1903

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

Louisiana State University and Agricultural & Mechanical College

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FIFTEENTH ANNUAL REPORT

OF THE

Agricultural Experiment Stations

OF THE

LOUISIANA STATE UNIVERSITY

AND A. & M. COLLEGE.

FOR 1902.

TO THE GOVERNOR.

BATON ROUGE:
PRINTED AT THE TRUTH BOOK AND JOB OFFICE.
1903.
REPORT.

Louisiana State University and A. & M. College,  
Office of State Experiment Station,  
Baton Rouge, La., January 24, 1903.

To His Excellency, W. W. Heard, Governor of Louisiana:

Sir—In accordance with the provisions of Section 2, of the Act of Congress to establish Agricultural Experiment Stations in connection with the colleges established in the several States, under the provisions of an Act approved July 2, 1862, and the Acts supplementary thereeto, I beg leave to submit a report of the operations of the Louisiana Agricultural Experiment Stations, including a statement of the receipts and disbursements from July 1, 1901, to July 1, 1902.

STATION NO. 1.
Sugar Experiment Station, Audubon Park, New Orleans, La.

The work of this station has been continued along lines already given in previous reports. Every department of the sugar industry has been investigated with a view to improvement. Field experiments with fertilizers continue upon the same plots, with results almost identical with those previously given. The number of varieties of seedling canes has been largely increased during the year, and many of the most promising have been transferred from the nursery to the field for general cultivation. After supplying the wants of the planters, enough of the varieties of the seedlings known as D. No. 74 and D. No. 95 were left to permit of two successful runs in the sugar house, results of which are herewith given in condensed form. There is also given results of the previous year with these seedlings, and for comparison, yields and analyses of our home canes.

Comparative Merits of Seedlings No. 74 and No. 95 With Our Home Varieties—Purple and Striped.

In 1901 there was given the first opportunity to test in the sugar house, the merits of the seedlings Nos. 74 and 95, from Demerara. Run No 8 at the Sugar Experiment Station given below, was made from the residues of plant, first and second stubbles, of the two varieties, left over after the demands of the planters were supplied. The stubbles were mainly from plant canes, cut the previous year early in October. The maximum tonnage given was from a few rows cut for the
mill in November of the previous season. The final molasses still contains a small quantity of available sugar. The following is the complete record:

Run 8, 1901. Plant, first and second years' stubble. D No. 74 and D No. 95.

<table>
<thead>
<tr>
<th></th>
<th>Brix</th>
<th>Sucrose</th>
<th>Glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td>D No. 74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant cane</td>
<td>15.00</td>
<td>11.75</td>
<td>1.24</td>
</tr>
<tr>
<td>First year's stubble</td>
<td>15.53</td>
<td>12.61</td>
<td>0.86</td>
</tr>
<tr>
<td>Second year's stubble</td>
<td>16.03</td>
<td>13.15</td>
<td>0.92</td>
</tr>
<tr>
<td>D No. 95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant cane</td>
<td>14.90</td>
<td>11.90</td>
<td>1.70</td>
</tr>
<tr>
<td>First year's stubble</td>
<td>14.78</td>
<td>11.62</td>
<td>1.47</td>
</tr>
<tr>
<td>Second year's stubble</td>
<td>15.35</td>
<td>12.30</td>
<td>1.50</td>
</tr>
</tbody>
</table>

Pounds of cane ground, D No. 74: 18,651
Pounds of cane ground, D No. 95: 8,219

Total pounds of cane ground: 26,870
Extraction, 75.36 per cent.
Pounds of juice extracted: 20,250.
Pounds of first sugar obtained: 1,929
Pounds of second sugar obtained: 491
Pounds of third sugar obtained: 73

Pounds of total sugars obtained: 2,493
Pounds of total sugars per ton of cane: 185.6
Pounds of first sugar per ton of cane: 143.6

Sucrose, Glucose
Analysis of first sugar: 94.5, 2.10
Analysis of second sugar: 81.9, 4.65
Analysis of third sugar: 84.4, 4.50

Analysis of Third Molasses—Total solids: 79.98; sucrose, 31.97; glucose: 28.98; solids not sugar: 19.03; glucose ratio: 90.63; purity coefficient: 39.97.

Maximum tonnage per acre: 44.02
Minimum tonnage per acre: 25.79

RESULTS IN 1902.

This year two adjoining plats were selected and home canes planted in one and D. No. 74 in the other. They were cultivated alike. The home canes gave a continuous stand, while No. 74 was gappy in the center of the plat. Each plat was divided for comparison into subplats of three rows each, and weighed at harvest separately and juices therefrom analyzed. On account of a "gappy" stand in the center of the No. 74 plat, the yield in tonnage there was below the average
of the plat. Each plat was run through the sugar house separately and juice weighed and analyzed, the home cane in Run No. 6 and No. 74 in Run No. 7. The following are the comparative results:

Run No. 6—Pounds of cane ground.......................... 23,361
Run No. 7—Pounds of cane ground.......................... 24,942
Run No. 6—Pounds of juice extracted........................ 17,662
Run No. 7—Pounds of juice extracted........................ 19,171
Run No. 6—Percentage of juice (extraction).............. 75.61
Run No. 7—Percentage of juice (extraction).............. 76.86

Run No. 6—Analysis of juice:

<table>
<thead>
<tr>
<th>Brix</th>
<th>Suc.</th>
<th>Glu.</th>
<th>Other Solids</th>
<th>G. R.</th>
<th>P. C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.39</td>
<td>10.69</td>
<td>1.70</td>
<td>2.00</td>
<td>15.90</td>
<td>74.28</td>
</tr>
</tbody>
</table>

