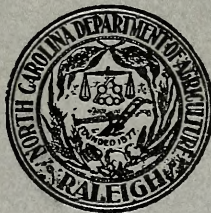


BIENNIAL REPORT
of the
**North Carolina Department
of Agriculture**



**From December 1, 1926
To November 30, 1928**

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BIENNIAL REPORT

of the

**North Carolina Department
of Agriculture**

From December 1, 1926

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RALEIGH
EDWARDS & BROUGHTON COMPANY
1929

ANNUAL REPORT
of the
North Carolina Department
of Agriculture

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 work of the Department of Agriculture for the years 1926 and 1928.

Respectfully,



Commissioner of Agriculture.

RALEIGH, N. C.,
DEC. 31, 1928.

OFFICIALS AND EMPLOYEES OF THE STATE DEPARTMENT OF AGRICULTURE

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P. M. ABERNATHY.....	Assistant Veterinarian
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C. S. BRIMLEY.....	Assistant Investigations
J. C. CRAWFORD.....	Assistant Investigations
J. A. HARRIS.....	Assistant Investigations
M. H. DAVIS.....	Assistant Investigations
MRS. PAULINE NEWSOME.....	Stenographer

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L. B. RHODES.....	Assistant Food and Gasoline Chemist
W. A. QUEEN.....	Assistant Food and Linseed Oil Chemist
J. O. DUNSTON.....	Assistant Food and Linseed Oil Chemist
W. C. HAMMOND, JR.....	Assistant Food and Linseed Oil Chemist
MISS SARAH G. ALLEN.....	General Clerk
MISS PEARL KOONTZ.....	Stenographer
McKAY MCKINNON.....	Inspector

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OBED CASTELLOE.....	Assistant Botanist
MISS SUSIE ALLEN.....	Seed Analyst
MISS GRACE STONE.....	Assistant Seed Analyst
MISS KATE BALLARD.....	Assistant Seed Analyst
MISS KATHERINE MCMILLAN.....	Assistant Seed Analyst

MARKETS AND RURAL ORGANIZATIONS

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R. B. ETHRIDGE.....	Senior Marketing Specialist
F. W. RISHER.....	Senior Marketing Specialist
L. C. SALTER.....	Junior Marketing Specialist
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JAMES J. ALLEN.....	Warehouse Examiner
C. R. REYNOLDS.....	Cotton Classer
MISS ELIZABETH MOORE.....	Stenographer
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D. R. PALMER.....	Assistant Statistician
WM. H. RHODES, JR.....	Assistant Statistician
MRS. ELLA R. SIMPSON.....	Filing Clerk
MRS. REBECCA HORTON.....	Senior Statistical Clerk
MRS. KATHERINE W. HAIG.....	Collaborator Clerk
MRS. POLK DENMARK.....	Statistical Clerk
MISS SADIE WALKER.....	Stenographer
HERBERT BARNES.....	Machinist

PUBLICATIONS

WM. H. RICHARDSON.....Agricultural Editor

DRAINAGE

F. O. BARTEL.....Engineer

FARM FORESTRY

H. M. CURRAN.....Farm Forestry Specialist

TEST FARMS

F. E. MILLER.....Director and Horticulturist

MISS LOUISE WRIGHT.....Stenographer

R. E. CURRIN, JR.....Superintendent Edgecombe Test Farm, Rocky Mount

F. T. MEACHAM.....Superintendent Iredell Test Farm, Statesville

S. C. CLAPP.....Superintendent Buncombe Test Farm, Swannanoa

CHAS. DEARING.....Superintendent Pender Test Farm, Willard

E. G. MOSS.....Superintendent Granville Test Farm, Oxford

J. L. REA, JR.....Superintendent Washington Farm, Wenona

J. F. HATCH.....Custodian



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BIENNIAL REPORT
OF THE
NORTH CAROLINA DEPARTMENT
OF AGRICULTURE
1926-1928

FOREWORD

In the compilation of this biennial document, which is required by law, I have incorporated the reports of all the division heads in the State Department of Agriculture, in order that a full review of what we have done during the past two-year period be presented. A study of these reports will show that progress has been made and that the work of the Department has proceeded along orderly lines. A contributing factor toward this end was the legislation passed in 1925 re-defining the relations between the Department and the State College, to which I made reference in my last Biennial Report. Harmony has continued to prevail between the two institutions and much duplication of effort has been eliminated.

While there are still many objectives to be striven for, yet a study of the reports that make up this document will reveal the fact that much has already been gained. Those working in the Department have, with rare exceptions, given me their loyal support and have worked toward one common end, that is, the betterment of conditions among our farmers, especially with a view to giving them the protection the law guarantees and helping them distribute, or market, to the best advantage that which they have produced through hard work and expense.

I shall not undertake to lay down any legislative program. That is a matter yet to be worked out, but it is not amiss to express the hope and belief that whatever is done in the General Assembly especially in the matter of tax reduction, will be done with a view to helping the farmer along with those engaged in other industries.

The problem of farm taxes is growing more and more burdensome in this state as well as in other states of the Union. The total taxes collected directly from farmers of the United States in 1914 were estimated at three hundred and fifty million dollars. The sum collected in 1926,

twelve years later, was a little less than nine hundred million dollars. During this period, the farmers' contribution in taxes to the support of various Government units increased more than one hundred and fifty per cent while the gross value of farm products increased only about sixty per cent. The indications are that the farmers of this country are paying out in taxes one-third of the net incomes of the farms. This condition is a repetition of the situation in England in A.D. 73 when, according to the record, "In order to meet the civil and military expenses entailed upon him, every farmer had to pay one-third of all that his farm could produce in taxes." Could any business live under such a burden?

Coming to North Carolina, this state paid, during the year ending June, 1928, the sum of two hundred twenty-five million, three hundred sixteen thousand, one hundred and sixty dollars into the Federal Treasury. Most of this gigantic sum came from taxes on manufactured goods, but it will be remembered that these goods were manufactured from raw materials grown on the farm. In addition to this, the people of this state paid sixty-eight million, six hundred nineteen thousand dollars as state and local taxes. In other words, the per capita taxation for North Carolina is twenty-four dollars and forty cents for every man, woman, and child in the State.

To show for this tremendous tax burden, we have our elegant schools, superb roads, and, at least, creditable institutions for the aged and infirm. We hold that these millions have been wisely invested and we are proud of these public properties, but when we look over the record and note that North Carolina ranks first in the Union in its bonded indebtedness, carrying a bonded debt of fifty-four dollars and fifty-four cents for every man, woman and child in the state, we are forced to ask whether it isn't time to call a halt and try to get some of these debts liquidated.

It is true we are prospering, the record shows we are paying in to the Federal Treasury more money than any other states in the Union except New York and Pennsylvania. We are rapidly becoming a manufacturing state. We seem to have the bulk of our indebtedness safely funded, to be paid off within the next twenty years. In the meantime, however, the tax rate on farm property will, of necessity, remain high in order to pay off this indebtedness incurred in making large investments for the public good.

True there is no tax on real estate for state purposes, but taxes on gasoline, franchises, etc. that used to go to the maintenance of county governments have been taken over by the state and the county forced to levy on real estate for public improvements and running expenses.

May we hope that the time is not far distant when our tremendous building program, in both county and state, for county roads and county schools and state roads and state schools may be checked up and some of the money at present used for the extension of our road and school systems be used to liquidate existing debts and help to defray running expenses, thus enabling the county commissioners to reduce the tax rate on realty? The owners of realty are crying out everywhere against mounting tax rates and plodding realty and agricultural returns. The idea has been advanced that farm lands should be graded and classified for taxation purposes. Open lands that have so far lost their fertility as to have been abandoned should not have to pay as much tax as the fertile acres on the same farm. This is what I mean by grading farm lands, the grading representing the differences in productive capacity. The lands might be classified as tillable lands, forest lands, and swamp lands, and take a tax rating comparable to their income producing capacity.

In 1899 North Carolina had a little over seventy-two thousand wage earners. In 1927 she had more than two hundred thousand. In 1899 she produced over eighty-five million dollars worth of manufactured products. In 1927 she produced over one billion dollars worth of such products. The same year she produced four-hundred and fifty million dollars worth of farm products, not quite half as much in value as her manufacturing products.

We are delighted to see North Carolina forging ahead as an industrial state because this means a rapid increase in wealth to the farmers in that a ready and keen local market is developed for farm products and tends to offset the necessity of looking for markets outside the State.

With the development of electric power, industry is enabled to decentralize its activities and locate mills at convenient points for transportation away from the expensive environment of the larger cities. This will not only benefit the industry by reducing operating expenses, but will enable the farmer to reduce transportation cost in furnishing supplies to the mill operatives.

In the following pages appear the reports of the heads of the various Divisions, which I have summarized as follows:

WEIGHTS AND MEASURES LAW

The Legislature of 1927 enacted the uniform Weights and Measures Law and provided that the execution of this law should be financed by fees collected from those subject to its operation. The act was placed in the Department of Agriculture and has been carried out with as much vigor as possible under existing conditions. There has been some com-

plaint arising from the operation of this law on the grounds that the fee system was unjust. It would seem, therefore, that the law should be amended and a direct appropriation made to take care of the cost of financing same. It has been urged that since this law is for the protection of the general public, an annual appropriation out of the general treasury should be provided for its execution.

TEST FARMS

We have six test farms or branch experiment stations located at convenient points throughout the state for the purpose of serving the farmers who have agricultural conditions peculiar to their sections. The mountain section of North Carolina has a climate and soils adapted to a rather different line of agricultural production from that which obtains in other parts of the state. For the purpose of serving the farmers of the extreme western portion of North Carolina, we have established at Swannanoa a modern experiment station where problems confronting agriculture in the mountains are worked out and results given to the public.

In the Piedmont section of North Carolina, we find agricultural conditions and market conditions that are unlike those found at many other points. Here a greater variety of crops can be grown with success than in any other part of the state. Here it is that industrial North Carolina finds its highest development; consequently, we find in this section the best local markets requiring the greatest variety of food and feed crops. The test farm at Statesville was originally established to serve the grain farmers of Piedmont years before the present industrial development of the section came about. This farm has been forced to readjust its relationships to the section from time to time in order to keep pace with the varying requirements brought about by the increasing industrial development. While not neglecting the general crops of the section—such as, cotton, corn, and the small grains—more and more attention is being paid to fruits, vegetables, and livestock suitable to the needs of the section.

It is well known that tobacco is, next to cotton, the most important money crop of the state. Problems of quality and quantity in tobacco production are worked out on the test farm at Oxford, North Carolina, which is located in what is known as “the old bright tobacco belt” of the state. Highly valuable results have been obtained from this farm. In passing we might note that it is the only strictly tobacco experiment station on the Atlantic Seaboard and for this reason it commands a very wide interest among the tobacco farmers of the South.

Cotton is our most important crop. Problems relating to this crop

are studied at the farm in Edgecombe County and in Iredell County and on the experiment station farm of the college at Raleigh.

In the southeastern part of the state, the strawberry and other small fruits industry has been given considerable attention on the experiment station farm in Pender County. In recent years we have given considerable attention to the growth of the Scuppernong grape, and are now devoting much study to the development of the bulb industry. This industry gives great promise of profit to the farmers in the southeastern Coastal Plains section. Quite a variety of problems present themselves for solution on the Pender County farm and much interest is being taken in the work at this point by the farmers who have, in the past, had difficulty in growing the old-time crops of tobacco, corn, and cotton.

On all these farms problems of varieties; the introduction of new crops; the proper fertilization of crops; the most economic rotation to be used in the production of these crops; the proper adaptation of different crops to different soil types; the different fertilizer requirements of the different soil types; the proper manipulation of the different crops; such as the pruning of trees; the storage and housing of fruits and vegetables; the economical feeding of farm animals; economic poultry production; problems relating to the dairy industry; and many other such like problems are studied and worked out on these experiment station farms. These farms serve as centers of interest for the different agricultural sections and are annually visited by thousands of people who go to study and observe the work done.

VETERINARY DIVISION

The Department of Agriculture, through its veterinary activities, exerts a vital influence upon the development of the livestock industry of the state. For years the Texas cattle tick made such inroads on the cattle of North Carolina as to render the development of the beef and dairy industries of doubtful possibility. Today we have stamped out the cattle tick and the above named industries are well on their way to success.

The prevalence of tuberculosis among cattle has never been as great in North Carolina as in some other states; nevertheless, this disease has caused considerable anxiety to our cattlemen. Some years ago a concerted effort was made by this department to stamp out tuberculosis among our cattle, and today we stand as the first state in the Union to be free from bovine tuberculosis. Our state today is on the modified accredited area of bovine tuberculosis-free territory, and there is no reason why the cattle industry of North Carolina should not multiply by leaps

and bounds because every requirement of climate and soil is found in North Carolina for the success of this industry.

We have not yet been able to grapple with complete success with hog cholera in our state. This disease seems to be difficult to control due to the fact that so many hogs are shipped into the state from outside sources where cholera is prevalent. We are, however, attacking this problem with great vigor and we hope to report this state under practical control within the next few years.

A leading phase of the livestock industry of this state is the production of poultry and eggs; but before our farmers could hope to gain reliable results, it was necessary to bring under control what is known as bacillary white diarrhea, a fatal disease among small chicks, which makes great inroads into the farmers' flocks. By means of the blood test we are enabled to establish accredited hatcheries free from this disease, from which hatcheries chicks free from this malady may be purchased. We have thus been able to add greatly to the success of poultry production in North Carolina.

There are a number of other contagious diseases that are kept under control by the vigilance of the workers in the Veterinary Division.

DIVISION OF FOOD AND OIL

In order to produce and maintain a strong and healthy condition among our people, our food supplies must be of the best and maintained on a basis of a health-giving quality. Of all the factors entering into the protection of the health of our people, aside from any sanitary consideration, we deem the maintenance of proper food the most important. Laws for the protection of the people against inferior food supplies, as sold over the counter in sealed containers, have been enacted from time to time and placed in the Department of Agriculture. These laws have been carried out by the Commissioner through the Division of Food and Oil, and we feel that a marked degree of success has been obtained in the execution of these laws.

It is through this division that the department polices the gasoline and oil trade of the state by analyzing from time to time samples of these commodities sent in by the oil inspectors. In this way we are enabled to maintain a high quality of gasoline and oil on our market for the consumption of our people.

ANALYTICAL DIVISION

The work of the Analytical Division is among the most important of this department. It is here that we keep track of the amount and quality of all kinds of commercial fertilizers used by our farmers. In

this division we also police the distribution and sale of feeds, insecticides, and fungicides. In addition to these regular lines of work, there is considerable miscellaneous work to do; such as, analyzing water, limestone, and other materials in which people of the state from time to time become interested.

ENTOMOLOGY

One of the great enemies to crop production in this state is the prevalence of insect pests. Our fruit crops are menaced by insects that inhabit nursery stock. The production of bulbs in eastern North Carolina is threatened by diseases that come into this country in imported bulbs. The production of honey, which is a vigorously growing industry at this time, is threatened by the prevalence of the disease known as "foul brood" among bees. All of these diseases and insects that attack our fruit crops, vegetable crops, and general crops, are being held in control as far as possible through the activities of the Division of Entomology.

BOTANY DIVISION

We attempt through our Botany Division to protect the farmers and seed dealers of North Carolina from the purchase and sale of inferior seeds. As the industries of our state multiply and our home markets thus increase in importance, the need for reliable agricultural seed to produce reliable crops for a reliable home market will increase. The work of the Botany Division is rapidly growing and expanding. The grading of grain and soy beans for the trade is becoming more and more important. Through this division the department is also fostering the development of Irish potato growing in the mountain counties.

DRAINAGE

A very important phase of the work of this department is that relating to land drainage. There are two kinds of land drainage, one has to do with surface drainage and the other with sub-surface drainage. Surface drainage may cause destructive erosion of our lands, while sub-surface drainage is likely to be so sluggish as to make the use of tile necessary in its successful operation. Our drainage engineer is giving special attention to methods of both surface and sub-surface drainage with the view of controlling and promoting the fertility of our soils.

FORESTRY

Through the Division of Forestry the Department is helping not only to teach conservation and judicious cutting, but is establishing new markets for lumber and other forest products. As a part of the general

distribution program the work of this Division has shown gratifying progress.

DIVISION OF STATISTICS

It is through the Division of Statistics that the state's agricultural bookkeeping is performed. We do our statistical work through a cooperative arrangement with the National Government which so far has worked satisfactorily. We feel it is just as important for the state to know how much agricultural crops it has produced during the year as it is for a manufacturer to know the amount of goods he has put out. It is through the Division of Statistics that we are enabled to ascertain our standing with reference to other agricultural states and to show to the world the inducements offered to outsiders to make investments among us.

MARKETS

One of the leading functions of this department is that of helping the farmer to sell his goods. We endeavor to ferret out the best markets in the country for our products at a time when these products must be sold. In coöperation with the college, we have been able to produce and sell millions upon millions of pounds of poultry products, to grade and certify thousands of car loads of fruits and vegetables, to grade and certify hundreds of car loads of soy beans. During the season of 1927, this department supervised the shipment of 18,432 carloads of fruits and vegetables alone, to say nothing of moving soy beans and grains. It is the policy of the department to find a market not only for the agricultural and horticultural products, but for the poultry and live-stock surpluses as well. A considerable amount of cotton is being marketed through coöperative arrangements and this plan of marketing will likely increase as the confidence of the farmers in this method becomes more firmly fixed.

MUSEUM

The State Museum is a part of the State Department of Agriculture. This feature of our work is primarily educational and is of especial interest to those who would like an ocular demonstration of the kinds and varieties of plants and animals and minerals found in North Carolina. The museum is housed in nine spacious halls, each hall largely devoted to a special department of the state's resources. Many thousands of people visit the museum every year, and it is not any unusual sight to see school trucks lined up along Halifax Street, having brought loads of school children here for the purpose of studying the exhibits in the museum.

PUBLICATIONS

The law requires the department to issue from time to time reports in bulletin form on the work being done under its supervision. But much of the information contained in these bulletins fails to reach as many people as it should, and for this reason we try to disseminate additional information through the state press by the publication of the "Agricultural Review," the official organ of the department. Again it not infrequently happens that things of general interest occur in the department which cannot be issued in bulletin form. News of such happenings is given to the daily and weekly press for distribution. In addition to this news service and publication of periodical reports, we find it advisable to broadcast over the radio certain internal workings of the department and thus disseminate more widely information of interest to our people. We consider the news service of the Division of Publications of the department a very important feature of our work, and the generous response we have received to the work of this division amply justifies us in our conclusions.

The terms of the following members of the Board expire with this sitting of the Legislature: W. A. Brown, of the Third District; George K. Grantham, of the Sixth District, and O. Max Gardner, of the Ninth District.

Following will be found detailed reports from the chiefs of the different divisions of the department in which any one may find a complete discussion of any matter in which he may be particularly interested.

DIVISION OF BOTANY

To the Commissioner of Agriculture:

SIR: 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 soybeans.

Fifth. Recleaning and treating tobacco seed.

A FEW NOTES ON THE STATE SEED LAW

The North Carolina State Seed Law was enacted for the double 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 of protecting agriculture against possible 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.

Any citizen of the State can have his seed tested in the State Seed Laboratories free of charge; but a charge of twenty-five 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 authority of 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 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 number of seed samples amounting to 5,288.

Tobacco Seed. The months of December, January and February are largely given over for the recleaning of tobacco seed sent to us by the farmers. The past two years we recleaned 1,014 pounds and one ounce.

Seed Tags. The past two years we distributed 247,732 seed tags.

We now have 103 licensed dealers; 38 resident, and 65 nonresident dealers.

Nitro-Cultures. The distribution of pure cultures for legumes the past two years was 4,711 acre-bottles.

Plant Identification. Farmers are becoming more interested in the identification of weeds and drug plants.

Grain Grading. Since our grain-grading service was established we have had 512 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.

J. L. BURGESS,

Botanist.

DIVISION OF MARKETS

To the Commissioner of Agriculture:

SIR: The following report covers the activities of the Division of Markets of the North Carolina Department of Agriculture for the years 1927-1928 in compliance with your request.

We have taken the liberty of presenting for your information some facts pertaining to this work over a period of more than two years specified because they emphasized the progress of the work during the past two years.

Because of our marketing and rural organization projects, we, perhaps more than any other division, are indebted to the other divisions of the Department and many branches of other departments or institutions.

GENERAL

At no time in our history has there been greater emphasis placed upon the business of farming. The necessity for the farmer to have an income throughout every week of the year has found its expression in ever-increasing suggestions for better farm management, wider distribution of agricultural products and more direct and efficient machinery for marketing from farmer to consumer, and the problems of standardization and preserving and warehousing and the processing of products from the farm appear to be the fundamentals of all farm relief programs.

The importance of a state-wide program of marketing and farm organization should be instituted as early as men and money are available in the School of Agricultural Economics and this Division of Markets and Rural Organization.

During the past two years there has been significant progress made towards the reduction of transportation costs. This Division has found an undeveloped field here in the preparation of detailed facts to support the complaints filed by our farmers and their agents and the presentation of those complaints with the Corporation Commission and by them to the Interstate Commerce Commission. We must know the weight of each commodity and container, also the field costs and practices or habits peculiar to each shipping point.

Almost daily requests come to this office regarding either the proposed formation, or the operation, of farmer organizations. We have been supported largely through the advice from the Secretary of State's

office and the office of the Attorney General. As will be shown in this report, the Attorney General's office should be given full credit for pursuing to final collection the sum of \$17,000 in refunds from loans heretofore sustained in our State Warehouse System.

STATE WAREHOUSE SYSTEM

Actual or estimated as of June 30th of each Year	Cash on hand in Principal Fund	Amount of O-S Loans to Warehouses on which State holds First mortgage	Invested in State, Institutional and Government Bonds	Cash on hand in Supervision or Operating Fund	Transfers from Supervision Fund, to Principal Fund	Refunds by Bonding Companies for Losses
1924	Approx. None	Approx. \$ 368,332.50	\$ 192,350.00	Approx. \$ 5,911.12	\$ -----	\$ -----
1925	\$ 18,681.73	353,422.50	192,350.00	18,526.66	5,000.00	6,677.15
1926	3,769.78	376,502.50	222,350.00	17,717.81	10,000.00	-----
1927	27,237.05	362,582.50	222,350.00	29,935.08	-----	10,249.10
1928	299.48	313,412.50	297,850.00	12,265.52	26,000.00	-----
					7-10-28	-----
Nov. 30, 1928	13,249.48	323,412.50	290,000.00	7,355.56	\$ 10,000.00	-----
					\$ 51,000.00	\$ 16,926.25

The total investments and cash in Principal Fund Nov. 30, 1928 amount to \$626,661.98.
 Cash Balance November 30, 1928, Supervision Fund, \$7,355.56.

