BIENNIAL REPORT

OF THE

NORTH CAROLINA DEPARTMENT OF AGRICULTURE

FROM DECEMBER 1, 1924
TO NOVEMBER 30, 1926

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LETTER OF TRANSMITTAL

To His Excellency, Angus Wilton McLean,
Governor of North Carolina.

Sir: In compliance with section 3944 of the Revisal of 1905, I submit the following report of the operation of the Department of Agriculture for the years 1925 and 1926.

Respectfully

Commissioner of Agriculture.

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J. L. REA, JR. ..... Superintendent Washington Farm, Wenona
J. F. HATCH ..... Custodian

BIENNIAL REPORT

OF THE

NORTH CAROLINA DEPARTMENT OF AGRICULTURE

1925-1926

WORK OF THE NORTH CAROLINA DEPARTMENT OF AGRICULTURE

The State Department of Agriculture has made steady and substantial progress along all its various lines of work during the past two years.

Reorganization and Allocation of the Agricultural Extension Service

For a number of years both the State Agricultural and Engineering College and the State Department of Agriculture contributed jointly to the support of the Agricultural Extension Service, while neither of these Institutions exercised direct executive control over said service.

This arrangement for carrying on the extension work had, all along, proved unsatisfactory to both the College and the Department but was allowed to go on until 1925, when the Legislature enacted Chapter 142, Public Laws of 1925, outlining the proper work of the Joint Committee which, prior to this time, exercised full control over the Agricultural Extension Work.

Even before this Act was passed the President of the College and the Commissioner of Agriculture had drawn the lines of demarcation between the functions and logical lines of work of the two institutions, giving the work of investigation and production in agriculture to the College and retaining the policing and marketing work under the jurisdiction and control of the department.

The two institutions are coöperating harmoniously at all points where full and complete separation of work was not possible, such, for in-

stance, as in the operation of the branch experiment stations. In the operation of these sub-stations the State Board of Agriculture sets aside whatever sum its budget can spare to be used by the College in its investigational work in agriculture, while the Department retains ownership and full executive control of the stations.

GENERAL CROP CONDITIONS

With the exception of cotton and tobacco the crops of the State for the past two years have, on account of prolonged spring and summer droughts, not yielded as abundantly as usual. But in spite of this shortage the crop values of the State for the past two years have averaged around $325,000,000.

In 1925 our corn crop was over 41 million bushels and the forecast for 1926 is for over 49 million. We are going to be short on the peanut crop, but on hay, sweet potatoes, all kinds of fruits, cane syrup, and some other minor crops, we can boast a great advance over 1925.

In 1925 we produced 9,810,000 bushels of wheat, but since that time prices, while higher than the average for the United States, have not encouraged the growing of wheat in competition with cotton and tobacco. In 1925 the acreage in wheat was the lowest since 1874. The yield was estimated at eleven bushels per acre and the price was $1.71 on December first. This brought the farmers only $18.81 gross return per acre. When cost of production is figured off the net return from the North Carolina wheat crop will be found to be very low. We cannot, therefore, in the face of such facts as these, encourage our farmers to grow wheat for the general market in competition with the western wheat growers. Our farmers can, however, grow their own home supply of wheat to great advantage, and to this extent we do urge them to include wheat in their program of diversification.

The State Agricultural and Engineering College and the State Department have, for years, urged diversification of crops as the safest farm practice. Some feel that our preachments have gone unheeded, and so they have to a large extent. Tobacco and cotton are still our leading money crops and are likely to remain so, but when we deduct $192,034,000, the sum of the values of our cotton and tobacco crops, from our total crop values of $325,000,000, we have left the sum of $133,627,000 to be distributed among all the other crops grown in the State—fruit, truck, grain, vegetables, nuts and so on, to say nothing of the ever increasing output of livestock and livestock products.

During the past two years our livestock sanitary work has placed the livestock industry on a stable basis and made our State safe for an unparalleled advancement in livestock production, within its borders.

Our activities in the field of marketing farm products have extended to fruits, vegetables, corn, soybeans, hay, poultry, eggs, hogs and cattle. Much good has been accomplished in this department of our work and the demand for a rapid increase of our efforts along marketing lines is becoming more and more insistent each year.

The terms of the following members of the Board expire March first: Second District, J. J. Harris, Macon; Fifth District, R. W. Scott, Haw River; Eighth District, W. B. McLelland.

Following are the biennial reports of the different divisions of the Department which will show the different lines of work of the Department and the progress made since 1925.

DIVISION OF TEST FARMS

To the Commissioner of Agriculture:

SIR: I am submitting herewith the biennial report of the Division of Test Farms for the fiscal years 1925-1926.

In this report special emphasis will be given to the kinds of work on the different farms due to their locations and to the improvements and notable results since the last biennial report.

More detailed reports on the various projects have appeared from time to time in bulletins and circulars published by the Department and State College, in the agricultural press, and in the newspapers of the State.

GENERAL

The six Test Farms are located in the principal soil regions of the State and are concerned chiefly with the agricultural problems of their respective regions. The program for work on each station has been maintained to the extent that the most fundamental problems confronting the farmers of the different sections might be given first consideration.

From the standpoint of organization the stations represent the field laboratories where the specialists of the State and Federal institutions can carry on their investigations under conditions typical of the different agricultural regions, and where the results secured can be used by the farmers of the sections without modification. From the standpoint of service to the agricultural interest of the State at a minimum cost, this plan has given good results.

The Test Farms are now carrying on 179 definite projects, and some of these have one or more sub-projects. Of this number 122 projects are conducted in coöperation with the subject matter division at the State College; 14 projects in coöperation with the subject matter divisions at the State College and the U. S. Department of Agriculture; 7 projects in coöperation with the U. S. Department of Agriculture alone; 13 projects in coöperation with the divisions at the State Department of Agriculture, and 23 Test Farm projects with no coöperation.

The coöperative work on the Test Farms has been most satisfactory. The specialists have shown a fine spirit in this coöperative plan, and they have been helpful in the conduct of the work on the farms as a whole. Our connection with the Federal Department allows us to carry on the work on a much larger scale, and at the same time have their assistance in planning and financing the work.

HOGS READY FOR MARKET FROM THE FEEDING TESTS AT THE BLACKLAND STATION
These pigs averaged 200 pounds at six months of age

BLACKLAND STATION—WENONA

J. L. RHEA, JR., *Superintendent*

This station of 200 acres was established in 1913 for the purpose of serving the farming interests of the large blackland area of Eastern North Carolina. One of the largest agricultural developments in recent years has been on these lands. Thousands of acres of this fertile land have been cleared, drained and brought into cultivation. Very little is known of the methods of handling this soil for best crop results, and the investigational work on the farm is planned with the view of solving these problems. The station is now conducting 16 definite projects.

Swine Investigation. This project has probably attracted more attention than any phase of the experimental work at this station. The work was started primarily to find a better market for corn, which is the principal money crop for the section.

The feeding tests have shown that fish meal, shelled corn and mineral are better than soybean meal, shelled corn and mineral from the standpoint of gain and cost. In the test in 1925 the fish meal lot cost $9.29 per hundred pound gain, and the soybean lot $9.61. The corn fed to hogs and marketed on "four legs" in this experiment brought 89 cents per bushel above the market price for corn.

A herd of twelve pure bred Poland China sows and a boar are kept on the station and all pigs for this test work are raised on the farm.

For the past two years the farm has marketed two cars of hogs annually from the feeding tests. The car sold in March, 1926 brought $1,509.44 net, and the car sold in August, 1926 brought $1,547.59.

Beef Cattle. The beef cattle projects started this spring are to determine the carrying capacity of the native reed pastures and to conduct breeding studies with native cattle. Eighty acres of undeveloped land at the back side of the farm is being used for this work.

Agronomy. In the fertilizer rotation test with corn, oats, soybeans and Irish potatoes, stable manure, nitrate of soda and potash give best results. Acid phosphate seems to have very little, if any value when applied alone.

The cultural plats have been increased in size this year and new plats added. The object of this test being to determine the proper depth of plowing and the advantage, if any, in ridging land in preparation for planting.

The lime tests further prove that lime is essential for the production of corn and soybeans, and that finely ground limestone is better than marl or hydrated lime. An 8-2-4 fertilizer applied at the rate of 300 pounds per acre in addition to limestone will materially increase the yield of corn on the blacklands.

In the soybean variety tests, the Herman and Dixie varieties gave the largest yield of seed and the Laroda gave the best yield of hay. The Biloxi and Otootan varieties were killed by frost before maturity.

The corn variety tests for the first year indicate that the one ear varieties will give the largest yield where no fertilizer is used.

A pasture grass test was started this spring using the different grasses and clovers alone and in combination. The object of this test being to determine the proper pasture mixture for permanent pastures on the blacklands.

General Crops. Approximately ninety acres of land is devoted to general crops with the view of producing feed for the work stock and corn for the hog feeding experiments.

Farmers Meetings. The second Annual Farmers Field Day was held this year on July 15 with good success. Around 700 folks were present. An instructive program was arranged which was followed by trips to the experimental fields. These meetings have been helpful in getting the work before the people of the section and should be encouraged. The number of visitors is increasing each year, which alone indicates a growing interest in the work of the station.

Improvements. The improvements completed during the past two years have materially benefited the station and added to its efficiency. A new implement shed (34 x 60 feet) was completed in 1925, which provides storage for the farm implements and machinery. A set of platform scales has been conveniently installed to take care of the swine experiments. A new modern horse barn has been completed to take the place of the barn destroyed by fire in February 1925. Eighty acres of land have been fenced for the beef cattle project. Two dwellings and the hog houses have been painted. Bath-room fixtures have been installed in the Superintendent's dwelling.

COASTAL PLAIN STATION—WILLARD

CHARLES T. DEARING, *Superintendent*

The Coastal Plain Station was established in 1905. The area of the station when purchased was 218 acres, and thirty-one acres were added in 1921 in order to allow for future expansion.

The work on this station deals with the kind of farming best suited to the lower coastal plain region of the State, and much valuable information has been secured from the many lines of investigational work which is being used generally by the farmers of the section. At present 42 definite projects are conducted at this station in addition to several minor tests.

All of the major projects of the station have been maintained and carried forward during the past two years and additional information has been secured. Of these projects four are outstanding from the

Narcissus Bulb Field at the Coastal Plain Station with the Poeticus Variety in Bloom

standpoint of results obtained and interest aroused among the farmers of the section. These are the poultry projects, the Narcissus bulb projects, the soybean variety tests, and the dairy investigations.

Poultry. A great deal of interest has been aroused by poultry work at this station, and the plant has become recognized as one of merit. Moreover the poultry sold from this plant have proven to have exceptional constitutions and vigor, thus establishing the importance of proper and careful handling of a flock. Of all flocks tested in the State so far, this is the only one found entirely free from bacillary white diarrhoea. This plant has taken the lead in the poultry industry for Southeastern North Carolina, and much of the credit is due to Mr. C. O. Bollinger, our Station Poultryman for his good work.

Narcissus Bulbs. One of the most important developments in this territory has been the Narcissus bulb industry, and in this work the station has been outstanding as a pioneer. During the past year we have again demonstrated the commercial value of Narcissus bulbs as a money crop for the section and the station has served as a nucleus for the exchange of information regarding this new development, and as a means through which the growers of this State have been reached by outside specialists on bulb culture.

Soybeans. The soybean variety tests have been very popular with our farmers as they have been much interested in comparing the relative merits of their standard varieties with the new varieties on the market, such as Biloxi, Otootan and Tokio. The results of last year's test showed Tokio to be the highest yielding variety both for hay and seed, but also demonstrated the merit of our standard varieties, such as "Virginia" for hay and "Mammoth Yellow" as a standard variety for feed and seed.

Dairying. With the increased interest in developing the dairy industry in Eastern North Carolina, the dairy department at this station has come to the front in supplying information on feeding, dairy management, equipment, breeding and pastures. Our Jersey dairy plant has been in operation since 1906, and the results as a whole secured during this period go to determine the better dairy practices for the section. The station has also helped in developing this industry by selling to the farmers registered breeding stock at reasonable prices.

Rumina's King, the senior herd sire of this station, qualified in 1925 for the American Jersey Cattle Club's silver medal. This is rather significant as it will be remembered that Eminent 19th, the senior herd sire before Rumina's King, qualified for a gold medal, being the first gold medal bull ever produced south of the Mason and Dixon Line.

New Projects. Strawberry Fertilizer Tests: Among the new projects started, one of the most important is the strawberry tests. This became possible through a coöperative arrangement in which the Southern Fertilizer Association and the State College have joined forces with the

Department. It has been possible in this way to inaugurate a very comprehensive piece of work which will ultimately be of great service to the strawberry industry of this immediate section. This project consists of 34 different treatments with and without lime, and is for the purpose of determining the proper fertilizer and cultural treatments with a view to producing the best strawberries from the standpoint of quantity, shipping quality and grade. At the present both the strawberry growers and the fertilizer manufacturers are anxious to secure this information. It is hoped that this project will serve a long felt need of this section.

Forestry Demonstrations. Another project started, which is of immense importance to this section of the State is a forestry demonstration. It is planned to take the Station woodlands and manage them in a way to supply the Station with its need of fire wood, fence posts, vineyard posts, etc., and at the same time provide a timber bearing forest. The work has been started in a very fast growing piece of pine timber.

New Pasture Crops. Seed of Yellow Annual Melodious furnished by Mr. Hugh McRae of Wilmington, N. C., have been tested, both from the standpoint of pasture legume and for planting with oats as a mixed hay crop. The results have been favorable where the planting was made on bur clover land, but not on land which did not contain the proper inoculating bacteria.

General Crops. In addition to the land required for the experimental work, approximately 100 acres of land is devoted to general crops in producing feed for the work stock, dairy and poultry, and improved seed for planting next season. Twelve acres are devoted to fruit and vegetable crops.

Farm Meetings. In addition to the results obtained for the different projects, definite progress has been made in bringing the work of the station closer to the people of this territory. The result is evident from the increasing number of visitors each year, and from the fact that they are coming here to get information relating to the different projects under way. Again the public is beginning to consider the station an appropriate place to hold their gatherings, as for example, the Joint Meeting of the Wilmington and Goldsboro Kiwanis Clubs was held here on May 25. Another sign of progress along this line is the increased number of visits of delegations, such as County Agents with groups of farmers and High School teachers with their agricultural classes. These delegations come here for the purpose of using the Station as a laboratory for their studies, and to gain information of modern farm practices. The tenth Annual Farmers Field Day was held this year on September 9th. Approximately 5,000 people attended this meeting, and all seemed to enjoy the day. This field day is a real institution, and is a means of keeping the work of the station before the people.

Improvements. The following improvements have been completed during the past two years: A new modern bulb storage house built in coöperation with the U. S. Department of Agriculture; the land devoted to coöperative bulb work has been tile drained; five acres of land have been cleared and brought into cultivation; new fences have been built around the hog lots and two new farrowing houses provided, and the final payment has been made on the land purchased from J. W. Johnson.

UPPER COASTAL PLAIN STATION—ROCKY MOUNT

R. E. CURRIN, JR., *Superintendent*

This was the first outlying station to be established by the Department. It was started in 1902, and comprises 202 acres. The work here deals with the problems of the farmers of the Upper Coastal Plain region. The station is now carrying 28 definite projects, which include studies in soil fertility, cropping systems, seed improvement, boll weevil control, swine feeding tests and horticultural investigations.

The long time experiments have been carried forward with good results and several new projects of importance have been added. The more outstanding results obtained from the many lines of work on the station can be summed up under the following headings:

Agronomy. A fertilizer containing ten to twelve per cent acid phosphate will hasten the maturity of cotton. A larger first picking is obtained in this way than where six to eight per cent acid phosphate is used. A fertilizer containing three or four per cent potash seems to be all that is necessary for cotton, as heavier applications delay maturity.

The inorganic sources of nitrogen seem to be more efficient than organic sources for cotton.

In a three year rotation with cotton, corn and cowpeas, oats and vetch, about twice the benefit is secured from the use of legumes where the rotations are fertilized as to where they are not fertilized.

The Mexican Big Boll cotton bred and introduced at this station is the leading 1 1-16 inch staple cotton in the State.

The yield of cotton will be slightly increased by delinting the seed with sulphuric acid.

It is very necessary to have a uniform stand of cotton to get maximum yields.

The topping of cotton does not pay at any stage of growth.

The use of sulphur dust will control Red Spider on cotton.

Soybeans saved from hay seem to respond to potash and when saved for seed they respond to phosphorus.

The results show that Mammoth Yellow and Herman are the best all-purpose varieties of soybeans for this section, and that the Virginia and Laredo are the best hay type varieties.

Swine Investigations. In the hog feeding tests the results show that corn and soybeans can be "hogged off" profitably. The gains compare favorably with gains from the same amount of corn fed through self-feeders.

Roasting-ear corn, such as Norfolk Early Market or Jarvis Golden Prolific can be "hogged off" profitably as the corn comes in when there is no other crop that could be used for this purpose. It costs 70 cents per bushel to produce this early maturing corn, and it was sold through the pigs for $1.30 per bushel.

Two cars of hogs are shipped annually from the feeding tests, and all hogs are raised on the station.

Horticulture. The pecan tests show that Stuart, Schley, Alley and Success are the best varieties for the coastal plain region.

For best results sweet potatoes should be spaced 12 inches in the row. Sweet potatoes seem to respond to a fairly heavy application of potash, also the yield and quality is as good where inorganic sources of nitrogen are used as where organic sources are used.

General Crops. Approximately 90 acres of land is devoted to general crops in producing feed for the work stock and hogs, and 20 acres in Mexican Big Boll cotton for market and seed distribution. Five acres are devoted to fruits and vegetables.

Farmers Meetings. The fourth Annual Farmers Field Day was held this year on September 2. Approximately 1,500 people attended the meeting, and all seemed well pleased with the work of the station. An instructive program was given in the morning, which was followed, after a good dinner, with inspection trips to the experimental plats. Also the County Agents of the district with groups of farmers visited the station during the crop season for the purpose of studying the results of the different projects. On the whole there has been a decided increase in the number of visitors during the past year as the farmers of the section now look to the station for new information on farm practices.

Improvements. The following improvements have been added during the past two years: A new modern seed house with equipment for delinting cotton seed and cleaning all seed grown on the farm; the four tenant houses have been repaired and painted; a room for treating cotton seed with steam boiler has been added to the seed house; new individual hog houses and self-feeders have been added to the swine equipment, and new fences have been built at the back side of the farm.

TOBACCO STATION—OXFORD

E. G. MOSS, *Superintendent*

The need for a suitable location to conduct tests in the growing and handling of tobacco led to the establishment of this station in 1913. The area of the station farm is 250 acres, and the soil is typical of the

Fertilizer Plats at the Tobacco Station

old tobacco belt. The work here deals largely with tobacco investigations, and is conducted in coöperation with the Office of Tobacco Investigations, U. S. Department of Agriculture, Washington, D. C. The station is conducting 20 major projects with a total of 375 separate tobacco plats. The notable results from the many tests are given in the following summary:

Tobacco Fertilizer Tests. Cotton seed meal has stood up as one of the best sources of nitrogen with nitrate of soda next. Ammonium sulphate gives good results on limed end of plats. A combination of organic and inorganic ammoniates is better than any individual source. Basic slag and bone meal are too slow for tobacco as a source of phosphate. Acid phosphate is the best source.

Special Potash Tests for Tobacco. Muriate of Potash produces a better yield and value per acre than the sulphate, but when the larger quantities of potash are used, the burning quality of the cured leaf is not near as good from the muriate plats as it is from the sulphate. There is a constant increase in yield and quality as the potash is increased; therefore it seems advisable to use not less than 40 to 60 pounds of potash per acre, not more than 20 lbs. of which should be derived from muriate. By the use of small amounts of muriate up to about 20 lbs. per acre, there does not seem to be enough chlorine present to injure the burn of the leaf.

Different Sources of Potash with Dolomite and Calcite for Tobacco. The section on which magnesium limestone (dolomite) is used gives the best yield and quality with no "sand drown," On the other two series "sand drown" occurs on all plats except where magnesium-potassium sulphate is used. The Kainit plats give a large yield of tobacco but poor quality of leaf.

Quantitative Magnesium Tests for Tobacco. A comparatively small amount of available magnesia will prevent "Sand Drown." This can be supplied by magnesium limestone or from the potash salts.

New Nitrogen Tests for Tobacco. No definite conclusions have been arrived at, but there are several sources that show promise, principal among which are Urea and Leuna-saltpeter of the synthetic products and Ground Fish of the organics.

Tobacco After Cowpeas. Tobacco of fair quality and yield can be grown after cowpeas and soybeans have been plowed under if liberal applications of phosphates and potash are added, provided the tobacco is planted reasonably close on the drill, topped high and harvested by priming.

Rotation Systems for Tobacco. A 4-year rotation with corn, oats and grasses and tobacco. A 3-year rotation with oats and rye and tobacco. A 2-year rotation with rye and tobacco. Each of these rotations are excellent and adaptable to farms of varying amounts of available land suited for growing tobacco.

Variety Tests for Tobacco. During the past few years something over a hundred and fifty varieties of tobacco have been tested, frequently showing a difference in value between the poorest and the best of $70 to $100 per acre. Three or four of the varieties giving the best results have been advocated and seed distributed.

Plant Nutrition Investigations. These are most interesting experiments showing that cotton and corn give excellent results after all the legumes but make larger yields after vetch and clover than they do after soybeans and peas. On the other hand tobacco does best after fallow and grass plots than after the legumes.

New work has been started consisting of 42 1/20 acre plats to determine the effect of sulphur, chlorine and magnesia and their relation to the different forms of potash. No definite results have been obtained as 1926 was the first year this test has been made. The indications are that a very small amount of chlorine is desirable under tobacco. Too much will undoubtedly injure the burning quality of the cured leaf.