Run No. 7—Analysis of juice:

<table>
<thead>
<tr>
<th>Brix</th>
<th>Suc.</th>
<th>Glu.</th>
<th>Other Solids</th>
<th>G. R.</th>
<th>P. C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.56</td>
<td>12.14</td>
<td>1.13</td>
<td>2.29</td>
<td>9.31</td>
<td>78.02</td>
</tr>
</tbody>
</table>

Run No. 6—Maximum sucrose.............................. 11.00 per cent.
Run No. 7—Maximum sucrose.............................. 12.90 per cent.
Run No. 6—Minimum sucrose.............................. 9.60 per cent.
Run No. 7—Minimum sucrose.............................. 10.70 per cent.
Run No. 6—Pounds first sugar obtained................ 1,348
Run No. 7—Pounds first sugar obtained................ 1,800
Run No. 6—Pounds first sugar per ton cane............ 115
Run No. 7—Pounds first sugar per ton cane............ 144
Run No. 6—Pounds first sugar per acre, maximum...... 4,035
Run No. 7—Pounds first sugar per acre, maximum...... 5,545
Run No. 6—Pounds first sugar per acre, minimum...... 3,257
Run No. 7—Pounds first sugar per acre, minimum...... 4,234
Run No. 6—Analysis of first sugar; Glucose 1.19; sucrose, 96.05 per cent.
Run No. 7—Analysis of first sugar; Glucose 1.64; sucrose, 94.05 per cent.

Analysis of first molasses:

<table>
<thead>
<tr>
<th>Total</th>
<th>Solids not solids.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brix</td>
<td>Suc.</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>No. 6</td>
<td>63.06</td>
</tr>
<tr>
<td>No. 7</td>
<td>57.18</td>
</tr>
</tbody>
</table>

Run No. 6—Maximum tonnage per acre................... 35.03
Run No. 7—Maximum tonnage per acre................... 38.57
Run No. 6—Minimum tonnage per acre................... 28.28
Run No. 7—Minimum tonnage per acre................... 29.40

In strike No. 7 the sugar boiler lost grain at first and made finally a small grained sugar which rather depreciated the yield.

Below is given Runs Nos. 4 and 8. Run No. 4 was of first and second year stubbles, of home cane, which were harvested in season 1900-1901. Run No. 8 was of first and second
year stubbles of Nos. 74 and 95, most of which were cut early in October each year for shipment to the planters. The maximum given below represents those rows which were not cut until the regular harvest. The following are the results.

**Runs.**

<table>
<thead>
<tr>
<th>Run</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 4</td>
<td>Maximum tonnage per acre</td>
<td>24.28</td>
</tr>
<tr>
<td>No. 8</td>
<td>Maximum tonnage per acre</td>
<td>34.35</td>
</tr>
<tr>
<td>No. 4</td>
<td>Minimum tonnage per acre</td>
<td>16.92</td>
</tr>
<tr>
<td>No. 8</td>
<td>Minimum tonnage per acre</td>
<td>22.56</td>
</tr>
<tr>
<td>No. 4</td>
<td>Pounds of cane ground</td>
<td>30,625</td>
</tr>
<tr>
<td>No. 8</td>
<td>Pounds of cane ground</td>
<td>19,125</td>
</tr>
<tr>
<td>No. 4</td>
<td>Percentage of extraction</td>
<td>73.20</td>
</tr>
<tr>
<td>No. 8</td>
<td>Percentage of extraction</td>
<td>73.67</td>
</tr>
</tbody>
</table>

No. 4—Analysis of juice:

- **Brix.**  
  - No. 4: 15.74
  - No. 8: 16.76

- **Suc.**  
  - No. 4: 12.54
  - No. 8: 12.54

- **Other Glu solids.**  
  - No. 4: 1.04
  - No. 8: 1.04

- **G.**  
  - No. 4: 2.18
  - No. 8: 2.18

- **R.**  
  - No. 4: 8.29
  - No. 8: 8.29

- **K.**  
  - No. 4: 7.69
  - No. 8: 7.69

- **P.**  
  - No. 4: 0.28
  - No. 8: 0.28

- **C.**  
  - No. 4: 33.37
  - No. 8: 33.37

No. 4—Maximum sucrose: 13.70  
No. 8—Maximum sucrose: 15.40  
No. 4—Minimum sucrose: 9.90  
No. 8—Minimum sucrose: 11.50  
No. 4—Pounds of first sugar per ton cane: 129.6  
No. 8—Pounds of first sugar per ton cane: 139.1  
No. 4—Pounds of first sugar per acre, maximum: 3,146  
No. 8—Pounds of first sugar per acre, maximum: 4,778  
No. 4—Pounds of first sugar per acre, minimum: 2,198  
No. 8—Pounds of first sugar per acre, minimum: 3,138

The following is the composition of the first molasses:

**Total solids.**  
- No. 4: 63.79
- No. 8: 58.66

**Suc.**  
- No. 4: 39.94
- No. 8: 37.28

**Glu solids.**  
- No. 4: 13.33
- No. 8: 10.25

**G.**  
- No. 4: 10.52
- No. 8: 10.13

**R.**  
- No. 4: 33.37
- No. 8: 32.49

**K.**  
- No. 4: 62.61
- No. 8: 63.57

**P.**  
- No. 4: 33.37
- No. 8: 33.37

**C.**  
- No. 4: 63.79
- No. 8: 63.79

A close inspection of the above will show the merits of the seedlings D No. 74 and D No. 95, which have now been on trial at the Sugar Experiment Station for eight years.

