr. Dalrymple also contributed a number of articles to different journals, both agricultural and veterinary, at home and abroad. Chief among these were articles bearing upon the value of sugar cane molasses (blackstrap) as a feed for stock, and an article on "The Diagnostic Symptoms of Anthrax in Horses," contributed to a foreign veterinary periodical. Several of these articles have been reproduced in other journals.

It should be stated, perhaps, that, on account of Dr. Dalrymple's official connection with the Experiment Station, the latter receives its full share of the credit for this work.
Dr. Dalrymple being a member of the faculty of the Louisiana State University, a large part of his time is occupied in class work during the college term. Notwithstanding this, however, as much of his time as he has at command is devoted to the veterinary and animal husbandry work of the station, and the large amount of correspondence which he receives, both in connection with animal diseases and animal husbandry, is attended to with as much despatch as possible.

The following is a synopsis of the report of Dr. Milks on the diseases of animals that have been studied the past year.

ANTHRAX OR CHARBON.

Since no outbreaks of this disease have been reported in time for investigation in the field, the work has been carried on at the laboratory. The various vaccines have been tested upon small animals and sheep. An experiment in which twenty sheep were used was made with three different vaccines.

An experiment is now under way to immunize some sheep against large doses of virulent anthrax bacteria. The aim in this experiment is to produce a serum with antitoxic properties and to verify Sobernheim's method of vaccination. This method is known as the simultaneous, and the vaccine as *Sero-vaccine*, Merck.

Since no field work was done, it was impossible to study the role that flies play as carriers of the disease. An experiment was undertaken along this line, but had to be abandoned because it was impossible to keep the flies in captivity.

Several attempts have been made to produce the disease in chickens, but so far we have been unsuccessful. More work will be carried on with these animals and similar experiments will be made with fish.

CEREBRO-SPINAL MENINGITIS.

This very fatal disease of horses and mules has been very prevalent during the past summer. Several localities were visited and much time given to investigations as to cause, treatment, prevention and pathology of the disease. The results of these investigations will soon be ready for publication.
DISEASES OF CHICKENS.

A disease very fatal to young chickens has been studied and found due to an organism so far undescribed. This organism has been isolated and its characteristics determined.

Several other diseases of chickens have been studied, but insufficient data has been obtained to arrive at any conclusions.

The department has been frequently called on to make bacteriological diagnosis, especially in the cases of suspected anthrax or tuberculosis.

Department of Plant Pathology.

This department has been under the direction of Mr. H. R. Fulton. He renders the following synopsis of work done:

COTTON.

Wilt or Blackheart Disease.—A general account of this disease has been published as Bulletin No. 96 of the station, under the title of "Cotton Wilt." Tests made in different sections of the State with Jackson Wilt Resistant and with Dixie Wilt Resistant cotton, which are the two least susceptible varieties known, have indicated that these are not suited for use in boll weevil districts, and have emphasized the importance of the breeding work already begun, which has for its object the securing of a variety that is early and wilt resistant and otherwise desirable. This work is being carried on along the lines of cross-breeding and selection, and it is believed that satisfactory progress is being made.

Anthracnose.—This disease of the boll of cotton has been unusually prevalent and destructive during the past year. While the cause and nature of the disease are very well known, no successful methods for control have been worked out. The loss from this disease every year is considerable in the aggregate, and the matter of proper control is an important one. A circular giving a concise account of cotton anthracnose, and suggestions for possible control, was prepared and sent to the large number of persons who asked for information about the trouble.
SUGAR CANE.

Root Disease.—This seems to be the only largely destructive disease of sugar cane occurring in the State. Several minor troubles have been noted, and are under observation, but their economic importance is not such as to warrant extensive investigation at this time. A rather full preliminary account of the root disease has been prepared, and will soon appear as Bulletin No. 100. Much of the work along the several lines of this investigation must be continued for a period of years before accurate conclusions can be reached; and new lines will suggest themselves during the progress of the work.

The present publication, while not final, will, it is hoped, serve a useful purpose in giving some accounts of the disease and suggestions regarding proper means of control.

RICE.

Blast.—This is the most destructive disease of rice found in the State. It effects the heads, preventing their proper filling out, so that yields are light from fields that may have been promising up to and after the time of heading out. The fungus may also attack very young plants, causing their death.

Brown Spot of Grains.—This trouble occasions heavy grading down of rice when any considerable portions of the grains are affected. The injury is brought about by the growth within the grains of saprophytic fungi and bacteria of several species; these are introduced by the punctures of a brown diamond-back pentatomid bug. While the problem of prevention of loss from this source is a problem for the entomologist rather than the botanist, it has seemed advisable to prepare some account of the nature of the trouble.