Distance of Planting. Tobacco planted 18 inches apart on the drill gave better yields and quality per acre than the plats with more distance. In 1926 tobacco was planted, after soybeans plowed under using 1,000 pounds 8-3-3 fertilizer per acre, 12 inches on the drill, which required a little over ten thousand plants to the acre. The quality and yields were good.

Cotton Variety Tests. Five of the cotton varieties best suited for the Northern cotton belt have been tested. The early maturing varieties give better results. If seasons are favorable the big boll varieties give larger yields.

Corn Breeding Work. A splendid strain of Weekly's Improved prolific corn has been developed.

Farmers Meetings. The fifth Annual Farmers Field Day was held this year on August 5 with approximately 1,500 attendance. In addition several other smaller meetings were held during the year for the purpose of studying the results of the experiments. The fertilizer people visit the station each year in order to keep in touch with the findings from the different tests. The results of the fertilizer work here are used by the fertilizer manufacturers in determining the formula and ingredients they use in their tobacco fertilizer for the farmers. The station as a whole is generally recognized as State headquarters for information on the culture and handling of tobacco.

Another important service rendered by the station is that of cleaning large quantities of tobacco seed for the farmers of Granville County, and the counties adjoining. Enough seed are cleaned each year to plant several thousand acres of tobacco. The growers who have seed cleaned come back each year and bring some of their neighbors. They have done this to the extent that it now takes one person practically full time during January and February to do this work. It is a line of work

that gives tangible results immediately and seems to be appreciated by the growers. In most cases while at the station they talk over their tobacco problems and ask for information as to fertilizers, varieties and cultural methods.

General Crops. In addition to the land required for the above tests approximately 60 acres of land is devoted to producing feed for the work stock, and abruzzi rye for seed; 15 acres in cotton; 5 acres in general crop tobacco and 6 acres in fruits and vegetables.

Improvements. The station is now furnished with electric lights and power, having extended the electric line from the edge of the city limits of Oxford. Fifteen acres of waste land have been cleared and brought into cultivation; this was made possible in part by completing the large drainage project which was started in 1924. A new pump house has been completed and equipped. A new Fordson tractor with disk harrow and plow has been purchased.

PIEDMONT STATION—STATESVILLE

F. T. MEACHAM, *Superintendent*

This is the second oldest station in the State, being established in 1903. The station farm of 208 acres is typical of the large Piedmont region and is suited to a wide range of agricultural pursuits. The work here is very popular and has been largely the basis of the agricultural development in the section. At present the station is carrying twenty-seven major projects dealing with such problems as soil fertility, crop rotations, seed selection and improvement, variety tests, pasture crops, swine and sheep feeding tests, forestry demonstrations, and horticultural investigations.

Agronomy. The work with seed selection and improvement has been outstanding in promoting the use of improved strains of the better varieties for Piedmont conditions. The seed improvement work is with Apper oats increase strain No. 11, Abruzzi rye increase strain No. 7, Virginia soybeans No. 11, Leap's Prolific wheat increase strain No. 32, Mexican Big Boll cotton strain No. 6, Beardless Barley strain No. 6 and Weekley's Improved corn. The results of this work have been very valuable, and the station is now growing these improved strains and distributing them to the farmers at a reasonable price.

The Mexican Big Boll cotton strain No. 6 developed on this station has proven superior to King and other varieties, and is being planted by many of the good farmers including the Commissioner of Agriculture and the Governor of the State. Strain No. 6 of Beardless Barley is proving to be quite popular. This barley is hardy and furnishes good grazing. It is equal to rye and yields as good as oats with no danger of winter killing. Strain No. 7 of Abruzzi rye has given good results, and the demand for the seed is greater than the supply.

The fertilizer and rotation tests have determined in a large measure the better rotations for the section, also the fertilizer formula and rates of applications for the different field crops. These tests include three series of plats with rotations of cotton, corn, wheat and red clover. Field G brings out the value of well planned rotations in comparison with continuous cropping; Field E soil type studies; Field F nitrogenous materials for cotton and corn; Field G rock phosphate tests; and Field K tests with soft phosphates.

Sheep. A flock of twenty-five ewes and a ram are maintained at this station, and information is obtained on the cost of raising and marketing lambs under Piedmont conditions. Further studies are made in determining the kind of pastures suited to sheep and good results have been obtained from both winter and summer pastures. A series of pastures have been arranged that will provide grazing for the sheep practically the year round.

Swine. The chief project of this division at present is that of securing data on the cost of handling a pure bred herd of Poland China hogs under Piedmont conditions. Eight sows and a boar are used in this test.

Horticulture. This work includes studies with peaches, apples, pears and small fruits in the way of determining varieties, cultural methods, pruning, spraying and methods of marketing. The horticultural work has been underway for twenty years and much valuable information has been secured which is being used generally by the fruit growers of the section.

Forestry. Four acres of unproductive land of the station has been given over to foresty demonstrations. The object being to determine the value of growing timber on unproductive lands, also to determine the best methods of forestry plantings. The test is divided into four areas of one acre each.

a. Land given no preparation, short leaf pine seed sown broadcast under natural condititns.

b. Land plowed and harrowed, short leaf pine seed sown broadcast and harrowed in.

c. Land plowed and harrowed, short leaf pine seedlings, set in a six foot check.

d. Land given no preparation, mixed hardwood seedlings set in a six foot check.

This will be a long time experiment, but will eventually furnish valuable information on forestry management, and best methods of growing timber.

General Crops. In addition to the land required for experimental work, approximately fifty acres of land is devoted to producing feed for the livestock, twenty-five acres to general crop cotton, and thirty acres in small grain, corn and soybeans for improved seed production.

Farmers Meetings. The twenty-third Annual Farmers Field Day was held this year on July 22d. Approximately 5,000 people attended this event and all seemed to enjoy the day. An instructive program was given, which was followed by inspection trips to the fields. Several of the divisions prepared attractive exhibits illustrating the results of their work. The livestock show and judging contests proved interesting, and as a whole the day would compare favorable to one of our best county agricultural fairs.

Several smaller meetings were held during the year for studying the work of the station. The County Agents frequently bring groups of farmers from adjoining counties to study the results from the different experiments. The meetings have been encouraged to the extent that the station is now considered the meeting place for those interested in agriculture for the section.

Mountain Station—Swannanoa

S. C. Clapp, *Superintendent*

This station was established in 1908 for the purpose of furnishing a suitable field laboratory to deal with the problems of the mountain farmers. The farm consists of 305 acres of land which represent the typical soils of the region. This large plateau region has great agricultural possibilities principally with fruits, vegetables, dairying, poultry and pasture crops, and the program for work on the station is planned with the view of developing these and other agricultural industries.

The following will be a brief summary of the kinds of work underway.

Dairying. The dairy feeding and herd development work has been carried forward with good results. In 1925 the milking herd averaging fifteen cows produced 133,383 pounds of milk and 6,320 pounds of butter fat. The average fat production was 335 pounds per cow.

The official testing work has been continued and during the past year seven cows have completed official records. Of this number four animals have qualified for the American Jersey Cattle Club's Silver Medal. Two of these cows hold State Class Championship records.

The new dairy experimental project started this spring is to determine the best and most economical methods and feeds for raising dairy calves.

Poultry. The poultry plant has made progress of note in the breeding, feeding for egg production and milk fattening work. The plant has proven to be very popular in the section, and the work is carefully studied by those interested in the poultry industry.

In 1925 the flock of 789 hens produced 9,681 dozen eggs. The twenty highest producing White Leghorn hens averaged 247 eggs each. The twenty-seven highest Rhode Island hens averaged 219 eggs each for the year.

In 1926 the flock of 1,100 hens produced 13,899 dozen eggs. During this year twenty high producing White Leghorn hens averaged 237 eggs and twenty Rhode Island hens averaged 231 eggs each.

The experimental feeding work has been chiefly comparing the feeding value of different protein feeds such as fish meal and meat meal. The milk fattening work has given good results, and in some instances gains as high as 45 per cent have been made during the fourteen day fattening period.

Horticulture. The variety apple orchard contains twenty-eight varieties. In this test the following have proven to be best suited to the mountain region; Stayman Winesap, Delicious and Bonum. The native Red Limbertwig is also considered desirable in that it yields well and will keep in storage for a comparative long period.

In the apple pruning test the light pruning method with a modified leader is giving best results so far. The trees pruned in this manner come into bearing earlier and yield a heavy crop of fruit.

The results of the fertilizer experiments this year with the apple trees in fruit show that two applications of nitrate of soda will increase the size of the fruit. However it is yet to be proven whether or not these trees will set a better crop of fruit next year.

Tests are under way with ten varieties of bunch grapes with the view of determining the varieties best suited to the section. The results indicate that the Delaware, Green Mountain, Concord, Niagara and Brighton are the most promising varieties.

The results from the test with twenty-six varieties of peaches show that the Arp Beauty, May, Delicious, Champion, Crosby, Belle of Georgia, and Iron Mountain varieties are best suited to this region.

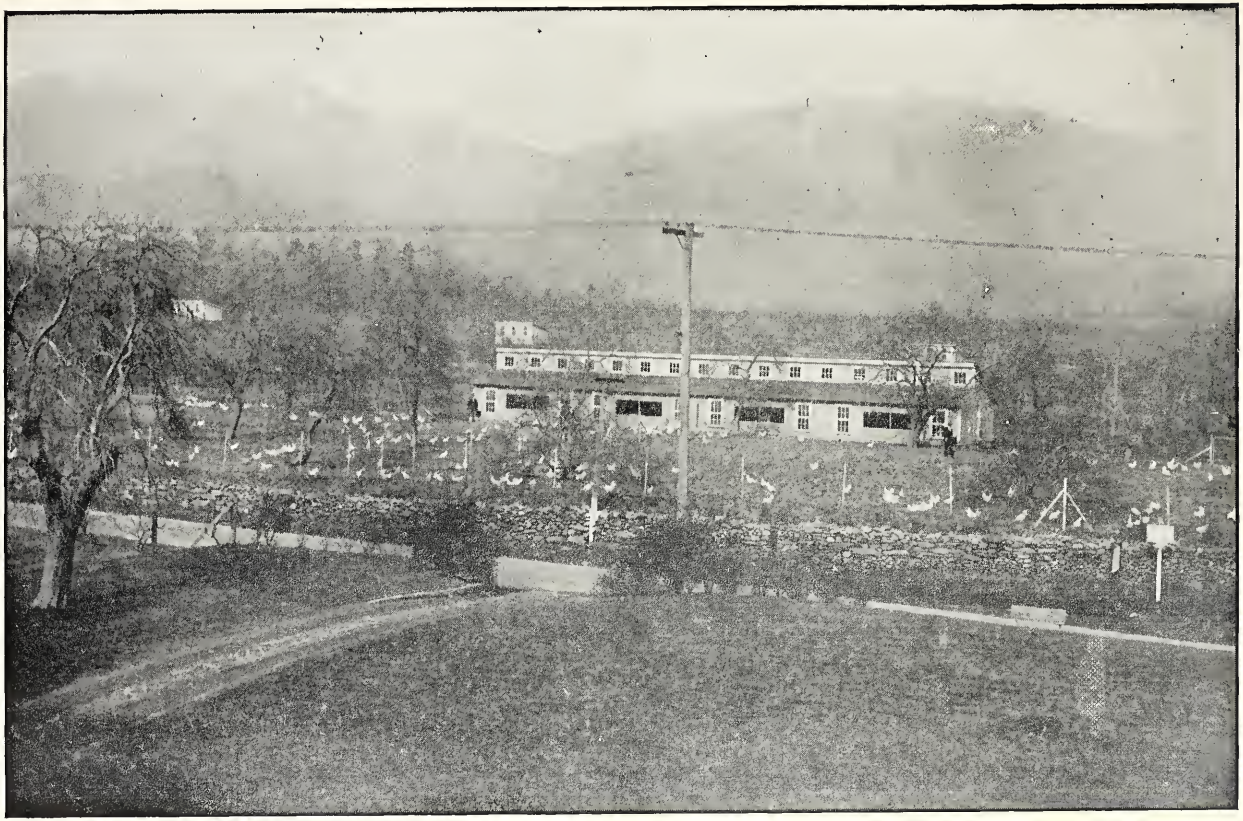
The cherry variety test proves that the Early Richmond and Montmorency are the best of the sour varieties, and that the Governor Wood and the Royal Arm are the leading sweet varieties.

Careful spraying records are kept in conjunction with all fruit tests, and the results show the advantage and in most instances the necessity of thorough spraying in order to secure clean marketable fruit.

In the strawberry variety tests the Klondike, Premier, Warfield and Stephens Late seem to be the most desirable varieties for the section from the standpoint of yield and quality.

There is an increasing demand for information on the growing of vegetables, and in order to furnish information on this subject two acres of land each year are devoted to a variety vegetable garden.

Agronomy. The long time fertilizer and rotation tests have been carried forward another year and additional information has been secured. This work comprises one hundred separate plats. The results from these tests have determined largely the better rotations for the region, also the kind and amounts of fertilizers necessary to produce maximum yields for the different field crops.



THE COMMERCIAL UNIT OF THE POULTRY PLANT AT THE MOUNTAIN STATION

This station is coöperating with the U. S. Department of Agriculture in testing 334 strains of wheat for the purpose of studying hardiness and rust resistance. Under the same coöperation several varieties of flax have been tested in order to determine if any varieties are suited to the mountain section.

The corn improvement and variety tests have been continued. The strain of Biggs Prolific developed at this station is proving to be very popular with the mountain farmers.

The soybean variety test shows the Haberlandt No. 38 to be the best variety for seed and soil improvement and the Virginia and Wilson Black the better for hay crops.

For further information on hay crops Sudan grass and Virginia soybeans were tested alone and in combination, planted in rows and broadcast. The results for the first year show that soybeans alone in rows give slightly the largest yield of hay.

Entomology. In the Mexican Bean Beetle control tests, it has been found that dusting with a mixture composed of one pound of Calcium Arsenate and nine pounds of hydrated lime approximately every ten days, will give good control. This pest has been doing heavy damage to the bean crop, and the growers look to this farm for advice and help on the best methods of control.

General Crops. Approximately fifty acres of land is devoted to general crops in producing feed for the livestock and poultry and ten acres to vegetables for market.

Improvements. The improvements completed during the past two years are as follows: Rock spring house with three sections, engine room, milk room and section for spring; fruit and vegetable storage house 20x40 feet, five room dwelling for dairyman; fencing 16 acre pasture; two poultry brooder houses; blacksmith shop, and connecting water lines to the York and Rhodes cottages.

Farmers Meetings. The Annual Farmers Field Day held this year on August 19 was attended by approximately 2,000 people. The morning program was given over instructive addresses by prominent speakers, including Ex-Governor Cameron Morrison. The evening program was made up with inspection trips to the experimental work. The workers from the different divisions prepared instructive exhibits and were on hand to explain their work, also to answer questions. The day as a whole was very successful.

Many smaller meetings were held during the year with good attendance for the purpose of studying the different lines of work. The station is growing in popularity each year as is shown by the increasing number of visitors. During the cropping season it requires practically the full time of one man to receive the visitors and show them over the station.

Respectfully submitted,

F. E. Miller,
In Charge Test Farms.

BOTANY DIVISION

To the Commissioner of Agriculture:

Sir: I am submitting herewith the biennial report of the Division of Botany covering the work of this division for the years 1925 and 1926.

The Division of Botany of the Department of Agriculture is charged with the following lines of work:

First. The examination and testing, for purity and germination, of field, garden, flower, tree, and herb seed.

Second. The identification and study of the control of noxious weeds.

Third. The manufacture and distribution of pure nitro-cultures for the inoculation of the seeds of the different legume crops.

Fourth. The placing of federal grades on wheat, oats, rye, corn, and soy beans.

Fifth. Recleaning and treating tobacco seed.

A Few Notes on the State Seed Law

The North Carolina State Seed Law was enacted for the purpose of promoting the use of better seeds among the farmers to the end that the farms of the State might produce greater yields of better crops at less cost, and for protecting agriculture against fraudulent practices on the part of the seed trade.

In its operation the law enables the dealer to secure good seed by having samples of a prospective purchase tested before the purchase is made; it protects the farmer against the purchase of bad seeds by enabling him to have his seeds tested in the State Seed Laboratories in order to check the guarantee made by the dealer; and the public by protecting its domestic food supply against being cut short by crop failure due to the use of poor seed or seed of low viability.

Any citizen of the State can have his seed tested in the State Seed Laboratories free of charge, but a charge of 25 cents is made for each purity and each germination test when done for parties living outside the State.

The North Carolina State Seed Law does not in any way interfere with the freedom of contract as any farmer can purchase seeds of any degree of purity and viability he may choose PROVIDED the dealer writes in the face of the State Seed Tag all the facts about which the farmer may care to know, such as the purity, viability, date tested, and so on. *The dealer must see that the farmer knows what he is purchasing at the time the purchase is made.*

The law provides that every package of seed weighing ten pounds or more, sold to a farmer for seeding purposes, shall have attached to it a State Seed Tag showing all the facts above mentioned. Of course, the Commissioner of Agriculture has the power to withdraw from sale any seeds that are entirely unfit for planting, as well as all seeds when sold in violation of law.

All seeds sold in the State by seed dealers must be sold under a license in the name of either the retail dealer or the wholesale dealer. In case of a retail dealer selling seeds without license, he must sell *only those seeds* which he has purchased from a wholesale house that *has license to sell seeds in this State.* In case of a wholesale house selling seeds in North Carolina, it must sell under a license taken out in its own name or sell to only those retailers who do have a license to do a seed business in North Carolina.

Section No. 18 of the State Seed Law permits dealers to use the term "Standard Seed" only in case the face of the State Seed Tag shows a percentage of purity and germination equal to that required in said section.

Seed Laboratory

There have been received and tested in the seed laboratory the past two years a total of seed samples amounting to six thousand, two hundred and fifteen (6,215). The months of December, January, and February are largely given over to the recleaning of tobacco seed sent to us by the farmers. The past two years we recleaned five hundred and eight (508) pounds of tobacco seed; distributed three hundred and twenty thousand, six hundred and seventeen (320,617) seed tags; and three thousand, four hundred and forty-nine (3,449) acres of nitrocultures.

Plant Identification. A great many plants have been identified the past two seasons. We have had to give considerable time to this phase of our work in the interest of weed control.

Grain Grading. Since our grain-grading service was established we have had three hundred and seventy (370) cases of disputed shipments of wheat, corn, and oats submitted to us. Some of these cases involve large sums of money, and before our service was established the millers of the State sustained much loss in the acceptance of inferior grains from distant shippers.

Cooperative Work With Market Division

The Market Division is, of necessity, very intimately associated with all the other Divisions when it comes to the preparation and marketing of farm products.

The past season Mr. Castelloe, of the Botany Division, has given most of his time to grading of soy beans for market. His office and head-

quarters have been in Washington, North Carolina, from which point most of the soybeans of Eastern North Carolina are shipped. This work is done in coöperation with the United States Department also. By this coöperative arrangement with the United States Department, we use the Federal grades and the Federal classification in preparing soybeans for market. A fee of $4 is charged for grading a minimum car of 600 bushels, and $2.50 for lots less than 600 bushels. Ten per cent of this fee goes to the United States Department of Agriculture and ninety per cent of it is credited to the general fund of this department.

To date this Division has graded 57,150 bushels of beans for market and collected fees to the amount of $390.50.

Just after the Board adjourned its last meeting, in July, 1926, we sent Mr. Castelloe into the Watauga potato growing district for the purpose of coöperating with the growers in their efforts to put a certified brand of seed potatoes on the southern market.

We were too late for the 1926 crop, but laid the foundation for an extensive campaign in 1927.

The Watauga potato growing area includes that part of North Western North Carolina that lies over the divide and drains in a northwesterly direction. Most of the counties of Avery, Watauga, and Ashe lie in this area. Both the soils and the climate of this area are peculiarly adapted to Irish potato growing, rivaling the conditions found in northern Maine, and certified potatoes grown in this area have competed successfully with similar varieties in the latitude of Maine and northern Michigan.

Here is a chance for the department to make agricultural history in North Carolina, as it would be a tremendous boon to the South to be able to get its seed potatoes for spring planting at least 1,500 miles nearer home than at present. We expect to push this certification work the coming season and help the farmers of the Watauga to develop this section into a great seed potato producing center.

It must not be assumed that in every case a seedsman is selling seeds of low viability because this laboratory shows his seed had a low percentage of germination, because many dealers send us their old left-over seeds in order to ascertain their value for the current year's trade. Of course, seeds of low vitality may be offered for sale, but the farmer should always demand the analysis, showing the quality of the seed, to be placed on the tag. Then the farmer should send the State Seed Laboratory a small sample as a check on the seedsman's guarantee as shown on the seed tag.

Respectfully,

J. L. BURGESS,
Botanist in Charge.

ANALYTICAL DIVISION

To the Commissioner of Agriculture:

Sir: I beg to submit herewith the report of the Analytical Division for the two years—January 1, 1925-December 31, 1926.

The work of this Division, which consists principally of the analyses of fertilizers, feeds, cottonseed meal, lime products, mineral waters, and other similar material bearing upon the agricultural development of the State, has progressed in a most effective and satisfactory manner during the past two years.

In addition to the regulatory work required by statute, much miscellaneous work has been handled by this Division for individuals, both in the form of chemical analyses and information furnished.

Chemical Work

The amount and kind of chemical work done in the laboratory during the two years—January 1, 1925 to December 31, 1926, is given in the following summary of analyses made in that time:

Official samples of fertilizers	5079
Fertilizers and fertilizer materials for farmers	468
Commercial feeding stuffs	1010
Cottonseed meal	394
Limes, limestones and marls	48
Mineral waters	52
Miscellaneous	38
Total	7089

In reference to the above, perhaps it would not be out of place to state that the analyses listed, as a rule, represent complete quantitative analyses in each case and that, in most instances, this requires from seven to ten determinations for each analysis reported. The results of these analyses have been published at the usual times in the Bulletin of the Department with such comment and information as seemed desirable and of value to those interested.

Both fertilizers and feeds, as a rule, have compared favorably with their guarantees and the quality of the material used therein, with a few exceptions, has been good.