Seedlings T. No. 111, and T. No. 189, seedlings respectively of D. 74 and D. 95, have this year been transferred to the field, and if future experiments shall sustain their high sucrose content, they may also prove valuable additions to our sugar fields.

Experiments in cultivation continue, and it is extremely gratifying to the station workers to learn from the returns recently made to the Sugar Planters' Association that fully eighty per cent of the planters of this State have adopted the teachings of this station, and are using the improved methods of cultivation.

Our planters are generally fertilizing their crops with
marked intelligence and with increased returns. The thorough preparation of the soil, the proper fertilization of the cane, with rational and economical cultivation, have enabled our planters to survive the disastrous seasons of the last four or five years.

The sugar house continued its work of clarification, checked by extensive investigations made by Dr. C. A. Browne, jr., who is devoting his time to the study of the composition of the sugar cane and its juices. In Bulletin No. 75, now in press, is given the results of his work on "Enzymes in Cane." The results of his studies of the "Germs in Cane" will soon be given to the public.

The preservation of syrups and molasses by sterilization, and the results of a study of the yeasts, molds and bacteria which cause a destruction of sugars, have been made the subject of Bulletin No. 75. The results given represent the patient and thorough work of Prof. W. R. Dodson for the past three or four years. By following the directions given, any small farmer can put up annually syrup sufficient for the wants of his family throughout the year, and perhaps some to spare.

By a device, illustrated in the bulletin, dealers may be enabled to put up sterilized syrup or molasses in large vessels, from which consumers or retailers can draw at pleasure without fear of fermentation.

**The Orange Grove**

continues to thrive and it is expected to gather a fair crop of fruit this year, both from the sweet oranges and the numerous crosses of the trifoliata and the edible oranges. Elsewhere, it is reported that crosses, similar to those in this orchard, have borne edible fruit, and this emboldens us to hope for success in our efforts the coming season.

**Fibre Crops.**

Ramie, jute and several varieties of hemp have again been grown during the past year. Late in November the Faure Decorticating machine reached New Orleans and was installed on this station. It is the invention of Mr. P. Faure of Limoges, France, and was delayed in shipment. Unfortunately it reached us too late to be tested last year, all of the plants being over ripe and injured by cold.

**Cottons.**

Fifty-four varieties of cotton were grown upon this station, covering many from India, Egypt, Japan and this country. They were all (Sea Island, Egyptian, long and short staple uplands) ginned on the roller gin imported from England. Seeds
of several varieties were distributed for trial among the planters of the State.

**Corns.**

A large number of varieties of corns of the six species, were grown. The species known as "Zea Tecta," with every grain in a shuck, and the entire ear also covered with shuck, was grown quite extensively to determine its merits as a feed stuff, when the entire ear was fed either whole or crushed.

**Tea Plants.**

The dry summer was unpropitious for the growth of the tea plants alluded to in our last report, and will therefore prevent the early harvest of leaves to be made into tea this spring.

**Garden, Grass and Forage Crops**

were grown. In the garden, as well as in the field, the superiority of home-raised seed was again demonstrated. Rescue grass, raised from homegrown seed, has proven perennial and is now growing well through the second winter, surviving the entire summer. Whilst that from bought seed disappeared completely after seeding in May. This grass affords excellent grazing throughout the winter, if sown in early fall.

Varieties of sorghums (saccharine and non-saccharine), millets, teosinte, beggarweeds, vetches, lathyrus, clovers, alfalfa, velvet beans and cow-peas have been very successfully grown during the past year, of the newly imported varieties, the Mauritius bean (Mucuna ——?) did well, giving an immense vine and ripening a few pods. The Pigeon Pea (Cajanus indica) grew to an immense height, making a large stalk and a dense foliage. It bloomed profusely, and late in the season produced a few seed.

A plant kindly sent us by Mr. Auguste De Villele, editor of Revue Agricole of St. Denis, Reunion, and known botanically as "Tephrosia canille," made a fine growth, but was killed by frost when in full bloom. Astragalus sinicus (an early and a late variety) was planted upon a large area. A good stand was obtained and the plants grew to maturity and ripened seed, but the quantity of hay produced per acre was insignificant. It is unworthy of further trial. Russian vetch has proven a success as a winter crop, readily reseeding itself the following fall. Phasemy (Phaseolus semirectus) and several varieties of Dolichos, made excellent growths, ripened their seed and in every way did well, but are greatly inferior to cow peas and velvet beans, and are deemed unworthy of cultivation here.

White lupins, green grams, sand vetch, several varieties of
horse beans and soja beans, sent by the Department of Agriculture from Washington, were more or less unsuccessful.

Sugar School.

During the fall, twelve sugar students from the Audubon Sugar School of the Louisiana State University, were given instruction in practical work by lectures and experiments in the field, laboratory and sugar house.

Station No. 2

State Experiment Station, Baton Rouge, La., has continued its work under Prof. W. R. Dodson, Assistant Director, with Mr. B. H. Atkinson as farm manager.

Besides the regular experiments in fertilizers, and with varieties of corn and cotton, an immense deal of work has been done in the raising of forage crops for feeding the large herd of cattle on the station. Besides the pure bred Herefords, there are ten grade Shorthorn cows, nine grade Hereford heifers, ten Polled Angus cows and heifers, sixteen fattening Polled Angus steers, one registered Polled Angus bull, and one grade Jersey cow. These cattle, notwithstanding the prolonged drought of last summer, were successfully pastured upon eighteen acres—perfect demonstration of the capacity of our native pastures to sustain an extensive cattle industry.