The School of Agriculture and the Department of Vocational Training, through their agricultural teachers and county agents, have made it possible for us to promote and to carry through to success many sales for farmer groups that otherwise would have been impossible with our limited man-power. The agricultural agents of various transportation organizations have furnished us full coöperation, the peculiar result of these coöperative projects being that these various agencies have increased their demands upon this Division of the State Department of Agriculture.

STATE WAREHOUSE SYSTEM

There are from year to year fifty or more cotton warehouses licensed in the State System. The inspection is done under the supervision of the U. S. Warehouse Act. We wish to call your attention to the attached statement, which refers to the principal and operating fund of the State Warehouse System, and shows that during the past four years \$51,000 has been saved from the operating fund and added to the principal fund. In 1925 and in 1927 Attorney General Dennis G. Brummitt recovered by court action a total of \$16,926.25 in refund

from bonding companies covering any and all losses of which we have knowledge. This leaves some funds to be invested. During the last four years an additional \$100,000 has been invested in State and Government bonds and we now have the best cotton warehouse receipt issued any where. Some regular banking connection should be promoted whereby any man placing cotton in the State Warehouse System could receive a loan at the lowest possible money rate.

WEIGHTS AND MEASURES

A detailed report of the work on weights and measures is being prepared separately in accordance with the Uniform Weights and Measures Act.

There is a growing demand for licensed weighers of cotton and other commodities. We think that the Superintendent of Weights and Measures should be given authority to license public weighers.

SAVING AND LOAN ASSOCIATIONS AND RURAL ORGANIZATION

An act of the legislature in 1915, as amended by the legislatures in 1917 and 1925, provides for this type of organization, North Carolina being the first State in the union to undertake the organization of rural credit societies and we now have in the State both rural and city, or commercial, groups. Twenty-three new associations have been organized in twenty-three counties. The only two organized agencies, other than banks, for benefitting the rural communities are the Saving and Loan Association and the Agricultural Credit Corporation.

Rural organization work needs a more definite program in this State. Several attempts have been made in the last year to promote this work through existing farmer organizations and it is hoped that these conferences will prove successful. This office has, and will continue in the promotion of this work.

MISCELLANEOUS PROJECTS

Increasing in number are the requests for aid in marketing many minor crops. Especially is this true of pecans, holly and other evergreens, honey, wood and novelties of many descriptions.

LIVESTOCK AND POULTRY

Carlot poultry shipments in North Carolina have continued with regularity and success. No one thing has contributed more to the popularity of the poultry business than this stabilized market throughout the year. The poultry program of production by the College and Extension Forces has given us a superior product to market. Market

reports indicate that the size of our poultry and eggs is larger than other southern shipments. The problem now foremost in this work is the proper classification of eggs and the setting up of proper standard certification of hatcheries.

With the coöperative shipments of hogs now numbering about five hundred cars per year, we hope to make much progress in the grading of hogs and the sale at the car door rather than in the terminal markets.

There is again a demand for the supervision of this Office of wool pools throughout the western part of the State and we again expect to conduct these sales similar to work done by this Office several years ago.

Additional demands come to this Office for the promotion and supervision of cream routes. We cannot adequately cope with this situation until there is a special plan and appropriation made for this work, because the supply of milk from any community is so limited that the total production on any route cannot bear the expense during the first twelve or eighteen month period, and the cream buying stations of large dairy or ice cream corporations have so lessened the earning power our coöperative creameries throughout the State that they cannot bear the expense of promoting these cream routes.

FRUITS AND VEGETABLES

The fruit and vegetable branch of agriculture has witnessed perhaps their most discouraging year. With a total shipment of between 18,000 and 19,000 cars out of the State, nothing more than a bare cost of production has been realized on any commodity when taken as a whole, and many carlots have brought only the cost of the containers. Especially is this true of potatoes and peaches. In spite of their disaster these growers continued with their standardization and inspection work in coöperation with this office and this seems even more unusual because that work is voluntary and paid for by the grower with the exception of the supervision given from this office.

We have coöperated with the Federal Bureau of Agricultural Economics in both the inspection work and the Market News Service. Special daily bulletins have been issued on strawberries, potatoes and peaches during the shipping season, and from this office special weekly bulletins on poultry, also special market bulletins have been issued on various commodities, giving the market, the supply in sight and advice in preparing for market.

North Carolina consigns a larger per cent of its fruits and vegetables than does any other state with the exception possibly of two. This is not necessarily a bad system, but one or two things must be ac-

completed to safeguard our interests,—either development of enough truly auction markets to determine the market price on that day, or, the placing in three or more of the large consuming markets our personal representatives. Strawberries are the only shipments of fruits and vegetables out of the State for which the farmer received cash before loading. An experiment in Mount Olive this last summer, as an auction market on all commodities, is the most interesting development in this line.

Congress has enacted a standard container act, which after another year will control the size and type of containers for fruits and vegetables. Grades for all fruits and vegetables have been promulgated by the Department of Agriculture in Washington, and approved by the several states with such minor changes as are necessary due to soil and climate conditions. Further emphasis should be placed by all farmers and shippers upon the grading and standardization program. This Division had held, and will continue, in coöperation with other agencies, grading schools. More than one hundred men as special inspectors are used during the heavy spring shipping season in this work.

FARM CROPS

We feel that our general farm crops, other than cotton and tobacco, have been neglected because they are too often considered by the farmer himself as merely a side line of small importance and we have not had sufficient men to promote crop improvement associations with the idea of certifying the trueness to variety other than seed Irish potatoes from a restricted mountain area. No State certified seed are produced in this State.

CONCLUSION

Because of the uncertainty of income, the number of regular employees in this Division has been reduced from twenty in 1925 to seventeen in 1926, to twelve in 1927, to eight in 1928. We will undertake to promote the additional market demands as set forth in this report when, in your judgment, the demands will justify and the funds can be made available.

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, 1926 to December 1, 1928.

TICK ERADICATION

The last of the tick infested counties was released from quarantine December 1, 1925. Since that time work has been done on premises under local quarantine that were still infested. Some reinfestation occurred on the Banks of Hyde and Dare Counties in the fall of 1927. Systematic dipping has been conducted in this section during the season of 1928 and we believe at this time that the ticks will be completely eradicated from this section and that this territory may be released from quarantine. It will be necessary to make frequent inspections, at least for another season in the counties recently released from quarantine. Much of this area is swampy, cut over land on which there were many wild and semi-wild cattle. While it is believed that all cattle were dipped and the ticks eradicated, it seems wise to make inspections in this area for the purpose of locating any infestation early and thus prevent its general spread. The U. S. Bureau of Animal Industry with whom we are coöperating in this work, takes the same view of this matter and will assist in making these inspections.

TUBERCULOSIS ERADICATION

On October 1, 1928, tuberculin tests of all cattle in the last of the one hundred counties were completed and the entire State was placed in the modified accredited area. Thus North Carolina was the first State to have this distinction. The following shows the year in which each county was completed:

1922	1923	1924
New Hanover	Cabarrus	Mecklenburg
Pender	Buncombe	Guilford
Davie	Forsyth	Stokes
Scotland	Alamance	Stanly
Cumberland ..	Wayne	Durham
Rowan	Greene	Wilson
Davidson	Iredell	Lenoir
	Robeson	McDowell

1927

Franklin	Wake	Pasquotank
Hoke	Alexander	Granville
Pitt	Duplin	Harnett
Halifax		Bertie
	1926	Clay
1925	Caswell	Currituck
Moore	Montgomery	Swain
Rockingham	Surry	Washington
Polk	Nash	Chatham
Gaston	Cleveland	Graham
Chowan	Caldwell	Dare
Edgecombe	Jones	Hyde
Person	Burke	Jackson
Northampton	Orange	Sampson
Warren	Vance	Avery
Lee	Carteret	Camden
Richmond	Columbus	Yadkin
Perquimans	Gates	
Tyrrell	Pamlico	1928
Union	Bladen	Watauga
Johnston	Brunswick	Cherokee
Randolph	Craven	Mitchell
Martin	Macon	Lincoln
Anson	Beaufort	Wilkes
Rutherford	Catawba	Alleghany
Yancey	Onslow	Ashe
Henderson	Hertford	Haywood
Transylvania		Madison

This work from the beginning was conducted in coöperation with the United States Bureau of Animal Industry working with the county commissioners of the several counties and the cattle owners. Eradication of Bovine Tuberculosis began in 1918 under the Accredited Herd Plan. Under this plan we tested most of the pure bred herds and the herds supplying milk to our cities and towns. Many of these were known to be infected as a result of adding infected cattle, many from other States where the infection was very heavy. In 1921 it was deemed advisable to attempt the complete eradication of this disease under the area plan. That is to class each county as a unit and systematically test all of the cattle in each county, continuing until all of the counties were completed. There seemed to be a general demand for this. Wherever the nature of tuberculosis in animals and the method of eradication is thoroughly understood, there is a general demand for its eradication.

The two most important reasons why tuberculosis in animals should be eradicated are: (1) to prevent the economic loss through decreased

productiveness and premature death of animals, and (2) for the protection of the public health.

Although tuberculosis in cattle is usually chronic and can seldom be diagnosed except by the application of the tuberculin test, yet cattle affected with this disease show a decrease in production, and the owner finds it necessary to dispose of such animals, not knowing that he is selling a tuberculous animal which may spread the disease to many healthy animals in some other herd. Many animals die prematurely as the result of tuberculosis. Meat-producing animals fail to make proper gains, and many are an entire loss when finally marketed. The meat inspection records of the U. S. Bureau of Animal Industry for the year ending June 30, 1922, show the following:

Cattle

Total slaughtered	7,871,457
Total retained for tuberculosis.....	213,608
Total condemned for tuberculosis.....	39,434
Total condemned for all other diseases.....	15,753

Swine

Total slaughtered	39,416,439
Total retained for tuberculosis.....	5,640,081
Total condemned for tuberculosis.....	70,304
Total condemned for all other diseases.....	92,622

To illustrate the above, there were thirty-nine train loads of cattle and twenty-three train loads of hogs, each containing forty cars, which were an entire loss, the time and feed used to produce these animals was wasted, on account of their being affected with tuberculosis. These records cover all animals slaughtered under Federal inspection and represent about 65 per cent of all animals slaughtered for food in the United States during that year. Most, if not all, tuberculosis in swine is a result of infection from cattle either through following tuberculous cattle in the feed lots or feeding on waste dairy products from tuberculous cows. When tuberculosis in cattle is eradicated it will naturally be eradicated from swine. Many livestock commission firms have arranged to pay a premium on hogs shipped from areas freed of tuberculosis. In many sections a premium is paid on dairy products from tuberculosis-free cows. No livestock owner can afford to keep animals affected with tuberculosis nor can he know that they are free of this disease except by the proper application of the tuberculin test. Our percentage of tuberculosis in cattle was small, but in order to locate the diseased animals and remove them it was necessary to test all of the cattle.

While we are not engaged in public health work, the question of the transmission of bovine tuberculosis to people naturally entered into our campaign of tuberculosis eradication in animals. Scientific investigation has definitely established that bovine tuberculosis is transmissible to the human, especially to children. The only difference of opinion seems to be in the various methods of transmission and the amount of human tuberculosis that is a result of infection from animals. It seems that children are most susceptible, and the principal source of infection is through the drinking of milk from tuberculous cows. Few persons have the opportunity or inclination to make sufficient scientific investigation as will enable them to speak with authority from personal knowledge of the transmissibility of this disease. We accept many facts in every-day life, without question, of which we have less personal knowledge than of this subject. In our tuberculosis eradication work we have in a number of instances found cows affected with tuberculosis and members of the owner's family affected with the same disease. Since so much scientific investigation by able research workers has been conducted, it seems useless for us to attempt to argue such a technical question. We prefer to quote a few of these scientists, and leave it to the readers to draw their own conclusions.

Park (Public Health and Hygiene, 1920): "The bovine type is pathogenic for almost all mammalian animals. The widespread existence of the disease in the cattle from which we derive all the milk renders the bovine bacilli an important etiologic factor in connection with tuberculosis in children."

E. C. Schroder (Journal American Veterinary Medicine, July, 1921): "The bovine bacillus is responsible for tuberculosis in children. Every case of tuberculosis in the human subject due to bovine bacilli must be charged to intimate contact, in most cases, through the ingestion of contaminated dairy products between persons and tuberculous cattle."

British Royal Commission: "A series of twenty-nine cases of abdominal tuberculosis in children, in which fourteen were of bovine origin."

Rabinowitch of Pasteur Institute: "In twenty-one cases of tuberculosis in children, picked at random, bovine bacilli were present in 50 per cent."

Mitchell of Edinburgh: "In seventy-two cases of cervical glandular tuberculosis in children under twelve years of age, only seven displayed the human organism and sixty-five exhibited the bovine type."

Fraser of Edinburgh: "Reports on forty-three tuberculous babies which had been bottle fed; thirty-five cases of the bovine type."

E. C. Schroder (B. A. I. Circular 118): "The danger from the presence of tuberculosis among dairy cows is not confined to the use of milk as a beverage. When tubercle bacilli are present in milk they enter the various articles of diet prepared from it, and are especially numerous in butter, in which they may remain alive seven weeks or longer without showing a diminution of virulence. The distribution of tubercle bacilli from tubercu-

lous cattle in a way to endanger human health is not left to chance. It is a commercial, systematic distribution, from door to door, or rather from table to table. As long as the use of tuberculous dairy cows is permitted, the manner in which dairy products are distributed will insure that practically every member of the human family is exposed to tuberculosis. This may explain why three European investigators from their post-mortem examination of respectively 1,452, 500 and 100 bodies of persons who died from various causes found that, among this total 2,052 bodies—no less than 91 per cent—showed lesions of tuberculosis.”

Park (Practical Hygiene, 1913): “The relationship between the human and bovine tubercle bacilli leads health departments to the opinion that while programs for the repression of human tuberculosis which take no note of tuberculosis in other animals may be successful. The time to strike for suppression of human tuberculosis cannot come until the program for control of bovine tuberculosis is well advanced.

Dr. C. H. Mayo (A. V. M. A. Journal, September 1928): “Today no recognized authorities and few physicians doubt the transmissibility of bovine tuberculosis to humans, but there are still some who minimize the danger even to the extent of opposing the efforts of those who are endeavoring to eradicate the disease from cattle on the ground that the menace is so slight as not to constitute a public health problem. I am satisfied that the figures I have quoted prove conclusively that the danger of bovine tuberculosis to man is quite sufficient to justify all the effort and all the expenditures to eradicate the disease from cattle and to justify me as Health Officer at Rochester in insisting that all the milk used in Rochester must be from cows negative to the tuberculin test, whether the milk is to be pasteurized or not.”

The following shows the number of cattle tested and the number of diseased animals found each year.

<i>Year</i>	<i>Cattle Tested</i>	<i>Tuberculous</i>
1918	4,358	104
1919	7,445	168
1920	10,339	219
1921	23,402	385
1922	114,296	785
1923	104,030	499
1924	127,253	467
1925	135,222	472
1926	91,514	313
1927	104,793	229
1928 (10 mos.)	64,990	128

The following is a brief summary of the work performed in placing the one hundred counties in the modified accredited area. A grand total of 621,304 tests were applied, 2,079 reactors on 1504 premises were found. The cost was approximately 50 cents per head which

is a nominal amount considering that our herds averaged only 2.5 animals per herd. In twelve of the one hundred counties no tuberculous animals were found and in four counties only one reactor in each county was found. All tuberculous animals were slaughtered and indemnity was paid on them in accordance with our State law (1919) covering, which provides not to exceed \$25 for grades and \$50 for pure bred animals shall be paid. The United States Bureau of Animal Industry paid indemnity under a similar law passed by Congress.

Little infection was found in our native cattle and it is apparent that this disease was introduced into our herds through the purchase of breeding stock. In completing this work at this time we have prevented the further spread of this disease and the consequent increased cost of eradicating. Practically no tuberculosis was found in our swine and poultry although a large number of tests and inspections have been made. We are indebted to our health departments and health officials, extension workers, business and civic clubs and others for their coöperation in connection with this work.

HOG CHOLERA

This disease has been very prevalent during this period, the chief cause for this being the peddling or moving of hogs and pigs from one section to another and the promiscuous use of hog cholera virus. Following a discussion by the Board at the December 1927 meeting relative to the use of virus a letter was sent to all persons using virus urging them to restrict the use of same and advising them that it would be necessary in the future to report all virus used and to quarantine all cholera infected hogs and those given the simultaneous treatment. It is believed that if this is properly carried out that it will help control cholera. We are receiving good coöperation from most of the users of virus. An investigation of those using virus is being made as often as possible. By proper methods of handling swine and the practice of sanitation, cholera can to a large extent be prevented. It would seem that our farmers are coming too much to depend upon vaccination to prevent cholera and are ignoring the principles of swine sanitation which are so essential for the control of cholera and other diseases. It is a significant fact that hog cholera is the only widespread important disease of live stock that has not been controlled or eradicated, notwithstanding that for 20 years we have had a specific serum which will protect against the disease if properly used and it is the only disease that untrained workers have attempted to handle. T. B., Sheep Scab, Tick Fever, Foot and Mouth Disease and others have been controlled and eradicated, but it has always been done by trained workers, that is,

qualified veterinarians, who by education and training are prepared to do such work. We have investigated a number of cases where bad results followed the use of serum and virus. In some instances it was made to appear that poor quality serum and virus was the cause of this trouble. In most cases it was found that the hogs were badly infested with parasites or suffering from some other disease, usually necrotic enteritis, at the time they were treated resulting in their dying shortly after being treated which may be expected under such circumstances.

A system of swine sanitation has already been worked out in the field by the U. S. Bureau of Animal Industry. Unless this system is followed the raising of pigs on many of our farms will be unprofitable if not impossible in the future. General adoption of this system will not be done voluntarily and this offers a wonderful opportunity for those who desire to help the farmer.

ACCREDITED HATCHERIES

During the period covered by this report we have had a great increase in the number of requests for blood testing flocks for Bacillary White Diarrhea. We blood tested during the season, 1926-1927—39,766 birds of which 3,601 reacted, and during 1927 and 1928, 61,393 birds of which 6,009 reacted, indicating the presence of the disease. These birds were removed from the flocks and sold for slaughter purposes. From the birds inspected there were a large number culled which were classed as unfit for breeding purposes.

The Poultry Department at State College classes Bacillary White Diarrhea as one of the most important diseases of poultry. Any disease which prevents the rearing of the young is serious and must be controlled if the industry is to prosper. We have received fairly satisfactory coöperation from flock owners, but not from some of the hatcheries. These hatcheries seem only to be interested in volume production and sales and it is believed that in many instances they are spreading the disease more than we are controlling it. With our force it is physically impossible to give each hatchery close supervision. However, it is hoped that by education of the importance of this disease that better results may be obtained.

At this time and for sometime past attempts have been made to secure uniform regulations for this work in order that the work might be placed on a uniform basis and Federal Aid secured. So far this has not been accomplished. The States of the West and Middle West want very liberal regulations and the Eastern and Southern States believe that such liberal regulations will not assist in controlling this

disease which seems necessary if the poultry industry is placed on the proper basis.

MEAT INSPECTION

Two plants, one at Shelby and one at Wilson have been approved during this period and granted permits under the law.

SHEEP SCAB

All of our inspectors engaged in Tuberculosis Eradication and other work have been instructed to be constantly on the lookout for any contagious disease of live stock. The inspectors working in the mountain counties on tuberculosis work have inspected a large number of sheep for sheep scab. As a result of these inspections four flocks in Ashe County were found infested. These flocks were placed in quarantine and dipped a sufficient number of times to eradicate the disease.

ANTHRAX

In September, 1927, Dr. H. P. Flowe of Asheville, N. C., formerly with this Division died of Anthrax and upon investigation it was found that he contracted this disease from holding a post mortem on a cow owned by a dairyman in Buncombe County. Three cows on this farm died from this disease and several others were found to be sick on my first visit to the farm. This farm was immediately placed under quarantine and the matter taken up with the authorities of Asheville and Buncombe County. Several conferences were held, at which you were present, and it was decided that on account of the seriousness of this disease, which is fatal to both man and animals, that all of the live stock on this farm should be destroyed and the premises thoroughly cleaned and disinfected. It was further decided to appraise the animals and reimburse the owner. This appraisal was made and the owner was allowed the total sum of \$3,500 to cover animals destroyed and the labor and material used in burning them and cleaning and disinfecting the premises. This money was paid by Asheville and Buncombe County and they were later reimbursed in the sum of \$1,950 by the State on authority of the Governor and Council of State. On Sunday, September 4, 1927, all live stock, except two mules which were held in quarantine on the farm, were killed and burned under my supervision. There were 39 head of cattle, about 300 chickens, 3 hogs and 1 dog destroyed. All of these were completely destroyed by burning. The premises were thoroughly cleaned and disinfected. No cattle were allowed on the premises for several months. During the winter the owner was allowed to move some young stock from the mountains

to the farm after they had been vaccinated against anthrax. No other cases have developed on this or any other farm since the original outbreak. We have not been able to account for this disease since there is no record of it having ever occurred in this section before. Anthrax is prevalent in some States, but rare in North Carolina, only two known outbreaks having occurred in the past twenty years.

GLANDERS

No cases have occurred during this period, although a number of inspections and tests have been made.

INVESTIGATIONS

About the usual number of investigations covering reports of outbreaks of disease, have been made. We have been somewhat handicapped in this by a lack of funds. As usual we have looked after the livestock on the farms owned by the State.