Respectfully submitted,

W. G. Haywood,
Head, Analytical Division.

DIVISION OF FOOD AND OIL INSPECTION

To the Commissioner of Agriculture:

Sir: I beg to submit the following report of the work of the Division of Food and Oil Inspection for the two years ending June 31, 1926, and some other matters pertaining to same:

The object or purpose of the work of the Division of Food and Oil Inspection is to protect the health, life and financial interest of the people of the State in the purchase of foods, beverages, linseed oil, illuminating oil and gasoline. This is accomplished through the enforcement of the several inspection laws, namely: Pure food, bleached flour, standard weight meal and flour, sanitary bottling plant, sanitary bakery and sanitary creamery and ice cream plant inspection laws.

First, through the general food law and sanitary food producing plant inspection laws in preventing the sale of adulterated, misbranded, unwholesome and deleterious foods and beverages in the State so as to enable one to know, in purchasing food, that not only pure, wholesome food is being obtained but that it is what and is as it is represented to be in weight or measure, quality and otherwise.

Without health life is hardly worth living. Without wholesome, unadulterated food and beverage a strong, healthy body and mind cannot be developed or maintained. The success and happiness of life depend much upon pure, wholesome, unadulterated food.

The grocery bill is one of the largest and most important bills paid from the average income. In the production of food products there is an endless and tempting opportunity to so adulterate and misbrand foods as to render them deleterious to health and the sale of same fraudulent, and were it not for official interference, it would be easy to do.

Second, through the linseed oil inspection law in preventing the sale of adulterated or misbranded linseed oil, the enforcement of which enables one to know, in the purchase of linseed oil, that he is getting linseed oil and not a substitute for same.

Third, in preventing the sale of dangerous illuminating oil or oil for illuminating purposes that hasn't good illuminating quality and that might be dangerous to the extent of causing explosions and fires that might result in the loss of property, human suffering and even loss of life itself in terrifying flames.

A very little gasoline in oil renders same dangerous for illuminating purposes and the two, oil and gasoline, handled as they are, constitute a great danger from accidental mixing.

Fourth, in preventing the sale of gasoline for internal combustion motor fuel that is not of high standard quality and that when used in a motor for fuel will not produce high, economic and satisfactory results.

During the two years such inspections of grocery stores and other places where food and food products are made and sold, as have been possible under the circumstances, have been made, which have amounted to little less than two general inspections a year of bottling plants, bakeries, creameries and ice cream plants, and special attention has been given to such things and places that needed extra attention, many grocery stores throughout the State having been inspected. But with only one food inspector it has not been possible to give all needed attention to grocery stores or other places handling food products.

About 1,450 samples of foods and food products of various kinds obtained from various places over the State have been analyzed, chemically or otherwise, special attention being given to foods originating and consumed in the State and foods received in the State and retailed from bulk and not subject to the Federal food laws, such as milk, butter, ice cream, honey, ground coffee, carbonated beverages and various flavoring extracts received in bulk and retailed under dealer's label.

Some of these foods were found to be so adulterated that they had been rendered deleterious to health and unfit for food, while others had been adulterated by the addition of harmless but worthless or less valuable substances as food that lowered their value, and rendered the sale of same fraudulent. And still others were so misbranded and misrepresented as to quality, weight, measure, et cetera, that their sales were also fraudulent.

Some of these adulterations consist of such as the addition of water to milk, less valuable constituents such as gelatin, skimmed milk, and other solids to ice cream, the substitution of saccharine for sugar, synthetic vanillin, coumarin, and so-called fruit esters for fruit flavors, roasted and ground cereals, chicory and carrots to coffee, invert sugar and glucose syrup to honey.

Under these inspection laws there has been most satisfactory improvement in some food products, especially ice cream, bottled beverages and others. Comparatively few years ago there was but little standard ice cream sold in the State, while now it appears that 90 per cent or more of it is high grade, standard ice cream. That is somewhat due to the repeal of the provision for the sale of substandard or compound ice cream. There has also been made great progress and much improvement in the carbonated bottled beverage business which has developed into one of the large industries of the State and there is no longer so much question as to the purity of these products.

Sanitary inspections were made of food producing plants as follows:

Creameries and ice cream plants	109
Bottling plants	162
Bakeries	114

All of these plants were inspected once a year, many of them twice and some oftener, all amounting to more than 1,200 inspections during the two years.

Most of the large ice cream plants and creameries and bottling plants and some of the bakeries are operated and kept in good condition, but some of the smaller ice cream and bottling plants and many of the bakeries have been found to be in very insanitary and dirty condition. Much effort has been made to cause the food producing plants to be so kept and operated that foods put out by them will be pure, wholesome and not deleterious to health.

Results of the investigation of self-rising flour which has been under way for several years indicate that there is very little cause for objection to self-rising flour. It is a good product and it appears that the objection made to it originated with certain baking powder manufacturers with whose business it interfered. Self-rising flour is simply flour to which the baking powder or leavening agent is added at the mill instead of at the time of baking.

In their effort to discredit self-rising flour the baking powder manufacturers, making the fight on self-rising flour, claim that food officials are not regulating the sale of self-rising flour. That claim is not true, for the same regulation applies to both baking powder and self-rising flour alike, requiring the label to show the name of the acid ingredient in same which determines the kind of powder it is, as alum, phosphate, or tartrate powder, as the case may be, whether it is in or out of the flour when sold.

A limited investigation has been made of grapes to determine if sufficient arsenic used in sprays and applied too close to ripening season would remain on fruit in sufficient quantity to be dangerous or objectionable to the consumer. Samples showed very positive quantities of arsenic but the samples were too small for quantitative analysis.

LINSEED OIL

Requirements of the linseed oil law are being complied with, but it requires close attention to see that the inspection tax is paid on all linseed oil shipped into the State.

During the time, 257 samples of linseed oil were examined, some of which were sent in for analysis by dealers and consumers. Very little adulteration was found.

ILLUMINATING OIL AND GASOLINE

The oil companies have complied reasonably well with the illuminating oil law.

In some instances, without the officials of the oil companies being aware of same, gasoline was accidentally mixed with oil and the latter rendered dangerous. Fortunately, in most cases, it was detected and use of same stopped without trouble, but, unfortunately, in a few cases the mixing happened after the oil had been tested and it resulted in accidents that caused much trouble and loss.

During the two years, 4,842 samples were collected and examined to determine if same were dangerous for illuminating purposes. Composite samples of these were tested from time to time for illuminating qualities. Very few samples only were found to be unsatisfactory and in such cases they were reported to the refiner of the oil and the trouble was promptly corrected.

In the case of gasoline the oil companies have not so satisfactorily met the requirements, notwithstanding they have developed improved processes that have enabled them to produce a much more volatile and better grade product and in greater volume from the same crude oil. Along with these improved methods, however, the demand for gasoline continues to increase rapidly and to meet the demand some of the companies have been inclined to market the lowest grade of gasoline that they could without conflicting with the inspection laws. In doing this they have often shipped into the State gasoline that was just a little low.

Some of the component parts of gasoline marketed now evaporates very readily if same is exposed to the open air. If gasoline that will just meet the requirements is shipped from the refinery, it requires very little exposure to cause it to fall below the requirements and make its sale illegal when it reaches its destination or place of sale.

Because of this condition, and apparently without any intention on the part of the shipper to violate the law, we have had much trouble at times to cause some of them to keep their product fully up to requirements.

In the effort to do so, 17,600 samples of gasoline have been collected and tested or analyzed. While the results of the examination of these samples show some of them to have been below the State standard, investigations have shown that there appeared to be no intention on the part of shippers not to comply with the requirements and they have apparently been willing to do so by correcting the troubles.

MISCELLANEOUS

The Department is often called upon and urged to do much and difficult chemical work not provided for by any law and entirely foreign to the inspection laws under which the chemical work is done. When

there appears to be reasonable cause for such work, as there is no provision for it, we usually do it, especially if it can be done without interfering with work provided for by law.

Under this head about 103 samples were tested or analyzed. These samples varied greatly, some of the more important ones were as follows:

Beverages for alcohol, various substance including human and other viscera for poison, drugs for cocaine, opiates, et cetera for officials enforcing the laws and others, mineral waters, waters to determine suitableness for certain manufacturing purposes, also waters from streams to determine if residues and by-products turned into same from factories, laundries, et cetera, render the water objectionable for fish, livestock drinking purposes, et cetera, and waters for indication of natural crude oil seepage from ground, gashouse by-products for preserving and painting purposes, lubricating oils, gasoline improvers, and others of probably less importance.

The number of samples examined and inspections made are as follows:

Food, including bleached flour	958
Linseed oil	103
Illuminating oil	4,842
Gasoline	17,600
Miscellaneous	245
Bottling plant inspections	480
Bakery inspections	391
Creamery and ice cream plant inspections	331

Funds from inspection fees and taxes collected and turned into Department Treasury:

Bleached flour	$16,755.00
Bottling plant inspection fees	4,080.00
Bakery inspection fees	2,680.00
Creamery and ice cream plant inspection fees	2,845.00
Linseed oil inspection taxes	3,424.27
Miscellaneous	300.00
Total	$30,084.27

Respectfully submitted,

W. M. ALLEN,
Chief Food and Oil Division.

DIVISION OF MARKETS

To the Commissioner of Agriculture:

Sir: Complying with your request, I hand you the report of the Division of Markets of the North Carolina Department of Agriculture for the past two years.

Because of the very nature of the work of the Division of Markets, being rather a service bureau, we have in so far as possible reduced this report to show, in many instances at least, the actual financial gain to the farmers of the State. Please bear in mind when a car of farm produce is sold out of a community, the gain is not only represented by the sum of money received for the particular sale but reflects throughout all other sales whether local or carlots.

Fruits and Vegetables

North Carolina ranks among the first 10 states in production of peaches. In quality of peaches this State rivals the best. The peaches are sold by national selling agencies, each one representing a peach growers association. All associations have the Federal State Inspection service, and upon this neutral agency they pool the fruits of their growers and sell to the trade. The 1922 crop sold into fifty-six cities. The 1923 crop was very short. The 1924 crop sold into 110 different cities and the 1925 crop sold into 130 different cities and a few cars going into Canada and three cars to London. Canada has placed an embargo on all eastern and southern peaches because of the Gypsy Moth.

The Corporation Commission and the Fruit Growers Associations are now practically assured of a reduction in freight rates and the refrigerating charges effective before another year.

The added value of inspected peaches as represented by the selling agencies amount to 10-15 cents per package over the uninspected. On the 1,452 cars inspected this past season, this approximates an actual value of $64,340. In 1925 this service inspected 164,000 barrels of potatoes which brought 50 cents per barrel extra to growers. This would represent an additional value of $82,100 to the growers. Our inspections during 1926 have almost doubled those of 1925 and the cost of inspection per car is almost half of the previous year.

Evidence of the improvement in the grading and standardization is shown by the buyers remaining in North Carolina to buy even after the Eastern Shore of Virginia began shipping.

North Carolina stands out alone in the production of dewberries. In 1925 we promulgated the grades on dewberries and entered that field of inspection for the first time. We inspected half the crop. There were 316 carloads shipped, returning to the grower a net average of $4 per crate. How much the inspection service added to the value of the dewberries is not given as there is such a wide difference in the prices of the '24 and '25 crop, but the last year, because of a number of influences, one most prominent of which was the inspection and certification of grades, the crop brought an added value of $126,400.

The early sweet potato industry of Currituck County has changed from a consignment deal to a f.o.b. deal by means of the brokers and farmers calling on us for inspection service in the harvest fields.

From 75-90 per cent of the 6,000 cars of Irish potatoes were in spected at shipping points. The produce trade north of us are putting a great deal of confidence in potatoes from this State, although our potatoes made their initial shipments this year on a very weak market at a time when shipments from the entire country were on the increase, the market gained $1.50 to $2.00 per barrel, until the harvest north of us became heavy.

In North Carolina this spring graded strawberries brought from $1 to $2 per crate more than ungraded berries and it now looks as if we will have a great demand for our services in the Wallace and Chadbourn sections next year.

The certification and inspection work is growing and although the fruit and vegetable industry is small when compared to the cotton and tobacco production, it will gain a much firmer foothold if North Carolina will give to the large consuming areas a standard grade and package.

For this service our growers and shippers pay the sum of $4 per carload for Irish potatoes in ventilated box cars and $5 per carload for refrigerator car commodities. The certificate issued is received as prima facie evidence in all courts. It binds the contract between shipper and receiver.

Total shipments out of North Carolina for fruits and vegetables are increasing. In 1921, 9,326 cars were shipped. In 1922 and 1923, over 11,000 cars were shipped each year. In 1924, 15,214 cars were shipped, the loss there over 1924 being explained by the reduction in Irish potatoes. Dry weather greatly reduced their yield. In 1926, the figures when finally tabulated will show an increase over any previous year of some 2,500 to 3,000 cars. The potato crop alone this year shows a 50 per cent increase, 6,600 cars being shipped. Peaches, apples, strawberries and sweet potatoes all show increased shipments. Due to the late frost, string beans, cucumbers, lettuce and some minor crops show decreases.

Twenty thousand (20,000) bushels of sweet potatoes have been inspected and placed in storage warehouses this fall. This inspection is important to prevent the storing of diseased or undesirable stock.

MARKET NEWS SERVICE

Up until July we published the *Market News* weekly. This was discontinued and the Department publishes the *Agricultural Review,* covering much of the same matter.

During the fruit and vegetable season of 1925, there were issued from this office, coöperating with the U. S. Department of Agriculture, reports on the following commodities: dewberries, strawberries, beans, potatoes, cucumbers, lettuce, cantaloupes, watermelons, peaches and sweet potatoes.

During the season of 1926, market reports were issued from Wilmington, N. C., coöperating with the U. S. Department of Agriculture, the Wilmington Chamber of Commerce, the Truck Growers Associations, and the county of New Hanover, commodity reports on strawberries, lettuce, beans and white potatoes. Market News Service for the season of 1926 was issued at Aberdeen on peaches, coöperating with the U. S. Department of Agriculture and the Sandhill Fruit Growers Association.

FARM CROPS

This office is a medium or connecting link, between the grower and the purchaser in general farm crops. In many cases a group of farmers in one section of the State will buy carlot shipments of corn, hay and beans from a group of farmers in another section. Much of the work in general farm crops, like the inspection of seeds for planting purposes, is done in coöperation with the Botany Division. During the season of 1925 and 1926, we issued 107 certificates of inspection on soybeans. These beans vary from $2 to $10 per bushel in their value for seed purposes.

During the past season we sold for groups of farmers in Eastern North Carolina thirty carloads of corn and 30,000 bushels of soybeans, serving through those shipments 275 farmers.

Much hay is shipped into our State. The quality has been improved by instructing the buyer to buy only on grade, and when the shipment arrives, if not satisfactory, the car of hay is reinspected by us and adjustment in price is accomplished.

Because of the large shipments of hay into this State, and due to the superior feeding value of our own soybean hay when properly cured, we are now marketing hay grown in this State.

We estimate that North Carolina requires 1,300,000 tons of hay per year. Our normal yield is about one-half that amount, leaving an annual purchase of more than a half-million tons from the northern

and western states, 60 per cent of which goes for transportation and commissions. The estimated expenditure of North Carolina for foreign hay is $13,902,000.

Not only the soybean hay, but the bean itself is growing in importance in North Carolina; now grown in ninety-nine counties; produced largely, however, in the cotton section of the State along the eastern border. The Division of Markets stands out as taking first place in the establishment of grades in coöperation with the Federal Department. There has been established a super-grade for the North Carolina soybean. No other state produces a bean quite as high in feed and oil value. The removal of damaged soybeans from the market last spring to oil mills resulted in the stabilization and increased demand for seed stock, resulting in fifty cents per bushel advance in price.

Cotton seed vary greatly in their value, not only for seed purposes but for their oil content. This Division and the Botany Division are coöperating in an effort to bring about a better understanding of these values. This can only be done by sampling and testing the seed, and farmers are advised not to plant their own seed without being sure of the variety and germination.

The certification of field seeds is of increasing importance. The farmer who takes care in the production of field crops for seed purposes should be recognized by some system of certification. All experience tends to prove that good seed grown in the State produces better than seed brought in from a distance. Uniformity in standards and requirements are being formulated for this work.

Holly, mistletoe and evergreens are being shipped in express shipments and carload lots out of the State. We have furnished to these shippers lists of reliable dealers and information regarding the preparation for market.

LIVESTOCK AND POULTRY

Accredited Hatcheries

We started last year in coöperation with the Veterinary Division the inspection and certification of flocks and hatcheries. The result of one year's work has far surpassed our expectation. The rules and regulations governing the accredited hatchery and hatchery flock project were worked out by this section of the North Carolina Division of Markets during the early part of 1925. It was then approved by a committee representing the North Carolina Poultry Association, the Department of Poultry Science, State College, and the Veterinary Division, North Carolina Department of Agriculture.

One hundred and nineteen (119) flocks with a total of 16,964 birds were inspected and 18 hatcheries were accredited. This service was on the basis of a service charge and was practically self-supporting. So important was it in the minds of the poultry people that 137 firms

and persons were served. The importance of this work is to protect the buying public who are now purchasing thousands upon thousands of baby chicks and except for this work, having been started by us last year, most of the buyers of baby chicks would have purchased from outside of the State because there was no way for them to determine what, if any, precaution the owner of flocks and hatcheries had taken to protect the public against White Diarrhea which kills thousands of baby chicks when they reach a few days of age.

Poultry and Eggs

Poultry is of general interest to every person in North Carolina, as practically every farmer has a few head of some kind of poultry and it is a common article on the tables of our city dwellers.

Until a few years ago prices for hens remained practically the same during the entire year, being as low as 12 cents per lb. in some of the remote districts of the State and 20 cents per lb. in the cities. Eggs were as low as 12 to 15 cents per dozen in the early spring months, or flush period of the year, in some of our more isolated counties in both eastern and western parts of the State.

The carlot system of marketing poultry and eggs has been a great factor in price stabilization and our poultry producers are now aware of the services being rendered and demand better prices from local buyers or our assistance in handling same. This work has been inaugurated in 86 per cent of the counties of the State. A great deal of this work has been done through personal contact and, in order to further the movement, a number of local poultry associations have been organized and to whom much of the responsibility can be shifted.

The following figures show in more condensed form the results of this work:

Number counties reached	86
Number farmers coöperating directly benefited	21,500
Live poultry shipped (pounds)	3,000,000
Total market value	$787,761.24
Approximate saving to farmers	$168,761.27
Eggs shipped coöperatively (cases)	10,000
Value	$ 73,000.00
Approximate saving to farmers	$ 6,000.00

In order to determine how far reaching this work has been, or what per cent of the total marketable poultry and eggs we have reached in this manner, we submit the following figures for study as taken from the Year Book 1924 by the U. S. Department of Agriculture, giving data on the North Carolina poultry industry for 1923.

In 1923 N. C. produced 15,000,000 head, valued	$10,000,000	
In 1923 N. C. breeding stock 8,000,000 head valued	6,966,000	
		$16,966,000
In 1923 N. C. produced 25,000,000 doz. eggs, @31c.		7,775,000
Total value of all poultry and eggs		$24,716,000
Total poultry sold—6,900,000 head, average weight 4 lbs., @21.8c. per lb.	$ 6,076,800	
Eggs sold 11,500,000 doz. @31c. per doz.	3,565,000	
		$ 9,641,800
Value poultry and eggs consumed on N. C. farms		$15,074,200

A large enough per cent of the total of North Carolina poultry crop has been handled to raise the general price level and to stimulate greater interest in the industry than ever before and to double the artificial egg hatching capacity of the State in four years, this capacity now totaling 1,700,000 eggs outside a large number of small machines not reported.

Another way of getting at the value of this marketing work is to study Farmers Bulletin No. 917, issued by the U. S. Department of Agriculture, noting especially that the average farm price in 1923 for poultry in North Carolina was 21.8 cents per pound, against 17.5 cents per pound in Tennessee, and in North Carolina eggs were 31 cents against 26 cents for Tennessee. This would mean a saving to North Carolina farmers as follows on the poultry and egg marketed.

6,900,000 head poultry of 4 lbs. saving 4.3 cents per lb.	$1,186,800
11,500,000 dozen eggs saving 5 cents per dozen	575,000
Total	$1,761,800

Although the system of marketing is not responsible for this entire difference in value, it has had its share in maintaining higher price levels than Tennessee where a large part of the poultry is taken up by "hucksters" who pay farmers less than they could receive from the direct sales to poultry cars even after a more reasonable marketing cost has been considered.

Hogs

In 1923 hog prices were very low and our farmers disposed of much breeding stock. There have been great losses of hogs from disease and of pigs from severe weather in the Corn Belt and our hog supply has diminished rapidly every year since 1923, as shown by the following figures for hogs in the United States on January 1 of each of the years mentioned:

January 1923	68,000,000 head of hogs
January 1924	66,000,000 head of hogs
January 1925	55,000,000 head of hogs
January 1926	51,000,000 head of hogs

These figures indicate a decrease of 25 per cent in hogs in the United States during the past four years. This decrease has been felt in prices. During June of this year (1926) the corn-hog ratio, or the number of bushels of corn that the price 100 pounds of live hog would equal, was greater than ever recorded before, it being 18.7 to 1 on the Chicago market. The average for the year 1910-1926 is 11 to 1, or 100 pounds of live hog when sold was equal to the value of eleven bushels of corn. (See Oct. 1926 issue of Crops and Markets). This would indicate that our hog producers have done well for the past two years and this is the case.

The following figures indicate the interest in feeding hogs during the past two years:

Number shipped from 26 counties.	175 cars of 12,250 head
Value of hogs shipped	$258,500
Approximate saving to farmers	40,800

These hogs were shipped largely form Eastern North Carolina where the bulk of the surplus corn is raised. Other hogs were marketed but these were handled as coöperative shipments.