The calves bought in Illinois, November, 1901, and mentioned in our last annual report, were successfully immunized against Texas Fever. The females were turned out in the regular pastures with other cattle, while the steers have been regularly fed upon home-grown products, viz., cotton seed meal, rice bran, molasses and hay, given in balanced rations, with a view of preparing them for the Chicago markets.

These steers are now doing well and gaining on an average of over two pounds per day. They now average over 1,000 lbs each, and will be ready for the market some time during the year.

It has been found during the summer, that the ticks maturing upon these cattle were much more virulent than those grown upon home-raised cattle. So great was the suffering from this tick infestation that these animals did not gain at all during the month of August, and a few had high fever. By clearing them of ticks in September they all began to show immediate gains. These experiments have emphasized the sufferings of our native cattle from tick infestation, and every effort should be made to keep them comparatively clean during our long summers. Imported cattle, even after complete immunization, should not be permitted to become heavily infested with ticks at any time, if the best results are desired.
Excluding the period of heavy infestation of ticks, these cattle have done well and made excellent gains upon our home products, demonstrating the value of the latter as cheap feed for fattening all kinds of stock. So great is the demand for immunized bulls of the beef breeds, that every male calf dropped in the last two years has found an eager purchaser, and several names are recorded for "future deliveries." It may be mentioned that hogs have been following these cattle during feeding.

**Digestibility of Rice, Bran and Polish.**

Local dairies, sugar and rice planters have fully demonstrated the feeding values of these by-products of our rice mills, and the prices which they now fetch in our local markets attest their extensive consumption. While highly appreciated at home, all works on feeding give them both low coefficients of digestibility. Upon investigation it was found that these figures were based upon unreliable data. After corresponding with the authors of works on "Feeds," it was determined to test experimentally the real exponents of digestibility of these feeds. Accordingly, three steers weighing in the aggregate about 4,000 lbs, were procured for the experiment. Rice bran was first used. After getting the animals well accustomed to this food a regular maintenance ration of it alone was daily given. A preliminary feeding of a week or more preceded the experiments. Then a systematic weighing and sampling of all the bran consumed and the excreta voided by each animal began and continued through six days. These samples from each animal are now being analyzed by Mr. Chiquelin and Dr. Browne in the laboratory of the Sugar Experiment Station. In a few days, similar experiments will be made with rice polish. When completed the results will give the full feeding values of these by-products, and will add materially to the accurate knowledge of the digestibility of Southern feed-stuffs. When completed the results will be published in a special bulletin.

Prof. H. A. Morgan has been experimenting during the year with various mixtures for spraying cattle, with a view of killing the ticks without injury to the animal, and has reason to believe that his efforts have been successful. He has been equally as successful in finding a wash which will repel the horn-fly, a veritable terror to cattle, particularly to those individuals of dark or black colors.

During the year he has published in Bulletin No. 70 the complete results of his investigations of the Sugar Cane Borer. Investigrays of Texas Fever and the tick which conveys it, are still going on, with the hope that ultimately some
means may be shown by which both may be eliminated from the South.

Dr. Dalrymple, assisted by Prof. Morgan, has continued his experiments in the study of the nodular worms in sheen, and the results obtained clearly indicate a way by which a flock of sheep may be raised entirely free from these parasites. These results embodied in a bulletin, now in press, will be of great value to the sheep breeders of the country.

Dr. Dalrymple has been called during the year to assist in eradicating infectious and contagious diseases among stock in several parishes of the State. He has recently attended the National Live Stock Association of America, where by invitation he lectured upon the “Infectious Diseases of Farm Animals.” He has also, by invitation, delivered a series of lectures at the Agricultural and Mechanical College of Nebraska, upon the “Immunization of Northern Cattle,” and the “Agricultural Possibilities of the South.”

The demand for seed, cuttings, and rooted plants, by the farmers of the State has been fully met by the Horticultural Department of this station.

Station No. 3.

North Louisiana Experiment Station, Calhoun, La., had a season similar to the previous one described in my last report. The spring opened with favorable weather and rainfall. Crops grew luxuriantly only to be seriously checked by a prolonged drouth in early summer, which materially reduced the corn fields and injured the tobacco crop. Subsequently, favorable conditions prevailed which produced a fairly good crop of cotton, and excellent hay crops and pastures. Accordingly, stock of all kinds entered the winter in good condition.

Dwarf Essex rape has again afforded an excellent fall pasture. Oats and barley sown in early fall, afford splendid grazing all through the winter, and if stock be taken off in March produce good crops of grain. A variety of forage crops, corns, cottons and tobacco were grown during the past year. The dairy continues to be popular with the farmers and gives them a model for their home efforts, which nearly everyone is adopting. There are very few farms in North Louisiana without first-class butter. The dairy has Jerseys, Guernseys, Devons and Red Polls, and the merits of each as a breed, meeting the requirements of the small farmers of North Louisiana, are being tested. Experiments are being continued in varieties of sheep and hogs, testing adaptability to the wants of this hill country.

The young orchard on the station continues to do well and hopes are entertained of a full crop the present year.
The garden is still a feature of the station and is a valuable demonstration of the adaptability of this section to truck growing on a large scale.