NUMBER OF HORSES AND MULES SHIPPED INTO NORTH CAROLINA

1924		1925		1926		1927	
Horses,	936	Horses,	471	Horses,	443	Horses,	1,144
Mules,	4,669	Mules,	4,891	Mules,	4,721	Mules,	7,846

As this report covers the completion of tick eradication and tuberculosis eradication it seems appropriate at this time to give a history of this Division which has been headed by six men which is given below, together with an outline of the work undertaken or accomplished.

DR. COOPER CURTICE (1898 to 1900)—Dr. Curtice was employed by State College and the Experiment Station in the late 90's to teach Veterinary Science and experiment along veterinary lines. He was transferred to the Department in 1898 at which time the Veterinary Division was established and he was made State Veterinarian. He at once began the studies of the cattle which led to a complete knowledge of the life history of this parasite which was necessary for its eradication. Through his untiring efforts the foundation was laid for the final eradication of this pest. His scientific investigation disclosed for the first time that a parasite was capable of transmitting diseases from one animal to another and this great discovery had a very important bearing in later years on other diseases of man and the lower animals which were found to be transmitted by a parasite. During his term he gave assistance in controlling other live stock diseases and also conducted Farmers Institute work. Dr. Curtice is now located at McNeill, Mississippi, where he is engaged in scientific investigation of animal parasites for the United States Bureau of Animal Industry.

DR. TAIT BUTLER (1901 to 1908)—The chief duties of Dr. Butler were to continue the work started by Dr. Curtice in connection with the cattle tick and to guard the quarantine line then extending along the Blue Ridge from Virginia to South Carolina. At that time there were 16 or 17 counties west of this line and of these 7 were infested with the cattle tick. Farm to farm inspections were made in order to locate infested premises. Large areas were freed of ticks by quarantine, vacating and changing pastures. Hand greasing of the cattle was practiced where an owner had only a small number of cattle, when it was impractical or impossible to vacate or make new pastures and when cattle were moved from infested to free premises. On July 1, 1906, when the coöperative work with the United States Bureau of Animal Industry began with the Commissioner and Board of Agriculture, seven counties west of the Blue Ridge had been entirely cleaned of ticks and ten additional counties and parts of three others east of the Blue Ridge had been cleaned. North Carolina is entitled to credit due for demonstrating the practicability of eradicating the cattle tick when most people thought it an impossible undertaking. Dr. Butler also gave information and advice in the control and eradication of other live stock diseases throughout the State. The outstanding achievement of Dr. Butler's term was the carrying on of work started by Dr. Curtice. Dr. Butler is now located at Memphis, Tennessee, and is an Editor of the *Progressive Farmer*.

DR. W. G. CHRISMAN (1909 to 1913)—The work previously started in connection with tick eradication was continued with success by Dr. Chrisman. The testing of herds of cattle especially State herds was undertaken in a limited way with satisfactory progress. Outbreaks of contagious diseases of live stock were investigated and advice for the control and eradication were given. A State owned plant for the manufacture of anti-hog cholera serum was started. Dr. Chrisman is now connected with the Health Department at Danville, Va.

DR. B. B. FLOWE (1913 to 1917)—The work previously started in the Veterinary Division was continued by Dr. Flowe. The serum plant was improved and completed. Much serum was produced and its use was demonstrated throughout the State. Tick Eradication was continued as was the testing of herds for tuberculosis. Investigations of outbreaks of contagious diseases were continued, giving assistance in the control and eradication of same. Dr. Flowe resigned to enter the World War and is now located at Asheville, N. C.

DR. O. H. GRAHAM (1917 to 1918)—This period was during the World War and the efforts of this Division were towards helping increase production and safeguarding the health of the live stock. Satis-

factory, but slow progress was made in tick eradication and the testing of herds for tuberculosis was continued in a limited way. Many investigations of reported outbreaks of diseases were made. Dr. Graham resigned to enter the World War and is now in practice at Tarboro, North Carolina.

DR. WILLIAM MOORE (1918-)—The outstanding accomplishments of this period are the completion of Tick Eradication and Tuberculosis Eradication. These are covered in this and previous reports as is the other work of this Division.

WM. M. MOORE,
State Veterinarian.

ANALYTICAL DIVISION

To the Commissioner of Agriculture:

SIR: The work of this Division consists principally of the analyses of fertilizers, feeds and insecticides. All of these products, which are so essential to the agricultural interests of the State, are subject to inspection laws, which require among other things, that each package shall show, either by tag or branding, the names and percentages of the active ingredients. By means of a State-wide system of inspection, samples of these materials are taken by inspectors throughout the State and sent to the laboratory for analysis and subsequent publication in the Bulletin of the Department, where they are shown in comparison with their guarantees.

In addition to the analyses of samples taken by official inspectors, a considerable number of analyses are made for the purchasers of these materials when taken in accordance with legal requirements.

Many analyses of marls, limestones, mineral waters, cotton seed meals, and other materials bearing upon the agricultural development of the State, are also made in the laboratories of this Division.

There have been no particular developments in the fertilizer and feed work during the past two years. A more thorough inspection has resulted in the drawing and analyses of more samples than in any two-year period heretofore in the history of the Department.

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.

The insecticide inspection, which has comparatively recently been inaugurated by this Department, is the result of an Act of the 1927 Legislature, which became effective October 1, 1927. Every effort has been made to communicate with all manufacturers whose products are sold in this State, and complete details covering the provisions of the law have been furnished them.

Also an attempt has been made along the same line with the insecticide and fungicide dealers in the State. This has been a considerable undertaking, as there are a great many dealers who handle these materials in a small way. Many of the products found on their shelves are old, and in a number of instances investigation has shown that the manufacturers are no longer in business.

A special laboratory has been equipped for the analyses of these products and such samples as have been drawn by inspectors or sent in by consumers have been handled without delay.

We are now in position to render the same service to users of insecticides and fungicides that we have furnished to the users of fertilizers and feeds for many years.

Respectfully submitted,

W. G. HAYWOOD,
Head, Analytical Division.

FOOD AND OIL DIVISION

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 December 31, 1928.

The object of the work of the Division 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.

The work is authorized by and carried out under the following laws: Pure food, bleached flour, standard weight meal and flour, sanitary bottling plant, bakery, creamery and ice cream plant, linseed oil, illuminating oil and gasoline inspection laws.

The enforcement of the food law prevents the manufacture or sale of adulterated or misbranded food or beverage.

The bleached flour law requires artificially bleached flour to be labeled bleached so that its appearance will not be misleading to the purchaser.

The sanitary soft drink bottling plant, bakery, creamery and ice cream plant laws require that these food producing plants be operated under such sanitary conditions that the foods produced by them will not be deleterious and a menace to the health of the people of the State.

The linseed oil law requires all linseed oil and substitutes for same to be plainly labeled what they are and same must meet the standard requirements in quality.

The illuminating oil law requires that illuminating oil must meet the standard requirements of safety and quality.

The gasoline law requires that all gasoline sold in the State must meet the State standard requirements in quality.

The expense of this inspection work is borne by and the work carried out by the use of funds from inspection taxes provided by these inspection laws.

Regular inspections, sanitary and otherwise, have been made of the following plants by trained men, and excellent results obtained:

Bakeries inspected	135	Inspections made	974
Bottling plants inspected.....	181	Inspections made	687
Ice cream plants inspected.....	125	Inspections made	841
Total inspections made.....			2,502

Since these laws have been in effect great improvements have been made in the conditions under which these plants are operated. While

the larger part of them are so conducted that they fully meet the requirements and give no trouble, there are many of them that must have regular and frequent attention or the products put out by them will be a menace to the health of the people, and an injustice to the business. Some of the smaller bakers and ice cream makers require much attention and have to be dealt with very firmly, even to the extent of prosecution, to prevent them from imposing upon the public by making and selling foods that are below standard in quality and dangerous to health. It is also hard to prevent similar violations in some of the smaller bottling plants. It is hard for less intelligent people to understand the importance of operating these food producing plants as is necessary for safety, and some of them are inclined to feel that such requirements are an unjust interference with their business.

Samples of foods, beverages, oils and gasoline collected from all parts of the State, and unofficial samples of various things sent in by the people of the State, have been analyzed, chemically and otherwise, as follows:

Foods and beverages for adulteration and misbranding.....	1,989
Foods and beverages, etc. for poison and dope.....	48
Water for mineral and general drinking purposes.....	59
Beverages for alcohol and dope.....	49
Drugs for dope and other purposes.....	22
Egg preservers	2
Cleaning mixtures and disinfectants.....	13
Embalming fluids	2
Human viscera, stomachs, etc. for poisons.....	8
Contents of stomachs, postmortem, for poisons.....	7
Water from streams for factory and other pollution.....	7
Water and mucky earth for naturally occurring mineral oil.....	237
Linseed oils, official and unofficial.....	237
Illuminating oils, official and unofficial.....	6,088
Gasoline, official and unofficial.....	18,892
Lubricating oils, unofficial.....	119
Fuel oils, unofficial.....	8
Other miscellaneous substances.....	138
<hr/>	
Total	27,722

FOOD

The food samples collected and analyzed for the detection of adulteration, misbranding or misrepresentation were collected from all parts of the State from products originating in and out of the State, but products shipped into the State, being subject to and having attention under the Federal law, more attention has been given by this Department to products either originating in the State or to products that

were shipped into the State in bulk, properly branded, but repacked and rebranded or sold at retail and might be misrepresented.

The products that have had most attention are as follows:

Fresh meats, especially sausage, for chemical preservatives, the use of which renders the meat less digestible and deleterious to health.

Oysters for the addition of fresh water in floating or soaking the oysters, by which the size or volume of the oysters can be almost doubled without increasing the food value and which tends to detract from the flavor of same.

Ground coffee shipped into the State in bulk and repacked and rebranded or sold at retail. It is not unusual to find it shipped in branded compound coffee or coffee and chicory or coffee and cereal to meet the Federal requirements in interstate shipments, and then repacked and sold as coffee in violation of the State law.

Extensive examination has been made of honey, packed both in and out of the State, with some adulteration and misbranding found in both.

The product to which more attention has been given than any other one is ice cream. It is vastly more difficult to prevent adulteration and misrepresentation in the sale of this product than in any other food product sold in the State.

Many other food products have had attention but not as extensively as the ones mentioned above.

LINSEED OIL

Extensive examinations have been made of linseed oils sold in the State, and it is gratifying to find comparatively little adulteration, misbranding or misrepresentation in the sale of same.

ILLUMINATING OIL AND GASOLINE

Comparatively little trouble has been had with illuminating oils. Accidental mixing of gasoline with oil, which of course, renders it dangerous, occurs now and then, and the sale of the oil is stopped as promptly as possible, but in a few instances very serious trouble had happened before the sale could be stopped, but the results of the examination aided in placing the responsibility.

In the case of gasoline the situation has been different, and some of the companies have not so satisfactorily met the requirements, and it was necessary to deal with them very firmly.

Because of newly developed chemical methods for making gasoline from the crude petroleum, the quantity produced from the crude has been increased greatly and, generally speaking, the quality improved,

but in some cases objectionable substances have been allowed to remain in the gasoline until their elimination was required under the law.

The corrosive substances are fairly easy to detect and determine, but the gasoline improvers and anti-knock substances are problems to be solved. There are such things as gasoline improvers, but it appears that there are also fakes of this nature in use, the use of which is fraudulent and deserves considerable study and investigation.

MISCELLANEOUS

Under this head many matters not provided for under the inspection laws are presented to the Department for investigation, some of which are of much importance, such as beverages for alcohol, various substances including human viscera for poisons, drugs for cocaine, opiates and other habit forming constituents, lubricating oils and seepage from ground for naturally appearing petroleum products.

Respectfully submitted,

W. M. ALLEN,
Chief of Division.

DIVISION OF ENTOMOLOGY

To the Commissioner of Agriculture:

SIR: The following is a report of the activities of the Division of Entomology covering the period December 1, 1926, to December 1, 1928.

The Division is charged with the inspection and certification of plant nurseries, imported bulbs, imported fruit tree shipments, the control of bee diseases, the enforcement of various quarantines pertaining to destructive insects and diseases, an insect survey of the state, and the control of many destructive insects. These subjects are briefly discussed below.

NURSERY INSPECTION AND CERTIFICATION

A total of 135 nurseries comprising 1,370 acres received one to four inspections each year of the biennium. The number of nurseries has increased from 119 in 1926 to 135 in 1928. Where destructive insects or diseases were observed in a nursery, certification was not granted until it was freed of pests. Our nurserymen are required to attach a printed copy of the inspection certificate issued them by the Department of Agriculture to each gift, sale or shipment of nursery stock which includes all field grown florist stock as well as ornamental shrubs, conifers, and fruit trees.

Out-of-state nurseries are required to file duplicate copies of their inspection certificates in this office, whereupon permit certificate tags are sent them at cost. One of these tags must be attached to each shipment of plants destined for points in this state. Only plants that have been inspected by officials in other states are thus permitted entry into North Carolina. Approximately 35,000 such permit certificate tags were mailed each year to out of state nurseries.

NARCISSUS BULB STERILIZATION AND INSPECTION

In the fall of 1927, 115,000 narcissus bulbs were imported from foreign countries and given the hot water treatment at Wilmington before they were released to the growers. A total of 220,000 such bulbs were imported during 1928. It is of interest to note in passing also, that about 500,000 Dutch Iris bulbs were imported each year—these however, not requiring hot water treatment. It appears that North Carolina especially in the coastal plain section is rapidly developing its bulb growing industry.

The bulb flies and eelworm were observed by the inspector in many of the shipments. The hot water treatment kills these pests, and the treatment is therefore a distinct benefit.

In addition to supervising the hot water treatment we are required to inspect all commercial plantings of narcissus (of which there are twenty-three in North Carolina) each year. Certification of freedom from these pests is necessary before bulbs can be moved out of the State. Our commercial plantings are free of the larger bulb fly, and very lightly infested in a few places with the smaller bulb fly. One outbreak of the eelworm appeared at Moyock in 1928 that completely ruined a commercial planting. These bulbs were immediately quarantined and subsequently destroyed.

IMPORTED FRUIT STOCK INSPECTION

In 1927, 223,000 trees and in 1928, 197,000 fruit stocks were imported from foreign countries by nurseries in this State. These were inspected, and all destructive insects were removed. Inspection of such stock is designed to prevent the introduction of such pests as the gypsy and brown tail moths which are now established in the New England states.

BEE DISEASE ERADICATION

Work on this project was actively begun in 1928. Its object is to eliminate the American and European foul brood diseases of honey bees that seriously affect honey production. These diseases are not as yet widespread in North Carolina, consequently eradication appears possible. Inspectors are now confining their work to Buncombe county, making a survey of the situation, and advising the destruction of infested hives. It is planned to make subsequent visits to the infested bee yards next spring to destroy such infested colonies as the owner failed to destroy after having been previously advised to do so.

QUARANTINE ENFORCEMENT

Because of the presence of such pests as the Pine Blister Rust, Japanese beetle and European Corn Borer, this division enforces quarantines against the movement of such plants or plant products as might be shipped into this state infested with these and other destructive pests. Plants originating in a section infested with these insects are inspected before they leave their original premises by the U. S. Department of Agriculture. Each individual who receives such a shipment in this State is advised by letter from this office to reexamine the packing soil and plants for insects and to burn all but the plants if any insects are found. A total of 14,104 shipments of plants were received

during October 1927 to November 1928 that originated in the territory now known to be infested with the Japanese beetle. There is constant danger that this pest will be introduced into North Carolina, and this division is striving to delay the entry of this and other pests as far as its present funds will permit.

WILD NATIVE PLANT SHIPMENTS

Many states require the certification of insect and disease freedom of wild native plants. To this end this Division makes a periodical survey of our mountain wild plants and native boxwood to ascertain whether at the shipping season they are infested with any destructive insect. A destructive scale insect has been found on wild azaleas on one mountain and the collection of azaleas from this mountain has been prohibited.

Such collectors as operate upon a commercial scale are required to secure a native plant shipping permit annually from this office. A copy of the permit must then be printed upon one side of the collector's shipping tags and such a tag attached to each sale of plants. For the season 1927-28, 33 such permits were issued. For the season 1928-29, 19 permits have been issued to date.

INSECT SURVEY

One of the activities of this division is to make a survey of the insect life of the state. We now know of 7,987 different kinds of insects as occurring in North Carolina. This is an increase of 486 over the report made two years ago. Actual specimens of nearly all of these are represented in the state's collection. Records are also kept upon suitable cards when the specimens were taken, by whom collected, the plants upon which they were taken if such is known and where they were found. The whole constitutes an invaluable reference to the entomologists of this and other states, and indirectly to the residents of the state.

It is expected that this list of insects as discovered for North Carolina will be printed within the next year. Only three states have thus far issued a list of insects known to occur within their borders. North Carolina's list will probably be the fourth.

GENERAL INSECT CONTROL

Along with the general and regulatory work, this division determines the spread and advises on the control of many outstanding insects such as the cotton boll weevil and the Mexican bean beetle.

We have established that 27 per cent of the possible crop in North

Carolina for the year 1927 was destroyed by the boll weevil and other cotton insects. For the year 1928, we estimate a reduction of 18 per cent due to the weevil alone. There was doubtless an additional reduction due to rot in 1928 brought about indirectly by the feeding habits of the weevils upon the bolls. Poisoning to control the weevil with dust poisons is profitable if carefully done, but our cotton growers, with the exception of a few who operate upon an extensive scale, seem averse to follow control directions as they must be followed in order to secure the expected results.

The weevil will continue to remain a constant menace to our cotton growers. It will be destructive only in wet summers and when other factors are favorable to its rapid increase.

During the past biennium the Mexican bean beetle completed its invasion of the state, reaching eastward to every county. This pest has inflicted a genuine hardship upon numerous farmers by its destruction of garden beans. Its injuries to the commercial bean growers in the east are problematical, but it does not now appear that the larger bean growers will be able to afford the cost of controlling this insect. Recent observations have also shown severe injury to soy beans. It has been generally understood that the beetle would not seriously injure commercial plantings of soy beans.

PEACH INSECTS

This division continues to give some attention to the control of insects affecting the commercial peach section. The major pest is still the plum curculio but there is increased destruction apparent, due to the oriental fruit moth. The methods of controlling the curculio are well established but the economic conditions of the peach industry now seem to prohibit the carrying out of control suggestions, to the end that the curculio is again being allowed to become a serious pest.

COTTONY CUSHION SCALE

During the past year a very interesting and successful project was undertaken at Wilmington to exterminate the cottony cushion scale on shrubbery by means of an insect imported from California, known as the Vedalia lady beetle. This scale is present only in two or three states having been introduced into California some years ago from Australia. When it threatened to wipe out the citrus industry there the lady beetles were secured from Australia and liberated in the California orchards. As a result the scale is no longer a pest in that state.

About four years ago the scale was accidentally introduced into this state at Wilmington. Complaints of its damage were received fre-

quently in this office. Accordingly a colony of the lady beetles was secured in February 1928 and after being bred in large numbers in our laboratory, they were released at different points in Wilmington. The beetles thrived in the Wilmington climate and have now entirely eradicated the cottony scale. We have thus used one friendly insect to combat another insect pest, and feel that we have prevented the spread over the state of a very destructive scale, that can scarcely be controlled by any known spray.

GENERAL WORK

In addition to the above mentioned subjects, the members of this division give much time to general field work as needed upon outbreaks of insects that appear and disappear as quickly. Miscellaneous duties such as office correspondence, the preparation of reports and the giving of popular talks, also occupy much of our time.

I wish to acknowledge your continued support and interest in our entomological work, and that of the Board of Agriculture, and the faithful service of each member of the Division.

Respectfully submitted,

R. W. LEIBY,
State Entomologist.

REPORT ON DRAINAGE

To the Commissioner of Agriculture:

SIR: 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, 1926 to December 1, 1928:

SOIL EROSION EXPERIMENTS

The major project of the Division during this period was the measurement of soil losses and run-off from an experimental installation on the Central Experiment Station Farm. A three year study of the losses from cotton, corn, bare and grass land, and from plots of varying length (from 37½ to 200 feet) in cotton, has been completed, a report prepared and submitted to the Washington office for approval and for publication. Progress reports covering the first two years' work have been published.

At the present time, studies are being made on this location to determine the effect of deep *vs.* shallow plowing and of various rotations, upon erosion and run-off losses. Two additional plots were added making a total of nine plots, and the old wooden fences have been replaced by galvanized sheet steel. The second phase of the study has not progressed sufficiently to draw any definite conclusions. Some of the most striking conclusions to be drawn from the completed phase of the study are:

(1) That the year is characterized by a definite erosion period including the months of June, July, August and September, during which period occurs 45 per cent of the rainfall, two-thirds of the run-off and seven-eighths of the annual erosion. This shows that we must depend upon terraces to control erosion where clean cultivated crops are grown, for it is the heavy summer and September rains coming down upon a cultivated soil that cause most of our soil losses. There is little loss from October until June.

(2) The average life of our soils under conditions similar to those on the experimental plots are:

No crop	47 Years
Cotton	49 years
Corn	73 years
Grass	17,000 years

(3) The loss of plant food through sheet erosion may be seven times as great from cotton and four times as great from corn as losses through crop removal.

EROSION CONTROL BY TERRACES

Studies to determine the rate of run-off that may be expected from terraced fields were continued on the Central Experiment Station farm, and three additional flumes were installed on a farm near Youngsville and two more on a farm near McCullers, together with automatic water stage recorders and a weighing-recording rain gauge at each location. Some unexpectedly high rates of run-off have been observed. Additional work has been done on yardage tables and determination of the waterway area of terraces of various shapes and on land of different slopes. This information is necessary for putting terracing on a more economic basis than heretofore. This Division assisted in revising the U. S. D. A. bulletin on terracing and in the preparation of a new State bulletin on the subject. It also was instrumental in the completion of an educational motion picture film on terracing, work on which was started three years ago.

TREE POISONING EXPERIMENT

A study of the value of various poisons in clearing land of trees and stumps was inaugurated, and 669 trees on a farm in Pitt County have already been treated and are being kept under systematic observation. Thirteen various poisons or dilutions of poison have been tried out. It is expected that this work will be included in a study of the value of chemicals in holding down or destroying growth on ditch banks and in the prevention of sprouting and acceleration of decay of stumps.