Based on the present supply of hogs and corn, farmers will do well to feed hogs in 1927. There is a reported increase of 255 sows bred for fall (1926) farrow. Should this increase be supplemented by a similar increase in the spring (1927) pig crop, we would expect that the price of hogs in the fall of 1927 would be much lower than it is now (November 20, 1926). The larger part of the United States hog supply comes from about twelve states in the mid-west, or Corn Belt, and our farmers should watch the statistics regarding conditions there, as well as for the entire country.

BEEF CATTLE

During the summer of 1925 a most unusual condition existed among the Western North Carolina beef breeders and feeders. The dry weather made it necessary to take their cattle off of pasture in the middle of the summer when they expected to graze them until October. The Division Representative secured grazing lands in the Valley of Virginia for many of these cattle and later aided in the marketing of those cattle. Most of the feeder cattle were shipped from the Counties of Madison, Yancey, Buncombe, Haywood, Jackson, Swain and Transylvania. Seventeen cars, or 605 cattle, were shipped to state butchers and brought a total of $18,742.51; 13 cars, or 440 cattle, were brought for North Carolina farmers as stock cattle, the total value paid being $16,937.99. There were 15 cars of feeder cattle sold to North Carolina

farmers as feeders. There were 31 cars sold into Virginia and South Carolina as feeders. One car of breeding cattle and a number of cars of cattle were resold after being fed for 110-120 days, making a total movement of 112 carlots of cattle consisting of 3,312 head, bringing a sum of $176,717.15. Three carlots of sheep and lambs were sold.

During the months of September, October and November this year, we shipped thirty (30) carloads, 810 head of cattle, all but two cars being feeders and also helped purchase three hundred and seventy-five (375) head of stock cattle that are being kept over by farmers in Haywood, Buncombe and Madison Counties. We also purchased, for different parties, four good Shorthorn bulls.

Cattle were actively in demand during the past season owing to scarcity and while the market generally was not a great deal higher than a year ago, there was a very much better feeling among the cattle men and cattle moved freely at very fair prices.

The supply of cattle as compared to one year ago is very much less with the prospect of a still greater depletion another year. The problem as we see it now is not one of marketing the cattle being raised in Western North Carolina but in securing a sufficient supply of young cattle to stock our pastures. It will probably be necessary in another year to go to the Western Central markets and purchase cattle for grazing purposes in the Western part of the State. This is a regretable condition and a great economic loss to that country. It means also a decided loss and inconvenience to the feeders in central and eastern North Carolina who prefer to purchase their feeder cattle in the mountain section.

MILK AND CREAM MARKETING

North Carolina is far behind with its milk production program so far as supplying its needs is concerned. Of the supposed 17 pounds per capita consumption of butter, North Carolina furnishes of this 10 pounds of farm (country) butter, one pound of creamery butter, and the other 6 pounds come from outside the State.

Several cream routes have been started during the past two years largely in the mountain sections of the State but with a few in the eastern part of the State.

Considerable attention has been given to working on problems affecting the whole milk situation with Charlotte and Winston-Salem as centers. This marketing work has just begun and our plans are to have an effective organization of the whole milk producers in these centers by next summer when considerable surpluses of milk are available on these markets. Our plans contemplate a bargaining organization and there is now in the process of organization what we call the Piedmont Milk Producers' Exchange. More will be said about this in a later report.

Sheep

The sheep population of the U. S. has decreased almost steadily for some time and the same is taking place in North Carolina. We attempted with fair success for the year of 1922, 1923 and 1924 to sell wool coöperatively, but the quantity was so small compared to the area in which it was located and the project was given little attention for the past two years except to furnish information as to the prices to those interested.

Several cars of lambs have been shipped from Edgecombe and Halifax counties during the past two years. There is an effort to revive the sheep production in this section on a different basis than in the past, that is, having the lambs dropped in December and January; getting them on an early market before stomach worms become too numerous and spring lamb prices get too low.

Rural Credits

There are now in existence 36 Savings and Loan Associations with total assets of $106,589.11. These are examined at least once a year. There have been four new ones organized and two dissolved.

State Warehouse System

There are at present fifty-four cotton warehouses in the System with a combined capacity of 181,125 bales, or an average capacity per warehouse of 3,863 bales, the majority of which are sprinklered and carry attractive insurance rates, and are located at strategic points with adequate facilities for receiving and delivering either from or to railway cars, wagons or trucks. These warehouses have accepted for storage this season since August, 208,629 bales of cotton, representing approximately $20,862,900.

Rural Organization

There have been a number of farmers' meetings in which we have taken part from time to time, usually presenting some particular subject on marketing. One two-day farmers' chautauqua was held at Sylva and was well attended. We assisted in organizing two Coöperative Dairymen's Associations, one in Buncombe County and one in a group of southeastern counties. We assisted in organizing a marketing organization in Haywood County. We are assisting in organizing a Marketing Association in Rutherford County, also assisted in the reorganizing of the Farmers Marketing Association in Polk County. Twenty-four poultry associations have been organized.

In coöperation with the Farmers' Federation, we have organized several groups for the production and marketing of tomatoes, cantaloupes and sweet potatoes on the basis of a regular marketing contract. Six coöperative exchanges have been organized in Eastern North Carolina for the marketing of soybeans and corn, one for the sale of potatoes and poultry, and one for the sale of strawberries, cucumbers and beans at Burgaw, North Carolina, and one in the Polish section of St. Helena. Quite a few of the associations already organized have been assisted in extending the organization to other local groups. This is especially true of the Wilmington Truck Growers Association.

Respectfully submitted,

GEO. R. ROSS,
Chief, Division of Markets.

VETERINARY DIVISION

To The Commissioner of Agriculture:

Sir: I herewith submit the biennial report of the Veterinary Division covering the period from December 1, 1924, to December 1, 1926.

Tick Eradication

I am very glad to be able to report at this time that cattle tick eradication has been completed in the State. During the 1925 season active work was conducted in Craven, Pamlico, Carteret, Onslow, Jones, Brunswick and Columbus and these counties were released from quarantine December 10, 1925. During the 1926 season it was necessary to continue the work on infested premises in some of the above counties and in several other counties. This clean up work progressed very satisfactorily and the last of these premises were released November 30, 1926, thus ending the work. The completion of this work was made possible by the 1923 Tick Eradication Act and accompanying appropriation, which relieved the counties of a large part of the expense. The General Assembly of 1925 provided a fund of $25,000 for the present fiscal year for this work—less than $5,000 will be used and the balance will remain in the general fund.

More than fifty years ago it was known by those familiar with the cattle industry that when cattle were moved from the south to the north that these southern cattle would leave behind them a trail of disease among the northern cattle. In the eighties the U. S. Department of Agriculture in coöperating with the Departments of Agriculture of the south began an investigation to determine the cause of this disease and if possible its prevention. Much of this experimental work was done in North Carolina because this State was near Washington and because this State desired to build up a profitable cattle industry. After years of experimental work by State and Federal Veterinarians it was determined that the cattle tick, technically known as the *Margaropus Annulatus,* was responsible for this peculiar disease affecting cattle. By 1906 the habits, method of propagation and complete life history of this parasite had been worked out by these veterinarians and the fact that this parasite was able to transmit a disease, tick fever, by its bite was established. This was the first instance up to that time that it had been established that a parasite could transmit disease by biting its host. Since that time the cause of malaria and yellow fever has been established, as well as other diseases transmitted by the bite of parasites.

As a result of these studies and experiments three fundamental facts were established and these through the years of eradication work have ever held true and been the basis of all work. (1) That the cattle tick can only propagate on cattle, horses, mules and asses. (2) That the shortest possible time that a female tick can mature and reproduce is 20 days. (3) That if a given area is kept entirely free of cattle for a period of seven months or if all cattle, horses, mules and asses in the area are dipped in a proper arsenical solution for a period of seven months the area will be freed of cattle ticks. With these facts established Congress was asked to make an appropriation in 1906 with which to coöperate with the State Departments of Agriculture of the southern states. This was done and actual tick eradication began in North Carolina in 1906. For a long time various oil preparations were used to destroy the ticks on the cattle but this was often found injurious to the cattle. Tar, crude oil and various other preparations were used and finally a solution of arsenic was perfected in which the cattle could be dipped to destroy the ticks without injuring the cattle. While the experimental work was being conducted Congress placed a quarantine line across the U. S. from Norfolk, Va., to San Diego, California, crossing North Carolina between Alleghany and Surry, along the north of Wilkes, south of Watauga, west of Caldwell, Burke and McDowell and east of Buncombe and Henderson and this placed all of the territory east and south of this line under quarantine and restricting the shipping of cattle. By 1906, as a result of the experimental work the line had been pushed east so that it ran as follows: East of Surry and Wilkes, north of Iredell, north and east of Davie across Rowan, east of Lincoln, east and south of Gaston, east of Cleveland, north of Rutherford and east of Buncombe and Henderson.

In 1906 the N. C. Department of Agriculture in coöperation with the U. S. Department of Agriculture began an intensive drive against ticks which was continued to the present time. Much opposition was met with during all this time and many can now remember the bitter fights in the General Assembly and elsewhere regarding free range and stock law. From the beginning a plan of disinfecting the cattle and vacating the pastures was practiced. This worked well through the Piedmont section and the western side of the Coastal Plain, but when the coast counties were reached, it was found that the plan used was not effective. This was due to several causes, large areas not under cultivation, mild winters through which the tick could live, lots of moisture which was conducive to rapid propagation, and a lack of interest in the eradication of the cattle tick and a lack of interest in building up a cattle industry. The Late Major Graham, Commissioner of Agriculture, was always an ardent supporter of tick eradication and it was one of his ambitions to entirely eradicate the tick from North Carolina.

Much of the credit for the success of this work was due to his untiring efforts and the program which he started has been vigorously pushed by the present Commissioner.

From 1906 to 1925 the several counties were freed of ticks and released from quarantine as follows:

1907 Cabarrus, Forsyth, Mecklenburg, Polk and Rowan.
1908 Davidson, McDowell, Alamance, Caswell, Cleveland, Durham, Granville, Guilford, Orange, Person, Rockingham, Rutherford, Stokes, Vance and Yadkin.
1909 Union, Anson and Warren.
1911 Chatham, Franklin, Montgomery, Randolph, Stanly, Wake, Halifax, Lee, Nash and Richmond.
1912 Wilson.
1913 Edgecombe.
1914 Moore, Hoke, Scotland, Robeson and New Hanover.
1915 Cumberland, Greene, Lenoir, Harnett, Wayne, Bladen, Johnston and Sampson.
1917 Duplin, Pender and Northampton.
1921 Chowan and Pitt.
1922 Pasquotank.
1923 Camden, Gates, Hertford, Bertie and Perquimans.
1924 Currituck, Martin, Washington, Tyrrell, Dare, Beaufort and Hyde.
1925 Craven, Pamlico, Jones, Carteret, Onslow, Brunswick and Columbus.

From 1917 to 1921 the progress was very slow and the fact was thoroughly established that the methods and laws would not be effective in completing the work in the nineteen remaining coastal counties. The Department of Agriculture was compelled to spend large sums of money to prevent the tick from spreading to the free portion of the State. In 1923, the General Assembly along with its program for better roads and schools and other progressive measures enacted a drastic tick eradication law which enabled the Department of Agriculture to complete this work during 1923, 1924 and 1925.

Tuberculosis Eradication

On December 1, 1926, North Carolina will have two more counties placed in the Modified Accredited Area by the U. S. Secretary of Agriculture, certifying that all the cattle in these counties have been tested for tuberculosis, that the diseased animals have been slaughtered, the premises disinfected and that less than one-half of one per cent of tuberculous cattle were found in these counties as a result of these tests. This will give North Carolina a total of seventy-four such free counties, nearly one-half as many as there are in the entire U. S. notwithstanding that this testing is going on in practically all of the states. In addition to these seventy-four counties all of the cattle in 13 other counties in North Carolina are being tested and they will in the near future be completed and placed in the Modified Accredited Area.

In 1918 the Department began a determined effort to eradicate animal tuberculosis from the State and the following figures showing the number of cattle tested each year and the number of tuberculous animals found, will indicate the progress of this work:

1918	4,358	cattle—104 tuberculous
1919	7,445	cattle—168 tuberculous
1920	10,389	cattle—219 tuberculous
1921	23,402	cattle—385 tuberculous
1922	114,296	cattle—785 tuberculous
1923	104,030	cattle—499 tuberculous
1924	127,253	cattle—467 tuberculous
1925	135,222	cattle—472 tuberculous
1926 (10 months)	75,894	cattle—298 tuberculous

The work is conducted in coöperation with the U. S. Department of Agriculture, the boards of county commissioners and the cattle owners. Practically no opposition to this work has been encountered as it is generally known that tuberculosis of cows is transmissible to the human family especially to children through the drinking of milk. Briefly the test chiefly used by the Department in this work consists in injecting a small amount of tuberculin, a sterile product made in the laboratory from the organism causing tuberculosis, between the layers of the skin. If the injected animal is affected with tuberculosis a characteristic swelling occurs and this is observed by the trained veterinarian who applies the test. The Department is interested in eradicating this disease from its cattle population for economic reasons. Tuberculosis in cattle is usually chronic and can seldom be diagnosed in an animal except by the application of the tuberculin test, yet cattle affected with this disease show a decrease in production, many animals die prematurely, meat producing animals fail to make proper gains and many are an entire loss when finally marketed.

Another important reason for the eradication of animal tuberculosis is the public health side and while the Department is not engaged in public health work this naturally enters into the campaign they are conducting to eradicate this disease. Scientific investigation has definitely established that animal tuberculosis is transmissible to the human, especially children. The only difference of opinion seems to be in the various methods of transmission and the amount of tuberculosis in the human family that is a result of infection from animals. The Department has often found herds badly infected and some member of the owner's family affected with this disease.

The following shows the counties that have completed this work and the date:

July 1923—Scotland, Rowan, Pender, New Hanover, Davie, Davidson, Cumberland, Cabarrus Buncombe, Forsyth.

February 1924—Iredell, Robeson, Greene, Alamance, Wayne.

June 1924—Guilford, Mecklenburg, Stanly, Stokes.
October 1924—Durham, Franklin, Lenoir, McDowell, Wilson.
December 1924—Hoke, Pitt.
January 1925—Halifax.
March 1925—Rockingham, Moore, Polk.
May 1925—Chowan, Edgecombe, Gaston, Northampton, Person.
June 1925—Warren, Lee.
September 1925—Perquimans, Richmond, Tyrrell, Union.
October 1925—Rutherford, Martin, Anson.
December 1925—Wake, Transylvania, Johnston, Henderson, Randolph, Yancey.
January 1926—Alexander, Duplin.
February 1926—Nash, Montgomery, Caswell, Surry.
March 1926—Cleveland.
April 1926—Caldwell, Jones.
May 1926—Burke.
June 1926—Vance, Orange.
July 1926—Carteret, Columbus.
August 1926—Brunswick, Craven, Macon.
September 1926—Beaufort, Onslow.
October 1926—Hertford, Catawba.
November 1926—Granville, Gates, Pamlico.

The following counties are coöperating with us on this work and all of the cattle are being tested:

Chatham, Bladen, Sampson, Harnett, Jackson, Madison, Pasquotank, Currituck, Bertie, Swain, Dare, Clay, Haywood.

The following counties have not as yet adopted this work:

Washington, Camden, Hyde, Yadkin, Wilkes, Alleghany, Ashe, Watauga, Avery, Mitchell, Graham, Cherokee, Lincoln.

In 1919 the late Major Graham who was then Commissioner of Agriculture, was instrumental in having the legislature enact a law providing for the payment of indemnities to owners whose cattle were slaughtered on account of being affected with tuberculosis. This law has sufficient safeguards to prevent it being profitable for an owner to have a tuberculous cow. This law together with the able support of the Department is responsible for the success attained. When this work is completed it will mean that we will have a milk supply free from the organisms causing tuberculosis, that cattle will be more vigorous and profitable and that our farmers will have an opportunity to sell cattle to other sections of the U. S. where healthy cattle are in demand.

HOG CHOLERA

During the last three months of the period covered by this report there has been more cholera than at any time during the past several years. Reports indicate that the U. S., especially the west and middle west has experienced the most severe outbreak of hog cholera since 1913.

This situation was made more serious by a great shortage of anti-hog cholera serum and an increase in price of about 100 per cent. Reports from more than 100 veterinarians, county agents and others in every section of the State and from our field inspectors show that while cholera is more prevalent at this time than usual there are not very many extensive outbreaks. However, there has been a great increase in demand for serum, there being shipped during the month of October 1926 272,100 c.c. as compared with 101,550 c.c. during October 1925, which was about a normal month for the two-year period. The greater part of this serum was used on healthy hogs to protect them against the disease. The Department distributes anti-hog cholera serum to the farmers of the State at cost. Fortunately during the present outbreak we had a large supply on hand and connections with a reliable serum company that has kept us supplied and we have not suffered any inconvenience as a result of the serum shortage. We were also able to maintain the old price which was based on hogs at about one half of their present market value. It is believed that the present outbreak and accompanying serum shortage will clear up in the very near future.

The feeding of raw garbage and the shipping of hogs into the State continue to be responsible for the most outbreaks of cholera. We now have fifty-four places permitted under the regulations of the Department to receive hogs for immediate slaughter. These places receive a large number of hogs, most of them from long distance and outside of the State and they are often infected with cholera. Frequent inspections of these places are made to assure that the hogs are handled and confined in such a way as to prevent the spread of disease. We have continued to vaccinate the hogs at the several State institutions and some of the charitable institutions and none of these have had any trouble from cholera. The losses some years ago were quite heavy, but we adopted the policy of vaccinating all of the pigs as soon as they were old enough and under this plan there has been practically no loss from cholera.

ACCREDITED HATCHERIES

This work was started in 1925 at the request of the poultry industry, in an effort to control and eradicate Bacillary White Diarrhea, a very fatal disease of young chickens, and to generally improve the breeding flocks of the State. This is an infectious disease and is transmitted to the chick through the egg and probably from one mature bird to another. The plan under which we are working provided for the annual blood testing and inspecting of all birds and the removal of those affected with disease or not of proper quality. During 1925 the inspection was done by inspectors of the Division of Markets and the blood testing by an inspector of this Division. As a result of the season's work it was deemed advisable to have all of the work done by this Division. For the 1926 season the Department provided a fund to help defray the expense and

the work is now being done at a total cost to the owner of 10 cents per bird. During the 1925 season we blood tested 12,605 birds, 1,266 of which reacted indicating the presence of Bacillary White Diarrhea. The 1926 season will not end until February, 1927, but the indications are that we will test from 35,000 to 40,000 birds and will not be able to take care of all the applications. A blood sample must be drawn from each bird, this bird must be banded with a sealed and numbered leg band, the blood sample must be taken to the laboratory and a small amount of the serum taken out to use for the test. This requires thorough and accurate work by trained inspectors and involves the use of a large amount of glassware and other laboratory equipment which must be washed and sterilized each time it is used. If this work could be spread out during the entire year it would be much easier to handle, but reliable tests cannot be made in the hot summer months or on pullets that are not in production nor can the work be continued into the hatching season later than February. It is, therefore, necessary to do the greater part of it during October, November and December and although our inspectors work very long hours they are not able to take care of it all.

The baby chick and poultry business in general has grown in the past few years to an enormous industry and it is realized by those familiar with the situation that steps must be taken to control disease, especially Bacillary White Diarrhea, if the industry is to thrive and prosper. As a result of the work already done we have demonstrated that disease exists to an alarming extent, that disease can be located by proper inspection and testing and that there is a general demand for the work. It is hoped that in the near future a more simple diagnostic test will be perfected which will enable us to test a great many more birds than is now possible. Experimental work is being conducted along this line.

MEAT INSPECTION

The General Assembly (1925) enacted a law giving the Commissioners of Agriculture supervision over slaughtering and meat packing establishments in the State. It had been found upon investigation that proper meat inspection was not being maintained and that some cities and towns were requiring inspection on meats that had been inspected in another city or town. The law referred to above is not compulsory, but provides that any one operating a slaughtering or packing establishment may apply to the Commissioner for a permit. The Commissioner has issued regulations in accordance with this law which provides in part that a permit will be granted provided it is found upon investigation that the establishment is operating in a sanitary manner and that adequate inspection is maintained. When a permit is granted an estab-

lishment they may sell meat and meat products anywhere in the State without further inspection. To date six plants have been granted a permit and are now operating under them.

INVESTIGATIONS

In addition to the work already mentioned in this report, we have made a number of investigations of reported outbreaks of disease but have found no serious outbreaks. No glanders, anthrax or black-leg has been found during the period covered by this report. Contagious abortion of cattle exists to a considerable extent in many sections of the State and seems to be on the increase. We have not been able to do very much in the control of this disease on account of not having funds for this purpose. Internal parasites of live stock are becoming more of a problem as our live stock industry increases, our mild winters aiding in this. It is becoming especially serious in swine, causing more loss directly and indirectly to swine than all other diseases combined. We have been able to do some control work on this, but not as much as should be done on account of having no funds for this purpose.

Respectfully,

W. M. MOORE,
State Veterinarian.

DIVISION OF ENTOMOLOGY

To the Commissioner of Agriculture:

Sir: Attached herewith is the Biennial Report of the Division of Entomology covering the period December 1, 1924 to December 1, 1926.

This division is charged with the studying of insects affecting the crops grown by farmers, orchardists, and others in the State, and the carrying out of inspection laws and quarantines affecting the movement of plants and plant products which might be infested with dangerously injurious insects and diseases.

The following report covers the more important activities of the division prosecuted during the interval December 1, 1924 to 1926. The various lines of work that the division force is engaged in are reported under separate headings.

Nursery Inspection. The regular inspection of all nursery and field grown florist stock was completed each year as required by the regulations of the Department. Certificates of inspection were duly rendered when the nurseries were found to be apparently free of dangerously injurious insects and diseases which might be disseminated on shipments of plants.

The number of nurseries in the State has increased rapidly during recent years, as shown in the following table:

Year	*Nurseries Inspected*
1920	52
1922	69
1924	82
1926	119

The total area of all nurseries inspected in 1926 amounted to 1,350 acres.