Green Smut and Black Smut.—These two diseases have been about as prevalent as last year. The loss occasioned by them is at present rather inconsiderate. A bulletin is being prepared on the diseases of rice, which will give the results of the investigations that have been carried on.

GARDEN AND TRUCK CROPS.

Detailed work on the diseases of this very large group of plants has been confined to some of the diseases of pepper and of beans. One of these, the fungus blight or wilt of pepper,
also affects beans, tomatoes, Irish potatoes, cow peas, cabbage, fig, cotton and a wide range of other valuable plants. Of the bean disease, the two most destructive are pod spot or anthracnose, and bacterial blight or bacteriosis. Both of these occur to a considerable extent in the State. Two less well-known diseases of beans, the fungus blight and a rot of pods and stems caused by the fungus Rhizoctonia, have also been studied. An account of all of these diseases, with information regarding their control, will be issued as a bulletin of the station, No. 101.

**GENERAL.**

The usual number of inquiries regarding a wide range of diseases of plants have been received and the desired information given whenever knowledge of the diseases permitted.

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**Horticultural Department.**

The work of this department has continued under Prof. F. H. Burnette. The following is a brief synopsis of what has been done.

The work in the horticultural department has been continued along general lines. The fertilizer experimental work with sweet potatoes has been completed and the results will be published in due time.

Cabbages and cauliflowers have also been grown, both in varietal list and commercial list. Tomato experiments have also been conducted and will be completed during the coming year.

The oranges and citranges have received attention, all the available varieties of the latter are being secured as rapidly as possible, from the United States Department of Agriculture. There is no doubt but that some of these will prove very desirable.

The propagation of pecans has been carried on and continued work along pecan lines is being planned.

A bulletin upon the Japanese Persimmon, No. 99, has been issued and one upon figs is in preparation.
Some attention has been given to the planning and planting of school grounds, and a limited quantity of plants for decorative purposes has been distributed.

The Louisiana State Horticultural Society, of which Mr. Burnette is Secretary, has received some attention and an earnest effort is being made by the department to build up a society that will stimulate an interest in the horticultural development of the State.

There has been a large increase in the correspondence of the department during the year, and the station has been honored in having Mr. Burnette elected again to the Presidency of the National Nut Growers' Association, an organization which includes all of the nut-growing States, and is actively encouraging the planting of pecans in the Southern States as one means of increased diversification.

He is also the representative from Louisiana in the American Pomological Society. This organization has a membership of many hundreds and is also national in its scope.

**RICE EXPERIMENTS AT CROWLEY, LA.**

In co-operation with the United States Department of Agriculture and some of the citizens at Crowley, La., work has been continued in testing varieties and fertilizer requirements of rice, this being the second year of this work. I am glad to report much more gratifying results than were obtained the year previous. Something over three hundred varieties were cultivated the past season, and something over sixty fertilizer experiments were tried. There is urgent need for enlarging this work, and there is considerable demand for the establishment of a permanent rice experiment station. At the present time we are using land gratuitously offered by Mr. J. F. Shoemaker, and irrigation water furnished free of charge by Duson Brothers. This work should be established on land belonging to the State, and every facility furnished to conduct the work with convenience and accuracy. Grounds, buildings and facilities should be furnished not only for rice experiments, but for studying all the problems that pertain to the permanent welfare and prosperity of the rice section.
DAIRY WORK AT HAMMOND, LA.

Early in 1907 the Dairy Division of the Bureau of Animal Industry of the United States Department of Agriculture offered to send a man to Hammond, La., to make investigations along dairy lines that seemed urgent, if we could co-operate with them and meet part of the expenses. I made a personal visit to Hammond, met there a representative of the National Department, and several prominent men interested in the dairy business, and arranged for securing records of feed consumption and milk production, and analyses of milk from a number of herds, and for some feeding experiments, both for suckling calves and milk-producing cows. It was later necessary to send a man to represent the station in this work, and J. G. Lee, Jr., was detailed to fill the position, while Mr. T. E. Woodward represented the United States Department. These young men have shown great interest in their work. We have a bulletin now in press giving results of herd tests. Another bulletin on feeding young calves is about ready for publication. The feeding experiments with varied rations has been delayed, and is just now being inaugurated. It is hoped that this work will stimulate greater progress in up-to-date methods of dairy practice in that vicinity, which supports the largest dairy business in the State outside of New Orleans.

TICK ERADICATION WORK.