CONCRETE TILE INVESTIGATIONS

The experimental concrete drain in Wilson County was uncovered and examined. This drain is still functioning, but many of the tile are in poor condition. After five years in the ground, the tar treated tile are in practically perfect condition. There appears to be considerable promise in the future of tar treated concrete tile.

EFFECT OF DRAINAGE IN WINTER KILLING OF PEACHES

Due to lack of coöperation on the part of the owners of the orchards in Moore and Richmond Counties where our equipment had been installed, it was decided to discontinue this study and our equipment was removed. From the information secured, drainage is apparently not a deciding factor in winter injury.

PEAT SHRINKAGE STUDIES

A preliminary examination was made of the principal peat areas of eastern North Carolina from Pender County north to Currituck in company with Dr. A. P. D. Stokes, a noted authority on peat soils and several members of the faculty of State College. A second examination was made of an area in the "Open Lands" of Carteret County and detailed plans worked out for a study of that area. This Division will undertake a study of the shrinkage of peat as its share of the investigation.

MISCELLANEOUS

Assistance in engineering problems on State farms and institutions consisted of the locating and installing of an additional tile drainage system on the Tobacco Experiment Station farm at Oxford and in the planning and supervision of grading and erosion control on the Old Blind Institute grounds in the City of Raleigh. Assistance was given in obtaining material for a study of the drainage index of soils by specialists of the Division of Agricultural Engineering of the United States Department of Agriculture which necessitated a trip to several of the large drained areas in eastern North Carolina. Several preliminary examinations and reports were made of drainage and irrigation enterprises, covering 200,000 acres. A paper on our erosion studies was prepared and presented before the twenty-second annual meeting of the American Association of Agricultural Engineers in Washington and information given to various publications on these studies. Active coöperation with the Erosion Committee of the A. S. A. E. was carried on. Two addresses on the work of the Division were broadcast over Station WPTF. A study was made of the relationship between run-off and the amount and intensity of rainfall in connection with our erosion project. Requests for information coming in to the Department upon matters pertaining to agricultural engineering were given attention.

Respectfully yours,

F. O. BARTEL,
Associate Drainage Engineer.

DIVISION OF TEST FARMS

To the Commissioner of Agriculture:

STR: I am submitting herewith the biennial report of the Division of Test Farms for the fiscal years 1927-1928. In a brief report of this kind, it is impossible to record progress on all of the 180 projects which are being conducted at the six Test Farms. It is possible, however, to indicate that progress is being made by reference to some of the outstanding projects at each farm. More detailed reports on the different phases of work under way 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.

COÖPERATION

The experimental work on the six Test Farms is handled in coöperation with the Agricultural Experiment Station of the State College and in some instances with the U. S. Department of Agriculture. The coöperative arrangement has been very satisfactory. The different specialists have shown a fine spirit in the work and have been helpful in the conduct of the work on the farms as a whole. Our connection with the Federal Department allows for an enlargement of our program and at the same time we have assistance from the Department in planning and financing the work.

PUBLIC RELATIONS

While the major purpose of the Test Farms is to conduct investigational work and secure information of use to the farmers of the State, it is also necessary that information secured be carried across to the people. Accordingly, the Stations have encouraged at all times visits from the public in order that they may observe the work under way. During the period of this report there have been more visitors to the Stations than during any previous period. It has taken much time of the Superintendents to receive these visitors and to see that they secure the information desired. It is estimated that 45,000 people visited the farms during the past year. In addition, we hold each year on the different farms, special meetings, such as Dairy Day, Poultry Day, Swine Day, Small Grain Day, and Cotton Day. These meetings are held in coöperation with the Extension Service. The special days per-

mit us to bring together at the Stations the specialists working on certain subjects and the people especially interested in those subjects so that they may exchange their viewpoints and get up-to-date information on the particular subject under discussion.

We have continued to hold our Annual Farmers' Field Day at each of the Stations. These meetings are real institutions and should be encouraged. The meetings are one of the best means of giving the public the benefits of the work on the farms and are a means of bringing about a friendly relationship between the Stations and the farming public.

UPPER COASTAL PLAIN STATION—ROCKY MOUNT

R. E. CURRIN, JR., *Assistant Director in Charge*

Station established in 1902; Soil type, Norfolk sandy loam; Area of Farm, 202 acres; Elevation, 105 feet above sea level; Mean annual temperature, 60.8° Fahr.; Annual rainfall, 49.15 inches.

This was the first outlying Station to be established in the State. The early work of the farm was largely that of testing fertilizers under various field crops, but in the course of time the demand for information on other phases of agriculture became urgent and as a result the Station program has been enlarged to deal with many of the outstanding farm problems in the section. This research program covers at present thirty-nine definite projects, which deal with studies in soil fertility, rotations, seed improvement, insect control on cotton and tobacco, swine feeding, horticultural investigations, sheep management, and disease control on sweet potatoes, cotton, and tobacco.

The following will report progress by divisions on some of the major lines of work under way at this Station.

AGRONOMY

Concentrated Versus Low Analysis Fertilizers. Results obtained in previous years by comparing ready-mixed concentrated fertilizers 16-8-8 and 18-6-6 used at the rate of 400 pounds per acre on cotton in the drill at planting with mixtures analyzing 8-4-4 and 9-3-3 used at the rate of 800 pounds per acre were substantiated by yields of the past year. The ready-mixed concentrated materials were just as effective as the less concentrated mixtures made from acid phosphate, manure salt and the ammonia derived one-half from cottonseed meal and one-half from nitrate of soda.

Sources of Nitrogen. In this experiment, in which the efficiency of nitrate of soda, leunasalpeter, urea, sulphate of ammonia, calcium

nitrate, cyanamid and cottonseed meal are compared as the sole source of nitrogen and in combination in a normal fertilizer analyzing 10 per cent phosphoric acid, 4 per cent nitrogen and 3 per cent potash, somewhat different results were secured in 1926 than had been obtained in previous years. The spring of that year was very dry from the time the fertilizer was applied before planting until after the cotton was about ten inches high which resulted in severe injury to the young seedlings from the use of large amounts of fertilizer in the drill at planting. This condition was much more marked on plats which had been fertilized with the mixtures containing inorganic sources of nitrogen; as a result the mixtures containing cottonseed meal gave larger returns than did those made from the inorganic nitrogenous materials which had been most profitable in previous years.

A Study of the Effect of Different Proportions of Fertilizer Upon Yield of Cotton. Varying the amounts of phosphoric acid from 6 to 12 per cent in a complete fertilizer mixture carrying 4 per cent nitrogen and 3 per cent potash applied in the drill at planting at the rate of 800 pounds per acre did not materially vary the yields. The four years' average yield from the mixture carrying 6 per cent phosphoric acid was 1,525 pounds as compared with 1,504 pounds of seed cotton per acre for the 12 per cent mixture. However, the high percentage application of phosphoric acid had a marked effect upon hastening maturity. Where 12 per cent of phosphoric acid was used in the mixture, 50 per cent of the cotton was open at the first picking on September 24, while where 6 per cent of phosphoric acid was used only 32 per cent was open at the first picking. As in the three previous years, varying the amount of potash from 2 to 6 per cent in a mixture containing 10 per cent phosphoric acid and 4 per cent nitrogen did not materially affect the yields, although they were increased slightly as the amount of potash was increased. Fertilizer in which the amount of nitrogen was 3, 5, and 7 per cent in the mixtures showed a reverse from previous years. The highest yields were secured from the lowest application of nitrogen with the yields decreasing as the nitrogen was increased. This was due to the fact that severe injury to the young seedlings during the dry spring resulted from the use of large quantities of nitrate of soda, which was used as the source of nitrogen. This condition was more marked in 1926 than in previous years because of the very dry season from the time the cotton was planted until it was about twelve inches high. From a 10-4-3 mixture applied at the rates of 400, 600, 800, 1,000 and 1,200 pounds per acre, contrary to the average of the three previous years, the largest yield was secured from an application of 1,200 pounds per acre.

Date of Planting Cotton. During the past four years, plantings have been made at this Station on the following dates: April 10, April 20, April 30 and May 10. The April 30 plantings have given slightly higher yields than did either those made on April 20 or May 10 and also gave considerably higher yields than did those made on April 10. The lower yields from the April 10 and April 20 plantings were due to poor stands, as they were better fruited and earlier than the later plantings. While the May 10 plantings have yielded fairly well, they suffered severe damage during a year favorable to boll weevil infestation.

TOBACCO INVESTIGATIONS

This work was started in 1927 and is handled in coöperation with the U. S. Department of Agriculture. Ten acres of suitable land have been given over for this experiment which includes the following studies: two year rotation with tobacco and cotton, three year rotation with tobacco, cotton, and corn. In addition to the rotation each series of plots is treated with different fertilizer materials with one-half of each plot receiving dolomitic limestone. Other tests deal with different sources of potash, varieties and lime studies. The experiments have progressed satisfactorily but have not been carried on for a sufficient period to make definite recommendations.

FERTILIZER FORMULAS AND APPLICATIONS USED FOR GENERAL CROPS

These are based on the findings from the fertilizer experiments on the Station.

<i>Crop</i>	<i>Mixture</i>	<i>Rate per Acre</i>
Cotton	10-4-4	800 lbs.
Corn	6-4-3	400 lbs. 18 lbs. inorganic nitrogen side dressing
Oats		18 lbs. inorganic nitrogen top dressing
Soybeans (hay)	8-2-4	400 lbs.
Sweet potatoes	8-3-8	600 lbs.
Peanuts	8-2-4	500 lbs.
Garden Crops	7-5-5	1,000 lbs.

HORTICULTURE

The pecan variety test continues to show that the Stuart, Schley, Alley and Success are the most desirable varieties for the Coastal Plain region.

In the sweet potato fertilizer tests, the plat receiving an 8-3-8 mixture at the rate of 600 pounds per acre gave the largest yield. The inorganic nitrates gave better yield than the organic nitrates when used as the sole source of nitrogen.

SWINE INVESTIGATION

In the "hogging off" immature corn test, the average daily gain per pig was 1.04 pounds, and each acre of corn produced only 193 pounds of pork. In "hogging off" mature corn with soybeans in the drill each acre produced 363 pounds of pork. The pigs in both tests were supplied fish meal and mineral from a self-feeder throughout the experiment.

SHEEP

The sheep industry in Eastern North Carolina has been revived considerably during the past few years and many of the farmers in the section have requested that we include sheep in our experimental program. As a result, the Station purchased a small flock of sheep last spring which will be handled largely from the standpoint of securing cost data on the handling of a small flock under average farm conditions.

IMPROVEMENTS

The following improvements added during the past two years have allowed for an expansion of the work and have benefited the Station in general appearance as well as increased efficiency: concrete tile block tobacco barn, frame tobacco barn, five-room dwelling for tobacco specialist, Delco light plant and pumping station and hog shelter. All buildings with the exception of the horse barn and implement shed have been repainted.

BLACKLAND STATION, WELDON

J. L. REA, JR., *Assistant Director in Charge*

Station established in 1912; Soil type, peat and muck; Area of Farm, 200 acres; Elevation, 16 feet above sea level; Mean annual temperature, 59.5° Fahr.; Annual rainfall, 55.05 inches.

This Station is the field laboratory for the farming interests of the large blackland area of Eastern North Carolina. The question of drainage has been provided and large areas have been cleared and brought into cultivation. Very little reliable information is available relative to the handling of this soil for best results and work of the Station is planned with the view of working out a safe agricultural program for the blackland farmers.

A total of twenty projects are now being conducted at this Station, dealing principally with hogs, beef cattle, pastures and fertilizer and lime studies with such crops as corn, soybeans, oats, and Irish potatoes.

SWINE INVESTIGATIONS

This project has been very popular with the farmers of the section. Since the inauguration of the work six years ago, the hog industry of



WESTERN FARMERS LOOKING OVER THE HOG WORK AT THE BLACKLAND STATION



the blacklands has been growing each year, along with the increasing demands for information on feeding and care and management of the breeding herd.

The Station herd consists of fifteen pure bred Poland China sows and a boar. All pigs used for experimental purposes are raised on the farm. Also a number of registered pigs are sold each year to farmers of the section who are interested in pure bred hogs or the building up of grade herds.

Bulletin No. 259, published by the N. C. Agricultural Experiment Station on "Soybean Oil Meal for Fattening Pigs" gives the results of the main feeding tests at this Station. The following table gives the summary of four feeding trials:

LENGTH OF FEEDING PERIODS—61, 55, 67, AND 67 DAYS	Number of Pigs	
	Lot Number 1 117	Lot Number 2 118
Ration.....	{ Shelled corn Fish meal Mineral	{ Shelled Corn Fish meal ½ Soybean oil meal ¼ Mineral
Average initial weight.....	102.60	102.61
Average final weight.....	229.44	231.36
Average gain per pig.....	126.84	128.75
Total gain per lot.....	14840.00	15193.00
Average daily gain per pig.....	2.04	2.06
Average daily feed per pig.....	7.56	7.70
Feed consumed per cwt. gain.....	{ Shelled corn.....	348.24
	{ Fish meal.....	21.37
	{ Soybean oil meal.....	23.99
	{ Mineral.....	1.40
	{ Total.....	373.21
Cost per cwt. gain.....	\$ 5.99	\$ 6.31
Returns per bushel corn.....	1.49	1.48
Profit per pig over feed cost.....	5.09	4.75

More profit and better gains are secured when soybean oil meal and fish meal are mixed together in equal amounts than when the soybean oil meal is fed as the sole protein supplement.

BEEF CATTLE

This project was started in 1927 and has not been under way for a sufficient period to report definite results. The object of the work is: (1) To determine the relative carrying capacity of native and tame pastures in eastern North Carolina; (2) Quality of meat Studies, using

calves that have been produced from native cows bred to a native bull, and calves that have been produced from native cows bred to a pure bred Hereford bull. This latter project is handled in coöperation with the U. S. Department of Agriculture.

AGRONOMY

Sources of Phosphoric Acid and the Effect of Varying Percentages of Potash in Fertilizer Mixtures. The use of phosphoric acid applied in the form of rock phosphate, basic slag or acid phosphate has not materially increased the yields of either corn, Irish potatoes, or oats. The use of potash, however, doubled and tripled the yields of corn and Irish potatoes, as well as greatly increasing the yield of oat hay. Figures given below are the average of the results of four years, showing the effect of potash in the different fertilizer mixtures:

Crop	Fertilizer Analyses	Application per Acre—Lbs.	Yield per Acre Bushels
Corn.....	0-0-0	0	19.1
Corn.....	8-2½-0	400	17.9
Corn.....	8-2½-4	400	42.7
Irish potatoes.....	0-0-0	0	54.4
Irish potatoes.....	8-4-0	1000	50.4
Irish potatoes.....	8-4-6	1000	111.8
Oat hay.....	0-0-0	0	2760 lbs.
Oat hay.....	8-2½-0	400	3274 lbs.
Oat hay.....	8-2½-4	400	5194 lbs.

It will be noted that the addition of 16 pounds of potash (K_2O) to 400 pounds of an 8-2½-0 mixture has increased the yields as follows:

Corn from 17.9 to 42.7 bu.

Oat hay from 3,274 to 5,194 pounds.

By adding 60 pounds of potash (K_2O) to 1,000 pounds of an 8-4-0 mixture, the yield of Irish potatoes was increased from 50.4 to 111.8 bushels per acre.

As shown by these results, where a fertilizer was used containing no potash, the yields of corn and Irish potatoes were less than where no fertilizer was used. The results from this experiment show clearly that crops cannot be produced profitably on this type of soil without the use of relatively high amounts of potash in the fertilizer mixtures.

Lime Experiment. A comparison of hydrated lime, ground limestone and marl when applied at the rate of 1, 2, 3, and 4 tons of calcium carbonate equivalent per acre has shown ground limestone to be the most efficient source of lime. The use of 300 pounds per acre of an 8-2-4 fertilizer in addition to the ground limestone increased the

yields in every instance. However, when the fertilizer was applied without the lime the yields were lower than when no fertilizer was applied.

Each succeeding year, larger yields are obtained on this soil from the use of fertilizers, provided the mixtures contain relatively high percentages of potash.

Cultural Treatment of Corn and Soybeans. There are two series of plats in this experiment, each series being rotated with corn and soybeans, thus giving a crop of each every year. The eight plats in each series are prepared for both crops as follows:

- (1) Plowed 8 inches deep, level, not rolled.
- (2) Plowed 8 inches deep, level, rolled.
- (3) Disked 4 inches deep, level, rolled.
- (4) Disked 4 inches deep, level, not rolled.
- (5) Plowed 8 inches deep, ridged, not rolled.
- (6) Plowed 8 inches deep, ridged, rolled.
- (7) Disked 4 inches deep, ridged, rolled.
- (8) Disked 4 inches deep, ridged, not rolled.

In all cases except plowing 8 inches deep and disking 4 inches deep, the same preparation which has given best results for corn did so for soybeans. Plowing 8 inches deep gave best results for corn, while disking 4 inches deep showed slightly better returns with soybeans. The results shown below are each an average of four plats for 1927 of both corn and soybeans.

Method of Soil Preparation	Yield Corn Bushels	Yield Soybeans bushels
Plowing 8 inches deep.....	51.9	14.8
Disking 4 inches deep.....	47.4	15.4
Cultivated flat.....	52.1	18.2
Cultivated on ridge.....	44.8	11.9
Not rolled.....	50.7	16.0
Rolled.....	48.7	14.1

Results obtained from a similar cultural experiment conducted on this farm from 1922 to 1925 showed very definitely that deep plowing in which large quantities of subsoil were turned up to be harmful to the crop. However, plowing 8 inches deep was not deep enough to cause injury to the crops.

With both corn and soybeans, thus far cultivating flat has given decidedly larger yields than where the crop was planted and cultivated on a ridge. The unrolled portion of the field outyielded slightly the portion which was rolled.

The pasture tests show that Blue Grass, Red Top and Lespedeza give the greatest amount of grazing for the blacklands.

IMPROVEMENTS

The following improvements have been made; which allow for an expansion of the work and materially benefit the Station as a whole: Beef cattle barn 30 x 50 feet with loft above for storage; garage for housing four cars; modern 100-hen poultry house; the three dwellings, main barn, corn crib and implement shed have been painted; two miles of new fence; and a Delco lighting plant has been installed.

Thirty acres of new land have been cleared for pasture and ten acres of this area have been tile drained.

COASTAL PLAIN STATION—WILLARD

CHARLES T. DEARING, *Assistant Director in Charge*

Station established in 1905; Soil type, Norfolk fine sandy loam; Area of Farm, 250 acres; Elevation, 51 feet above sea level; Mean annual temperature 62.1 degrees Fahr.; Annual rainfall, 50.86 inches.

The forty-five experimental projects under way at this Station have yielded valuable agricultural information which is being used generally by the farmers of the Lower Coastal Plain section. The Station has been particularly helpful in developing agriculture along the lines of horticulture, poultry, dairying, pastures and in some of the field crops.

PROGRESS REPORT OF SOME OF THE ESTABLISHED PROJECTS

BULB WORK

One of the most spectacular projects at the Station is the bulb investigation work. The Station is conducting a commercial demonstration and also coöperating with the U. S. Department of Agriculture in very comprehensive bulb investigations in support of the commercial industry which has developed in the section, and it has grown to the extent of a major industry from the standpoint of capital invested. During the period the Station brought to a close its original commercial venture of planting an acre of bulbs purchased and grown under contract with a large bulb importing firm. Originally an acre was planted with sixty-five thousand bulbs at an investment of \$1,280.50. Since making this investment the bulbs have been grown for a period of three years during which time three flowering crops were sold and bulbs produced of a commercial grade. The bulbs were marketed by selling back to the firm from which they were purchased at prices in accordance with the current market. It was found that the flower sales alone more than took care of the maintenance cost, and with



NARCISSUS "KING ALFRED" GROWING AT THE COASTAL PLAIN STATION

the large sale of bulbs at the end of the three-year growing period which amounted to more than the original investment for bulbs, the project was found to have made a cash profit and to have produced very vigorous stock of growing bulbs which have been and will continue to be marketed in the future. The success of this project was enhanced by the fact that bulb prices tended to rise during the period. It would appear that this is a good venture for farmers wishing to diversify provided they have sufficient capital, personal adaptability and the willingness to fully inform themselves in advance of making investment. Bulb growing, however, will be a losing proposition for the poorly informed party, the party without capital, or the party who is not sufficiently interested to give close attention to the business. The gross flower sales during the year 1928 amounted to over \$400 and the bulb sales to over \$1,500 from an area of approximately one acre of land, but representing two acres of normal bulb planting as practiced generally in the territory. The usual distance apart of rows is three feet, but here at the Station we have found it advisable to plant in rows eighteen inches apart, thus giving twice as many bulbs on an acre and making better use of fertilizer. In cooperation with the Government many varieties of bulbs have been tested with a view to determining those best suited to eastern North Carolina conditions. Storage problems have been studied and much information has been secured which will be useful in handling bulbs in storage during the summer period. The Station has served the commercial bulb growers by its activities in the interest of popularizing bulb culture, thus acquainting the people of the State with the possibilities and joy of bulb culture and creating a demand for bulbs.

POULTRY WORK

The poultry project has been enlarged during the year and has yielded both practical and investigational results and data of most valuable nature. The flock continues to be one of the outstanding poultry flocks of the State from the standpoint of constitutional strength and completed on November 1 a three year test (a monthly test during the third year) in which not a single individual reacted, thus showing the flock to be free from Bacillary White Diarrhea. This test entitles the flock to receive the first State certificate as an accredited flock. The protein feed tests conducted in cooperation with the State Experiment Station are yielding valuable information which is being recorded in bulletins from the Experiment Station. The physical equipment of the poultry plant has been much improved during the year by the erection of a new brooder house and shelter for fattening work and by the purchase of electrical equipment to the extent of one electric brooder, 600 chick

capacity; and one electric incubator, 1,400-egg capacity. Tests of this new electric equipment have proven it to be most satisfactory. Roughly speaking, the number of eggs hatched has been increased about 20 per cent by changing from kerosene to electric equipment. It is found that this equipment also produces healthier and more vigorous chicks and greatly reduces incubation worry and work.