Mr. W. R. Goyne, a graduate of the University, and who was announced in our last report as the successor of Mr. T. Ivy Watson as farm manager, resigned his position in July last, and in a few weeks thereafter was taken with typhoid fever and died. It is with deep regret that we chronicle the untimely death of this promising young man, so full of enthusiasm in his chosen profession of agriculture.

The great success in every way of the last Camp Meeting and Fair held at this station in October, was a source of much pleasure to all. A large attendance, an extensive and varied exhibit, a good premium list, and the best of order were the prominent features of the occasion.

**STATE GEOLOGICAL SURVEY.**

Having received an increased appropriation for this survey from the last legislature, the work has been greatly enlarged. Mr. A. G. Veatch, a former member of this survey, has made a thorough study of the subterranean waters of North Louisiana, South Arkansas and East Texas. This work has been accomplished at the joint expense of the United States Geological Survey and the State Survey. His report, which will throw much light upon artesian waters in North Louisiana, will be given to the public as soon as his work is completed.

Prof. G. D. Harris and Mr. E. F. Lines have been in the field since January 1st., investigating the oil resources of the State and studying the subterranean strata in which it occurs. Incidentally a large amount of valuable information relative to other subterranean resources has been obtained. Considerable enthusiasm in the oil developments of this State, prevails, and a large number of wells are being bored in various sections, many of which will doubtless prove disastrous failures.

Mr. C. E. Smith has been engaged during the winter in studying the clays and lignites of the State. He has collected a large number of samples of clays and brick from many sections of the State, and will test the quality of the former in the station laboratory, and in the kilns of the Baton Rouge Brick Works, permission for which has been kindly granted by the generous proprietors. In examining the so-called lignites of the Dolette hills, he was surprised to find an immense bed of almost pure coal. The upper seam is 6 1-2 feet thick and easily workable. There are several seams below this, varying in thickness from five to seven feet. A ton of this coal has been sent us for trial and analysis. It was found to burn excellently well in stoves and closed grates. Its high content of water
causes it to burn slowly at first in open grates. However, with a hot fire and a little artificial draught, it burns fairly well here.

A proximate analysis gives it the following composition: Moisture 35.55 per cent. Volatile Matter 30.28 per cent. Fixed Carbon 31.18 per cent, Ash 2.99 per cent. This sample is from the upper seam and only four or five feet from the surface. It is highly probable that deeper covering and lowering seams may produce a coal with much less moisture. Upon exposure a large amount of this moisture will evaporate and give an increased value to the residue. It will probably "slack" more or less on exposure. Experiments are now being conducted looking to the solution of these questions.

On account of the importance of this discovery, Prof. G. D. Harris and Mr. E. F. Lines have joined Mr. Smith and together they are making a complete investigation of the entire field. The results of their work will be given later in a bulletin.

Mr. Edwin Smith, of the United States Coast and Geodetic Survey, has been cooperating with the State Survey and has been during the winter engaged in determining the magnetic influences and establishing a permanent North and South line at the various parish seats. It affords me great pleasure to announce the full cooperation of the Police Juries of the various parishes with us in this work.

Through the generosity of the Bureau of Soils (Prof. Milton Whitney, Chief), of the Department of Agriculture at Washington, D.C., a large area of the soils of Louisiana will be mapped. The following schedule of work has been adopted for the present year:

Parish of Ouachita, January 1, to March 31.
An area of 200 square miles around New Orleans, April 1, to June 30.
Parish of East Baton Rouge, July 1, to Sept. 30.
Parish of Acadia, October 1, to Dec. 31.

Mr. Geo. N. Coffey and Mr. Rice began work on this schedule January 1st., and will continue throughout the year. They are making a complete soil survey and establishing lines of level by means of the plane table. The soils will be carefully analyzed physically and chemically, and their adaptability to certain crops as shown by analysis pointed out. Maps of the section will accompany the report.

The entire expense of this survey is borne by the United States Department of Agriculture, and the results of the work will be furnished the Geological Survey of this State.

A contract has been entered into between the Director of the United States Geological Survey and the Director of this station, by which a quadrangle included between 30° 30', and
31° latitude, and 91° and 91° 30' longitude shall be mapped upon a scale 1:125000, showing the courses of the drains, bayous, etc., hypsography and public culture, including location of farm houses, roads, towns, and county boundaries lines. The townships and sections of the land survey will be accurately given. The hypsography will be shown by contour lines with vertical intervals of 20 feet. The heights of important points will be determined and at least one permanent bench mark established in each township. All outlines of wooded areas will be represented on the map. Upon the completion of the survey, the station will be furnished copies of the manuscripts and transfers from the copperplates of the maps for use in printing its own edition of said map.

This survey will begin March 1st and continue until finished, the work to be completed not later than January 1, 1904.

Since our last report another publication of this survey has been issued by Prof. G. D. Harris and Mr. A. C. Veatch. Seven thousand copies were published. The book is an octavo of 288 pages, besides numerous illustrations, and is very neatly printed and bound. The following subjects, all handsomely illustrated, are treated therein:

1. The tertiary geology of the Mississippi embankment.
2. The saline of North Louisiana.
3. The geography and geology of the Sabine River.
4. Notes on the geology along the Ouachita.
5. Improvements in Louisiana cartography.
6. The subterranean waters of Louisiana.
7. The tides in the Rigolets.
8. Oil in Louisiana.

The demand for the publications of the survey is very great, both from our home people and those seeking investments in this State. Copies are furnished free upon application to the Director of this station.

Farmers' Institutes.

The staff of the three stations has taken an active part in the Farmers' Institutes held last year in this State, several acting as Conductors.