Out-of-state nurseries are required to file duplicate copies of their inspection certificate with this Division before they can secure shipping tags which are supplied at cost for attachment to shipments sent into North Carolina. A total of 219 nurseries filed duplicate certificates during 1926. These requested and were furnished 30,000 shipping tags, which would indicate that about 25,000 nursery shipments were sent into the State during 1926.

Inspections of Imported Plants. All shipments of foreign plants and nursery stock that come into the State are regularly inspected at the time of entry. Nearly one million nursery seedlings were inspected during each of the years 1925 and 1926.

Bee Disease Inspection. Eight queen breeding apiaries were inspected twice during each year and found free of American and European foulbrood diseases; whereupon the queen breeders were given certificates which will permit the sale and entry of queen bees into other States. Regulations of the Department require two inspections annually of all queen breeding apiaries.

During 1926, a total of 35 apiaries were inspected for foulbrood diseases in sections of the State known to be infested. These inspections were made preliminary to a bee disease eradication program it is hoped to conduct during the next two years.

Mexican Bean Beetle Scouting. The advance of this pest eastward and across the State has been determined each year. It entered the southwestern corner of the State in 1921 and now extends eastward to and including portions of the counties of Caswell, Alamance, eastern Chatham, northeastern Moore, Montgomery, Stanly and Union. Approximately 4,000 square miles of this territory were invaded during the summer of 1926.

In connection with the scouting to determine the annual spread of the bean-beetle, studies of its habits and seasonal development, and methods of its control are made each year at the Mountain Test Farm. The results of these studies have been issued in The Bulletin of the Department of Agriculture for November 1924 which was prepared by J. C. Crawford. Further studies have shown that the insect was checked in its increase in numbers by the unusually warm and dry weather that prevailed each of the last two summers. Dusting with a mixture of 9 parts of air slaked lime and 1 part of calcium arsenate has given satisfactory results in the control of the beetle and its grubs. However, the dust should be applied to the underside as well as the upperside of the bean foliage; and it is not always practicable for the average farmer or gardener to purchase suitable dusting machinery by means of which the desired results can be obtained. The result is that fewer beans are being grown in the territory now infested with the bean-beetle.

Potato Tuber Moth Quarantine. Because of serious destruction to Irish potatoes by the Tuber Moth in eastern Virginia and Maryland during 1924 and 1925 the Irish potato growing sections of this State appeared to be threatened with serious injuries. A quarantine was therefore placed by the Department in December, 1925, prohibiting the entrance of Irish potatoes for seed planting purposes that originated in a section known to be infested with the Tuber Moth; unless the potatoes had been inspected and certified as free of this insect. Frequent inspections were made of larger shipments intended for movement into this State. Upon several occasions entry was refused. In one instance a shipment of 212 barrels was found infested and entrance into the State denied.

An intensive scouting survey of the northern and eastern parts of the State to determine the presence or absence of the Tuber Moth was made during the fall of 1926. This survey revealed the presence of this insect in small numbers in Granville, Vance, Franklin, Warren, Halifax, Northampton, Bertie, Beaufort, Washington, Pasquotank, Camden and Currituck counties. It was observed breeding upon potatoes, tobacco, wild thistle and jimson weed. Although it now appears that it will develop into a pest of serious proportions only by a coincidence of favorable weather conditions and circumstances, it has been considered advisable to maintain the quarantine for at least another year.

Insect Survey. The survey of the insect life of the State has been in progress since the establishment of the entomology division, twenty-four years ago. This consists of collecting insects of all kinds in all corners of the State by workers of the division, and others interested in insect distribution both within and without the State, properly mounting those collected, classifying them, and preserving them in the insect collection. As the result of this work, the Department is known among entomologists out of the State as possessing one of the leading State collections; and we are frequently called upon for records of the occurrence of various species by entomologists interested in different groups.

The list now known to occur in this State includes a total of 7,501 species—453 species more than were reported two years ago.

The collection is contained in 750 Schmidt insect cases. A record of each species is kept on a filing card, upon which is also represented the various localities the insect was taken, the date of its collection, and by whom collected or sent to the office. The insect collections assist us in identifying specimens sent to the Department by citizens; and they are drawn upon for exhibit purposes in the State museum and various fairs.

Narcissus bulb inspection and certification. Because of a Federal interstate quarantine effective July 1, 1926, which requires all narcissus plantings to be certified as free of the larger and lesser bulb flies and the eel worm before the bulbs may be shipped out of the State, it has become necessary for the Department to inspect all narcissus planting stock. Two annual inspections are required—one at the time of lifting the bulbs and a second when the bulbs are in bloom. The commercial narcissus plantings in this State are quite extensive, and they now total over three million bulbs. More than 3,000 bushels of planting stock were inspected during late summer and certified as apparently free of pests. Five hundred and sixty-nine bushels of salable stock were inspected and passed so that they could be shipped out of the State and comply with Federal quarantine regulations.

Another requirement of the Federal quarantine is the hot water sterilization of all narcissus bulbs that are imported from abroad into the State. Approximately 900 bushels of bulbs imported during the fall

of 1926 by commercial bulb growers for planting stock were given the sterilizing treatment under the supervision of our entomological inspectors. The process of sterilization requires the bulbs to be kept immersed in moving water heated to a temperature of from 110 to 111.5 degrees F. for a period of two and one-half hours. The importance of treating all imported bulbs was repeatedly demonstrated by the finding of living specimens of the larger bulb fly in the bulbs. After the hot water treatment had been given the bulbs it was invariably observed that the sterilization process had killed these larger bulb fly larvæ. It appears certain that without treatment of the imported bulbs, the future of the bulb industry in the State would be menaced by one or more of these pests.

During the course of the field inspections many partly decayed bulbs were collected from each planting and brought to the laboratory to ascertain whether they were infested with the lesser bulb fly. Studies of this insect have shown that it is distributed in small numbers in about half of our commercial plantings, but that in no instance is it regarded as a serious pest. We have found that the adult flies emerge scatteringly from June 19 to September 8. Our observations also indicate that they are reluctant to oviposit upon sound and healthy bulbs, apparently preferring only those bulbs that show signs of decay.

Cotton Boll Weevil. During the past two years the boll weevil has been held in check by climatic conditions—the unusually hot and dry weather preventing the development of this insect in destructive numbers. Only in a few widely scattered sections has it been found advisable to apply calcium arsenate in the dust form to control the weevils in late summer. It should be noted, however, that the weevil is passing the winters successfully in such numbers in this State, that given favorable climatic conditions (a somewhat rainy and moderate temperature in summer), it can and will in all likelihood become a major cotton pest. Our advice to the cotton growers has been and still is, that they be prepared to apply the dust calcium arsenate poison when a part or all of their crop is threatened with serious injury.

Our studies on the habits and development of the boll weevil have been made at the Aberdeen laboratory and more recently at the Edgecombe Test Farm as well. These show that of 3,249 weevils placed alive in cages during the fall of 1924, 0.52 per cent remained alive throughout the winter to infest the cotton in the early summer of 1925—the remainder perished. Of 5,700 weevils placed in cages in the fall of 1925, 0.37 per cent survived the winter of 1925-1926. Another method of determining the winter survival of adult weevils is arrived at by examining quantities of spanish moss during early fall for living weevils, and examining a similar quantity of moss in early spring before the weevils leave winter quarters. In the fall of 1925 the living weevil population in Spanish moss collected in Columbus County was at the rate of 552 weevils per ton of moss. By early spring of 1926 winter climatic condi-

tions had reduced the living weevils to none per ton of moss. Apparently all or nearly all weevils in Spanish moss had perished during the winter 1925-1926.

Studies on the control of the weevil during the past two years have been necessarily limited because of the general light infestation. These show, however, that the poison molasses mixture (1-1-1 formula) appeared to be slightly superior to the calcium arsenate dust in the spring of 1925, but only for the one pre-square application that is usually made to poison the weevils that have successfully passed the winter and found cotton.

During 1924 and 1925 field tests were conducted to control the weevils with contact oil sprays which were applied by means of a steam cotton sprayer. The results were only partly successful, but it was demonstrated that the cotton plants on an acre could be thoroughly misted with an oil spray with a steam sprayer using as little as five gallons of liquid. Some of the oils used did not seriously injure the cotton foliage.

During 1926 several new insecticides were used in cage tests to poison the weevil. These furnished no better means of control than that secured by dusting with calcium arsenate.

Cotton Flea. During the summer of 1926 a new cotton pest known as the cotton flea made its appearance in the cotton growing section of the State. Serious injuries to the newly formed squares at the base of the cotton stalk were reported from Lincoln and Cleveland counties from June 16 to July 1. No further complaints were received probably because of the generally favorable weather to the growth and fruiting of the cotton plant.

Sulphur was dusted on the cotton plants on a farm at Crouse which resulted in controlling the flea to some extent.

During the summer the flea was found breeding in great numbers over the Piedmont and Southern Coastal Plain cotton counties. This tiny insect sucks the sap from the basal stem of the small squares, causing the squares to shed. We believe that only the unusually favorable cotton growing season of 1926 prevented a considerable loss of the cotton crop by the flea. This new pest will bear close observation and study another year.

Peach Insects. Further studies upon the habits and control of peach insects have been conducted at the Aberdeen laboratory during the past biennium. The insects studied were the Plum Curculio, Peach Tree Borer, Oriental Peach Moth and the San Jose Scale.

The Plum Curculio has been, until recently, the major insect enemy of our commercial peach section. The intensive campaign of instruction in the methods of control of this pest conducted during the past five years have reduced its numbers to the point, where careful and thorough spraying and picking up of dropped fruits will show a negligible loss of the fruit at harvest. It would not be surprising, however, if the

Curculio would again become a serious pest in a few years because of the economic conditions now prevailing in our commercial peach sections.

In connection with our Curculio and scale spraying work there has been perfected at our Aberdeen laboratory an orchard spraying machine that breaks up the spray solution by means of steam instead of the old method of high pressure. The steam sprayer appears to be advantageous over the high pressure sprayer in that it eliminates troublesome and costly delays frequently encountered in using a high pressure sprayer fitted with a pump and gasoline engine. The steam sprayer is also capable of producing a finer mist than the average pressure sprayer which is also often desirable.

The Oriental Peach Moth made its appearance generally in the State on peaches during 1925. Prior to this time it was known to occur only at Wilmington, Raleigh and Burlington. The appearance of this newly imported pest in the commercial peach growing section of the Sandhills occasioned considerable alarm among our peach growers, since there was and still is a possibility that it may prove a major pest.

Studies on the habits of the insect have shown that in 1925, only the latest maturing variety of peaches (Augbert) was seriously affected by the larvæ of the Oriental Moth. At least twelve per cent of this variety was rendered unfit for sale by this insect. The J. H. Hale variety was only slightly affected.

In 1926 the insect first appeared in peach twigs on April 5. These larvæ evidently came from moths that had developed from overwintering larvæ. Other larvæ were taken throughout the month of April. The first moths were bred on May 10. Thereafter larvæ were taken throughout the summer. The length of the pupal stage varied from six to eleven days.

Adult moths were attracted to bait traps placed in the orchard throughout the summer indicating an overlapping of generations under field conditions. In 1926 the larvæ proved to be a pest only upon the Augbert and Hale varieties. In an orchard near Raleigh more than 90 per cent of the Hale variety was destroyed by the Oriental Moth some of the fruits containing as many as four larvæ.

In the control of the Peach Tree Borer, we have found that Paradichlorobenzene can be safely used on peach trees three years or more of age in our Sandhill section. The highest kill is secured when the Paradichlorobenzene is applied between October 1 and 15. When the Paradichlorobenzene is applied in early June or at a time that the borers are well grown, slightly more than half of them will be killed by the usual dosages.

Comparative tests to control San Jose Scale with soluble oils, oil emulsions and lime-sulphur were continued on an extensive scale in the winter of 1925. These showed a uniformly higher killing power

on the part of the oil sprays. Two commercial soluble oils and a two and one half per cent lubricating oil emulsion killed from 96 to 99 per cent of the scales, while concentrated lime-sulphur, diluted one to eight parts of water, showed only from 83 to 87 per cent of the scale killed.

Codling Moth Control. Spraying tests to control the codling moth on apples continue to show that if the complete schedule advised by the Department is followed out, the injuries by this pests will be reduced to a negligible factor. If arsenate of lead is left out of the sprays after the calyx application, side worm injury by the second brood of larvæ may be severe. These conclusions are based on observations and examinations of harvested apples made during the past two years at the Mountain Test Farm and in privately owned orchards.

Black Corn Weevil. Observations made during the past two years substantiate our previous findings that later plantings of corn made on the Black-Land Test Farm at Wenona are not as heavily infested with the corn weevil as are early plantings. During 1926 it has been further ascertained that the planting of an acre of corn as early as permissible close to the storage crib, will act as a trap crop for the adult weevils.

Insect Outbreaks. Only one major insect outbreak has occurred during the past two seasons. This insect was the *corn ear worm* (or cotton boll worm) which appeared in epidemic numbers on vetch, cotton and corn early in spring in Scotland, Hoke and Moore counties, and in Buncombe County in late fall. An unusual characteristic in the feeding habits of this insect was noted in the Buncombe outbreak, in that the larvæ fed within the ears of hard and matured corn besides burrowing in the dried corn stalks. When the corn ear worm appeared in army worm proportions its ravages were effectively checked by the digging of trenches around the infested areas, poisoning with calcium arsenate and the scattering of poison bran mash.

The reappearance of the *cotton caterpillar* or leaf worm was noted on cotton in the Piedmont section late in the summer of 1926. Some injury was inflicted to late maturing cotton. A single application of calcium arsenate served to control the worms when it was applied in time.

Two pecan insects appeared in troublesome numbers during 1925 and 1926. These were the *Leaf Case Bearer* and the *Pecan Spittle Bug.* Spraying with a solution of 1 pound of lead arsenate to each 50 gallons of water, to which was added nicotine sulphate at the rate of 1 part of the nicotine to each 600 parts of water, served to effect a control of the Case Bearer and Spittle Bug. Two applications were found necessary, the first during August and a second during the early part of

June. The owner of the largest pecan orchard in the State believes that these two applications of poison and nicotine prevented a loss of ten to fifteen thousand pounds of pecans during 1926 in his orchard.

MAJOR PUBLICATION BY MEMBERS OF THE DIVISION THAT APPEARED IN 1925-1926

Insect Enemies of the Pecan in North Carolina, by R. W. Leiby, February 1925 Bulletin, N. C. Department of Agriculture.

The Polyembryonic Development of Platygaster Vernalis, by R. W. Leiby and C. C. Hill. Journal Agricultural Research, Vol. 28, No. 8, p. 829-855.

The Origin of Mixed Broods in Polyembryonic Hymenoptera, by R. W. Leiby. Annals of Ent. Soc. America Vol. 19, No. 3, p. 290-299.

The Mexican Bean Beetle in North Carolina, by J. C. Crawford. November 1924 Bulletin N. C. Department of Agriculture.

Apple Insects and Their Control, by J. C. Crawford, January 1926 Bulletin, N. C. Department of Agriculture.

The Water Dogs (Necturus) of North Carolina, by C. S. Brimley, Journ. Elisha Mitchell Scientific Soc. Vol. 40, Dec. 1924 p. 166-168.

Reptiles, Amphibians and Fishes Collected in Eastern North Carolina in the Autumn of 1923, by C. S. Brimley, Copeia, No. 139, Feb. 1925, p. 14-16.

Revised Key and List of the Amphibians and Reptiles of North Carolina, by C. S. Brimley. Journal Elisha Mitchell Scientific Soc. Vol. 42, Oct. 1926 p. 75-93.

New Species of Diptera from North Carolina, by C. S. Brimley. Entomological News, vol. 36, March 1925, p. 73-76.

CONCLUSION

During the first ten months of the period which this report covers this division was under the leadership of Professor Franklin Sherman, since resigned. Grateful acknowledgement is also made of the interest and support of the Commissioner and Board of Agriculture, as well as the faithful service of each member of this division.

Respectfully submitted,

R. W. LEIBY,
Chief in Entomology.

DIVISION OF PUBLICATIONS

To the Commissioner of Agriculture:

Sir: I have the honor to submit to you for incorporation into your forthcoming biennial report a review of the work done in the Division of Publications since August 15, 1925, on which date I assumed the duties of editor.

The work of this Division is twofold. It includes the distribution of information, based on research work, to individuals and others applying for it and the issuance of printed bulletins. Since I began my duties here I have, in response to special requests, sent information about agricultural North Carolina to several thousand inquirers. These inquirers wrote from all parts of this State and from nearly every other state in the Union. Also, much information has been sent to persons residing in the insular possessions of the United States and to foreign countries. School children, research workers and others throughout the country are studying North Carolina and its resources as never before, as the files of this office will show.

In addition to answering letters asking for definite information, the Division of Publications prepares for the press news items of agricultural interest. The press has proved a helpful and coöperative agency and has assisted greatly in the spread of agricultural information.

This Division edits *The Bulletin,* the Department of Agriculture's monthly publication. It also issues a semi-monthly agricultural newspaper known as *Agricultural Review.* This publication superseded *Market News,* which was formerly issued once a week. It was found that the same results could be obtained from a semi-monthly, which costs considerably less. The same mailing list is used and has been greatly increased during the past few months.

The June number of *The Bulletin* in 1926 was compiled and edited with a view to giving inquirers a concise statement of North Carolina's agricultural advantages and was captioned "Agricultural North Carolina." A special edition of this number was sent to the Sesqui-Centennial as a part of the Department of Agriculture's contribution to the North Carolina State exhibit there, in addition to agricultural maps and charts. Many letters are on file which show that this literature was read by numerous persons. The editor was assigned to go to Philadelphia, to be in charge of the exhibit, September 17-October 3.

The work of this Division has been carried on as economically as possible. Although additional duties have been incorporated into its routine, no extra help has been employed and an effort has been made to keep expenses down to a minimum.

Besides carrying on its regularly-prescribed duties, it has been the pleasure of this Division to coöperate with other State agencies and Departments in the distribution of information about North Carolina.

The work of this Division is carried on in a systematic manner and an effort is made to serve not only the agricultural population but the State as a whole.

Respectfully submitted,

WM. H. RICHARDSON,
Editor of Publications.

MUSEUM

To the Commissioner of Agriculture:

Sir: I beg to submit herewith my report on the operations of the Museum from December 1, 1924, to December 1, 1926.

For the purposes of convenience, the report will be presented under various sub-headings, as follows:

Rehabilitation. As the museum was only opened to the public on August 17, 1925, following a long period of comparative inactivity, the period from December 1, 1924, to the above-named opening date, was one devoted to repairs and renovation of the interior of the building and to the repair and preparation of cases and specimens for exhibition.

So much time and effort was required to carry out this program that it was finally decided to open the doors to the public as soon as the first three exhibition halls were in presentable shape, and to open the others as the work progressed.

The interior of the building was in far worse condition than had been anticipated and it was found necessary to replaster, repaint, and to lay new floors in all of the exhibition halls. We also found it advisable to install fire-proof windows in all the thirty two openings on the north elevation of the building—where the fire risk is rather acute—and to repair all the remaining wooden window frames and sash in every room.

This work on the building has now been completed, with the exception of finishing the new floor in Hall No. 9, and this will be completed in the near future.

Technical Work. Since the reopening, a large part of the time of the Museum force has been taken up in repair work on specimens and their arrangement and relabeling, and in the oversight of repairs and remodeling of exhibition cases, the latter having been mainly conducted by Mr. Davis. Noticeable progress has been made in these directions and the exhibit series as a whole has been much improved within the past year. A number of birds and animals have been received in the flesh and properly cared for and a much larger number of mineral specimens has been brought in, examined by the Geologist, and stored for future reference. These will be treated more fully under the sub-head of "Accessions."

The writer has handled all zoölogical specimens needing preparation. Mr. Davis, in charge of the geological department of the Museum, has taken care of all specimens in his department, including the determination of 598 mineral specimens during the two year period, an average

of approximately 25 per month. This latter line of work is largely on specimens shipped in and therefore calls for quite an amount of correspondence.

Under the authority granted by the Commissioner and by the Board, several collections of minerals have been donated to schools that have made application for such, as follows: Raleigh High School, Junior High School, Raleigh, Wiley School, Raleigh, Brinson Memorial Consolidated School, New Bern, Kannapolis Graded Schools, Kannapolis.

Accessions. From the Audubon Society of North Carolina we have received as a gift twenty-four water-color paintings of North Carolina birds, these being the original paintings from which the colored plates used in the book *Birds of North Carolina* were made. This collection of pictures has been conservatively valued at $2,400.

A machine combining a cotton gin, carding appliance and spinning frame, worked by hand, is one of the most notable accessions we have ever had. It seems to be a unique object and it will assuredly prove a most attractive feature when properly equipped and placed on exhibition.

Biennial Report of Curator. In the Zoölogical Department the most striking addition has been the great twelve hundred pound ocean sunfish from Swansboro, captured in May, 1926, and now in course of preparation in the Museum workrooms.

Perhaps our small exhibit of live specimens, one group of which illustrates the differences between poisonous and non-poisonous snakes, has attracted more additional visitors than any single accession made during the period covered by this report. We have managed to handle these collections, together with live sparrow hawks, barred owl, bullfrogs, terrapins, turtle, etc., without the development of any objectionable features, though, of necessity, the half dozen young gray foxes have to be displayed out of doors and viewed through the Museum windows. Most of the live specimens have been contributed by local Boy Scouts.

Specimens of great rarity include a water turkey, from Core Sound, a long-eared owl and a lapwing, both from Chatham County, and a sooty tern, from near Raleigh. The Lapwing is a European bird that has only been recorded from the continental United States on three previous occasions, all of them from Long Island, New York, the last being in 1905. This is the most unusual bird record we have for the State.