DAIRY WORK

The fine registered Jersey herd of the Station has been maintained in good health and condition and increased in size in spite of the fact that our equipment in the way of barns, lots, etc., is out of condition and in need of replacement or repair. During the period in our cow test work, two cows have made gold medal records under awards from the National Jersey Association and others have made good records. At present we are endeavoring to prove out the merits of the junior herd sire. The average butterfat production of the herd has been increased during the two-year period from 310 pounds, per cow to 367 pounds, per cow. During the period a number of special investigation projects in coöperation with the dairy investigator of the State Experiment Station have been inaugurated.

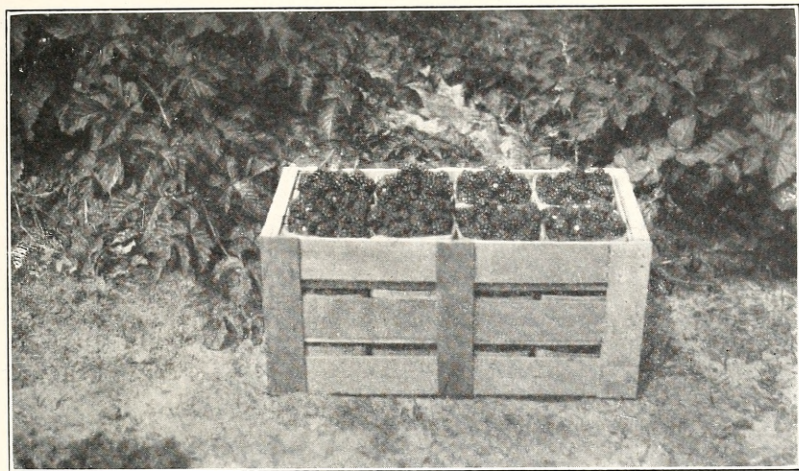
AGRONOMY WORK

Work of the Agronomy Division on several projects has been maintained along lines previously started and has given, not only another two years of accumulative data, but has served as the basis for demonstration to visiting farmers of the fertilizer needs of our soils, the relative value of varieties, and much other information. The soybean tests have been greatly enlarged as a result of the Government entering into coöperation with the Station and the State Experiment Station. This resulted in the testing of many new productions resulting from Government soybean breeding work.

NEW PROJECTS STARTED

BLUEBERRY WORK

We are pleased to report that during the period efforts to secure the coöperation of the Government and the inauguration of a comprehensive blueberry investigational project for eastern North Carolina succeeded, with the result that under coöperative agreement between the Bureau of Plant Industry of the United States Department of Agriculture and this Station of the North Carolina Department of Agriculture a coöperative blueberry project has been inaugurated and comprehensive plantings were made in the spring of 1928 at this Station



A CRATE OF "YOUNG" DEWBERRIES, A NEW FRUIT INTRODUCED AT THE COASTAL PLAIN STATION



PROMINENT STRAWBERRY GROWERS AND SPECIALISTS EXAMINING PROMISING NEW VARIETIES OF STRAWBERRIES AT THE COASTAL PLAIN STATION

and also of the outlying places. One of these plantings was located in the blueberry growing section of Duplin County where it will be accessible to the people of that section as a demonstration. The other two outlying plantings were made in Sampson County, which is the leading blueberry producing county of the State. One of these plantings is in the vicinity of Ingold, and the other, the major planting of all, is located on State Highway Route No. 60, about five miles south of Clinton on the farm of Mr. William Peterson. While the native wild blueberry or huckleberry has been harvested and marketed for years this is the first comprehensive test of improved hybrid blueberries which have been produced by the Government as a result of some eighteen years' plant breeding and selection with a view to producing large and high quality fruit. It is hoped and believed that this project will prove the possibility and practicability of growing these selected types and that an industry will develop based upon their culture which in turn will result in greatly increasing land values of the section, a section where land has in the past been cheap. In fact, it can be said that our activities on this project have already resulted in attracting northern interests to the section with the result that land sales have been made.

STRAWBERRY INVESTIGATIONS

In addition to strawberry fertilizing work in coöperation with the State Experiment Station and the National Fertilizer Association, a new strawberry project was started in coöperation with the Government. This project relates to the study of factors which influence the firmness and therefore the shipping quality of strawberries. Also in coöperation with the Government a project of strawberry breeding work was started in 1927 and during the season 1928 very important results were secured from these two projects, results which will be of very great importance to the strawberry industry of this immediate section. It has been found that some of the Government productions are firmer than the standard commercial varieties of the section, also earlier and more productive. It was also determined that the use of fertilizer where other factors are controlled does not affect the firmness of strawberries so much as does the use of proper varieties and the proper handling of fruit. However, the use of certain fertilizers in excess may cause the production of heavy foliage which in turn will result in fruit more susceptible to those diseases which attack fruit in transit to market, thus causing it to arrive in bad condition.

BLACKBERRY, RASPBERRY, DEWBERRY BREEDING

A third coöperative project has been started with the Government Small Fruit Division. This relates to the conduct of plant breeding

and selection work on blackberries, raspberries, and dewberries and also the testing of new types of these fruits under eastern North Carolina conditions. It is believed that by using Asiatic species and crossing these with cultivated American types that varieties of raspberry can be produced which will thrive in the South. The Van Fleet raspberry is the only variety of this type at present in culture and this is the only variety which has so far succeeded in the South.

FLORICULTURE

Having succeeded so well with the bulb investigation work the Station has started three other floriculture projects. These are the Peony investigations in coöperation with the Mohican Peony Garden, Reading, Pa.; Dahlia tests in coöperation with Dahliedel Nurseries, Vineland, N. J.; and Hardy Chrysanthemum tests in coöperation with the United States Department of Agriculture. It is believed that these tests will furnish much interest to visitors and much information to those of our citizens especially interested in floriculture work. The tests will also not only give information on varieties, but will serve as a means of bringing into eastern North Carolina the very best types to supplant much poor material which is now being grown.

NEMATODE STUDIES

It has been found that some of the Station soils are infested with nematodes which makes them unsuited for the culture of certain varieties of sweet potatoes and other plants having fleshy roots. Accordingly, a project has been started in coöperation with the Pathology Division of the State Experiment Station for the purpose of studying conditions of controlling this trouble and other diseases on sweet potatoes, one of the staple crops of the section.

CORN VARIETY TEST

While North Carolina has given much attention to the study of the cotton and tobacco crops it has, relatively speaking, given very little attention to the study of the corn crop, especially in eastern North Carolina. In view of the devastation by the cotton boll weevil and the relation of the corn crop to diversified farming in eastern North Carolina, it seems most fitting that more attention be given to the problems of corn growing. The Station has for some time been working upon the improvement of the Cocks' Prolific corn as a variety for the section. During the year it has inaugurated a new project relating to the testing of varieties with a view to determining what progress, if any, has been



WAYNE COUNTY DELEGATION IN ATTENDANCE "DAIRY DAY," COASTAL
PLAIN STATION



NEGRO FARMERS IN ATTENDANCE AT THEIR ANNUAL FIELD DAY,
COASTAL PLAIN STATION



made in the selection of Cocke's Prolific corn here and also with a view to determining what are the best varieties and strains of corn for the section. This work is in coöperation with the Agronomy Division of the State Experiment Station.

WINTER CROP TESTS

In the past too little attention has been given to winter crops in southeastern North Carolina on farms other than truck farms. It is only in recent years that it has been possible to see green fields in the winter time in this section. There is much need for more information and it has seemed expedient, therefore, to inaugurate a project for the purpose of testing and comparing the various winter crops. A project has accordingly been started in coöperation with the agronomy division of the State Experiment Station and one year's data has been secured

MANGANESE TEST

Evidences have been noted of deficiencies in soils, even when given normal fertilizer applications, and studies of these locations seem to indicate that there is a deficiency of manganese. Tests have accordingly been started in coöperation with the fertility experts of the Experiment Station with a view to determining the importance of manganese as a fertilizing element and the need of applying same to soils of southeastern North Carolina.

IMPROVEMENTS

In addition to conducting the regular work of the Station, it is our purpose to make each year certain definite improvements in the equipment and facilities of the Station. During the period improvement has been made both in the physical development and in the general appearance of the Station. For example, we secured permission of the railroad company, whose right-of-way passes through the Station, to do grading work on the right-of-way and plant same to lawn grasses, thus giving a more finished first impression to the visitor as he comes here. A considerable amount of landscape work has been done in the vicinity of the main buildings of the Station. A comprehensive program of landscape development was inaugurated in the spring of 1928 when a new improved road system was constructed and a great deal of shrubbery planted. A new and attractive specialist's house has been constructed at a cost of \$2,000. A new tenant house, considered to be almost ideal from the standpoint of adequacy at low cost, has been constructed for \$600. New cattle fence with cedar posts has been installed around our three pastures, one of twenty-six acres, one of five acres, and one of two

acres. A slat shed for bulb storage work was constructed. Improvements have been made to the poultryman's house and a poultry brooder house of latest design has been constructed. A ladies' rest room has been added to the office. Land has been improved by removing remaining stumps from the cultivated fields. A roof has been put upon the main barn and the roof of the dairy shed attached to same has been repaired. Several small lines of tile drainage have been installed in low, wet, places and repairs have been made to tenant houses so that at the end of this period, the Station as a whole is in the best state of repair it has been in at any time.

TOBACCO STATION—OXFORD

E. G. Moss, *Assistant Director in Charge*

Station established in 1912; Soil type, Durham sandy loam; Area of farm, 250 acres; Elevation, 500 feet above sea level; Mean annual temperature, 58° Fahr.; Annual rainfall, 46.03 inches.

The Tobacco Station is the research laboratory for the tobacco growers of the State and it is rendering a real service to this large industry. The experimental work of the Station has been continued in coöperation with the Office of Tobacco Investigations, United States Department of Agriculture. The following will give briefly a progress report on the principal experiments under way:

REGULAR FERTILIZER EXPERIMENTS

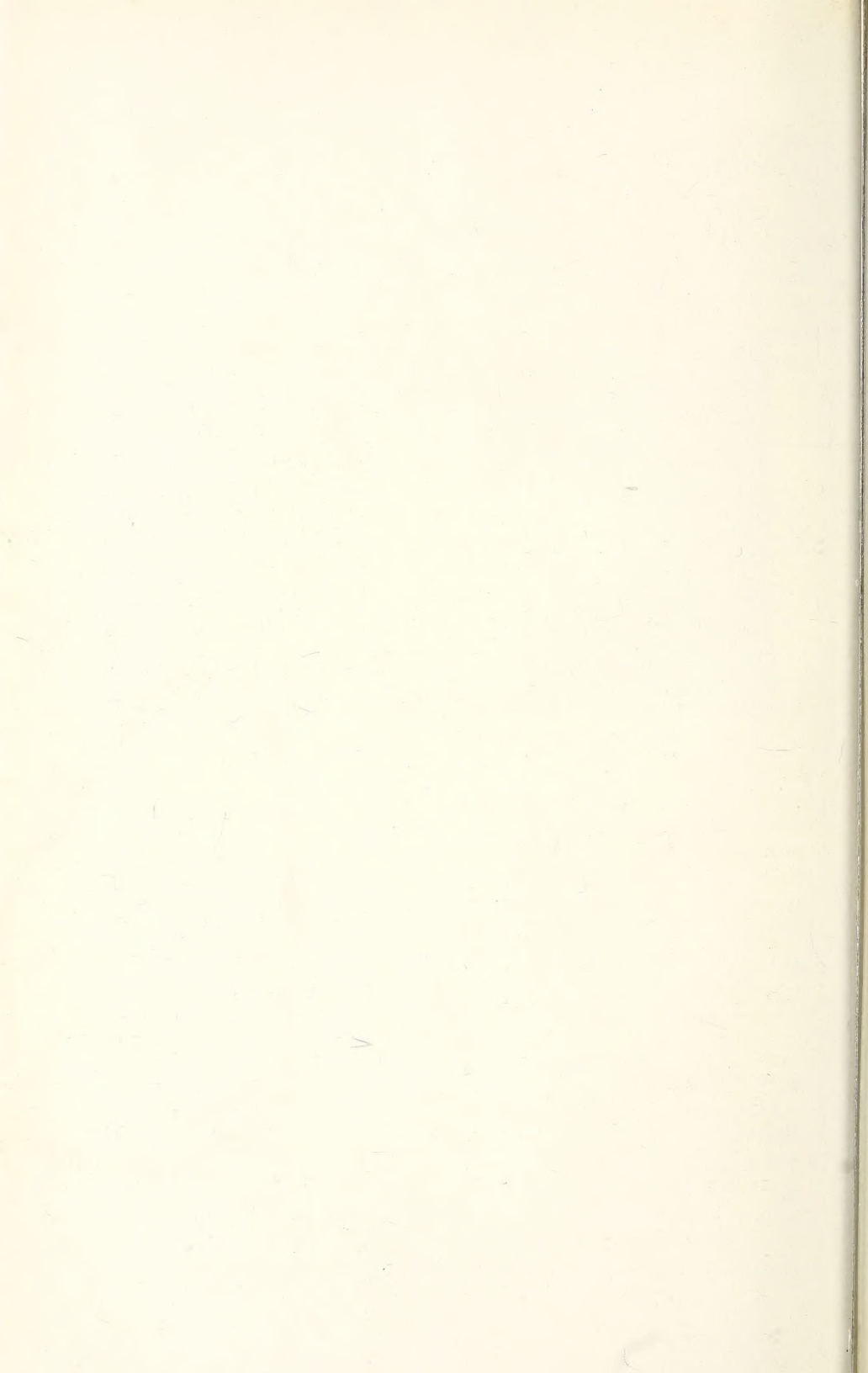
Cottonseed meal has stood up as one of the best sources, with nitrate of soda coming next in efficiency as carriers of nitrogen in fertilizer for tobacco. Sulphate of ammonia has given good results of the limed end of the plats. A combination of organic and inorganic ammoniates has been found to be better than any of the individual sources. For supplying phosphoric acid, acid phosphate is the best source, basic slag and bone meal being found to be too slow acting for tobacco.

SPECIAL POTASH TESTS

Muriate of potash has produced 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 nearly as good from the muriate as from the sulphate plats. There is a constant increase in yield and quality of the tobacco as the potash is increased; therefore, it seems advisable to use not less than 40 to 60 pounds of this constituent per acre, not more than 20 pounds of which shall be derived from muriate of potash. By the use of small amounts of muriate up to about 20 pounds



FERTILIZER PLATS AT THE TOBACCO STATION



of potash per acre, there does not seem to be enough chlorine present in the cured leaves of the tobacco to injure their burning qualities.

Different Sources of Potash with Dolomite and Calcite. The section of the field on which magnesium limestone has been applied has given best yield and quality with no occurrence of "sand-drown." On the other two series, "sand-drown" has occurred on all plats, except where sulphate of potash-magnesia was applied. The kainit plats have given a large yield of tobacco but the quality of leaf was poor.

Quantitative Magnesium Tests. It has developed from these experiments that comparatively small amounts of available magnesia present in the soil will prevent "sand-drown." The magnesia can be supplied either from magnesium limestones or from potash salts carrying considerable of this constituent such as sulphate of potash-magnesia.

Special Magnesium Tests with Magnesia, Sulphur, and Chlorine for Tobacco. These tests have not yet been running a sufficient length of time to arrive at any definite conclusions with reference to the value of each of these.

New Nitrogen Tests. At present, no definite conclusions have been reached, but there are several sources that show promise, principally among which are urea and leunasalpeter of the synthetic products and ground fish of the organics.

Experiment with Tobacco after Cowpeas. It has developed that tobacco of fair quality and yield may be grown on land after cowpeas or soybeans have been plowed under, provided liberal applications of phosphoric acid and potash are added, and the tobacco is planted reasonably close in the drill, topped high and harvested by priming.

Rotation System for Tobacco. There are four plats of one-half acre each in this experiment, with the following rotations:

- (1) A four-year rotation with corn, oats, grasses and tobacco.
- (2) A three-year rotation with oats and rye and tobacco.
- (3) A two-year rotation with rye and tobacco.

Variety Tests. During the past few years, something over 150 varieties of tobacco have been tested, these frequently showing differences in value between the poorest and the best of \$75 to \$100 per acre. Three or four of the varieties which have given the best results, have been advocated and seed of them have been distributed to leading growers.

Plant Nutrition Investigations. These are most interesting experiments and have shown 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 cowpeas. On the other hand, tobacco has done best after fallow and grasses than after any of the legumes.

Additional Experiments with Sulphur, Chlorine, and Magnesia. As 1926 was the first year in which this experiment was conducted, no definite results as yet have been obtained. Indications are, however, that a very small amount of chlorine is desirable for tobacco. The use of too much in the fertilizer mixture, however, will undoubtedly injure the burning quality of the cured leaves.

Distance of Tobacco Planting Experiments Tobacco transplanted 18 inches apart in the row has given better yields per acre and quality of crop than did those which had more distance between plants. In 1926, the tobacco was transplanted after the soybeans were plowed under, using 1,000 pounds of an 8-3-3 fertilizer mixture per acre. When transplanted 12 inches in the row, which required a little over 10,000 plants to the acre, the quality and yield were good.

The 1927 June Bulletin of the Department reports in detail the results of the fertilizer experiments at this Station with flue-cured tobacco.

Through the coöperation of Dr. W. W. Garner, of the United States Department of Agriculture, Dr. F. A. Wolf, Plant Pathologist, has done considerable work on the study of tobacco mosaic and frencing. A large part of the work was carried on at this Station.

The State Department has stationed at this Station, Mr. James F. Bullock, a graduate of North Carolina State College, for the purpose of studying varieties of tobacco and making selections. This work is being started on a sound basis and much good is expected from the results obtained.

IMPROVEMENTS

Two modern tobacco curing barns have been built during the past year, one with cinder blocks and one with clay tile. The cinder block barn has been converted into a sweet potato storage and curing house. A modern tobacco storage house with grading and ordering rooms was completed in 1927.

PIEDMONT STATION—STATESVILLE

F. T. MEACHAM, *Assistant Director in Charge*

Station established 1903; Soil type, Cecil clay loam; Area of Farm, 208 acres; Elevation, 950 feet above sea level; Mean annual temperature, 58.6° Fahr.; Annual rainfall, 50.98 inches.

The Piedmont area of the State is suited to a wide range of agricultural pursuits and it is the purpose of this Station to deal with as many of the farm problems of the region as funds and facilities for doing work will permit. The following will give a brief progress report on the chief experiments:



GROUP OF TOBACCO FARMERS IN ATTENDANCE AT THEIR "TOBACCO SCHOOL" HELD
AT THE TOBACCO STATION



AGRONOMY

Crop Rotation Experiments. The crop rotation work consists of a study of the value of one, two and three-year rotations of corn and wheat, with and without the use of legumes—cowpeas or soybeans and red clover, the fertilizer applications being the same with all rotations. Results for corn over a period of eight years shows a gain for the three-year rotation of 16.3 bushels over plats where continuous corn was grown. The two-year rotation has shown a gain of 11 bushels. Results for wheat, show a gain for the three-year rotation of 6.5 bushels over continuous wheat, while wheat in a two-year rotation gave a gain of 2.4 bushels over continuous wheat.

Fertilizer Work. The fertilizer experimental work at this farm is carried on for the purpose of determining the chief plant food deficiencies of this type of soil and finding the best proportions of fertilizing constituents for the different crops adaptable to the Piedmont region. A four-year rotation is followed on the two fields, each consisting of two series of plats. One-half of each series of plats is limed, the other half remaining unlimed. The rotation to be used on these plats is as follows:

First year—Cotton, rye.

Second year—Corn, wheat.

Third year—Wheat, red clover.

Fourth year—Red clover.

Results obtained over a period of 17 years have shown that phosphoric acid is the main limiting plant food constituent for the profitable production of corn, cotton, and wheat, with nitrogen ranking next in importance. Potash has a greater value in the growing of cotton than with the other two crops. Lime, phosphoric acid and potash have been found to be determining factors in the successful growth of red clover. For the past seven years, this crop has been a complete failure on the unlimed portion of the plats, except on those that received a heavy application of phosphoric acid and potash. On the limed portion of the plats, phosphoric acid has given greater yields of red clover than has the use of the other two constituents.

Acid Phosphate Versus Rock Phosphate. Results from field experiments continue to show that acid phosphate is a more efficient carrier of phosphoric acid than is rock phosphate, when both are used in sufficient quantities to supply normal amounts of phosphoric acid for the growing of corn, wheat and red clover.

⁵*Nitrogen Carriers.* In this work, a comparison of the relative value

of nitrate of soda, sulphate of ammonia, nitrate of ammonia calcium cyanamid, sludge, cottonseed meal, leunasalpeter, and urea as carriers of nitrogen in a rotation of cotton and corn is being made. Results so far obtained show nitrate of soda, nitrate of ammonia, and sulphate of ammonia of about equal rank as carriers of nitrogen, with a very slight advantage in favor of nitrate of soda.

Small Grain Varieties. The purpose of this experiment as conducted has been to lay the foundation for future work in grain improvement in the State. At this farm, there has been conducted a variety and strain test for five consecutive seasons with leading varieties of small grain usually grown in Piedmont North Carolina. Five of the leading varieties of wheat grown in this section of the State were tested for comparative yields during this period with the following results:

<i>Varieties</i>	<i>Average Yield (Bus.) per Acre</i>
Fulcaster	28.7
Purple Straw	27.9
Gleason	27.5
Stoner	27.4
Leap's Prolific	26.2

These average results determine the relative rating of these leading varieties of wheat for yield. The leading varieties in this test are to be continued in future tests as standards by which to compare new varieties or strains that might appear desirable to introduce into the State. For example, during the last three years of this test Alabama Blue Stem and Pennsylvania No. 44 were introduced into the test. In the average yields for the three remaining years both these outyielded all the other varieties in the test. The first is an improved variety selected by the Alabama Station and the second is an improved strain of Fulcaster selected by the Pennsylvania Station.

The test of common and Abruzzi ryes for the same period showed a difference in average yields of 4.6 bushels per acre in favor of the Abruzzi variety. This result further confirms the fact that Abruzzi rye is especially adapted to that part of North Carolina lying east of the Blue Ridge.