The writer held three very successful institutes in the Sugar District, viz., Houma, Thibodaux, and Napoleonville, during the fall, all of which were largely attended, and great interest manifested.

Analyses of Fertilizers and Paris Greens.

The official work performed in the laboratory of the station during the past year has greatly increased.

3,001 samples of commercial fertilizers and 71 of Paris
Green, sent by the inspectors of the State Department of Agriculture, have been received and analyzed. This immense work required nearly the entire time of our whole force of chemists from January to July, and a part of them the rest of the year.

The last legislature included cotton seed meal (when used as a fertilizer) under the provisions of the Fertilizer Act, and the present year will therefore add still further to the work of this laboratory.

It is extremely gratifying, however, to know that such confidence is placed in our work that buyers and sellers effect contracts based upon our official analyses.

An immense bulletin of nearly 200 pages, embodying the results of this work, has recently been given to the public.

Other Analyses.

Besides the official work given above, the station has performed 37 analyses of waters, and 60 analyses of coals, ores, boiler scales, limes, cement and clays for the public.

Irrigation Waters of Rice Fields.

To determine the amount of fertility borne to the rice fields by the irrigating waters, and to compare those coming from rivers, bayous and wells, large number of waters were collected during the flooding season from the different rivers, bayous and artesian wells of Southwest Louisiana, and accurate analyses made of the same. This work is not yet complete. When finished the results will be given to the public.

Station and Survey Analyses.

Besides the above public work a large number of analyses incident to the regular work of the station has been made. Whenever opportunity has permitted, work on the soils of the State collected by the Geological Survey has been performed, and up to date over two hundred soils have been chemically analyzed, and over five hundred physically separated.

Bulletins and Reports.

Since our last report the following bulletins have been issued:

No. 66, Sugar Cane—Experiments in cultivation—26 pages.
No. 67, Broom Corn—"How to grow and cure it,"—14 pages.
No. 68, Home-grown versus Purchased Seed—32 pages.
No. 69, Pecans—40 pages.
No. 70, Cane Borer—42 pages.
No. 71, Report of North Louisiana Station, for 1901—28 pages.
No. 72, Forage Crops, Grasses, Clovers, etc., (in press)
No. 73, Analyses of Commercial Fertilizers and Paris-Green (1902)—200 pages.
No. 74, Sheep and diseases of same (in press)
No. 75, Preservation of Syrups, etc (in Press)
Fourteenth Annual Report—12 pages.

The demand for bulletins has become so great that our entire mailing list has been carefully revised and extended. Fifteen thousand copies of each bulletin are now issued, and the labor of sending them off, even with the most approved modern facilities, is great.

South Carolina Interstate and West Indian Exposition.

Charleston, S. C. Dec. 1, 1901—June 1, 1902.

By request of your Excellency, Major J. G. Lee and the writer, Commissioners to the Pan-American Exposition at Buffalo, N. Y., transferred at its close the Louisiana Exhibit to Charleston, S. C., where it was most tastefully installed by our assistant, Mr. Robert Glenk, in a space of 4,500 square feet.

The exhibit was greatly admired, and received the following awards: 32 gold medals, 16 silver medals, 23 bronze medals, 31 diplomas of honorable mention, and one special award for installation of exhibit. Louisiana Day was appropriately celebrated on the 27th March, with addresses from our distinguished citizens Judge Emile Rost, Dr. Fred J. Mayer, and Mr. Lucien Soniat, besides appropriate remarks from several invited guests.

At the close of this exposition, the entire exhibit was removed to New Orleans, where with your approval, it was turned over to the Progressive Union. It was handsomely displayed by Mr. Glenk in the room of this Union where it is attracting a large amount of interest, besides affording a valuable object-lesson of the wonderful resources of this great State.

Much of it will be used for the coming World's Fair at St. Louis.

Staff of the Station.

A few changes have taken place in the personnel of the stations since our last report.

Messrs. G. W. Agee and T. D. Boyd, Jr., have resigned to accept more lucrative positions elsewhere. Their places have
been filled by Mr. M. Esnard and Mr. R. E. Loudon, graduates of the Louisiana State University. Mr. Wm. D. Clayton resigned to accept a position elsewhere, and Mr. Robt. S. Washington has been appointed in his place. Mr. M. Bird, so long chemist at the North Louisiana Experiment Station, resigned last spring, and Mr. Simon Baum has been transferred from Audubon Park to fill his place. Dr. C. A. Browne, Jr., an expert in organic chemistry, has been added to the chemical force of the Sugar Experiment Station, and is engaged in studying the solids not sugar in the sugar cane and its products. We have already alluded to the resignation and untimely death of Mr. Wm. R. Goyue.

The following constitute the present staff of the stations:

Sugar Experiment Station No. 1.

Postoffice Audubon Park, New Orleans, La.
William C. Stubbs, Ph. D., Director.
R. E. Blouin, M. S., Assistant Director and Chemist.
P. L. Hutchinson, B. S., Chemist.
C. A. Browne, jr., Ph. D., Chemist.
M. Esnard, B. S., Asst. Chemist.
R. E. Loudon, B. S., Asst. Chemist.
G. D. Harris, M. S., Geologist.
C. E. Smith, Assistant Geologist.
E. F. Lines, Assistant Geologist.
George Chiquelin, Chemist and Sugar maker.
R. S. Washington, M. S. Farm Manager.
Jas. K. McHugh, Secretary and Stenographer.

State Experiment Station No. 2.