The Station has always taken an active part in the tick eradication work, this Station having been the first to work out the complete life history of the tick and determine the time required to eradicate the tick under a rotation system. Toward the close of the year, when the National authorities found it necessary to reduce the expenditures for tick eradication work in the northern portion of Louisiana, at a time when it seemed necessary to further guard the territory already cleared of ticks, to make the work effective, the Crop Pest Commission could not supply any additional men for this purpose. The Experiment Station employed to meet the deficiency additional men. This is demonstration work, rather than experimental work, but the Experiment Station Committee thought this action was entirely proper under the circumstances.
The Experiment Stations again made a fine exhibit at the State Fair at Shreveport. The exhibit space was the same as last year, and to those interested in agriculture it was the most attractive portion of the agricultural building. Our exhibit was probably the most instructive one that we have yet made.

The State University also had a most creditable display along with that of the Experiment Stations.

EXTENSION WORK.

No farmers' institutes were held during the past year, but the Director of the Stations has made about seventy addresses and lectures on agricultural topics to gatherings of farmers, school teachers and public schools. Other members of the staff have given consideration in the way of a number of lectures to similar bodies.
Station No. 3, North Louisiana Experiment Station,
Calhoun, La.

This Station is located in Ouachita Parish, and is under the immediate direction of Major J. G. Lee. At the rendering of the last annual report, Major Lee was on leave of absence on account of poor health. Mr. J. B. Garrett, a graduate of this University, was placed in charge of the station during the absence of Major Lee, and he carried the work forward in a most creditable manner. November, 1907, Mr. Lee returned, having sufficiently regained his health to resume the work, and at the present time the work is progressing nicely under his active management.

FERTILIZER EXPERIMENTS.

These experiments on corn and cotton have been continued without modification. A series of experiments with phosphoric acid on new ground were conducted the past year for the first time, resulting in considerably increased yields. A series of experiments on the spring application of fertilizers to oats were also inaugurated. The results this year show that the crop can be more than doubled in yield by moderate fertilization with readily available fertilizers, just as vigorous spring growth sets in.

Experiments to determine the influence and quality of syrup from fertilizers applied to cane, have been continued, this being the second year. Cotton seed meal and acid phosphate again showed superiority over stable manure. Applications of stable manure produce a dark colored syrup with rather an unpleasant flavor, which we have not yet been able to neutralize.

Experiments in the Williamson method of cultivating and fertilizing corn were begun the past year. The results were largely vitiated by severe damage to the crop by storms and excessive rains.
FEEDING EXPERIMENTS.

Reported last year as having been inaugurated, terminated very successfully so far as the actual gain in weight of the steers was concerned, but we were not able to secure the premium in the price of the fat steers that we were entitled to. Some of the consumers of the meat reported it as being of exceptionally good quality. The butchers state that if they could secure enough of this quality of beef to supply a constant trade, they would be justified in paying better prices for it. We are again feeding fourteen steers, one group on cotton seed meal and hulls, and one on silage and cotton seed meal. The largest and cheapest gains are being secured from feeding silage.

THE SILO.

This is the second year we have used the silo for preserving succulent feed stuff, and the results have been highly successful. Some of the friends of the Station who are well acquainted with the work done in preserving and feeding silage regard this as the most valuable work done by the Station for some time.

PRESERVATION OF FARM TIMBERS.

At the present time, we are just beginning some very important experiments, in co-operation with the Forestry Service of the National Government, in the preservation of fence posts. The supply of durable rough timber for service in contact with the soil or exposed to the weather is rapidly becoming depleted. It is believed that a cheap and practical method of impregnating sap woods with creosote has been discovered that will enable us to use timbers now considered valueless, and make durable fence posts, shingles, etc., out of them. If these experiments are a success, it will mean a market for the small pine of the old fields, for sweet gum, black gum, bay and other woods that now have no value, but are quite abundant. These experiments will be carried on at Calhoun.

DISTRICT FAIR.

The fair held on the Station grounds the past year was universally conceded to have been the best fair yet held. In agricultural displays, it was far superior to the State Fair at Shreveport.
FARM MEETING.

The interest in the monthly meetings has kept up, the attendance being excellent at most of the meetings. A great deal of good is accomplished through these discussions.

HORTICULTURAL AND TRUCK WORK.

Work along these lines has been continued, mainly in continuation of experiments already reported. A new orchard for seedling peaches and scuppernong grapes was cleared and planted, and a collection of native plums begun. It is our purpose to gather at the Station all the native grapes, plums and seedling peaches as a basis for breeding work.

I regret to report that we have lost the services of Mr. E. J. Watson, who has been with the station since its organization. His long and faithful service made him a most valuable man. He resigned to go into commercial work.