Three strains of hooded barley were compared with each other and with the oats and rye in the same test. One of them was a local strain and the other two were improved strains secured from the Tennessee Station. The strain of North Carolina origin outyielding the leading Tennessee strain by only 0.6 bushel. There was a difference of 4.9 bushels per acre in yield between the two Tennessee strains, No. 6 being the higher yielder. Fall-sown Fulghum oats outyielded the Appler

variety by 1.6 bushels per acre. Both proved low in cold resistance, being killed outright in the winter of 1923-1924 and only about 5 per cent of each survived the winter of 1926-1927. Lee (a selection from Culberson) proved far more cold resistant than did either of the other two.

One of the interesting results of this test is found in a comparison of the relative yields of the different leading grains compared in the tests. On account of the difference in weight of a measured bushel of the different grains, the comparison of yields are reported in pounds per plat, which were as follows:

<i>Grains</i>	<i>Average Yield (lbs.) per Plat</i>
Rye (Abruzzi)	90.6
Wheat (Fulcaster)	83.6
Barley (Tennessee No. 6).....	72.0
Oats (Fulghum)	46.0

In order that the yields may be recorded in actual pounds of grain production, 30 per cent was deducted from the original weight of oats for husks, and of 15 per cent from barley.

Legume Studies. In 1927, this Department entered into an agreement with the United States Department of Agriculture to conduct legume investigations at the Piedmont Station. The work is progressing in good order and has created considerable interest among the farmers of the section. The results show so far that the source of alfalfa and red clover has an important bearing upon the successful growing of either crop under Piedmont conditions. At present, the following projects are under way, and the work will be enlarged during the coming season:

1. To determine the relative value of alfalfa varieties and strains for hay under Piedmont conditions.
2. To determine the value of foreign red clover seed of known origin and imported seed with port of entry from Baltimore and South for hay yields.

LIVE STOCK

Bulletin No. 253, published this year by R. S. Curtis and F. T. Meacham, on "The Methods and Cost of Raising Lambs to Marketable Age," gives the results of the sheep work at the Piedmont Station from 1915 to 1927. This bulletin gives valuable information on the raising of lambs and flock management which should be of interest to the sheep industry of the State. The cost of producing lambs to marketable age ranged from \$7.53 per lamb in 1926-1927 to \$11.87

per lamb in 1924-1925; this high cost being due to short pasture caused by drought during several months of the best pasture season necessitating heavy grain feeding. Even under these conditions, the lambs over the period of the test showed a good profit.

The experimental feeding work with swine deals largely in securing cost data on pork production using the Poland China breed of hogs. The tests show that it costs \$3.97 to raise pigs to weaning age. This work has been published in Experiment Station Bulletin No. 244.

The purpose of the beef cattle experiment which was started this fall is to determine the extent to which farm grown roughages can be substituted for cottonseed hulls as a roughage for fattening cattle. This experiment should furnish valuable information for the live stock interests of the section.

HORTICULTURE

The young peach and apple orchard of six acres area has come into bearing and is giving valuable information on varieties, fertilization and pruning.

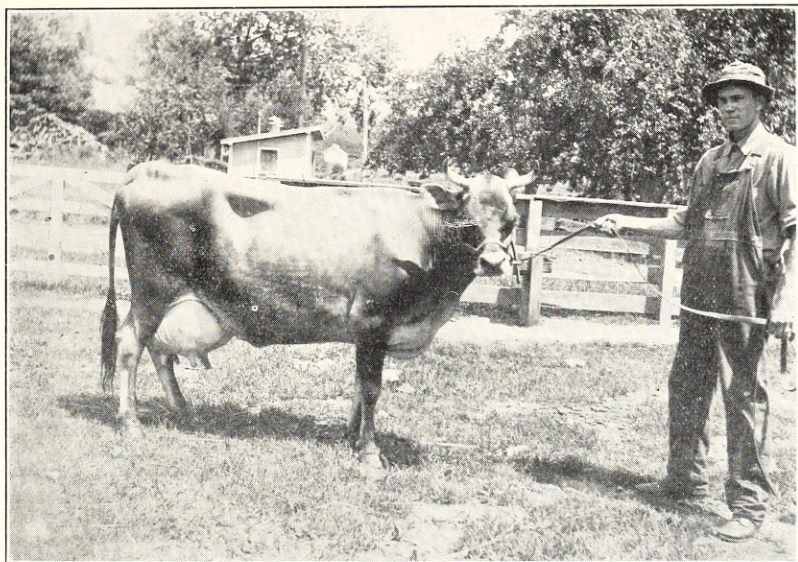
The following table gives the average yield of three-year-old trees with and without nitrate of soda:

Variety	Average Yield per Tree	
	1 lb. Nitrate of Soda per Tree	No Nitrate
Hiley.....	1.3 bushels	.35 bushel
Georgia Belle.....	1.6 bushels	.40 bushel
Elberta.....	.76 bushel	.50 bushel
J. H. Hale.....	1.2 bushels	.87 bushel
Augbert.....	.42 bushel	.20 bushel

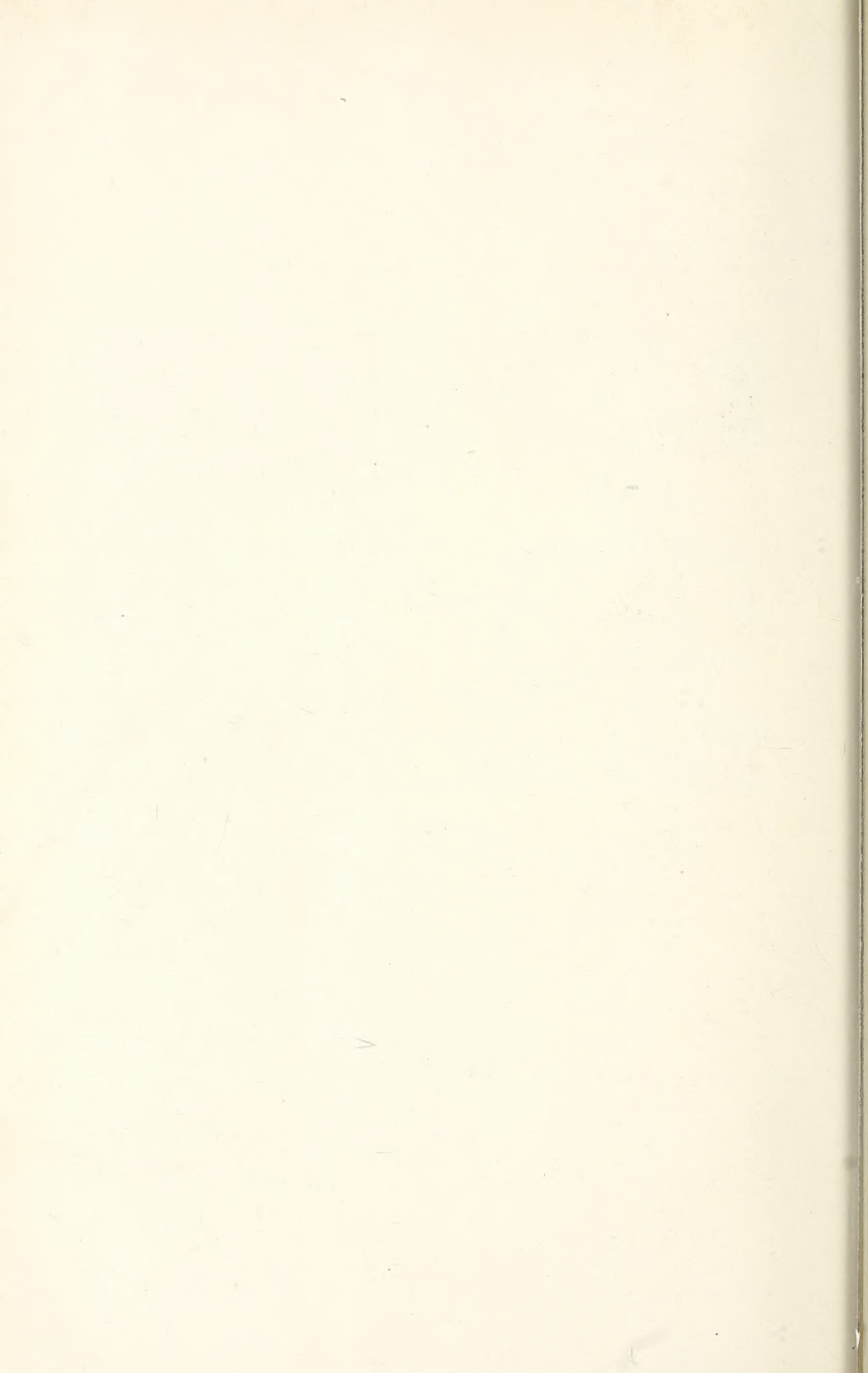
The pruning tests show that lightly pruned peach trees are larger and produce larger crops than trees heavily pruned.

IMPROVEMENTS

A cattle barn was completed in 1927 for \$1,700. The Superintendent's dwelling has been repaired costing \$400. A new seed cleaner has been added to the farm equipment at a cost of \$200, also a new grain thresher for \$600.



HARRY COULTER, DAIRYMAN AT MOUNTAIN STATION, SHOWS ONE OF HIS RECORD
JERSEY COWS, "HAPPY GIRL," RECORD AT AGE OF 3 YEARS, 10,926
POUNDS MILK AND 498.12 POUNDS BUTTERFAT IN 305 DAYS



MOUNTAIN STATION—SWANNANOA

S. C. CLAPP, *Assistant Director in Charge*

Station established in 1908: Soil types, Toxaway loam and Ashe clay loam; Area of Farm, 305 acres; Elevation, 2,600 feet above sea level; Mean annual temperature, 54.1 degrees Fahr.; Annual rainfall, 41.06 inches.

The Mountain section of the State embraces the large high plateau area extending from the Tennessee line eastward, including the irregular chain of mountains known as the Blue Ridge. This section has great agricultural possibilities, principally with fruit, truck crops, dairying, poultry, small grain and pasture crops, and the program of work on the Mountain Station is planned with the view of developing these industries.

DAIRY HERD DEVELOPMENT

This is a study of progress made in the improvement of a pure-bred dairy herd by the use of young sires of good breeding. Additional data have accumulated during the past year.

Seven lactation records on daughters of Eminent 19th 78620, gold medal bull, and thirteen lactation records on daughters of Rumina's King 160969, silver medal bull, have been added to the data. This herd has a very good breeding history and has passed two clean blood tests for bovine infectious abortion. The daughters of Majesty's Eminent Raleigh 208352 do not give promise of equaling their dams in production. They show no improvement in type and lack some of the refinement present in their dams.

Sybil's Gamboge of Swannanoa 254225, a young sire whose ancestry gives much promise of results in production and type, has been purchased for use at this station.

HERD AVERAGE

<i>Year</i>	<i>Milk</i>	<i>Per Cent</i>	<i>Butter-fat</i>
1924	5,594.66 lbs.	4.96	274.69 lbs.
1925	7,080.43 lbs.	4.76	334.62 lbs.
1926	8,399.7 lbs.	5.56	403.67 lbs.

OFFICIAL TEST RECORDS

Eminent's Happy Girl 562993 AAA.....	498.12
Eminent's Happy Girl 562993 AAA.....	498.12
Eminent's Foxy Eva 562990 Class A.....	545.28
Eminent's Tidy Louise 562991 Class AAA.....	557.42
Pender Eminent Lass 1369043 Class AAA.....	467.77

The herd development work shows that improvement by untried sires is a slow and uncertain process.

Young males though carefully selected often fail to transmit high production. When selection for both production and type is attempted with limited funds the task is exceedingly difficult.

Value of Fly Repellants in Maintaining Summer Milk Production. This is a study to determine the value of fly repellants on cows in maintaining summer milk production. Two groups of five cows each comparable for breed, type, age, stage of lactation, and productive capacity were used. The double reversal system of three experimental periods of twenty days each, with five day preliminary periods preceding each, was used. The results were slightly in favor of the use of the spray. This work will be repeated during the summer of 1929.

POULTRY

Bulletin No. 254, published during March of this year, on the "Cost of Producing Eggs with S. C. White Leghorns and the Control of Roup and Its Effect upon Egg Production," give results of the experiment at the Mountain Station poultry plant. The bulletin reports that results of one year test with the flock of White Leghorns show a profit of \$2.40 per hen, also that it required six pounds of feed to produce one dozen eggs. The feed cost of the eggs was 15 cents per dozen, and the balance of the overhead was 10 cents per dozen, making the eggs cost 25 cents per dozen to produce.

HORTICULTURE

Training and Pruning Apple Trees. Apple training and pruning investigations were started at the Mountain station in 1919, to determine the relation of the amount of annual pruning to early bearing and productiveness.

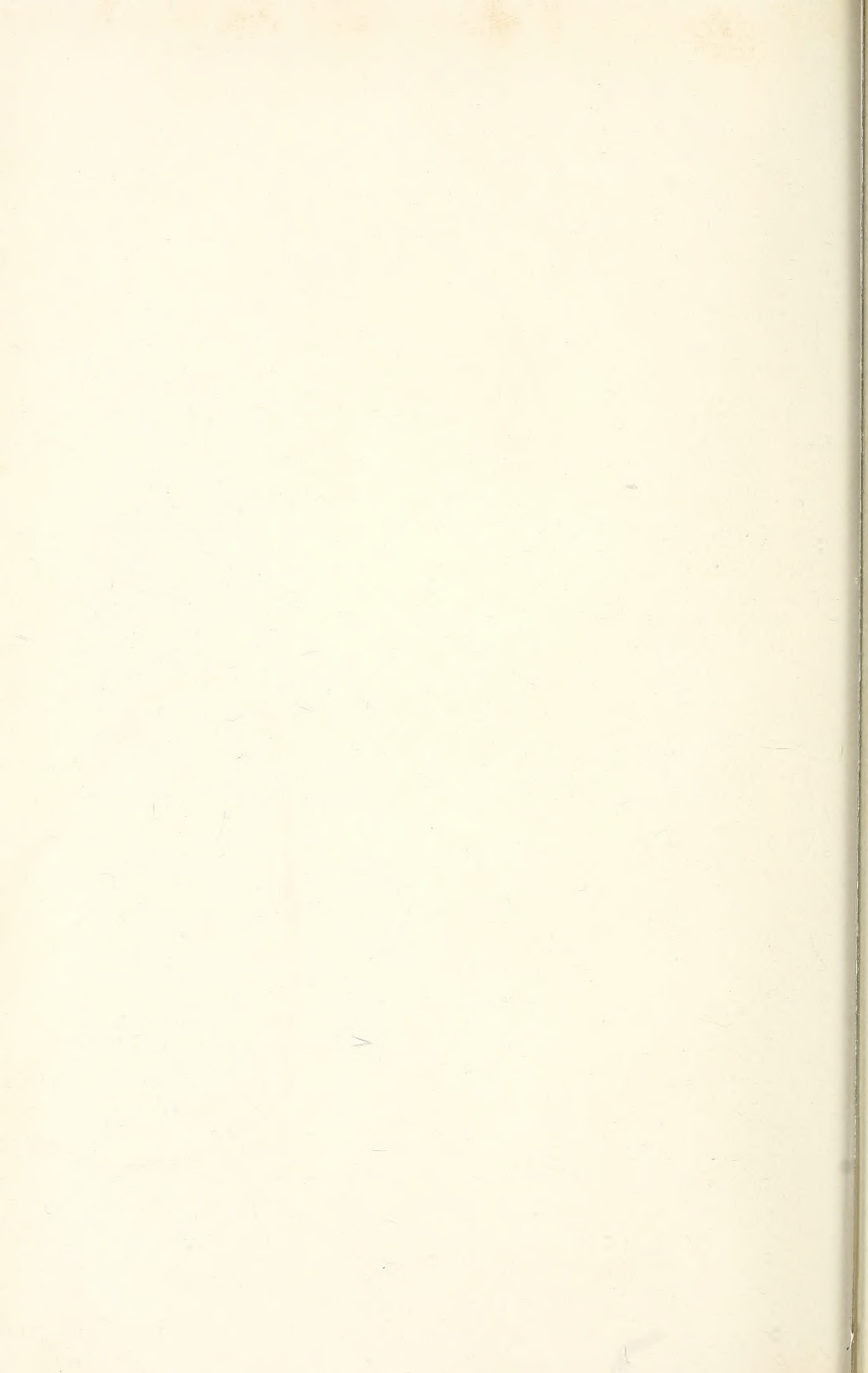
Investigations have been conducted at the Mountain station since 1919 to determine the comparative value of the open head and the modified leader systems of training and to determine the comparative value of the low headed and high headed tree.

The orchard at the Mountain station was divided into blocks in which open head and modified leader systems of training have been followed and in which heavy, medium and light pruning has been practiced. Measurements of annual growth of each tree have been secured and recorded. Crop records have been secured.

The following table supplies information on the effect of different degrees of pruning on early bearing and on yield:



WHEAT VARIETY PLATS AT THE MOUNTAIN STATION



EFFECT OF HEAVY, MEDIUM AND LIGHT PRUNING IN RELATION TO
EARLY BEARING AND YIELD

Variety	Age	Heavy Pruned		Medium Pruned		Light Pruned	
		Number of Trees	Yield in bushels	Number of Trees	Yield in bushels	Number of Trees	Yield in bushels
Rome.....	8	11	.31	8	.69	8	1.41
Winesap.....	8	11	1.17	8	3.52	8	4.01
Stayman.....	8	11	2.22	8	4.75	8	6.56
Delicious.....	8	11	.18	8	.74	8	1.98

ENTOMOLOGY

The Mexican Bean Beetle has been doing great damage to the bean crop. Of all the materials used to combat this pest, best results have been obtained from the use of a mixture containing seven parts of hydrated lime to one part of calcium arsenate.

AGRONOMY

Soil Fertility Experiments. Results thus far secured in the soil fertility experiments at this farm show that phosphoric acid is the first and nitrogen the second limiting factor in the production of corn, wheat and Irish potatoes on this type of soil. Lime, when used with a complete fertilizer, has proven profitable. When used alone it has given beneficial results with the legumes. A complete fertilizer has proven most profitable for Irish potatoes. The use of sulphate and muriate of potash as sources of potash, have given practically the same results, each having produced a higher yield than a fertilizer mixture containing kainit as the potash source.

Small Grain Studies. The same five leading varieties of wheat were tested for the same period as at the Piedmont Branch Station. The average yields have changed the rating somewhat of some of the different varieties from what they were at the Piedmont farm. For example, Leap's Prolific which ranked fifth at the Piedmont farm ranked second at the Mountain farm. This indicates that perhaps some of these varieties are better adapted to mountain conditions, than to the Piedmont section of the State. On the Mountain Station the varieties ranked as follows, given in the order of their rank in yield of grain per acre: Fulcaster, Leap's Prolific, Purple Straw, Stoner and Gleason.

Common and Abruzzi varieties of rye were also tested and it was found that the Abruzzi outyielded the common by only 0.2 bushel per acre.

It is well known that clayey upland soils are better adapted to wheat-

growing than are sandy bottom lands that usually contain more vegetable matter. There is a popular notion among farmers that a bearded variety of wheat will outyield a smooth wheat on bottom-land or any other land not well adapted to wheat. To prove or disprove this popular notion, in addition to the plats seeded on the upland in the test at the Mountain farm, a plat each of Fulcaster and of Leap's Prolific was seeded on typical bottom-land. The Fulcaster outyielded in both cases. It yielded on the upland at the rate of 23.5 bushels per acre, on the bottomland at the rate of 20.8 bushels, a difference of 2.7 bushels per acre in favor of the upland. Leap's Prolific yielded on the upland 22.6 bushels per acre, and on bottom-land only 16.1 bushels, a difference of 6.5 bushels in favor of the upland. The Fulcaster on the upland outyielded the Leap's Prolific only 0.9 bushel per acre; on the bottom-land 4.7 bushels. Fulcaster is a bearded rust-resistant variety, while Leap's Prolific is a smooth rust-susceptible variety. Based on these data, upland appears better adapted to wheat-growing than bottom-land. Bearded varieties, at least rust-resistant varieties, appear much better adapted to bottom-lands than is the smooth headed or rust susceptible variety.

NEW CROPS

Stock beets have proven to be an excellent winter feed for both dairy cattle and poultry, and the tests show that this crop is well adapted to the mountain region of the State. The yield from 1 1-3 acres on this station last season was 31 tons.

The dairymen and poultrymen should give more attention to the growing of stock beets, since the home growing of feed is their big problem in economic production.

A test planting of Jerusalem artichoke has been made this spring in coöperation with the Federal Government. It has been found that the sugar made from this plant is valuable in the treatment of diabetes. The purpose of the test is to determine if the crop will grow successfully in the Mountain region, and at the same time yield a high content of sugar.

IMPROVEMENTS

The following improvement items have been completed during the past two years: new roof, heating plant and general repairs to Superintendent's dwelling; clearing ten acres of new land; ceiling dairy barn; painting apple storage house, garage and cottage No. 1, and utilization of river timber area for a forestry and pasture demonstration.

Respectfully submitted,

F. E. MILLER,

Director Test Farms.

STATISTICAL REPORT

To the Commissioner of Agriculture:

SIR: The Department of Agriculture has available a wealth of current farm information, and a finely developed office of information offering far reaching possibilities, that should mean much to its several Divisions. A careful investigation or analysis of its statistical work would result in a greater realization of value, efficiency and foresight evidenced here. Almost the entire scope of farming is embraced in its many reports, much of which while not published (due to insufficient printing funds) is used by the United States Department, and is available and helpful in the North Carolina interpretations. It is also available for reference as county data.