Postoffice, Baton Rouge, La.
William C. Stubbs, Ph. D., Director.
W. R. Dodson, A. B., S. B., Asst. Director, Botanist and Bacteriologist.
C. E. Coates, Ph. D., Chemist.
H. A. Morgan, B. S. A., Entomologist.
F. H. Burnette, Horticulturist.
B. H. Atkinson, Farm Manager.
H. Skolfield, Treasurer.

North Louisiana Experiment Station No. 3.

Postoffice, Calhoun, La.
William C. Stubbs, Ph. D., Director.
D. N. Barrow, B. S., Assistant Director.
Simon, Baum, B. S., Chemist.
H. Peevy, Farm Manager.
F. J. Watson, Horticulturist.
Travis McLendon, Dairyman and Poultryman.
C. H. Bumpass, Tobacconist.

At the end of this report will be found a correct exhibit of the receipts and expenditures arising from the Hatch Bill for the fiscal year ending June 30, 1902. It shows that expenditures have equalled receipts.

There is also given a supplementary statement of receipts from all sources and expenditures of every kind.

All of which is respectfully submitted.

Wm. C. Stubbs. Director.

**Financial Statement.**

<table>
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<tr>
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<th>Cr</th>
<th>Dr</th>
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<tr>
<td>1902</td>
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<td>$15,000.00</td>
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<td>The receipts from the Treasurer of the United States for the year ending July 1, 1902.</td>
<td>$15,000.00</td>
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<td>By Salaries</td>
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<td>Labor</td>
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<td>Freight and Express</td>
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<td>Heat, Light and Water</td>
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<td>Chemical Supplies</td>
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<td>Seeds, Plants and Sundry Supplies</td>
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<td>Fertilizers</td>
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<td>Feeding Stuffs</td>
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<td>Tools, Implements and Machinery</td>
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<td>Scientific Apparatus</td>
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<td>Live Stock</td>
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<td><strong>Total</strong></td>
<td><strong>$15,000.00</strong></td>
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We, the undersigned members of the Board of Agriculture and Immigration, to whom is entrusted the disbursement of the above funds, do certify that we have examined the accounts of the Experiment Station of the Louisiana State University and Agricultural and Mechanical College, for the fiscal year ending, June 30, 1902, and have found the above classification to be correct, and the receipts for the time named are shown to be $15,000.00, and the corresponding disbursements are $15,000.00, for all of which the proper vouchers are on file, and have been examined by us and found correct.

(Signed) J. G. Lee.

Commissioner of Agriculture and Immigration.

Wm. Garig, vice-President Board of Supervisors and ex-Officio Member of Board of Agriculture.
### Supplementary Statement.

#### 1902

<table>
<thead>
<tr>
<th>Description</th>
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<tr>
<td>To receipts from other sources than the United States, for the year ending July 1, 1902.</td>
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<td>To Balance, July 1, 1901,</td>
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<td>State Appropriation</td>
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<td>Geological Survey</td>
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<td>Fertilizer Fund</td>
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<td>Farm Sales</td>
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<td>Miscellaneous receipts</td>
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<td><strong>Total</strong></td>
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<td>By Balance, July 1, 1902</td>
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LIST OF PUBLICATION.

FIRST SERIES.

Bulletin No. 1—Organization of Sugar Experiment Station.
" No. 2—Manural Requirements of Soil.
" No. 3—Experiments With Various Crops.
" No. 4—Results of Experiments With Oats
" No. 5—Results of Experiments With Sorghum.
" No. 6—Results of Experiments With Corn.
" No. 7—Field Experiments With Sugar Cane.
" No. 8—Experiments With Cotton.
" No. 9—Analyses and Valuation of Fertilizers.
" No. 10—Sugar House and Laboratory Work in 1886.
" No. 11—Experiments in Oats
" No. 12 Experiments in Sorghum.
" No. 13—Cotton and its Products.
" No. 14—Sugar Cane (field experiments).
" No. 15—Rice.
" No. 16—Potatoes, Tomatoes, Peas and Small Grains.
" No. 17—Ensilage.
" No. 18—Analyses of Commercial Fertilizers.
" No. 19—Sorghum, Field, Laboratory and House Results; Diffusion Process
" No. 20—Sugar Cane (field results)
" No. 21—Report of State Experiment Station, Baton Rouge, 1888.
" No. 22—Report of North Louisiana Experiment Station, Calhoun, 1888
" No. 23—Sugar Cane, Laboratory and Sugar House Results.
" No. 24—Rice and its by products.
" No. 25—Analyses or Commercial Fertilizers.
" No. 26—Report of State Experiment Station, Baton Rouge, 1889.
" No. 27—Report of North Louisiana Experiment Station, Calhoun, 1889.
" No. 28—Report of Sugar Experiment Station, 1889.

SECOND SERIES.