A report of the work of the year would be incomplete without reference to the faithful service of Mr. T. I. Watson, for many years farm manager, who ably looked after all interests of the Station during the three months interim between the departure of Major Lee on leave of absence and the arrival of Mr. Garrett, as acting assistant director. Mr. Watson's familiarity with the details of the work at the Station, from his long and efficient service, enabled him to keep the work in good form.

NEW BUILDINGS.

Some improvements have been made to the buildings, and a residence of the farm manager is now being constructed on the grounds.

BUILDING BURNED.

Early in December, 1907, the small building used as a butter room was burned. It was insured for $200.00.
Analyses of Fertilizers, Feed Stuffs And Paris Green.

Mr. J. E. Halligan is the head chemist in charge of this work. In response to my request he has tabulated the following statement of the work done in this laboratory for the year ending September 1st, 1907:

**General Summary—**

<table>
<thead>
<tr>
<th></th>
<th>1905-06</th>
<th>1906-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilizer analyses made</td>
<td>1,075</td>
<td>1,160</td>
</tr>
<tr>
<td>Feed stuff analyses made</td>
<td>643</td>
<td>1,581</td>
</tr>
<tr>
<td>Paris green analyses made</td>
<td>73</td>
<td>214</td>
</tr>
</tbody>
</table>

**Commercial Fertilizers—**

<table>
<thead>
<tr>
<th></th>
<th>1905-06</th>
<th>1906-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete fertilizers</td>
<td>1,302</td>
<td>2,164</td>
</tr>
<tr>
<td>Fertilizers containing phosphoric acid and nitrogen, not tankages</td>
<td>40</td>
<td>67</td>
</tr>
<tr>
<td>Fertilizers containing phosphoric acid and potash</td>
<td>54</td>
<td>95</td>
</tr>
<tr>
<td>Acid phosphates</td>
<td>199</td>
<td>486</td>
</tr>
<tr>
<td>Bone meals</td>
<td>123</td>
<td>206</td>
</tr>
<tr>
<td>Tankages</td>
<td>372</td>
<td>206</td>
</tr>
<tr>
<td>Cotton seed meals</td>
<td>328</td>
<td>864</td>
</tr>
<tr>
<td>Chemicals</td>
<td>38</td>
<td>58</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>52</td>
<td>15</td>
</tr>
</tbody>
</table>

Total analyses .................................. 2,508 4,161

The results of the fertilizer work show that there was an increase in the number of shipments for the past year. The manufacturers are endeavoring to "sell what they state," but the analyses show the importance and necessity for our law.

**PARIS GREEN.**

There were 214 samples of Paris green examined and all of them ran above the guarantee of 50 per cent arsenious oxide as required by our law. The average per cent of arsenious oxide in the samples was 57.17.
Commercial Feeding Stuffs—

<table>
<thead>
<tr>
<th></th>
<th>1905-06</th>
<th>1906-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton seed meal</td>
<td>588</td>
<td>749</td>
</tr>
<tr>
<td>Rice bran</td>
<td>177</td>
<td>343</td>
</tr>
<tr>
<td>Rice polish</td>
<td></td>
<td>142</td>
</tr>
<tr>
<td>Wheat products</td>
<td>74</td>
<td>1,402</td>
</tr>
<tr>
<td>Molasses feeds</td>
<td>330</td>
<td>442</td>
</tr>
<tr>
<td>Corn chops</td>
<td></td>
<td>2,101</td>
</tr>
<tr>
<td>Corn and oat feeds</td>
<td>543</td>
<td>749</td>
</tr>
<tr>
<td>Hominy feeds</td>
<td></td>
<td>42</td>
</tr>
<tr>
<td>Feed meals</td>
<td></td>
<td>65</td>
</tr>
<tr>
<td>Brewers’ grains</td>
<td>29</td>
<td>46</td>
</tr>
<tr>
<td>Poultry feeds</td>
<td>4</td>
<td>323</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>70</td>
<td>65</td>
</tr>
<tr>
<td><strong>Total analyses</strong></td>
<td><strong>1,815</strong></td>
<td><strong>6,469</strong></td>
</tr>
</tbody>
</table>

The amendment to the Feed Stuff Law requiring the manufacturer to guarantee and tag all ground products not the primary products of grain, is the cause of the increase of the many samples in the above table under the headings, Rice Polish, Wheat Products, Corn Chops, Hominy Feeds, Feed Meals and Poultry Feeds.