Some features of information secured in the 133 reports (1928):

1. SEASONAL COTTON REPORTS (31)
 - Condition
 - Yield
 - Forecasted production
 - Prices
 - Ginnings
 - Sales (monthly)
 - Field boll counts
 - Boll analyses, weights, etc.
2. REGULAR MONTHLY REPORTS OF CROP AND LIVESTOCK (12)
 - All crops except cotton
 - Intentions to plant
 - Condition
 - Yield
 - Forecasted production
 - Quality
 - Prices
 - Stocks on farms
 - Number, classes and values of livestock.
 - Eggs and milk production
3. TOBACCO MONTHLY AUCTION SALES (9)
 - Sold by dealers, resales and prices
4. SPECIAL REPORTS (81)
 - Peanuts
 - Legumes (Very complicated account interplanting, etc.)
 - Small grains (Each kind and seasonal)
 - Labor
 - Wages
 - Land values

Livestock (Various and by classes)
 Pig survey
 Poultry
 Yields (Very extensive inquiry and complicated)
 Harvest
 Planting
 Rural Carrier Surveys (9,000 reports)
 Farm Census (180,000 farm reports—all crops)
 Identical samples
 Truck crops (Very difficult to get coöperation)
 Fruit
 Millers (Very poor aids)
 Farm Forecasters (1 annual—3 quarterly issues)
 Crop meter records (6,000 miles)
 Pecan
 Annual Revisions (Final summation all crops)
 And others

CONSPICUOUS ACCOMPLISHMENTS 1928

There were 133 different reports compiled during the current year (1928), averaging about three per week. The schedules or inquiry forms for many of these were prepared in the Raleigh office. The reports, other than the Census, averaged about 28 items and 200 reports used in each compilation. This meant over half a million items called for. The Farm Census included about nine million items. Including the calculation work probably in excess of 20,000,000 item data were handled during the year. This simply illustrates the time consuming complications involved in statistical work which summates such simple results. As for the efficiency of the clerks in this Division, they will compare admirably with the best in this or any other State, according to observations of statistical authorities.

The large number of requests (names) carried on our mailing lists establishes the increasing demand for this work. According to the many letters received so stating, the farm scope covered and form of reports (especially in Forecasters) issued by this office are equal to those of any other State. That 8,000 report copies (quarterly Forecasters) are needed to meet the needs simply means that it is economy to print these instead of duplicating them on the mimeograph. The appearance of the mimeographed reports simply result in their being discarded as soon as read. The Farm Forecasters are read carefully and preserved. Many States are now issuing much more imposing (expensive) statistical bulletins than we do.

The field investigations work (travel expense) is shared by the Federal coöperating Bureau. The plan is for the State to pay for transportation and the government to meet subsistence expenses. This arrangement has

simplified and equalized the travel expense. More than ever before, efforts have been made to secure reasonable information and estimates on *truck* crops. The peach estimates were already well founded. Our suggestions of several years ago to the Crop Reporting Board at Washington have borne fruit in the form of *cotton* boll counts as a part of the cotton estimating methods. This has been expanded until the North Carolina samples were made from several hundred fields throughout the cotton counties. Well over 100 fields were tested with the view of determining the effect of boll lock damage on good locks. This appears to be 10 per cent or more. This agrees with the opinion of Dr. R. Y. Winters, Director of Experiment Station. The cotton estimates work now *requires* much field work. For the first time in any State the *peanut* estimates have been aided by field counts of the nuts per plant and quality. Such counts were made in about 100 peanut fields, including before and after digging operations. This is believed to be a decidedly forward step with this crop in which North Carolina's production leads.

Thus it is increasingly found that field investigations, bringing our statisticians into contact with actual conditions, are not only better for them but the farmers themselves are becoming awakened to such studies to their own advantage and appreciation of statistical methods.

It has always been the aim of the Crop Reporting Service to aid and to maintain North Carolina's reputation for high rank in values and methods of performance. At the same time practical economy and wise investment policies have been pursued.

FARM FORECASTER

No matter how fine a crop may be grown, unless it is not only housed but *used* or *sold*, then it is a loss. Just so with farm information. If it is distributed in a *way* that it will be studied and preserved, then it becomes a good investment. Looking into the *economy* of the quarterly printed reports (Farm Forecasters) the following features are important:

1. The cost averages about 3 cents per copy.
2. Free postage means a great saving.
3. The magazine size means maximum efficiency in presenting comprehensive county tables without breaks.
4. The magazine size permits of cheaper composition and printing costs, as well as reference convenience.
5. The 9 x 12 inch size commands attention and an importance, resulting in preservation.
6. The illustrations are all made during field travel investigations, so truly relate to the statistical information. Illustrations are an essential

adjunct with statistical matter. They inject life into a dead (appearing) subject. That is why mimeographed reports are almost worthless.

AGRICULTURAL EDUCATION

Most of the Vocational High Schools of the State are now using the crop reports and especially the Farm Census, county and township data in their class work. This provides current and local applications or studies. This practical feature of agricultural education is unique in North Carolina. The Farm Census gives this advantage over other Southern States for county data is very erratic with any other basis.

The County Farm Agents are rapidly learning to appreciate its value and aid in their work. This is especially true where new agents go into a county. This classified data really hastens an Agent's familiarity with his county by a year. It, therefore, *pays* the county a handsome return on its small investment in this way alone.

Bankers, agricultural specialists and others are steadily coming to depend on the North Carolina farm statistics as a basis for conducting their business relations with farmers. That is they take farm risks which otherwise would be unwise.

Many farmers are now thinking for themselves, due to the Farm Forecaster and Crops and Markets data available to them in addition to the various fine farm papers. At the low county cost, the Farm Census is one of the best investments a county can make, and surely little enough return is now being made for the farmers' proportionally high taxes.

FRANK PARKER,
Statistician.

THE MUSEUM

To the Commissioner of Agriculture:

SIR: I am submitting herewith my report on the operation of the State Museum for the biennium ending on November 30, 1928.

As the report covers the first complete biennium since the opening of the Museum in its present reconditioned quarters, I feel that it is an opportune time for presenting a brief sketch of the museum rooms and exhibits as they now are, which directly follows.

The Museum has made substantial progress during the two years in question and I may safely state that it is at the present time in better condition than at any time in its history. We now have all of our nine exhibition halls open to the public, these halls running in size from 35 x 40 feet to 40 x 80 feet, with a total exhibit space of about 18,000 square feet.

Hall No. 1. This is the first room entered by the visitor entering by way of Halifax Street. It is a spacious hall, 47 x 55 feet, with a ceiling pitch of 23 feet, and in it are displayed miscellaneous specimens of outstanding character that call attention to the exhibits shown in the other halls according to their classification. Thus, we find in Hall No. 1 a 45 foot skeleton of the Right Whale, various bones and most of the skull of a mastodon, mounted Elk and Buffalo illustrating animal species formerly abundant but now extinct in the State, a mounted Tarpon, a pair of mounted Ravens, several large geological specimens, and one or two unusual specimens in forestry. There is also a collection of living snakes which illustrates the differences between the poisonous and the non-poisonous species.

Halls No. 2 and No. 3 contain the geological and mineralogical collections, which are under the direct charge of Harry T. Davis, Curator of Geology.

A complete rearrangement of a part of these exhibits is now under way, and a new case is being prepared for our exhibit of native gems and gem stones so that they can be shown to a better advantage than is possible with the cases we now have. Most of the cases in these two halls have been overhauled, some of them remodelled, and all that have been worked on have been made dust-tight, a very necessary provision.

A large number of new specimens have been secured, and such of these as are needed to fill in gaps in the present collections are now in course of classification and preparation.

Hall No. 4 is devoted to the exhibits illustrating the principal forest trees of the State, and this is one of the most complete collections of native woods shown by any State. The main collection was refinished and reinstalled nearly two years ago, but since then we have had built ten additional cases to take care of the smaller and the more or less miscellaneous collections relating to the subject of forestry. These cases are awaiting an opportunity to install the exhibits therein, a press of other work having made it impossible to do this up to now.

Our most interesting individual exhibit in this room is the section of a large cypress tree that measured 11 feet one inch across the stump and was about 840 years old when it was cut in 1913.

Hall No. 5, the first room on the second floor, will be largely devoted to relief maps, pictures and miscellaneous exhibits, but it is incomplete at this writing.

Hall No. 6 contains our collections of fishes and other forms of marine life. Among the rarer and more striking exhibits are the 1,200-1,300 pound Ocean Sunfish, from Swansboro; 500 pound Sand Shark; an 11 foot Sawfish; Sailfish; 15 pound Lobster; 7 foot Sturgeon; an Octopus with a spread of 5 feet; a 55 pound Red Drum, and a collection of mounted specimen that includes most of the more important game and food fishes found in the State.

Hall No. 7 is devoted to birds and reptiles. Group cases show the birds of a fresh-water marsh, those of the sea beach, 24 species of wild ducks and 4 of wild geese, nesting cormorants, Snowy Owls, eagles, etc., each case showing the specimens among natural surroundings.

Many of the smaller species of birds in the wall and floor cases are mounted in connection with their nests and eggs. The systematic collection of birds fairly well represents the bird life of the State in wild-fowl, game birds, marsh birds and birds of prey, but we are quite short of an adequate representation in some of the other groups, particularly in the smaller species. A lack of time available for field collecting during the last few years is mainly responsible for this condition.

But we do have a number of species that are quite rare in the State represented in our collections, such as Man-o-War Bird, Carolina Parquet, Lapwing, Razor-billed Auk, Water Turkey, Snowy Owl, Dovekie, Yellow-crowned Night Heron, Sooty Tern, Great Black-backed Gull, Hybrid Snow Goose X Brant, Long-billed Curlew, Gannet, Purple Gallinule, Golden Eagle, Saw-whet Owl, Long-eared Owl, Swallow-tailed Kite, Pigeon Hawk, Ground Dove, etc.

Among the reptiles in this room probably the 800 pound Leather-back Turtle, the 6 foot Diamond-back Rattlesnake, and the 9 foot alligator are the most noticeable. We have the skin of an Alligator in the

work-rooms that measured 11 feet 6½ inches and weighed about 550 pounds that will be worked up and placed on display as soon as time can be found. But our reptile collections, particularly those including the small and medium-sized species, are by no means complete. A large number of alcoholic specimens are awaiting an opportunity to work them up into condition to be exhibited.

Hall No. 8. This room is devoted to native mammals, some species being shown in habitat family groups. These groups include White-tailed Deer, Opossum, Skunk, Mink, etc. We have a number of skins stored that should be mounted and placed on exhibition but so long as a large part of our time has to be devoted to office work much of this technical work must remain in abeyance.

The collection shows individual mounted specimens of the fur-bearing animals of the State, which is fairly complete, and we also show models from plaster casts of two of the more common species of porpoise found on our coast. A collection of native furs is another feature, this showing the best methods of preparing fur skins for securing the highest prices. But a good many additions are needed in this room to properly present the animal (mammal) life of the State.

Hall No. 9 is our largest and best lighted room and is devoted to Agriculture in all its branches. Our collections in some of the divisions of this department were in excellent shape at the abandonment of the old Agricultural Building in preparation to the starting of the new, but during the long period of storage that followed this class of material suffered the greatest deterioration of any of our exhibit stuff. And, as we have had no opportunity until quite recently to replace the damaged material, the present exhibit is not as creditable as it should be—and will be.

A new feature in this room is the installation of a case of birds of prey—hawks and owls—the labels attached to the specimens indicating which are harmful and which are beneficial to the farmer. It is our desire to later on install exhibits of our commoner birds showing their economic status.

A model barn is a feature of this room, and a fine collection of colored enlargements of photographs, mainly of farm scenes, adorn the walls. This feature will be added to later.

This room has been equipped with a number of built-in cases for habitat groups, though none of them are occupied at the present time. Above each of these cases is a frame holding four colored transparencies, and the same hidden lights that light the transparencies will light up the group cases.

We have added somewhat to our collection of old farm implements

and home appliances on the farm during the two years, but this part of the exhibit has not yet been installed. The renovation of this room, following the completion of the new Agricultural Building and the evacuation of the Museum rooms by the employees of the Agricultural Department, was held up until all of the others had been completed. This was partly due to shortness of funds but mainly for the reason that we had to work from the front of the Building, back. It was only opened to the public immediately preceding the close of the biennium. We expect to make this the most attractive exhibition hall of the Museum. It will probably be necessary to hang our new Sperm Whale skeleton in this room as the one containing the 45 foot Right Whale skeleton is not of sufficient dimensions either way to hold this larger one.

Accessions. It seems to be unnecessary to list these in full in a report of this kind, but a brief mention of some of those of major interest may be in order, as follows: Skeleton of 55 foot Sperm Whale, large Black Bear, partial albino Raccoon, full albino Opossum, Fox Squirrel, several specimens each of Glass Snake, Diamond-backed Rattlesnake, Banded Rattlesnake, Copperhead, Chicken Snakes, etc., an 11½ foot Alligator, a 55 pound Red Drum, a Sailfish, a Sooty Tern, which had been blown north by one of the West India hurricanes of last summer, Lapwing, Wood Ibis, Snowy Owls, Water Turkey and two Razor-billed Auks, the last six species of birds and the Sailfish being very rarely taken in this State.

Of course, the Sperm Whale skeleton is the largest and most valuable of the foregoing, in fact, the most valuable accession the Museum has ever had. This whale drifted ashore on Wrightsville Beach on April 6, 1928. It was secured for the Museum after many complications and the expenditure of much time, labor and mental agony. My associate, Harry T. Davis, superintended the "cutting in" of the whale after it had been towed to Topsail Inlet. It was at least three weeks after the death of the animal when he completed the job of getting out the bones, and one can readily imagine what he was up against. But he did finish it! The bones were buried in the sand of the beach to remain there until in condition to be removed to Raleigh.

Attendance. Nothing indicates so definitely the continually growing hold the Museum has on the people of the State as the steady increase in our attendance figures. The first twelve months of the biennium showed an attendance of 126,848. The second year, the total was 161,495, an increase of nearly 28 per cent. This seems to be the only museum in the country that can show an annual attendance equal to four times the population of the city in which it is situated. And in

this attendance are included about 300 school classes, some of them coming from more than 150 miles distance.

Operating Costs. In terms of cost per visitor, we operate more economically than any museum in the country of which I have knowledge. Leaving out interest on investment, depreciation and insurance, our cost of operation does not exceed nine cents per visitor, while some of the larger museums operate at figures running from 50 to more than 60 cents for every visitor that enters their doors. Even if our force were increased by one or two additional employees, which are badly needed, I am confident that we could still operate at a lower cost compared with our size and our attendance figures than any other museum in the country.

Personnel. We will never be able to function as we should until Mr. Davis and I are relieved of all the office work of the Museum. It is the extreme reverse of economy for us to be compelled to carry on a line of work that could be done so much more rapidly and so much more efficiently by a lower-salaried employee. I realize that I have been harping on this condition and on the necessity for relief therefrom—which I have presented in all its details in former reports—for more than four years. But conditions get worse all the time, and I would not be doing my duty by the Museum were I to fail in continually bringing this matter to your attention so long as the present conditions exist.

I have also called attention to the desirability of changing the classifications of the two technical workers of the Museum from Curator and Associate Curator to Director and Associate Director, with the reasons therefor. Such change would materially help our standing among other museums. There is no reason against such a change and every reason for it.

General. Including the items mentioned under other headings in this report, we have had a large number of exhibit cases repaired and made insect-proof and dust-tight during the biennium. This has been a crying need of all of our older cases, and it is our intention to keep this repair work going until all of our exhibit cases are in a condition to carry the specimens they contain with a minimum amount of depreciation. We have lost much material in the past by its being exhibited in old cases that failed to protect it against the ravages of insects and against coal-smoke particles. We have also added a number of new cases, purchasing the material and having the work done on the premises this having proved much more economical than in investing in cases ready made, or having them made to order.

Mr. Davis and I have made addresses during the period under dis-

cussion before a number of civic clubs, science clubs and other organizations on matters pertaining to the Museum, and each of us has made one talk over the local radio on similar subjects.

We have answered a great number of requests for information, and many identifications of zoölogical specimens have gone out from my office. Mr. Davis has determined geological specimens brought or sent in on an average of about twenty per month. These determinations often call for a chemical analysis and nearly always for a written report. This one line of work alone is quite a job.

The requests for information that come to us cover a wide field. Outside of those relating to Geology and allied subjects, which are handled by Mr. Davis, one might infer that a museum worker is supposed to know everything. Is a whale a fish? How to treat a sick canary? What is an old fiddle worth? Where is a good market for skinned rabbits? How old is an Alligator of a certain length? What is a certain piece of old paper money worth? Is there such a thing as a Joint Snake? How to get rid of moles? Can you tell the age of a snake from its rattles? Was that big ape at the State Fair really a Gorilla? And a host of others on every conceivable subject. And we are usually able to make an intelligent reply to all, or at least advise the inquirer as to where definite information may be secured.

The writer has reconditioned, which has sometimes included an amount of repair work, and remounted on more appropriate stands or perches, more than a hundred of our mounted birds during the past year.

Under authority granted by the Board several years ago, the Museum has distributed to such High Schools of the State as have requested them, collections of minerals made up of species of which we have a number of duplicates. This work has been carried out by Mr. Davis.

We have recently completed the wiring and lighting of Halls No. 2 and No. 6, in which more light was badly needed. The improvement is well worth the cost, and visitors can now see the specimens and read the labels on dark days and late in the afternoon during the winter months, which was previously impossible.

We have also had wiring and lights installed in seven habitat group cases and in four floor cases, all of which required artificial lighting to properly display their contents. This type of lighting for exhibit cases is becoming more and more the usual practice in museums, as dark interiors and reflections in the glass fronts of the cases have made so many of them almost useless under the quality of natural light available. This refers particularly to the conditions as they exist on cloudy days, particularly during the winter months. This artificial lighting

for our exhibition halls should be continued until all of them are so provided.

Mr. Davis and I attended the annual meeting of the American Association of Museums—in which both of us hold membership—in 1927 and in 1928, Washington being the place of meeting for both of these years. I attended the Southern Conference of the Association in 1927, which was held in Charleston, S. C. In 1928, the meeting of the latter organization was held in Birmingham, Alabama, but the distance of the meeting place combined with a congestion of work here at the time prevented our attending.

These annual meetings of the American Association of Museums are the only opportunities we have of foregathering with the other museum workers of the country, and we find attendance at them of the greatest value in our work here. The practice of regular attendance at these meetings is one of the most important features in our keeping the North Carolina State Museum abreast of the times.

This is, of course, mainly a report on operations, but as several of our needs have already been expressed, I desire to call attention to one other. This is the need for an electric refrigerator in which to keep perishable specimens until the time can be found to work them up. At present, we have no convenient means of keeping such specimens and, in the past, we have lost a good many by reason of this lack in our equipment.

I desire to express to you my appreciation of the active and intelligent support you have given the Museum during this period, without which we must have failed in many of our endeavors. This support is exemplified in your giving us authority to go ahead and secure the Sperm Whale skeleton when the opportunity so suddenly arose, at a time when our funds were short and before we really knew what a good investment, both from a business and from a scientific point, it would prove to be.

For the first time in three years, the State Fair was held in October, and the exhibit of the Department of Agriculture was placed by you under the direction of Mr. F. E. Miller and me. Considering the late date at which work on the exhibit could be started, I feel that the Department's activities were well represented, though not as fully as would have been the case had the building been ready for occupancy at an earlier date.

Respectfully submitted,

H. H. BRIMLEY,
Curator.

DIVISION OF FORESTRY

To the Commissioner of Agriculture:

SIR: The interesting features of the work in this division center about the following lines of work undertaken and accomplished:

In the region about Wilmington the forester noted some time ago great areas of second growth, and old, boxed long leaf pine. These in his judgment were of sufficient importance to attempt to reestablish turpentine in this region. Experts from Washington were called in, and Mr. Wyman, in charge of turpentine experiments of the Southern Forest Experiment Station, agreed with the forester, and the owners of the timber lands were induced to let contracts to Georgia operators.

One still has been erected, and some sixty thousand trees, (six crops) are being worked. Another tract has been leased, and a second still is to be erected the coming year. This gives us two new stills, and probably some thirty or forty crops in the region about Wilmington. Care is being taken to prevent fire, and the most modern methods of tapping are being used by the operators.

The return of this industry to eastern Carolina, will mean much to its future. Some two to three million acres in eastern Carolina should be producing turpentine.

A second interesting feature of the work undertaken in the past two years, was a survey of the timberlands of the various test farms. It was deemed necessary to have the State-owned timberlands of the test farms put in such condition and managed in such a manner, that they would be a demonstration to the farmers of the State of a practical method of handling the neglected, waste areas, of the average farm for profit, and for the supplying for home use, and for sale, fuel and lumber, and other wood products.

Each of the test farms presented a different problem. The farm at Statesville was without woodland. An unprofitable field was planted to pine, and is now making excellent growth. A low swampy area covered with alders and briers, has been planted with various hardwoods, and the prospects are for a fair stand under these difficult conditions.

The forest land at Oxford consisted of some forty acres second growth pine mixed with hardwoods. This was marked for thinning, all undergrowth removed, and fuel wood for tobacco curing is being secured from the thinnings.

A similar operation of thinning was undertaken at Willard, this

to be extended into mature stands of pine and hardwood along the creek. From this thinning construction material for repairs will be secured.

A thinning has been undertaken in the river pasture at Swannanoa, thinnings are to be undertaken in the mixed pine and hardwood stands on the steep slopes above apple orchards and fields.

A plan for thinning the forest at Edgecombe has been made but due to overflow conditions in the deep cypress and gum swamp during periods when labor can be used, no thinnings have been undertaken.

Many other activities connected with the forester's work might be mentioned, they are largely routine, and of little interest for this report.

Correspondence of the office, field trips to advise or devise, plans for marketing, the rounds of the mills and wood-using industries to keep in touch with and develop markets, consume a large part of the time of the forester.

We are saving the farmers thousands of dollars, annually, and it would seem economy to increase the appropriation of the office whenever funds are available.

Respectfully submitted,

H. M. CURRAN,
Forester.

DIVISION OF PUBLICATIONS

To the Commissioner of Agriculture:

SIR: Herewith, I have the honor to submit to you the biennial report of the Division of Publications, covering the calendar years of 1927 and 1928.

For many years, the Department, through its editors and others designated by it, has issued information to the public in general and the farmers in particular.

While there have been no radical departures in the Division of Publications during the past biennium, there have been several added features, which have been put into effect without additional cost. It is hoped to expand the work further as time goes on.

The work of issuing publications has been coördinated and placed in this Division, whose duties are briefly outlined as follows:

1. The issuance of The Bulletin containing statistical and other data the Department is required by law to publish. Such material as the results of fertilizer, feed and other analyses is furnished through this medium, the copy passing through the Division, on to the printers.