A very large spider crab, measuring twenty four inches from tip to tip of claws, was received from Swansboro; various fossils have been collected from the Gulf coal region and from the banks of the Inland Waterway canal; a collection of sea-shells has been contributed by Dr. William Hand Browne, and many other zoölogical specimens of lesser note have been added to the collections.

In the department of Geology perhaps the most attractive single feature is the exhaustive collection of "Made in North Carolina" pottery manufactured from native clays. The largest of our pottery exhibits was donated by the North State Potteries, of Sanford, the display showing some fifty specimens of handwork, with no duplicates. Other smaller exhibits have been loaned the Museum by the Omar Khyyam Potteries, of Candler, and the Pisgah Forest Potteries, of Biltmore. Mr. Davis is responsible for securing these valuable exhibits.

Collections of shales, clays, feldspar, mica and other minerals of economic importance have been secured, and we recently obtained from the State Department of Conservation and Development a set of mineral specimens illustrating the publication of the North Carolina Geological Survey on the "Corundums and Periodites of Western North Carolina," being volume 1, Reports of the N. C. Geological Survey. Many other mineral specimens have been received, and most of the samples submitted for determination provide specimens that can later be used in the Museum.

Change of Classifications. I still feel that the titles of the two technical workers of the Museum should be changed to such as better indicate their duties and responsibilities, as follows: The "Curator" should be made "Director, and Curator of Zoölogy," and the "Assistant Curator" should be changed to "Associate Director, and Curator of Geology." Such change would be in conformity with modern museum practice and would give the workers of the Museum Division of the Department—and the Museum itself—a better standing among other like institutions.

Field Work. Several short collecting trips have been made by both Mr. Davis and the writer, some of them at our own expense. These trips have accounted for a number of the specimens listed under the head of "accessions" and other trips have resulted satisfactorily. The joint trip to Swansboro secured the large sunfish mentioned above.

Last May, both of us attended the annual meeting of the American Association of Museums, of which we are both members, in New York, and much information was secured therefrom that is already proving of value in our conduct of this Museum. In 1925 we failed to attend this annual meeting, but I feel strongly that in the future all these meetings should be attended by both of us if we are to keep our institution abreast of the times.

Attendance. The number of people visiting the Museum from August 17, 1925, to August 16, 1926, was 104,965, a very gratifying showing. I do not know of any other museum that can show an annual attendance equal to three times the population of the city in which it is situated. And our visitors this fall are approximating 150 per day greater than a year ago, indicating a State-wide increased interest in our Museum

that is a source of much gratification. Our patronage is drawn from all over North Carolina and from many other places, some of them quite remote.

Routine Office Work. This has been carried out both by Mr. Davis and the writer in as satisfactory a manner as could be expected with no clerk, stenographer, or office assistant of any kind, but it is false economy for us to have to do this kind of work that could be so much better carried out by a competent office assistant at a considerably lower cost.

Generally speaking, the Museum is moving forward satisfactorily, as may be inferred from the number and character of our visitors and from the details above submitted.

The Museum now occupies approximately 30,000 square feet of floor space, including offices, laboratories, workrooms, storage space, public utilities, etc. Its new entrance on Halifax Street and the general condition of the exhibition halls and their contents are such a great improvement over the old entrance and the worn condition of the old rooms that I feel sure its future is going to show a greater value and importance to the State than ever before.

Respectfully submitted,

H. H. BRIMLEY,
Curator, N. C. State Museum.

STATISTICAL DIVISION

To The Commissioner of Agriculture.

Sir: I respectfully submit herewith my biennial report as Agricultural Statistician of the State. This report includes all the work done in coöperation with the Federal Bureau of Agricultural Economics from January 1, 1925 to December 31, 1926.

The accompanying table shows the crop statistics of acreage, yield and production for the last three years in relation to the more important productions in North Carolina. From this it is quite evident that the year 1926 has been unsually favorable for large crop productions. In view of this condition being general throughout the South, prices of products are low. This is especially true of the principal cash crop, cotton. During this biennial period we have had the driest falls for many years. These are accountable for the unusually good small grains yields, and in as much as the recent fall conditions were quite dry, another good harvest is anticipated. In spite of the supposedly unfavorable weather this year, there has resulted a heavy production in almost all crops not affected by the early spring freezes.

A notable feature of North Carolina's agriculture is its diversity of crops. While in a few cotton and tobacco counties this may not be true, over the State at large there is a good variety and distribution of crop acreage. For instance, corn occupies 35 per cent of the cultivated land acreage; cotton 29 per cent; tobacco 8 per cent; wheat 7 per cent; all tame hays 8 per cent; soybeans and cowpeas 2.5 per cent; peanuts 3 per cent; oats 4.3 per cent; sweet and Irish potatoes 2.2 per cent, with all other crops being something less than 5 per cent. This State is unique in using many of its acres for growing two, three and sometimes four crops in the same year. A very common example is Irish potatoes followed by corn or cotton, with soybeans planted between the corn rows.

Two contrasts to this State's crop program are the livestock states, like Wisconsin, where the great portion of their land is planted to feed crops. North Carolina is well adapted to livestock production, and judging from the livestock central Piedmont area, there would be more contentment and prosperity by converting the crops into livestock products similar to Wisconsin's 36 per cent hay; 28 per cent oats; 23 per cent corn and 8 per cent to rye and barley.

The results of the Farm Census for 1926 are included herewith and show the acreage, yield and production of the crops by counties. North Carolina should be particularly proud of this Farm Census, especially

as this is the only one collected in the South, and it largely eliminates the probable errors of determining these data by estimates or so-called "guessing." While this census is not complete, it is sufficiently so to provide amazingly reliable results.

The Crop Reporting work resulting from the coöperative relations with the Federal Bureau of Agricultural Economics is regarded as equal to any in the South and is now accepted as an established and dependable source of statistics, both in and outside of the State. While the Federal officials have expressed the idea that this service is now largely recognized and gets the credit for being the State Department of Agriculture's project, they have no objection so long as the information collected is satisfactory. A few in the State feel that this should be recognized entirely as a State Department office regardless of the large participation by the Federal Government. The aim of the Crop Reporting Service is to collect and disseminate to the maximum degree, at least cost, the seasonal statistics bearing on agriculture in North Carolina. By using the government frank and stationery, a saving of thousands of dollars annually is made to the State, but such a privilege requires that the State statistician must be personally responsible for its usage.

The crowded condition of the statistical work prior to October 1, is now relieved by authority of the Commissioner of Agriculture in transferring us to the offices vacated by the Home Economics Division. This is expected to result in better service, as well as to provide more efficient and convenient quarters for the Farm Census summarization annually.

The indirectly expressed ideas that this Service is not doing the work it did a few years ago is easily explained on the grounds that in 1922-23 the appropriation was about $9,000 for all expenses, while the current appropriation is $5,075. As the Farm Census work has been steadily growing its expenses could not be reduced, and consequently the margin for other expenses was doubly reduced. In order to provide properly interpreted and current reports on crops, field investigations are essential. As the results interpreted into statistical trends and data is the object sought, the published information is the value determining factor of this work. It is unfortunate that the field travel and the Farm Forecaster publications could not be provided for as regularly as the demand justified.

During the past two years some very fine statistical records have been provided in a readily available and comprehensive form. Much of this information has been published in the Federal "Crops and Markets" monthly bulletin, as well as in the "Farm Forecaster" issues prepared by this office. Much valuable data has not been published at all, either due to lack of adequate funds or to the infrequent demands for such information.

The two most frequently called for and difficult types of information to secure are those relating to State imports and exports and to cost of production features. The first was attempted, but it was found impossible to get reliable results from any known sources. While the cost of production is a basic and an essential factor in determining profits and losses, we have been unable to get sufficient replies to questionnaires from the several thousands mailed to use in determining reliable trends.

Using the year 1926 as an illustration of the work resulting from the Statistical Division, the following might be mentioned:

Over 300,000 envelopes and more than twice that many sheets of paper used, were furnished by the Federal Department. During the year the various features of acreage, yield, production, value, stocks, wages, land values, livestock data, etc., were collected, thus rounding out the agricultural statistical information for the whole year. Fifty-two important statistical reports were developed in detail, representing the information of several thousand farmers. Among these were the semi-monthly cotton reports, the ginners' semi-monthly reports, the and special reports on truck, fruits, legumes, pecans, etc.

The most complimented and useful product of this office is the Farm Forecaster, a printed publication going to 6,000 reporters and agriculturally interested mailing-list, used for disseminating the current information collected. This publication was intended to be issued monthly whenever the appropriation would permit. The December meeting of the Agricultural Extension Specialists and County Agents passed a resolution requesting that the Farm Forecaster appear more regularly, in order that its appearance might be counted on and also that the scope of agricultural statistics would be more nearly complete during the year. Many recipients have expressed the opinion that this publication should be issued monthly and should go to a list of not less than 25,000 agriculturally interested people in this State.

The Farm Census records for 1926 included 174,904 *satisfactory* enumerations of farm owners. This constitutes 72 per cent of the cultivated land of the State and offers remarkably good samples from which reliable results may be deducted. This method of getting information is believed to be the best and most economical possible. It minimizes the chance of error and provides results during the same year to which they relate. In many instances, township and county results have been more than either the Federal Census or the tax figures. The confidential nature of this information has rapidly broken down the objections farmers had to reporting their crop acreages. In view of the fact that the results cannot be possibly made known until after the harvest, eliminates the possibility of it being used for speculative

purposes and insures its value as a safe aid towards the farmers determining the next year's crop acreages.

Due to the reliable nature of the Farm Census information, the Agricultural Teachers in the Vocational Educational work of the State are using it in their curriculum this year to aid in the local application of their farm management and agricultural economic studies. The Agricultural Extension Service, especially the County Agents, are rapidly becoming appreciative of and using this data in formulating their plans for county work. In representing the facts as to what has already taken place, it offers an ideal medium for correcting the crop diversification and livestock trends in any given locality.

The mechanical methods of crop estimating are rapidly coming into vogue. The *crop frontage meter* was used this year in 5,204 miles of travel. This has given good comparative and ratio-relative indications. It provides an ideal diversification indicaton. *Field counts* provide fairly good indications, but this method is rapidly being replaced with the frontage meter. *Boll counts* have been made this year as never before. There were 545 counts, covering approximately 3,000 miles of travel. *Test in boll weights* were made in much of this field investigation travel. Investigations of *emergency* conditions were made in regard to freeze damages to truck and fruit, as well as wet and dry weather damages to crops.

The information service of this office has been unusually good, due largely to the very favorable attitude and coöperation of the various press organizations represented in Raleigh. While many reports are sent to the Press of the State with releases, it is impossible to use this means of supplying all of the information collected to the papers. It is fortunate that the Press seek the statistical reports as much as they do, especially as a principal purpose of this office is to supply the agricultural public with current crop and livestock information.

In view of the request for and the evident needs, the following are suggested as features that should rapidly be provided for in the program of this Division:

1. Cost per acre records.
2. More complete aid to the Agricultural Educational and Extension workers of the State.
3. A more detailed and comprehensive agricultural service to the counties, in view of their coöperation with the Farm Census.
4. A special annual statistical report, printed in such form and scope as would give credit to the Department of Agriculture.
5. An economic service through statistical interpretations of forecasting of price trends as well as productions, the probable trends of marketing and the purchasing power of farm products, supply and demand areas, truck and fruit crop statistics.
6. Monthly publication of the Farm Forecaster.

In appreciation of the voluntary service rendered by thousands of farmers over the State, this office should provide a service that would be commensurate with their time contributed. This should especially be the case in view of the advantageous coöperation extended by the Federal Bureau of Agricultural Economics. Many compliments are constantly received for the services rendered, but they also express themselves as thinking we should provide for the additional features mentioned heretofore.

Respectfully,

FRANK PARKER,
(*Coöperative*) *State Agricultural Statistician.*

NORTH CAROLINA STATISTICS BY

COUNTY	Tobacco			Cotton (Lint)		
	Acreage	Acre Yield Lbs.	Production Lbs.	Acreage	Acre Yield Lbs.	Production Bales
Alamance	7,258	667	4,841,086	4,353	255	2,322
Alexander	1,010	750	757,500	7,805	247	4,033
Alleghany	------	800	------	------	------	------
Anson	22	700	15,400	55,530	280	3,252
Ashe	1	------	------	------	------	------
Avery	------	------	------	------	------	------
Beaufort	10,454	711	7,429,950	13,295	325	9,039
Bertie	6,091	713	4,342,883	22,754	294	13,995
Bladen	2,722	695	1,891,790	21,504	288	12,956
Brunswick	944	781	737,264	1,160	302	732
Buncombe	270	600	162,000	79	------	------
Burke	81	620	50,220	3,184	220	1,465
Cabarrus	------	------	------	29,788	298	18,571
Caldwell	427	500	213,500	1,164	238	580
Camden	------	------	------	6,141	345	4,432
Carteret	1,130	675	762,750	328	274	188
Caswell	16,261	650	10,569,650	1,118	270	------
Catawba	------	400	------	24,150	243	12,277
Chatham	2,593	720	1,866,960	20,416	262	11,190
Cherokee	9	------	------	------	------	------
Chowan	466	750	349,500	10,197	338	7,210
Clay	12	------	------	------	------	------
Cleveland	------	------	------	65,645	290	39,826
Columbus	9,744	796	7,756,224	6,317	308	4,070
Craven	12,488	692	8,641,696	8,091	294	4,976
Cumberland	920	725	667,000	57,241	265	31,734
Currituck	------	------	------	2,628	290	1,594
Dare	------	------	------	14	------	------
Davidson	4,953	733	3,630,549	7,811	288	4,706
Davie	1,071	667	714,357	9,916	248	5,145
Duplin	17,263	794	13,706,822	21,024	316	13,899
Durham	9,648	617	5,952,816	5,375	275	3,092
Edgecombe	18,060	662	11,955,720	64,495	293	39,533
Forsyth	8,803	694	6,109,282	1,133	263	6,233
Franklin	12,932	592	7,655,744	49,715	250	26,001
Gaston	5	------	------	28,389	263	15,620
Gates	169	780	131,820	10,365	227	4,922
Graham	------	------	------	------	------	------
Granville	20,932	630	13,187,160	9,709	250	5,078
Greene	20,134	710	14,295,140	21,958	300	13,781
Guilford	12,701	700	8,890,700	1,085	251	570
Halifax	4,980	662	3,296,760	75,303	296	46,631
Harnett	5,114	745	3,809,930	52,655	299	32,937
Haywood	392	450	176,400	20	------	------
Henderson	237	600	142,200	13	------	------
Hertford	2,010	680	1,366,800	17,957	341	12,810
Hoke	326	707	230,482	36,491	297	22,673
Hyde	12	------	------	4,793	330	3,309
Iredell	360	680	244,800	49,452	275	28,450
Jackson	7	------	------	16	------	------
Johnston	16,909	707	11,954,663	93,927	335	65,828
Jones	7,669	664	5,092,216	7,624	284	4,528
Lee	1,767	625	1,104,375	14,850	298	9,258
Lenoir	20,293	770	15,625,610	25,075	298	15,633
Lincoln	------	------	------	40,894	265	38,304
McDowell	65	600	39,00	261	220	120

COUNTIES, FOR PRINCIPAL 1926 CROPS

Corn			Wheat (for grain)			Oats (for grain)		
Acreage	Acre Yield Lbs.	Production Bu.	Acreage	Acre Yield Bu.	Production Bu.	Acreage	Acre Yield Bu.	Production Bu.
29,471	23	677,833	14,217	14	59,038	5,958	26	154,908
16,427	22	361,394	9,455	13	122,915	2,077	23	47,771
8,237	27	222,399	3,281	14	45,934	2,213	29	64,177
28,552	19	542,488	4,146	13	53,898	12,047	25	301,175
16,616	28	465,248	3,455	14	48,370	6,755	26	175,630
4,220	23	97,060	532	14	7,448	2,205	24	52,920
32,117	25	802,925	81	15	1,215	1,205	29	34,945
28,375	22	624,250	25	15	375	616	20	12,320
30,036	20	600,720	194	13	2,522	1,390	21	29,190
9,262	21	194,502	29	14	406	447	22	9,834
24,078	25	601,950	6,029	15	90,435	3,893	25	97,325
18,747	23	431,181	9,347	14	130,858	1,391	24	33,384
25,429	22	559,438	10,621	15	138,073	7,018	24	168,432
18,879	22	415,338	8,109	14	113,526	2,592	25	64,800
17,533	25	438,325	5	-----	----------	109	25	2,725
4,923	23	113,229	2	-----	----------	179	21	3,759
18,650	20	373,000	7,605	13	98,865	1,656	19	31,464
22,624	21	475,104	15,881	16	254,096	6,669	22	146,718
38,396	20	767,920	17,021	14	238,294	6,143	21	129,003
20,160	21	423,360	581	12	6,972	470	20	9,400
10,106	24	242,544	17	-----	----------	213	23	4,899
8,528	23	196,144	3,449	13	44,837	270	20	5,400
37,445	21	786,345	5,696	15	85,440	8,096	22	178,112
31,988	22	703,736	53	15	795	2,129	21	44,709
24,545	23	564,535	9	-----	----------	2,043	21	42,903
35,361	21	742,581	168	14	2,352	4,091	19	77,729
13,060	24	313,440	28	18	504	81	23	1,863
207	18	3,726	3	-----	----------	----------	-----	----------
25,214	23	579,922	25,403	16	406,448	8,693	25	217,325
15,403	22	338,866	9,823	14	137,522	3,699	24	88,776
45,799	20	915,980	27	14	378	2,066	19	39,254
16,474	21	345,954	3,439	13	44,707	1,781	22	39,182
34,174	18	615,132	116	13	1,508	2,794	18	50,292
20,347	24	488,328	13,710	17	233,070	6,801	20	136,020
31,943	17	543,031	257	11	2,827	851	21	17,871
25,988	22	571,736	6,731	15	100,965	5,493	26	142,818
16,127	22	354,794	31	14	434	265	18	4,770
5,663	22	124,586	113	12	1,356	163	20	3,260
29,714	19	564,566	3.741	13	.48,633	2,475	22	54,450
21,033	20	420,660	----------	-----	----------	1,093	20	21,860
38,143	23	877,289	19,513	16	312,208	7,415	22	163,130
43,455	18	782,190	77	12	924	1,040	20	20,800
29,165	20	583,300	389	12	4,668	2,993	29	86,793
14,332	24	343,968	5,283	16	84,528	3,500	20	70,000
16,825	27	454,275	1,165	15	17,475	1,178	25	29,450
16,327	20	326,540	29	12	348	527	18	9,486
20,542	20	410,840	156	15	2,340	2,687	22	59,114
17,715	30	531,450	----------	-----	----------	2,167	32	69,344
41,756	21	876,876	21,481	15	322,215	8,448	26	219,648
13,601	24	326,424	2,600	13	33,800	2,122	25	53,050
57,649	20	1,152,980	158	14	2,212	4,835	25	120,875
19,204	18	345,672	2	15	30	802	22	17,644
12,757	20	255,140	1,307	11	14,377	2,372	22	52,184
34,522	21	724,962	121	14	1,694	2,348	21	49,308
21,722	21	456,162	9,264	16	148,224	4,422	25	110,550
12,447	23	286,281	4,420	15	66,300	758	23	17,434

NORTH CAROLINA

COUNTY	Tobacco			Cotton (Lint)		
	Acreage	Acre Yield Lbs.	Production Lbs.	Acreage	Acre Yield Lbs.	Production Bales
Macon	23					
Madison	2,357	760	1,791,320	48		
Martin	13,459	634	8,533,006	14,943	301	9,410
Mecklenburg	63	700	44,100	64,147	258	34,623
Mitchell	200	800	160,000	7		
Montgomery	802	683	547,766	11,699	278	6,804
Moore	3,568	675	2,408,400	14,448	269	8,131
Nash	23,310	672	15,664,320	54,983	303	34,853
New Hanover						
Northampton	136	690	93,840	50,722	346	36,715
Onslow	7,055	783	5,524,065	5,175	309	3,345
Orange	5,508	590	3,249,720	5,833	270	3,295
Pamlico	425	700	297,500	5,599	254	2,975
Pasquotank	1			8,470	333	5,901
Pender	1,960	690	1,352,400	4,120	320	2,758
Perquimans	57	800	45,600	12,438	334	8,691
Person	17,965	615	11,048,475	1,584	238	789
Pitt	44,773	717	32,102,241	44,920	294	27,629
Polk				9,016	226	4,263
Randolph	2,847	594	1,691,118	5,661	278	3,292
Richmond	213	715	152,295	45,190	293	27,700
Robeson	14,750	700	10,325,000	93,576	304	59,513
Rockingham	17,048	700	11,932,600	117	250	61
Rowan	52	700	36,400	37,806	289	22,858
Rutherford	462	670	309,540	36,797	235	18,091
Sampson	7,284	679	4,945,836	61,879	289	37,412
Scotland	130	725	94,250	55,573	297	34,530
Stanly	1		1	18,679	296	11,567
Stokes	18,374	672	12,347,328	11		
Surry	17,572	632	11,105,504	119	230	57
Swain	5	650	3,250	5		
Transylvania	221	660	145,860			
Tyrrell				315	260	171
Union	222	690	153,180	66,420	269	37,379
Vance	11,007	580	6,384,060	11,665	243	5,930
Wake	23,100	705	16,285,500	65,819	286	39,381
Warren	5,836	590	3,443,240	35,754	263	19,672
Washington	584	700	408,800	2,475	278	1,439
Watauga	2			89		
Wayne	20,910	706	14,762,460	57,821	328	39,676
Wilkes	946	570	539,220	473	225	223
Wilson	26,422	698	18,442,556	43,921	309	28,392
Yadkin	8,363	617	5,159,971	1,727	250	903
Yancey	305	700	213,500			