The enforcement of the Feed Stuff Law has resulted in not only requiring the manufacturers to reach their guarantee, but it has also brought about a great improvement in the composition of several of the feeds offered for sale in this State. Louisiana is no more used as a dumping ground for inferior feeds. Manufacturers find that it pays them to put out a high-class feed. Last year, one company changed the guarantee on one of its brands three times, each time making it better.

**MISCELLANEOUS ANALYSES.**

Several samples of feed stuffs, fertilizers and waters were sent in by planters during the past season. Samples of soil, ores and other miscellaneous materials were also examined. The official work is always given preference and any material that is sent in is analyzed during our spare moments free of charge.

By comparing the work done along the lines of fertilizer and feed stuffs control with other State laboratories, we find that our laboratory made 90 analyses more per man than any other
laboratory of which we have reports. In the number of feed stuff analyses made we surpassed all of the laboratories charged with such work. It is our aim to get the results to the planter and manufacturer at the earliest possible moment, after the samples reach us.

The work of the laboratory has the confidence of the planters and the manufacturers and contracts for payment are frequently made on the results of our work.

The equipment of the laboratory has been improved by the installation of new apparatus which greatly facilitates the work.

The laboratory force has done some work for the Association of Official Agricultural Chemists. Messrs. Halligan, Green, Taggart and Summers co-operated on the determination of nitrogen and water, and Mr. Halligan was appointed associate referee on sugar and referee on molasses.

State Geological Survey.

The following synopsis of work done and planned is submitted by Dr. G. D. Harris, Geologist, who has continued in charge of the work.

CO-OPERATIVE WORK.

Co-operative work of this survey with the U. S. Geological Survey ended during the few first days of January, 1907. Since that date the latter organization has continued independently in and about Winn Parish, making a complete precise traverse of the parish and a road map of the same. The soil survey has platted the soils for the same area.

The Coast and Geodetic Survey has continued to maintain tide-gage work at Weeks’ Island at the station established by the State Survey.

STATE WORK.

Finished editing and putting through the press Bulletin No. 4, Veatch’s Underground Water Resources of Louisiana.

Had maps engraved, wrote, edited and published Bulletin No. 5, Notes on the Geology of the Winnfield Sheet; had maps engraved, wrote, edited and published Bulletin No. 6, Cartography of Southwest Louisiana; completed work on Salt, Bulletin No. 7; had maps engraved, printed, and text manuscript
in the hands of printer. Spent latter part of November and December, 1907, in geological work for forthcoming report on oil in Louisiana.

The following work is planned for 1908-09:

I. Season of 1908-09, final study of oil fields and publishing of report. II. Field work and report on the clays of the State. III. This is completion of work and report upon the Lignites of the State. IV. Co-operation, if funds will permit, with the U. S. Geological Survey, to the extent of making one or two quadrangles annually as outlined on Pl. X, Bulletin No. 6. The interesting and important area about Shreveport should be mapped in co-operation with U. S. Geological Survey. Good base maps mean free soil surveys.

Financial Statement.

The following is a statement of the receipts and expenditures of the Hatch Fund and Adams Fund for the year ending June 30th, 1907:

DR.

To receipts from the Treasurer of the United States, as per appropriations for fiscal year ended June 30th, 1907, under acts of Congress, approved March 2, 1887 (Hatch Fund), and March 16, 1906 (Adams Fund) $15,000.00 $7,000.00

CR.

Abstract.

By Salaries $14,296.32 $5,310.17
Labor 20.00 36.50
Publications 683.68 1.70
Postage and stationery 4.00 282.36
Freight and express 41.81
Heat, light, water and power 203.74
Chemical supplies
Seeds, plants and sundry supplies 25.90
Feeding stuffs .......... 10 .......... 8.65
Library ............... 11 .......... 151.74
Tools, implements and ma-

chinery ............... 12 .......... .40
Furniture and fixtures 13 .......... .30
Scientific apparatus 14 .......... 476.96
Live stock ............ 15 .......... 37.92
Traveling expenses 16 .......... 123.35
Buildings and land 18 .......... 308.50

Balance ................ .. .......... ........
Total .................... $15,000.00 $7,000.00

Financial statements of the receipts and expenditures for
geological survey fund, fertilizer, feed stuff and Paris green
fund, and State fund for experiment stations, is published semi-
annually and filed with the State Auditor.

We, the undersigned members of the 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 30th, 1907, and have found the above-
classification to be correct, and the receipts for the time named
are shown to be $15,000 for the Hatch Fund, and $7,000 for the
Adams Fund, and the corresponding disbursements are $15,000
for the Hatch Fund and $7,000 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 L. S. U. and Ex-
Officio Member of Board of Agriculture.