Bulletin No. 1—Commercial Fertilizers.
" No. 2—Texas Screw Worm.
" No. 3—Report of Horticultural Department for Baton Rouge and Calhoun Stations.
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<td>4</td>
<td>Irish Potatoes; Results at Three Stations</td>
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<td>5</td>
<td>Sugar Making on a Small Scale (reprint with additions)</td>
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<td>Sugar Cane (field experiments, 1890)</td>
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<td>Report of State Experiment Station, Baton Rouge</td>
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<td>8</td>
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<td>9</td>
<td>Sugar Cane Borer and its Parasite</td>
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<td>Systematic Feeding of Work Stock</td>
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<td>11</td>
<td>Report of Sugar House and Laboratory, 1890</td>
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<td>Sugar Cane; Field and Laboratory Results</td>
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<td>15</td>
<td>Report of Veterinarian for 1891</td>
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<td>16</td>
<td>Results of North Louisiana Experiment Station, Calhoun</td>
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<td>17</td>
<td>Report of State Experiment Station, Baton Rouge</td>
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<td>18</td>
<td>Analyses of Commercial Fertilizers</td>
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<td>19</td>
<td>Forage Crops, Grasses, Clovers and Small Grains</td>
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<td>Tobacco Growing in Louisiana; Results at Calhoun</td>
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<td>21</td>
<td>Results of North Louisiana Experiment Station, Calhoun, for 1892</td>
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<tr>
<td>22</td>
<td>Report of State Experiment Station, Baton Rouge, 1892</td>
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<td>23</td>
<td>Analyses of Commercial Fertilizers</td>
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<td>Sugar Cane; Field Experiments, Physical and Physiological</td>
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<td>25</td>
<td>Tobacco at North Louisiana Experiment Station</td>
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<td>26</td>
<td>Sugar Cane; Varieties of Cane and Striped Versus Purple</td>
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<td>27</td>
<td>Horticulture at Baton Rouge, Calhoun and Audubon Park</td>
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<td>28</td>
<td>Report of State Experiment Station, Baton Rouge</td>
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<td>29</td>
<td>Results for 1893, at Calhoun</td>
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<td>30</td>
<td>Sweet Potatoes (with illustrations.)</td>
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<td>31</td>
<td>Domestic and Commercial Fertilizers</td>
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<td>32</td>
<td>Ramie, Uses, History, Composition, etc.</td>
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<tr>
<td>33</td>
<td>Tobacco Growing in Louisiana, With Results at Calhoun</td>
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<td>34</td>
<td>Cattle Feeding in Louisiana</td>
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</table>
Bulletin No. 35—Report of North Louisiana Experiment Station, Calhoun, 1894.

No. 36—Horticulture; Results for 1894.

No. 37—Windrowed Versus Standing Cane.

No. 38—Chemistry of Sugar Cane and its Products.

No. 39—Analyses of Commercial Fertilizers.

† No. 40—Cow Pea; Origin, Botanical Relations, Chemical Composition, Feeding Value, Restorative Virtues to the Soil, etc.

No. 41—Tobacco; Results at Baton Rouge and Calhoun.

No. 42—Horticulture; Results for 1895.

No. 43—Bovine Tuberculosis in North Louisiana.

† No. 44—Charbon or Anthrax, with Experiences During Outbreaks in North Louisiana.


† No. 46—Leguminous Root Tubercles.

No. 47—Experiments in Corn, Cotton, Forage Crops, Tobacco, etc., at State Experiment Station, Baton Rouge.

No. 48—Report of the Entomologist.

No. 49—Commercial Fertilizers

No. 50—Red Rice.

† No. 51—Cattle Tick and Texas Fever.

No. 52—Horticulture; Results for 1896-1897.

† No. 53—Grasses, Clovers, Forage Crops, etc.

No. 54—Analyses of Commercial Fertilizers and Paris Green.

† No. 55—Alfalfa, Spanish Peanuts, Unknown Cow Pea and Velvet Bean.

† No. 56—Ticks and Texas Fever.

No. 57—Immunization Against Texas Fever by Blood Inoculation.

No. 58—Analysis of Commercial Fertilizers and Paris Green.

† No. 59—Sugar Cane; Fields and Laboratory Results for Ten Years

No. 60—Charbon (Anthrax)

No 61—Rice; Preparation, Cultivation, etc.

No. 62—Report of North Louisiana Experiment Station, Calhoun, for 1899


No. 64—Report of the Veterinarian.

No. 65—Analyses of Commercial Fertilizers and Paris Green.
Bulletin No. 66—Sugar Cane; Experiments in Cultivation.
No. 67—Broom Cora; "How to Grow and Cure it."
No. 68—Home-Grown Versus Purchased Seed.
No. 69—Pecans and Pecan Culture.
No. 70—Cane Boere (Diatroza Saccharalis)
No. 71—Report of North Louisiana Experiment Station, Calhoun, for 1899.
No. 72—Forage Crops, Grasses and Clovers.
No. 73—Analyses of Commercial Fertilizers and Paris Green.
No. 74—Sheep; Different Breeds, Internal Parasitic Diseases, etc.
No. 75—Preservation of Cane Syrups; and Yeasts, Moulds, Bacteria and Enzymes.

SPECIAL BULLETINS.
The Orange and Other Citrus Fruits, from Seed to Market, With Insects Beneficial and Injurious, with Remedies for the latter. Sugar Cane, Vol. 1, History, Botany and Agriculture.

GEOLOGICAL BULLETINS.
Part II. A Preliminary Report upon the Hills of North Louisiana, South of the Vicksburg, Shreveport and Pacific Railroad.
Part IV. A Preliminary Report upon the Bluff and Alluvial Lands of Louisiana.
Part V. Historical Review; General Geology; Special Papers.
Part VI. Tertiary Geology of the Mississippi Embayment; Salines of North Louisiana; Geography and Geology of the Sabine River; Notes on the Geology Along the Ouachita; Improvements in Louisiana Cartography; Subterranean Waters of Louisiana; the Tides in the Rigolets; Oil in Louisiana.
Annual Reports.
1888, ‡ 1889, 1890, 1891, 1892, 1893, ‡ 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902.

Biennial Reports.
Reports and bulletins marked thus (‡) are out of print and cannot be supplied.