STATISTICS—*Continued*

Corn			Wheat (for grain)			Oats (for grain)		
Acreage	Acre Yield Lbs.	Production Bu.	Acreage	Acre Yield Bu.	Production Bu.	Acreage	Acre Yield Bu.	Production Bu.
14,601	20	292,020	3,879	12	46,548	1,482	20	29,640
17,954	26	466,804	6,348	13	82,524	5,288	28	148,064
20,666	24	495,984	48	15	720	2,083	22	45,826
43,450	21	912,450	3,337	14	46,718	4,897	27	132,219
7,937	28	222,236	864	14	12,096	4,971	29	144,159
15,353	20	307,060	8,180	13	106,340	3,835	27	103,545
21,466	20	429,320	6,743	12	80,916	4,259	21	89,439
34,189	18	615,402	2,234	13	29,042	2,278	19	43,282
1,664	23	38,272	----------	------	----------	93	20	1,860
31,637	21	664,377	42	15	630	1,880	19	35,720
20,231	18	364,158	6	------	----------	602	20	13,244
22,152	20	443,040	10,079	14	141,106	2,928	22	64,416
13,910	26	361,660	4	------	----------	808	22	17,776
20,432	25	429,072	21	------	----------	224	22	4,928
18,179	19	345,401	----------	------	----------	450	19	8,550
17,094	23	393,162	41	15	615	337	24	8,088
24,140	21	506,940	6,456	13	83,928	3,457	20	69,140
49,471	22	1,088,362	46	15	690	5,816	25	145,400
12,088	20	241,760	564	13	7,332	790	20	15,800
38,150	23	877,450	28,291	15	424,365	9,270	25	231,750
22,775	21	478,275	917	15	13,755	5,537	22	121,814
75,783	20	1,515,660	717	12	8,604	8,706	22	191,532
26,206	21	550,326	11,587	14	162,218	3,013	20	60,260
27,520	25	688,000	28,631	16	458,096	11,995	23	275,885
34,365	20	687,300	5,431	15	81,465	4,522	22	99,484
50,089	19	951,691	109	16	1,744	2,465	22	54,230
18,573	20	371,460	222	15	3,330	3,694	24	88,656
22,989	21	482,769	21,433	13	278,629	9,271	23	213,233
23,204	22	510,488	13,196	14	184,744	1,996	24	47,904
35,739	23	821,997	16,607	15	249,105	3,425	23	78,775
9,972	25	249,300	576	12	6,912	995	21	20,895
8,209	25	205,225	59	14	826	1,339	21	28,119
9,136	21	191,856	15	------	----------	256	22	5,632
42,797	20	855,940	4,273	13	55,549	15,477	25	386,925
15,127	18	272,286	877	13	11,401	731	18	13,158
46,885	18	843,930	872	12	10,464	3,741	22	82,302
27,214	18	489,852	1,220	12	14,640	1,199	20	23,980
12,647	26	328,822	16	------	----------	937	20	18,740
9,319	27	251,613	2,005	12	24,060	4,197	23	96,531
48,634	18	875,412	54	13	702	2,763	22	60,786
42,085	24	1,010,040	16,262	13	211,406	1,883	23	43,309
27,984	18	503,712	49	14	686	2,810	18	50,580
22,808	22	501,776	13,227	12	158,724	3,872	22	85,184
11,517	27	310,959	1,956	14	27,384	5,866	27	158,382

NORTH CAROLINA

COUNTY	Field Cowpeas (for peas)			Soybeans (for beans)		
	Acreage	Acre Yield Bu.	Production Bu.	Acreage	Acre Yield Bu.	Production Bu.
Alamance	1,059	12	12,708	1,855	15	27,825
Alexander	1,108	11	12,188	725	12	8,700
Alleghany	32	13	416	192	12	2,304
Anson	276	12	3,312	125	15	1,875
Ashe	45	14	630	87	10	870
Avery	13	12	156	22	13	286
Beaufort	294	12	3,528	6,644	17	112,948
Bertie	120	14	1,680	1,224	17	20,808
Bladen	1,123	14	15,722	1,848	14	25,872
Brunswick	567	11	6,237	1,001	15	15,015
Buncombe	270	14	3,780	690	13	8,970
Burke	1,141	10	11,410	740	13	9,620
Cabarrus	1,546	12	18,552	744	13	9,672
Caldwell	985	12	11,820	1,232	14	17,248
Camden	70	12	840	8,483	13	110,279
Carteret	143	11	1,573	2,380	16	38,080
Caswell	706	11	7,766	590	12	7,080
Catawba	1,609	14	22,526	1,590	12	19,080
Chatham	1,463	12	17,556	1,485	13	19,305
Cherokee	372	12	4,464	235	14	3,290
Chowan	222	12	2,664	1,415	16	22,640
Clay	679	11	7,469	144	11	1,584
Cleveland	462	12	5,544	111	11	1,221
Columbus	983	13	12,779	1,997	17	33,949
Craven	664	14	9,296	4,462	17	75,854
Cumberland	1,835	12	22,020	1,131	15	16,965
Currituck	148	13	1,924	6,616	13	86,008
Dare				213	14	2,982
Davidson	1,122	13	14,586	1,542	12	18,504
Davie	771	13	10,023	1,010	15	15,150
Duplin	434	11	4,774	3,908	16	62,528
Durham	1,109	12	13,308	890	12	10,680
Edgecombe	425	12	5,100	1,165	13	15,145
Forsyth	800	13	10,400	2,068	15	31,020
Franklin	690	15	10,350	404	14	5,656
Gaston	747	14	10,458	167	12	2,004
Gates	555	11	6,105	1,709	12	20,508
Graham						
Granville	735	11	8,085	408	14	5,712
Greene	837	10	8,370	668	18	12,024
Guilford	1,899	15	24,485	3,987	14	55,818
Halifax	807	16	12,912	1,231	15	18,465
Harnett	300	15	4,500	256	15	3,840
Haywood	7	11	77	155	11	1,705
Henderson	229	13	2,977	987	15	14,805
Hertford	220	10	2,220	485	12	5,820
Hoke	279	12	3,348	12	13	156
Hyde	2	11	22	13,526	18	243,468
Iredell	2,836	13	36,868	1,049	15	15,735
Jackson	54	12	648	538	11	5,918
Johnston	608	14	8,512	1,274	15	19,110
Jones	264	13	3,432	5,337	16	85,392
Lee	533	15	7,995	158	14	2,212
Lenoir	436	11	4,796	1,485	17	25,245
Lincoln	754	11	8,294	1,038	15	15,570
McDowell	409	13	5,317	1,313	14	18,382

STATISTICS—*Continued*

Peanuts (for nuts)			Irish Potatoes			Sweet Potatoes		
Acreage	Acre Yield Lbs.	Production Lbs.	Acreage	Acre Yield Bu.	Production Bu.	Acreage	Acre Yield Bu.	Production Bu.
115	------	------	322	91	29,302	743	96	71,328
94	800	75,200	263	60	15,780	384	73	28,032
------	------	------	415	89	52,715	22	86	1,892
------	------	------	346	75	25,950	782	86	67,252
------	------	------	434	114	49,476	41	88	3,608
------	------	------	667	98	65,366	19	91	1,729
810	893	723,330	5,491	138	757,758	2,478	109	270,102
36,000	1,042	37,512,000	173	94	16,262	1,444	117	168,948
256	747	191,232	135	93	12,555	1,230	89	109,470
3,614	900	3,252,600	102	98	9,996	2,383	100	238,300
95	750	71,250	1,664	72	119,808	515	71	36,565
76	800	60,800	377	67	25,259	331	90	29,790
97	700	67,900	202	70	14,140	313	93	29,109
124	780	96,844	850	87	73,950	651	97	63,147
90	1,050	94,500	2,601	131	340,731	692	108	74,736
1,343	800	1,074,400	1,836	134	246,024	2,369	136	322,184
15	780	11,700	423	66	27,918	1,001	90	90,090
283	600	169,800	305	64	16,520	1,325	88	116,600
235	770	180,950	239	89	21,271	675	86	58,050
------	------	------	755	80	60,400	393	75	29,475
10,891	938	10,215,758	284	116	32,944	657	119	78,183
------	------	------	170	75	12,750	122	88	10,736
28	990	27,720	273	70	19,110	1,195	84	100,380
2,110	908	1,915,880	485	109	52,865	3,782	103	389,546
855	900	769,500	697	121	84,337	1,977	106	209,562
57	722	41,154	441	92	40,572	1,246	89	110,894
219	1,060	232,140	3,332	134	446,488	4,798	122	585,356
------	------	------	49	100	4,900	108	80	8,640
141	600	84,600	670	88	58,960	1,338	104	139,152
1	700	10,500	147	71	10,437	231	95	21,945
1,270	878	1,115,060	4,263	100	426,300	2,549	98	249,802
75	750	56,250	260	70	18,200	724	82	59,368
12,459	933	11,624,247	529	93	49,197	862	93	80,166
30	725	21,750	675	75	50,625	777	102	79,254
72	900	64,800	406	100	40,600	929	94	87,326
72	900	64,800	230	75	17,250	754	90	67,860
10,189	1,167	12,625,773	179	98	17,542	916	104	95,264
------	------	------	306	85	26,010	144	------	10,080
45	700	31,500	531	68	36,108	1,111	84	93,324
35	910	31,850	304	98	29,792	415	88	36,520
115	760	87,400	726	92	66,792	1,047	105	109,935
22,228	800	17,782,400	692	87	60,204	1,192	90	107,280
24	883	31,192	164	86	14,104	1,353	98	132,594
------	------	------	1,319	73	96,287	184	79	14,536
------	------	------	1,485	80	118,800	272	83	22,576
22,377	1,180	26,404,860	204	92	18,768	601	116	69,716
9	849	7,641	256	89	22,784	259	94	24,346
58	900	52,200	153	106	16,218	173	125	21,625
87	600	52,200	508	66	33,528	477	83	39,591
------	------	------	1,063	83	88,229	271	91	24,661
112	700	78,400	602	84	50,568	3,532	89	314,348
1,720	700	1,204,000	241	117	28,197	454	104	47,216
4	550	2,200	131	72	9,432	455	92	41,860
631	720	454,320	274	104	28,496	1,074	87	93,438
117	680	79,560	182	67	12,194	392	87	34,104
12	875	10,500	428	70	29,960	380	84	31,920

NORTH CAROLINA

COUNTY	Field Cowpeas (for peas)			Soybeans (for beans)		
	Acreage	Acre Yield Bu.	Production Bu.	Acreage	Acre Yield Bu.	Production Bu.
Macon	209	13	2,717	265	13	3,445
Madison	115	13	1,495	541	16	8,656
Martin	136	14	1,904	1,143	17	19,431
Mecklenburg	1,813	13	23,569	367	13	4,771
Mitchell	16	11	176	152	14	2,128
Montgomery	308	14	4,312	298	16	4,768
Moore	1,258	11	13,838	567	14	7,938
Nash	508	14	7,112	468	15	7,020
New Hanover	85	14	1,190	124	15	1,860
Northampton	408	11	4,488	759	18	13,662
Onslow	956	14	13,384	3,342	18	60,156
Orange	634	13	8,242	468	12	5,616
Pamlico	67	12	804	4,739	14	66,346
Pasquotank	139	14	1,946	10,718	15	160,770
Pender	438	15	6,570	1,499	15	22,485
Perquimans	196	13	2,548	7,659	14	107,226
Person	755	13	9,815	117	15	1,755
Pitt	219	11	2,409	1,627	18	29,286
Polk	118	13	1,534	68	12	816
Randolph	1,072	14	15,008	3,140	14	43,960
Richmond	956	16	15,296	1,042	17	17,714
Robeson	2,245	12	26,940	474	15	7,110
Rockingham	966	15	14,490	378	14	5,418
Rowan	2,625	13	34,255	1,864	15	27,960
Rutherford	682	11	7,502	691	10	6,910
Sampson	1,313	14	18,382	1,316	16	21,056
Scotland	56	7	392	38	13	494
Stanly	789	15	11,835	88	15	1,320
Stokes	405	16	6,480	167	13	2,171
Surry	1,029	13	13,377	806	12	9,672
Swain	98	9	882	183	10	1,830
Transylvania	33	13	429	202	11	2,222
Tyrrell	88	13	1,144	6,450	16	103,200
Union	472	14	6,608	231	13	3,003
Vance	654	12	7,848	208	15	3,120
Wake	1,858	14	26,012	1,191	16	19,056
Warren	3,032	13	39,416	535	16	8,560
Washington	141	15	2,115	5,906	17	100,402
Watauga	15	12	180	117	11	1,287
Wayne	650	11	7,150	799	14	11,186
Wilkes	3,395	14	47,530	1,829	15	27,435
Wilson	939	10	9,390	717	18	12,906
Yadkin	2,258	14	31,612	846	16	13,536
Yancey	55	10	550	181	13	2,353

STATISTICS—*Continued*

Peanuts (for nuts)			Irish Potatoes			Sweet Potatoes		
Acreage	Acre Yield Lbs.	Production Lbs.	Acreage	Acre Yield Bu.	Production Bu.	Acreage	Acre Yield Bu.	Production Bu.
			591	90	53,190	210	85	17,850
			621	101	62,721	228	83	18,924
18,269	1,125	20,552,625	685	105	71,925	1,049	121	126,929
52	800	41,600	289	72	20,808	792	88	69,696
			678	98	66,444	100	92	9,200
			220	64	14,080	304	81	24,624
			201	65	13,065	559	89	49,751
195	1,020	198,900	584	88	51,392	1,529	97	148,313
566	900	509,400	1,387	111	153,957	295	118	34,810
29,384	1,070	31,440,880	267	98	26,166	707	113	79,891
7,052	764	5,387,728	95	114	10,830	1,029	116	119,364
			190	72	13,680	441	85	37,485
133	890	118,370	5,698	142	809,116	2,573	105	270,165
503	1,050	528,150	4,712	135	636,120	287	116	33,292
3,612	850	3,070,200	339	94	31,866	1,759	111	195,249
7,495	1,165	8,731,675	223	122	27,206	668	108	72,144
			378	71	26,838	505	83	41,915
1,563	940	1,469,200	1,238	109	134,942	1,201	100	120,100
			143	70	10,010	269	81	21,789
70	800	56,000	565	85	48,025	562	94	52,828
133	800	106,400	526	88	46,288	781	95	74,195
108	755	81,540	829	94	77,926	2,008	100	200,800
			486	62	30,132	852	81	69,012
110	700	77,000	426	98	41,748	471	98	46,158
46	900	41,400	210	71	14,910	1,331	84	111,804
163	838	136,594	749	96	71,904	2,477	91	225,407
10	865	8,650	90	90	8,100	211	99	20,889
45	740	33,300	145	75	10,875	248	90	22,320
			501	64	32,064	551	80	44,080
			748	70	52,360	654	84	54,936
			533	84	44,772	298	70	20,860
			434	80	34,720	170	72	12,240
845	1,000	845,000	2,486	129	320,694	554	117	68,818
53	830	43,990	464	88	40,832	879	90	79,110
			97	74	6,956	389	79	30,731
366	800	292,800	796	79	62,884	2,557	87	222,459
225	950	213,750	509	82	41,738	971	96	93,216
6,639	900	5,975,100	447	118	52,746	246	130	31,980
			1,168	108	126,144	23	93	2,139
119	800	95,200	1,760	100	176,000	1,764	86	151,704
75	750	56,250	1,388	82	113,816	920	89	81,880
118	950	112,100	588	89	52,332	1,125	88	99,000
			328	70	22,960	316	98	30,968
			701	100	7,100	56	79	4,424

NORTH CAROLINA RECOMMENDED CROP REVISIONS, 1924-1926

Crop and Unit	Acres (Thousands)			Yield per Acre			Production (Thousands)		
	1924	1925	1926	1924	1925	1926	1924	1925	1926
Corn, for grain, bu.	2,227	2,314	2,296	18.0	18.5	22	40,086	42,809	50,512
Corn, for silage, tons	15	16	15	5.4	5.0	4.0	81	80	60
Corn, for forage	75	70	65						
Corn, all, (except sweet pop) bu.	2,317	2,400	2,376	18.0	18.5	22	41,706	44,400	52,272
Winter Wheat planted	436	412	456						
Winter Wheat harvested, bu.	414	406	447	12.0	11.0	14.1	4,968	4,466	6,303
Oats, for grain, bu.	258	258	310	18.0	19.0	22.0	4,644	4,902	6,820
Barley, for grain, bu.	7	10	15	23	23	26	161	230	390
Rye, for grain, bu.	71	80	104	9.0	11.5	13.0	639	920	1,352
Buckwheat, bu.	10	10	10	18.0	14.0	22.0	180	140	220
Sorghum for forage, tons	18	19	20	1.20	.90	1.25	22	17	25
Cotton, planted	2,099	2,037	2,054						
Cotton, harvested, lbs.	2,005	2,017	2,023	196	261	295	825	1,102	1,250
Potatoes, Irish, bu.	59	58	74	105	78	100	6,195	4,524	7,400
Potatoes, Sweet, bu.	80	80	84	92	88	90	7,360	7,040	7,560
Tobacco, lbs.	497	547	574	577	695	665	287,000	380,000	375,725
Sorghums, for syrup, gals.	31	28	44	87	68	91	2,697	1,904	4,004
Clover Seed, red, etc., bu.	8	9	8	2.8	3.2	3.1	22	29	25
All Clover, tons	104	114		1.0	0.7		104	80	
Timothy, tons	25	26	151	1.2	0.64	1.0	30	17	151
Clover and Timothy mixed, tons	45	49		1.4	0.70		63	34	
Alfalfa, tons	5	5	5	2.7	1.05	1.90	14	5	10
Annual Legumes:									
Cowpea, tons	128	90	135	0.85	0.60	0.93	109	54	126
Soybean, tons	96	109	136	1.15	0.70	1.05	110	76	143
Vetch, tons	13	14	14	1.0	0.70	1.00	13	10	14
Peanut, tons	186	184	193	0.62	0.60	0.70	115	110	135
All, tons	423	397	478	0.82	0.63	.87	347	250	418
All grains cut green for hay, tons	79	89	93	1.06	.75	.83	84	67	77
All other hays, tons	94	109	120	1.10	0.70	0.90	103	76	108
All tame hays (total) tons	775	789	847	.96	.67	0.90	745	529	764

DIVISION OF FORESTRY

To the Commissioner of Agriculture:

I am submitting herewith biennial report of the Division of Forestry covering years 1925 and 1926.

The work of this Division during the past two years differs from the previous work of the extension forester. With the removal of the extension forces and the research workers from the Department of Agriculture to the North Carolina College of Agriculture and Engineering, the work of the Division was organized on slightly different lines. Mr. R. W. Graeber was appointed Extension Forester at the State College, and in close coöperation with this Division is carrying on the purely extension features of farm forestry work. This left the Forester free to undertake the marketing of farm forest products as his principal line of endeavor. This is a unique service, as no other state devotes the entire time of one man to this field.

In most of the northern states, this would probably not be necessary. North Carolina's problem differs largely from that of the northern states. In the South the farmers and other land owners (conducting farming operations through tenants) are the principal forest land owners. In North Carolina the area of forest lands in the hands of farmers and farm landlords exceeds ten million acres. The value of products from these lands at the time of the last census was more than eighteen million dollars. This does not include another fourteen million dollars worth of forest products, cut and used on these same farms. In other words, the farmers of North Carolina are doing a thirty-two million dollar farm forest business.

Stated in another way, the farm forests of North Carolina are yielding annually three dollars and twenty cents worth of forest products per acre. The magnitude of this business, greater than the entire business of the U. S. Forest Service, (if we consider the amount of revenue derived), this great forest harvest demands the services of many experts.

The Forester is attempting to organize the marketing of this annual crop in such a manner as to secure maximum prices for the wood cut, ready sale for all products, the renewal and restocking of cut-over areas, and the improvement of existing stands through fire protection and intelligent harvesting.

This latter branch is carried on coöperatively with the State Forester's office, with the extension forester, and the personnel of the test farms.

Two definite problems confronted this office, and considerable progress has been made towards their solution. The first problem—stock-

taking—included a reconnoissance of the farm forest lands of the State, the determination by cruising of the amount and quality of existing commercial products, the condition of the immature stands, and also the problems which affect the marketing of this timber and the growth of the new crop. This hurried survey convinced the Forester that there was an adequate amount of high grade timber, in sight, to supply the needs of our existing industries for a period of from twenty to fifty years;—a sufficient length of time to enable the young growth, if intelligently handled, to furnish a perpetual supply of high grade material for these industries.

North Carolina cuts annually, according to the last census, more than a billion feet of forest products in the form of manufactured lumber, and at the period of its greatest cut manufactured two and a quarter billion feet.

The potential capacity of the ten million acres now in some form of forest growth, and owned by North Carolina farmers, is two billion feet annually, under the existing conditions of neglect and unintelligent care.

A properly conducted forest business would increase the capacity of these lands to four or more billion feet annually, would increase the value of the cut by the utilization of low grade products removed in thinnings, and by the growing of high grade logs through improved methods of treatment.

Assuming that this is a conservative statement of facts, this Division is slowly working toward the second and major problem of the farm forest owner. He must know accurately the amount and quality of his timber, the proper method of handling from stump to market, and its value in the markets open to him. The second great problem includes the organizing of the market to receive the farmers' product, so that he may receive a fair price, a price which will induce him to produce regularly and in sufficient volume to interest the larger timber operators. Successful headway is being made, and the farmers of Carolina can now find a market for high grade hard wood and pine logs over a large part of the area.

The great problem of low grade logs, pulp wood and fuel wood remains unsolved, because of the tremendous volume of this product awaiting sale, the small amount that can be consumed in local markets, and the low price of the product which prevents its shipment to distant markets.

There is only one solution to this problem. This wood can not go to the industry—the industry must come to the product. This means wood-using industries capable of utilizing our low-grade forest products must be developed in every county of North Carolina. Industries indicated are pulp mills, which will produce pulp and paper from logging waste, mill waste and the thinnings of dense young stands.

Creosoting plants are also needed to consume other forms of thinnings, power plants needed to furnish auxiliary power to our hydro-electric plants, replacing the coal now used with cheap fuel wood from near-by lands. This and other forms of manufacture will utilize the greater part of our waste and make it possible to grow high grade products for our industries and to bring other industries here, assuring them of a continuous supply of the class of wood necessary for their success. In addition, assuring them of a continual supply of these products at a price which will enable them to compete in all markets.

All branches of the work indicated are well under way. Progress is necessarily slow, due to the lack of personnel and funds for extending the work. An assistant has been promised, and an attempt has been made to secure a satisfactory man. It is hoped, that later, through coöperation with the Federal government, local chambers of commerce land owners, and the organized industries, that both funds and adequate personnel may be provided.

Respectfully,

H. M. Curran,
State Forester.

REPORT ON DRAINAGE

To the Commissioner of Agriculture:

I hereby submit a report on the activities of the drainage division conducted under a coöperative agreement between the North Carolina Department of Agriculture and the United States Department of Agriculture. This report covers the two year period from December 1, 1924 to November 30, 1926.

The major project of the Division during this period was the carrying on of measurements of soil losses and run-off from an experimental installation on the Wake County Experiment Station Farm. These records now cover a period of two and one-half years and take in one exceptionally wet and one exceptionally dry year. The losses from cotton, corn, bare and grass land are being studied on plots of the same length and width and, in the case of cotton, of varying length. Progress reports covering the records thus far obtained, have been published. It is expected that the present experiments will be discontinued at the end of May, a final report prepared and experiments covering the effect of deep and shallow plowing and various rotations inaugurated on the same location. One of the most striking and practical results obtained thus far from the experiment is the discovery that three-fourths of the annual erosion takes place during the months of June, July and August, showing that attempts to control soil losses by means of cover crops will be only partially successful unless these are grown through the summer. A grass sod was found to be very effective in controlling erosion, the loss being only one per cent of that from cotton.

Reports have been prepared and published on the results of groundwater studies in muck soils at the Black Land Station of the North Carolina Department of Agriculture, Washington County, and on the Nissen Farms, Inc., Beaufort County. In the former case, the land was drained by tile lines 330 feet apart; in the later by small open ditches 178 feet apart. Similar reports in tiled drained mineral soils on the J. T. Lewis farm, Pitt County, and on the Coastal Plain Station, Pender County, have been published. These reports, and the report on the Cotton Valley Farm, Edgecombe County, previously prepared, give valuable information with respect to tile and open ditch drainage under various soil conditions and were combined into a paper to be presented at a meeting of the First International Congress of Soil Science.

A report covering ten and one-half years' records of run-off from a typical Piedmont Creek, Third Creek, in Iredell County, has been pre-

pared. The data thus presented will be of value to drainage engineers and commissioners and to those interested in water supply and power.

A study of the effect of stream action in eroding or building up the creek bed was completed and published for a typical Piedmont Creek, Buffalo Creek, Cleveland County. These records show a general tendency toward aggregation of the canal bottoms, accompanied by widening of the bed. The gradients of the stream measured ranged from about 2 to 17 feet per mile. The report covers a period of about eight and half years.

An investigation into the effect of slope of the land, and height, width and shape of terrace section, upon the amount of work necessary in terrace construction and upon terrace capacity, has been carried forward. This data will be published soon after the new year. In connection with this investigation, a considerable number of farms were visited for the purpose of making check measurements in the field.

A large number of locations were visited and investigated for the purpose of securing sites suitable for the measurement of run-off from terraces. A location on the Experiment Station Farm, Wake County, N. C., was selected and two improved Venturi flumes, with recording water stage instruments and a recording rain gage, installed. The flumes, well boxes and instrument shelters were built especially for this installation.

Equipment consisting of three automatic water stage registers and ground-water wells were installed on two orchards in the Sandhill section in Moore and Rockingham counties, to determine the relationship between drainage conditions and winter injury to peach trees. Records covering several months have been taken.

An inspection was made of the experimental concrete tile drain in Wilson County, and a branch line of tile from other sources, added.

Assistance was given in location and taking pictures for an educational motion picture film on terracing and soil erosion, which will soon be released. Various parts of North Carolina, South Carolina and Georgia were visited in the taking of this film.

An investigation was made and a report published on drainage conditions on the Albemarle and Pungo River drainage districts in Washington, Beaufort and Hyde counties with suggestions for improvement. A trip to Washington, D. C., was necessary in connection with this report.

A similar investigation was made and report published on drainage conditions in the Maple Hill Drainage District in Pender, Onslow and Duplin counties.

About two weeks time was devoted in Washington, D. C., to reviewing a report by the Consulting Engineer of the East Coast Land Company, on drainage conditions in the "Open Lands" of Carteret County, as experimentally determined by that company.

An inspection trip, covering a considerable portion of Dare County was made in company with the State Forester to determine the possibility of undertaking studies on the effect of drainage upon timber growth.

In order to coördinate the methods and purposes of the Extension Division as regards drainage with those carried on in the past, considerable work in terracing, soil erosion and building construction was carried on in coöperation with this division. This was necessary on account of a change of personnel in the engineering branch of the Extension Division. Assistance was given on ten farms in Wake County, two in Johnston, and one in Halifax County. In addition, assistance was given on the State Farm in Granville County, where a preliminary survey, map design and location survey were made for lateral drainage by 3,900 feet of tile drains; on the Coast Plain Station farm in Pender County, where engineering assistance was given in changing a main canal location and on the Edgecombe County and Wake County farms, where 3,200 and 7,000 feet of terraces were laid off, respectively. A list of the names and addresses of all persons with whom this division had conducted extension projects since the work was inaugurated together with the nature of the projects was also prepared.

A drainage survey was made and recommendations given on the St. Elizabeth Hospital Farm, Washington, D. C. Assistance was also given to the Wake County Dairy Inspector on six dairy farms.

At the request of the Custodian, a survey was made and plans prepared, for the drainage and paving of the alley and part of the court of the new Agricultural Building and assistance given in reducing and copying the floor plans of the Agricultural Building Annex.

An address on the history and progress of tile drainage was given before the Farmers' Convention at State College. A class in terracing was conducted at the 1925 Farmers' Short Course in coöperation with the instructor in Agricultural Engineering at State College. A series of lectures on tile drainage and terracing was given at the 1925 County Agents' School. The engineer was called on as a technical witness in a case before the Wake County Court.

Committee work on the affairs of the Raleigh Federal Business Association in the preparation of a report on office space and equipment of the various Federal and Coöperative activities in Raleigh, attention to requests for information which could be attended to by correspondence, and the giving of advice and assistance on drainage matters to other divisions and departments were incidental features of the work of the Division.

Respectfully submitted,

F. O. BARTEL,
Associate Drainage Engineer.

THE DEPARTMENT OF AGRICULTURE

STATEMENT OF RECEIPTS

FISCAL YEAR ENDED JUNE 30, 1926

Fertilizer tax	$242,635.60	
Cottonseed meal tax	30,075.33	
Feed tax	58,499.11	
Seed licenses	2,675.00	
Condimental feed licenses	580.00	
Serum	15,328.10	
Irregularities	404.50	
Legume inoculation	930.95	
Linseed oil tax	1,723.01	
Bleached flour licenses	8,415.00	
Bottling plant licenses	1,660.00	
Chicken tests	1,218.98	
Lime plant	4,008.25	
Test farms	45,854.55	
Land sold Granville farm	670.00	
Oil and Gasoline Divisions	3,000.00	
Ice cream licenses	1,410.00	
Bakery licenses	1,010.00	
Refunds	497.13	
Seed tags	1,846.04	
Division of Markets	11,936.98	
Analyzing stomachs	300.00	
Testing seed	16.25	
Permit tags	443.60	
Interest on deposists	1,517.56	
		$436,655.94
Balance on hand first of fiscal year		90,274.57
Total		$526,930.51

DISBURSEMENTS

EXECUTIVE DIVISION

Personal Service

Executive salaries	$3,999.96	
Professional and technical	2,362.50	
Clerical	2,499.96	
Skilled labor	309.70	
Unskilled labor	2,290.00	
Per diem and fees	970.56	
		$ 12,432.68

Supplies and Materials			
Office supplies	$1,077.78		
Cleaning and household supplies	482.22		
Tags	6,579.00		
Library supplies	25.00		
Ice	627.50		
General supplies	521.48		
			$ 9,312.98
Postage, Telephone, Express			
Postage	$ 318.41		
Telephone and telegraph	126.40		
Express, drayage, freight	515.07		
			959.88
Travel expense			
Hotel and meals	$ 507.08		
Railroad and other fares	880.59		
			1,387.67
Printing, etc.			
Office forms	$ 674.13		
Bulletins, etc.	3,156.89		
			3,831.02
Light, power and water	$ 762.69		
			762.69
Repairs			
Repairs equipment	$ 53.32		
			53.32
General Expense			
Rent office	$ 4.00		
Rent equipment	17.00		
Miscellaneous expense	499.18		
			520.18
Insurance			
Fire insurance	$ 850.00		
Casualty insurance	213.33		
			1,063.33
Miscellaneous Obligations			
Refunds	$ 5.14		
			5.14
Equipment			
Office equipment	$ 89.59		
			89.59
			$30,418.48

INSPECTION

Personal Service

Inspectors' salaries	$8,495.52		
		$ 8,495.52	
Supplies and Materials			
General supplies	$ 48.76		
		48.76	
Postage, Telephone, Express			
Postage	$ 10.00		
Express, drayage, freight	269.27		
		279.27	
Travel expense			
Hotels and meals	$5,745.33		
Railroad and other fares	3,033.14		
Advances	2,200.00		
		10,978.47	
Printing			
Office forms	$ 74.46		
		74.46	
			$ 19,876.48

FARM FORESTRY

Personal Service

Professional and technical salaries	$3,000.00		
		$ 3,000.00	
Supplies and Materials			
Botanical and grounds supplies	$ 30.00		
		30.00	
Postage, Telephone, Express			
Postage	$ 75.00		
Telephone and telegraph	63.53		
Express, drayage, freight	14.30		
		152.83	
Travel expense			
Hotel and meals	$ 262.25		
Railroad and other fares	414.24		
		676.49	
			$ 3,859.32

ANALYTICAL

Personal Service

Executive	$ 3,075.00	
Professional and technical	15,258.76	
Clerical	4,099.92	
Unskilled labor	2,631.82	
		$ 25,065.50

Supplies and Materials

Office supplies	$ 97.15	
Laboratory	1,866.99	
Library	123.11	
General supplies	150.00	
Coal	67.50	
		2,304.75

Postage, Telephone, Express

Postage	$ 380.00	
Telephone and telegraph	30.36	
Express, drayage, freight	225.91	
		636.27

Travel

Hotel and meal	$ 43.85	
Railroad and other fares	58.90	
		102.75

Printing

Office forms	$ 271.66	
		271.66
Light, power and water	$ 22.50	
		22.50

General Expense

Miscellaneous expense	$ 76.96	
		76.96

Equipment

Laboratory equipment	1,098.65	
		1,098.65
		$ 29,579.04

ENTOMOLOGY

Personal Service

Executive salaries	$ 3,374.94	
Professional and technical	10,142.36	
Clerical	1,599.96	
Skilled labor	3.75	
		$ 15,121.01

Supplies and Materials			
Office supplies	$ 116.24		
Laboratory supplies	58.73		
Library supplies	68.72		
General supplies	95.96		
		$ 339.65	
Postage, Telephone, Express			
Postage	$ 198.00		
Telephone and telegraph	62.75		
Express, etc.	25.53		
		286.28	
Travel expense			
Hotel and meals	$2,003.42		
Railroad and other fares	2,500.98		
		4,504.40	
Printing			
Office forms	$ 281.46		
		281.46	
Repairs			
Repairs equipment	$ 5.00		
		5.00	
General Expense			
Miscellaneous	$ 172.66		
		172.66	
Equipment			
Laboratory equipment	$ 265.15		
Office equipment	14.85		
		280.00	
			$ 20,990.46
BOTANY			
Personal Service			
Executive salaries	$ 3,499.92		
Professional and technical	5,676.59		
Clerical	1,500.00		
Unskilled labor	10.50		
		$ 10,687.01	
Supplies and Materials			
Office supplies	$ 307.14		
Laboratory supplies	43.13		
Library supplies	64.15		
General supplies	64.27		
		478.69	

Postage, Telephone, Express			
Postage	$ 175.00		
Telephone and telegraph	32.91		
Express, drayage, freight	26.31		
		$ 234.22	
Travel expense			
Hotel and meals	$ 70.70		
Fares	278.02		
		348.72	
Printing			
Office forms	$ 184.41		
		184.41	
Repairs			
Repairs equipment	$ 15.50		
		15.50	
General Expense			
Outside laundering	$ 14.93		
Miscellaneous	4.85		
		19.78	
Miscellaneous Obligations			
Refunds	$ 7.50		
		7.50	
Equipment			
Office equipment	$ 207.91		
Laboratory equipment	710.50		
		918.41	
			$ 12,894.24
PURE FOOD			
Personal Service			
Professional and technical salaries	$ 1,500.00		
Clerical	3,249.92		
Skilled labor	2.00		
		$ 4,751.92	
Supplies and Materials			
Office supplies	$ 83.50		
Laboratory supplies	9.93		
Library	29.00		
General supplies	121.90		
		244.33	

Postage, Telephone, Express			
Postage	$ 70.00		
Telephone and telegraph	30.60		
Express, drayage, freight	20.56		
		$ 121.16	
Travel expense			
Hotel and meals	$ 93.30		
Fares	143.70		
Advance	40.00		
		277.00	
Printing			
Office forms	$ 36.48		
		36.48	
General Expense			
Outside laundering	$ 4.28		
Miscellaneous	16.23		
		20.51	
Miscellaneous Obligations			
Refunds	$ 9.95		
		9.95	
Equipment			
Office equipment	$ 26.53		
Laboratory equipment	83.72		
		110.25	
			$ 5,571.60
MUSEUM			
Personal Service			
Executive salaries	$ 3,499.92		
Clerical	2,100.00		
Skilled labor	1,004.31		
Unskilled labor	4,299.38		
		$ 10,903.61	
Supplies and Materials			
Office supplies	$ 153.80		
Cleaning supplies	85.25		
Library	14.00		
Museum	232.71		
General supplies	1,243.41		
		1,729.17	
Postage, Telephone, Express			
Telephone and telegraph	$ 32.53		
Express, drayage, freight	26.02		
		58.55	

Travel expense			
Hotel and meals	$ 59.61		
Fares	150.89		
		$ 210.50	
Repairs			
Repairs equipment	$ 12.00		
		12.00	
General Expense			
Miscellaneous	$ 48.73		
		48.73	
			$ 12,962.56
FARM ENGINEERING			
Personal Service			
Professional and technical salaries	$ 675.00		
Clerical	210.00		
Unskilled labor	10.00		
		$ 895.00	
Supplies and Materials			
Office supplies	$ 31.55		
		31.55	
Postage, Telephone, Express			
Postage	$ 25.00		
Telephone and telegraph	5.76		
Express, drayage, freight	3.14		
		33.90	
Travel expense			
Hotel and meals	$ 121.70		
Fares	270.18		
		391.88	
Equipment			
Electrical equipment	$ 27.69		
General equipment	43.76		
		71.45	
			$ 1,423.78
DRAINAGE			
Personal Service			
Professional and technical salaries	$ 2,000.00		
Unskilled labor	24.81		
		$ 2,024.81	
			$ 2,024.81

LIME

Skilled labor	$ 575.84		
		$ 575.84	
			$ 575.84

MISCELLANEOUS

Personal Service

Executive salaries	$ 3,499.92		
Clerical	450.00		
Superintendent's salary	999.96		
Skilled labor	20.63		
Unskilled labor	2,671.98		
		$ 7,642.49	

Supplies and Materials

General supplies	$ 155.17		
		155.17	

Postage, Telephone, Express

Express, drayage, freight	$ 58.46		
		58.46	

General Expense

Miscellaneous	$ 301.37		
State College	60,000.00		
Farmers Convention	400.00		
Public buildings and grounds	4,050.00		
		64,751.37	

Miscellaneous Obligations

Refunds	$ 16.92		
		16.92	
			$ 72,624.41

VETERINARY

Personal Service

Executive salaries	$ 3,499.92		
Professional and technical	13,378.22		
Clerical	1,500.00		
Unskilled labor	335.95		
Per diems and fees	625.00		
		$ 19,339.09	

Supplies and Materials

Office supplies	$ 28.19		
Laboratory supplies	242.50		
Library	25.00		
General	67.38		
		363.07	

Postage, Telephone, Express			
Telephone and telegraph	$ 84.56		
Express, drayage, freight	65.83		
		$ 150.39	
Travel			
Hotel and meals	$ 967.32		
Fares	5,681.02		
		6,648.34	
Printing			
Office forms	$ 81.59		
		81.59	
General Expense			
Rent equipment	$ 4.00		
Miscellaneous	71.15		
		75.15	
Equipment			
Office equipment	$ 70.00		
Laboratory equipment	671.97		
		741.97	
			$ 27,399.60
SERUM			
Supplies and Materials			
Office supplies	$ 46.71		
Ice	138.00		
General supplies	364.93		
		$ 549.64	
Postage, Telephone, Express			
Postage	$ 376.00		
Telephone and telegraph	32.15		
Express, drayage, freight	260.00		
		668.15	
Rent equipment	$ 4.00		
Serum and virus	13,623.29		
		13,627.29	
Miscellaneous Obligations			
Refunds	$ 30.10		
		30.10	
			$ 14,875.18

MARKETS

Personal Service

Executive salaries	$ 4,641.58	
Professional and technical	7,164.96	
Clerical	20,110.61	
Inspectors	28,437.14	
Unskilled labor	112.50	
		$ 60,466.79

Supplies and Materials

Office supplies	$ 849.99	
Library supplies	111.22	
General supplies	269.35	
		1,230.56

Postage, Telephone, Express

Postage	$ 1,007.00	
Telephone and telegraph	1,583.37	
Express, drayage, freight	75.88	
		2,666.25

Travel

Hotel and meals	$ 5,910.09	
Fares	9,258.75	
Advances	100.00	
		15,268.84

Printing

Office forms	$ 567.31	
Bulletins	1,955.42	
Engraving, lithographing	29.73	
Notices and advertisements	84.16	
		2,636.62

Repairs

Repairs equipment	$ 32.45	
		32.45

General Expense

Rent Office	$ 11.00	
Rent equipment	45.00	
Miscellaneous	97.51	
		153.51
		$ 82,455.02

TEST FARMS

Personal Service

Clerical salaries	$ 1,040.00	
Superintendents' salaries	11,383.22	
Skilled labor	980.68	
Unskilled labor	32,454.09	
		$ 45,857.99

Supplies and Materials			
Office supplies	$ 14.30		
Botanical and grounds	1,280.67		
Farm and dairy	38,956.90		
Forage	5,375.09		
General supplies	659.49		
		$ 44,286.45	
Postage, Telephone, Express			
Postage	$ 50.00		
Telegraph and telephone	48.09		
Express, drayage, freight	426.18		
		524.27	
Travel			
Hotel and meals	$ 141.56		
Fares	651.78		
		793.34	
Printing			
Office forms	$ 106.15		
		106.15	
Repairs			
Repairs equipment	$ 51.00		
		51.00	
General Expense			
Miscellaneous	$ 814.78		
		814.78	
Interest			
Interest temporary loans	$ 44.43		
		44.43	
Insurance			
Fire insurance	$ 824.20		
		824.20	
Equipment			
Farm and dairy equipment	$ 165.64		
Livestock	143.75		
		309.39	
			$ 93,612.00
Total			$431,142.82

GASOLINE INSPECTION

STATEMENT OF RECEIPTS

FISCAL YEAR ENDED JUNE 30, 1926

Gasoline tax stamps	$512,425.78

DISBURSEMENTS

Personal Service		
Executive salaries	$ 4,249.92	
Professional and technical salaries	3,049.96	
Clerical salaries	5,676.27	
Inspectors' salaries	7,538.16	
Skilled labor	244.50	
Unskilled labor	980.00	
		$ 21,738.81
Supplies and Materials		
Office supplies	$ 58.92	
Laboratory supplies	203.06	
General supplies	124.55	
Coal	67.50	
		454.03
Postage, Telephone, Express		
Postage	$ 80.00	
Telephone and telegraph	79.12	
Express, drayage, freight	859.34	
		1,018.46
Travel		
Hotel and meals	$ 4,912.77	
Fares	5,150.35	
Advances for travel	200.00	
		10,263.12
Printing		
Office forms	$ 428.82	
		428.82
Repairs		
Repairs equipment	$ 40.20	
		40.20
General Expense		
Rent offices	60.00	
Outside laundering	.65	
		60.65

Equipment			
Office equipment	$ 349.13		
Laboratory equipment	113.57		
General equipment	223.20		
		$ 685.90	
Transfer of Funds			
To Department of Agriculture	$ 1,500.00		
To General Fund	500,000.00		
		501,500.00	
			$536,189.99

OIL INSPECTION

STATEMENT OF RECEIPTS

FISCAL YEAR ENDED JUNE 30, 1926

Oil tax stamps	$ 92,752.17

DISBURSEMENTS

Personal Service			
Executive salaries	$ 3,549.96		
Professional and technical salaries	2,599.92		
Clerical salaries	1,966.60		
Inspectors' salaries	7,810.00		
Unskilled labor	820.00		
		$ 16,746.48	
Supplies and Materials			
Office supplies	$ 47.19		
Laboratory supplies	3.75		
Library supplies	19.00		
General supplies	198.08		
		268.02	
Postage, Telephone, Express			
Postage	$ 70.00		
Telephone and telegraph	26.53		
Express, drayage, freight	373.75		
		470.28	
Travel			
Hotel and meals	$ 4,809.39		
Fares	5,746.78		
		10,556.17	
Printing			
Office forms	$ 297.47		
		297.47	
Repairs			
Repairs equipment	$ 46.20		
		46.20	
Equipment			
Laboratory equipment	$ 125.00		
		125.00	
Transfer of Funds			
To Department of Agriculture	$ 1,500.00		
To General Fund	60,000.00		
		61,500.00	
			$ 90,009.62