2. The Semi-monthly publication of the official organ of the Department, known as "Agricultural Review," in which appear non-technical discussions of agricultural subjects and agricultural news. This publication goes to five thousand farmers and others requesting it.

3. Supplying newspapers with items of interest concerning the Department's activities which will be of interest to the public.

4. Attending to individual letters from inquirers who seek agricultural information. During the past two years, several thousand such letters have been received and the desired information has been forwarded in a majority of cases. It is sometimes necessary to refer inquirers to other sources of information.

5. The Division has worked in coöperation with the local broadcasting station in promoting a weekly period assigned to the Department for broadcasting agricultural news.

Work of this Division is open to your inspection at any time, or to the inspection of others who are interested in its activities.

Respectfully submitted,

WM. H. RICHARDSON,
Editor.

DEPARTMENT OF AGRICULTURE

STATEMENT OF RECEIPTS

JULY 1, 1926—JUNE 30, 1928

	1927	1928
Fertilizer tax	\$228,803.73	\$275,669.51
Cottonseed meal	35,295.12	22,433.04
Feed	52,158.68	57,276.32
Seed Licenses	2,700.00	2,650.00
Condimental feed licenses.....	640.00	660.00
Hog Cholera Serum	26,745.52	43,776.56
Costs and fines.....	1,156.02	1,694.36
Legume Inoculation	750.20	1,622.70
Linseed Oil	1,388.25	1,718.30
Bleached Flour Licenses.....	9,675.00	14,085.00
Bottling Plant Licenses	1,700.00	1,920.00
Ice Cream Licenses.....	1,605.00	1,655.00
Soybean Inspection	432.00	126.50
Oil and Gasoline Divisions.....	3,000.00	.....
Test Farms	46,176.94	49,694.94
Bakery Licenses	1,850.00	1,590.00
Chicken Tests	3,953.44	5,273.58
Division of Markets.....	11,329.73	626.62
Refunds	152.33	232.47
Testing Seed	41.53	40.00
Seed Tags	1,537.20	1,647.61
Permit Tags	516.50	627.75
Insecticides .....	.....	1,070.26
Weights and Measures.....	.....	5,571.37
Lime .....	.....	65.75
Inspection Entomology .....	.....	189.76
Analyzing Stomachs .....	.....	775.00
Interest on Deposits.....	2,063.86	2,438.90
Total	\$433,671.05	\$495,131.30
Balance First Fiscal Year.....	95,787.69	86,310.87
Total	\$529,458.74	\$581,442.17

GASOLINE INSPECTION

Gasoline Tax Stamps.....	\$553,264.92	\$607,905.44
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OIL INSPECTION

Oil Tax Stamps.....	\$ 97,903.76	\$103,269.75
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STATEMENT OF DISBURSEMENTS

JULY 1, 1926—JUNE 30, 1928

	1927		1928	
EXECUTIVE DIVISION:				
<i>Personal Service:</i>				
Executive	\$ 4,000.00		\$ 3,999.96	
Professional	2,820.00		3,300.00	
Clerical	2,500.00		2,499.96	
Unskilled labor	2,443.00		3,274.00	
<i>Per diems</i>	1,379.82	\$ 13,142.82	1,089.78	\$ 14,163.70
	<hr/>		<hr/>	
<i>Supplies and Materials:</i>				
Office	\$ 1,218.90		\$ 297.83	
Cleaning	55.50		.....
Library	25.00		32.75	
Grounds	82.75		24.75	
Ice	606.50		502.90	
General	103.14		.....
	<hr/>		<hr/>	
		2,091.79		858.23
<i>Postage, etc.:</i>				
Postage	\$ 448.39		\$ 301.26	
Telephone and telegraph..	202.65		239.17	
Express, etc.	462.92		496.30	
	<hr/>		<hr/>	
		1,113.96		1,036.73
<i>Travel:</i>				
Hotels	\$ 459.55		\$ 312.09	
Fares	1,013.03		1,038.10	
	<hr/>		<hr/>	
		1,472.58		1,350.19
<i>Printing:</i>				
Office forms	\$ 1,620.11		\$ 10,830.46	
Bulletins	3,485.81		865.02	
Laws	19.69		.....
Tags	7,004.00		.....
	<hr/>		<hr/>	
		12,129.61		11,695.48
<i>Repairs:</i>				
Repairs equipment	\$ 7.20		\$ 17.70	
	<hr/>		<hr/>	
		7.20		17.70
<i>General:</i>				
Rent equipment	\$ 21.00		\$ 16.00	
Miscellaneous	103.79		77.37	
	<hr/>		<hr/>	
		124.79		93.37

Insurance:

Fire	\$ 75.00	\$ 3,556.25	
		\$ 75.00	\$ 3,556.25

Miscellaneous:

Refunds	\$ 15.00	\$ 86.42	
		15.00	86.42

Equipment:

Office	\$ 324.13	\$ 125.05	
		324.13	125.05
		\$ 30,496.88	\$ 32,983.12

INSPECTION:

Personal Service:

Inspectors salaries	\$ 8,825.51	\$ 9,235.83	
		\$ 8,825.51	\$ 9,235.83

Supplies and Materials:

General	\$ 96.48	\$ 129.43	
			\$ 129.43

Postage, etc.:

Postage	\$ 10.00	\$ 10.00	
Express	299.57	371.45	
		309.57	381.45

Travel:

Hotels	\$ 6,346.82	\$ 9,107.46	
Fares	4,430.04	5,211.60	
Advances	2,350.00	1,675.00	
		13,126.86	15,994.06

Printing:

Office forms	348.26	\$ 5.59	
		348.26	5.59

Equipment:

General	\$ 257.46		
		257.46	
		\$ 22,964.14	\$ 25,746.36

MARKETS:

Personal Service:

Executive	\$ 4,000.00	\$ 3,999.96	
Professional	9,150.00	4,983.31	
Clerical	6,617.35	4,675.00	
Inspectors	17,401.18	8,957.06	
Unskilled labor	9.60	13.75	
		\$ 37,178.13	\$ 22,629.08

<i>Postage, etc.:</i>			
Postage	\$ 260.00	\$ 305.00	
Telephone and telegraph..	45.35	60.30	
Express, etc.	156.99	156.86	
	<hr/>	<hr/>	
	\$ 462.34		\$ 522.16
<i>Travel:</i>			
Hotels	\$ 10.70	\$ 42.40	
Fares	27.64	82.84	
	<hr/>	<hr/>	
	38.34		125.24
<i>Printing:</i>			
Office forms	\$ 219.93	\$ 427.60	
	<hr/>	<hr/>	
	219.93		427.60
<i>Repairs:</i>			
Equipment	\$ 36.17	\$ 201.78	
	<hr/>	<hr/>	
	36.17		201.78
<i>General:</i>			
Miscellaneous	\$ 11.23		
	<hr/>	<hr/>	
	11.23		
<i>Equipment:</i>			
Laboratory	\$ 1,301.85	\$ 53.03	
	<hr/>	<hr/>	
	1,301.85		53.03
	<hr/>	<hr/>	
	\$ 25,753.73		\$ 26,322.68
ENTOMOLOGY:			
<i>Personal Service:</i>			
Executive	\$ 3,500.00	\$ 3,499.92	
Professional	10,110.00	8,359.92	
Clerical	1,508.33	1,500.00	
Unskilled labor	181.65	21.35	
	<hr/>	<hr/>	
	\$ 15,299.98		\$ 13,381.19
<i>Supplies and Materials:</i>			
Office	\$ 243.57	\$ 19.22	
Laboratory	221.67	67.05	
Library	114.71	121.69	
General	2.40	196.45	
	<hr/>	<hr/>	
	582.35		404.41
<i>Postage, etc.</i>			
Postage	\$ 127.00	\$ 223.20	
Telephone and telegraph..	79.13	77.53	
Express, etc.	16.51	11.25	
	<hr/>	<hr/>	
	222.64		311.98

Travel:

Hotels	\$ 1,727.14	\$ 1,723.94	
Fares	2,871.99	3,070.46	
		\$ 4,599.13	\$ 4,794.40

Printing:

Office forms	\$ 267.45	\$ 492.16	
Lithographing		4.00	
	267.45		496.16

Repairs:

Equipment	\$ 10.50	\$ 1.86	
	10.50		1.86

General:

Miscellaneous	\$ 108.66	\$ 28.30	
	108.66		28.30

Equipment:

Office	\$ 55.00	\$ 17.55	
	55.00		17.55
		\$ 21,145.71	\$ 19,435.85

CROP STATISTICS:

Personal Service:

Executive	\$ 1,100.00	\$ 366.64	
Clerical	14,395.90	14,161.15	
		\$ 15,495.90	\$ 14,527.79

Supplies and Materials:

Office	\$ 139.62	\$ 106.18	
Library	4.00	5.00	
General	21.12		
	164.74		111.18

Postage, etc.

Postage	\$ 55.50	\$ 23.00	
Telephone and telegraph..	56.77	69.89	
Express, etc.	13.01		
	125.28		92.89

Travel:

Hotels	\$ 161.23	\$ 109.55	
Fares	448.52	894.02	
	609.75		1,003.57

<i>Printing:</i>			
Office forms	\$ 35.95	\$ 758.05	
Bulletins	1,495.13	265.34	
Lithographing		164.47	
	<hr/>	<hr/>	
		\$ 1,531.08	\$ 1,187.86
<i>Repairs:</i>			
Equipment	\$ 4.25	\$ 2.25	
	<hr/>	<hr/>	
		4.25	2.25
<i>General:</i>			
Miscellaneous	\$ 36.04		
		36.04	
<i>Equipment:</i>			
Office		\$ 485.10	
			485.10
	<hr/>	<hr/>	<hr/>
		\$ 17,967.04	\$ 17,410.64
DRAINAGE:			
<i>Personal Service:</i>			
Professional	\$ 1,750.00	\$ 1,808.31	
	<hr/>	<hr/>	
		\$ 1,750.00	\$ 1,808.31
<i>Postage, etc.</i>			
Express, etc.	\$	\$.74	
			.74
	<hr/>	<hr/>	<hr/>
		\$ 1,750.00	\$ 1,809.05
BOTANY:			
<i>Personal Service:</i>			
Executive	\$ 3,500.00	\$ 3,499.92	
Professional	7,020.00	6,895.00	
Clerical	1,620.00	1,620.00	
Unskilled labor	11.02	9.00	
Fees	13.75		
	<hr/>	<hr/>	
		\$ 12,164.77	\$ 12,023.92
<i>Supplies and Materials:</i>			
Office	\$ 413.23	\$ 127.20	
Laboratory	129.57	72.63	
Library	45.26	55.27	
General	54.13	27.95	
	<hr/>	<hr/>	
		642.19	283.05
<i>Postage, etc.</i>			
Postage	\$ 150.00	\$ 125.00	
Telephone and telegraph..	57.95	68.96	
Express, etc.	11.24	24.58	
	<hr/>	<hr/>	
		219.19	218.54

<i>Travel:</i>			
Hotels	\$ 285.94	\$ 247.20	
Fares	731.39	843.20	
		\$ 1,017.33	\$ 1,090.40
<i>Printing:</i>			
Office forms	\$ 81.21	\$ 247.14	
		81.21	247.14
<i>Repairs:</i>			
Equipment	\$ 13.10	\$ 4.50	
		13.10	4.50
<i>General:</i>			
Laundry	\$ 2.21	\$ 6.38	
Miscellaneous	22.28	59.60	
		24.49	65.98
<i>Miscellaneous:</i>			
Refunds	\$	\$ 3.00	\$ 3.00
<i>Equipment:</i>			
Office	\$ 143.54	\$ 41.70	
		143.54	41.70
		\$ 14,305.82	\$ 13,978.23
PURE FOOD:			
<i>Personal Service:</i>			
Professional	\$ 3,300.00	\$ 3,300.00	
Clerical	518.10	.....
Inspectors	439.80	3,005.00	
		\$ 4,257.90	\$ 6,305.00
<i>Supplies and Materials:</i>			
Office	\$ 36.92	\$ 108.97	
Laboratory	99.59	36.62	
Library	22.00	64.00	
General	59.41	125.31	
		217.92	334.90
<i>Postage, etc.</i>			
Postage	\$ 60.00	\$ 40.00	
Telephone and telegraph..	50.14	71.55	
Express, etc.	3.45	10.25	
		113.59	121.80
<i>Travel:</i>			
Hotels	\$ 135.35	\$ 100.43	
Fares	118.64	116.21	
		253.99	216.64

Printing:

Office forms	\$ 27.96	\$ 200.65	
	<hr/>		
	\$ 27.96		\$ 200.65

Repairs:

Equipment	\$ 7.70	\$ 37.38	
	<hr/>		
	7.70		37.38

General:

Laundry	\$ 1.06	\$ 25.88	
Miscellaneous	10.25		
	<hr/>		
	11.31		25.88

Equipment:

Office	\$	\$ 136.50	
	<hr/>		
			136.50
	<hr/>		
	\$ 4,890.37		\$ 7,378.75

MUSEUM:

Personal Service:

Executive	\$ 3,500.00	\$ 3,499.92	
Clerical	2,400.00	2,400.00	
Unskilled labor	2,110.82	2,123.58	
	<hr/>		
	\$ 8,010.82		\$ 8,023.50

Supplies and Materials:

Office	\$ 34.16	\$ 176.71	
Cleaning	50.00		
Library	15.00	56.58	
Museum	125.30	497.62	
General	290.72	253.92	
	<hr/>		
	515.18		984.83

Postage, etc.

Telephone and telegraph..	\$ 45.64	\$ 68.95	
Express, etc.	16.20	57.14	
	<hr/>		
	61.84		126.09

Travel:

Hotels	\$ 93.35	\$ 154.54	
Fares	81.70	267.05	
	<hr/>		
	175.05		421.59

Repairs:

Equipment	\$ 28.15		
	<hr/>		
	28.15		

General:

Miscellaneous	\$ 154.42	\$ 366.79
	<u> </u>	<u> </u>
	\$ 154.42	\$ 366.79
	<u> </u>	<u> </u>
	\$ 8,945.46	\$ 9,922.80

FARM FORESTRY:

Personal Service:

Professional	\$ 3,000.00	\$ 3,000.00
Clerical	23.10	21.93
	<u> </u>	<u> </u>
	\$ 3,023.10	\$ 3,021.93

Supplies and Materials:

Office	\$ 43.59	\$ 18.80
Library		12.00
	<u> </u>	<u> </u>
	43.59	30.80

Postage, etc.:

Postage	\$ 50.00	\$ 25.00
Telephone and telegraph..	29.00	51.53
Express	2.73	
	<u> </u>	<u> </u>
	81.73	76.53

Travel:

Hotels	\$ 215.57	\$ 245.70
Fares	527.55	372.14
	<u> </u>	<u> </u>
	743.12	617.84

General:

Miscellaneous	\$ 50.23	\$ 55.00
	<u> </u>	<u> </u>
	50.23	55.00
	<u> </u>	<u> </u>
	\$ 3,941.77	\$ 3,802.10

VETERINARY:

Personal Service:

Executive	\$ 3,500.00	\$ 3,499.92
Professional	13,872.56	14,094.84
Clerical	1,500.00	1,560.00
Inspectors		2,988.16
Unskilled labor	312.50	1,369.53
Fees	50.00	100.00
	<u> </u>	<u> </u>
	\$ 19,235.06	\$ 23,612.45

<i>Postage, etc.</i>			
Postage	\$ 381.00	\$ 785.50	
Telephone and telegraph..	13.26	65.97	
Express	456.10	729.86	
	<hr/>	<hr/>	
		\$ 850.36	\$ 1,581.33
<i>Travel:</i>			
Hotels	\$ 72.45	\$ 15.50	
Fares	241.28	421.28	
	<hr/>	<hr/>	
		313.73	436.78
<i>Printing:</i>			
Office forms	\$ 8.09		
	<hr/>		
		8.09	
<i>General:</i>			
Rent equipment	\$ 6.00	\$ 8.00	
Serum	24,699.50	36,406.55	
Miscellaneous	220.69		
	<hr/>	<hr/>	
		24,926.19	36,414.55
<i>Miscellaneous:</i>			
Refunds	\$ 78.95	\$ 114.55	
	<hr/>	<hr/>	
		78.95	114.55
		<hr/>	<hr/>
		\$ 26,725.42	\$ 39,841.27
TEST FARMS:			
<i>Personal Service:</i>			
Executive		\$ 3,499.92	
Clerical	\$ 2,240.00	2,465.00	
Supervisors	11,299.92	13,324.99	
Unskilled labor	37,597.75	38,663.64	
Fees		25.00	
	<hr/>	<hr/>	
		\$ 51,137.67	\$ 57,978.55
<i>Supplies and Materials:</i>			
Office	\$ 71.83	\$ 11.50	
Library		15.00	
Botanical	11.20	77.82	
Farm and dairy.....	42,524.18	42,670.45	
Forage	114.50	1,920.07	
General	128.22	1,199.51	
	<hr/>	<hr/>	
		42,849.73	45,894.35
<i>Postage, etc.</i>			
Stamps	\$ 50.00	\$ 65.00	
Telephone and telegraph..	75.58	67.03	
Express		13.06	
	<hr/>	<hr/>	
		125.58	145.09

<i>Travel:</i>			
Hotels	\$ 209.64	\$ 394.71	
Fares	1,614.86	3,950.57	
	<hr/>	<hr/>	
		\$ 1,824.50	\$ 4,345.28
<i>Printing:</i>			
Office forms	\$ 49.38	\$ 22.80	
	<hr/>	<hr/>	
		49.38	22.80
<i>Repairs:</i>			
Equipment	\$ 10.00	\$ 5.40	
	<hr/>	<hr/>	
		10.00	5.40
<i>General:</i>			
Miscellaneous		\$ 24.15	
	<hr/>	<hr/>	
			24.15
<i>Insurance:</i>			
Fire	\$ 412.20	\$ 605.05	
	<hr/>	<hr/>	
		412.20	605.05
<i>Equipment:</i>			
Office	\$ 630.00		
Farm and dairy.....	1,261.94	\$ 2,169.58	
Livestock	620.00	50.00	
	<hr/>	<hr/>	
		2,511.94	2,219.58
<i>Lands, Buildings</i>	\$ 2,218.33	\$ 1,650.34	
	<hr/>	<hr/>	
		2,218.33	1,650.34
		<hr/>	<hr/>
		\$101,139.33	\$112,890.59
MISCELLANEOUS:			
<i>Personal Service:</i>			
Executive	\$ 3,500.00		
Inspectors		\$ 2,590.75	
Supervisors	916.63		
Unskilled labor	840.00		
	<hr/>	<hr/>	
		\$ 5,256.63	\$ 2,590.75
<i>Supplies and Materials:</i>			
Office		\$ 6.55	
General		621.74	
	<hr/>	<hr/>	
			628.29
<i>Postage, etc.</i>			
Postage		\$ 80.00	
Telephone and telegraph..		4.26	
Express		17.65	
	<hr/>	<hr/>	
			101.91

Travel:

Hotels		\$ 485.74	
Fares		1,460.35	
		<hr/>	
			\$ 1,946.09

Printing:

Office forms		\$ 549.74	
		<hr/>	
			549.74

General:

State College	\$ 60,000.00	\$ 60,000.00	
Custodial	7,200.00	7,200.00	
Miscellaneous	2,417.50	341.66	
		<hr/>	
		\$ 69,617.50	67,541.66
		<hr/>	
		\$ 74,874.13	\$ 73,358.44
		<hr/>	
Totals	\$443,147.87		\$454,003.68

GASOLINE

Personal Service:

Executive	\$ 4,250.00	\$ 4,249.92	
Professional	2,965.00	3,120.00	
Clerical	7,060.00	7,199.88	
Inspectors	7,025.00	8,050.00	
Unskilled labor	1,020.00	1,020.00	
		<hr/>	
		\$ 22,320.00	\$ 23,639.80

Supplies and Materials:

Office	\$ 256.43	\$ 138.66	
Laboratory	321.24	283.54	
Library	19.50		
		<hr/>	
		597.17	422.20

Postage, etc.

Postage	\$ 232.75	\$ 185.00	
Telephone and telegraph..	83.67	49.94	
Express	937.47	1,003.43	
		<hr/>	
		1,253.89	1,238.37

Travel:

Hotels	\$ 4,586.51	\$ 5,280.74	
Fares	5,626.11	7,299.26	
Advances	200.00		
		<hr/>	
		10,412.62	\$ 12,580.00

Printing:

Office forms	\$ 454.49	\$ 520.16	
		<hr/>	
		454.49	520.16

Repairs:

Equipment	\$ 37.90	.....
	<u> </u>		
	\$ 37.90	.....

General:

Laundry	\$ 1.21	\$ 1.03	
Miscellaneous .....	.....	80.49	
	<u> </u>	<u> </u>	
	1.21		\$ 81.52

Equipment:

Office	\$ 50.53	\$ 229.60	
Laboratory	20.00	.....
	<u> </u>	<u> </u>	
	70.53		229.60
			<u> </u>
			\$ 38,711.65

Transfer of Funds:

Dept. to Dept.....	\$ 1,500.00	.....
Dept. to State.....	500,000.00	.....
		501,500.00	.....
		<u> </u>	
		\$536,647.81	.....
Transferred to General Fund.....			\$637,571.32

OIL INSPECTION

Personal Service:

Executive	\$ 3,550.00	\$ 3,549.96	
Professional	2,820.00	2,820.00	
Clerical	2,000.00	2,079.96	
Inspectors	7,225.00	8,050.00	
Unskilled labor	736.66	780.00	
	<u> </u>	<u> </u>	
	\$ 16,331.66		\$ 17,279.92

Supplies and Materials:

Office	\$ 66.25	\$ 5.40	
Laboratory	2.00	263.42	
Library .....	.....	4.00	
General .....	.65	.....
	<u> </u>	<u> </u>	
	68.90		272.82

Postage, etc.

Postage	\$ 40.00	\$ 65.00	
Telephone and telegraph..	23.63	40.43	
Express	580.96	488.78	
	<u> </u>	<u> </u>	
	644.59		594.21

Travel:

Hotels	\$ 4,419.62		\$ 4,982.18	
Fares	5,168.10		7,490.73	
Advances	200.00		.....
	<u> </u>		<u> </u>	
		\$ 10,787.72		\$ 12,472.91

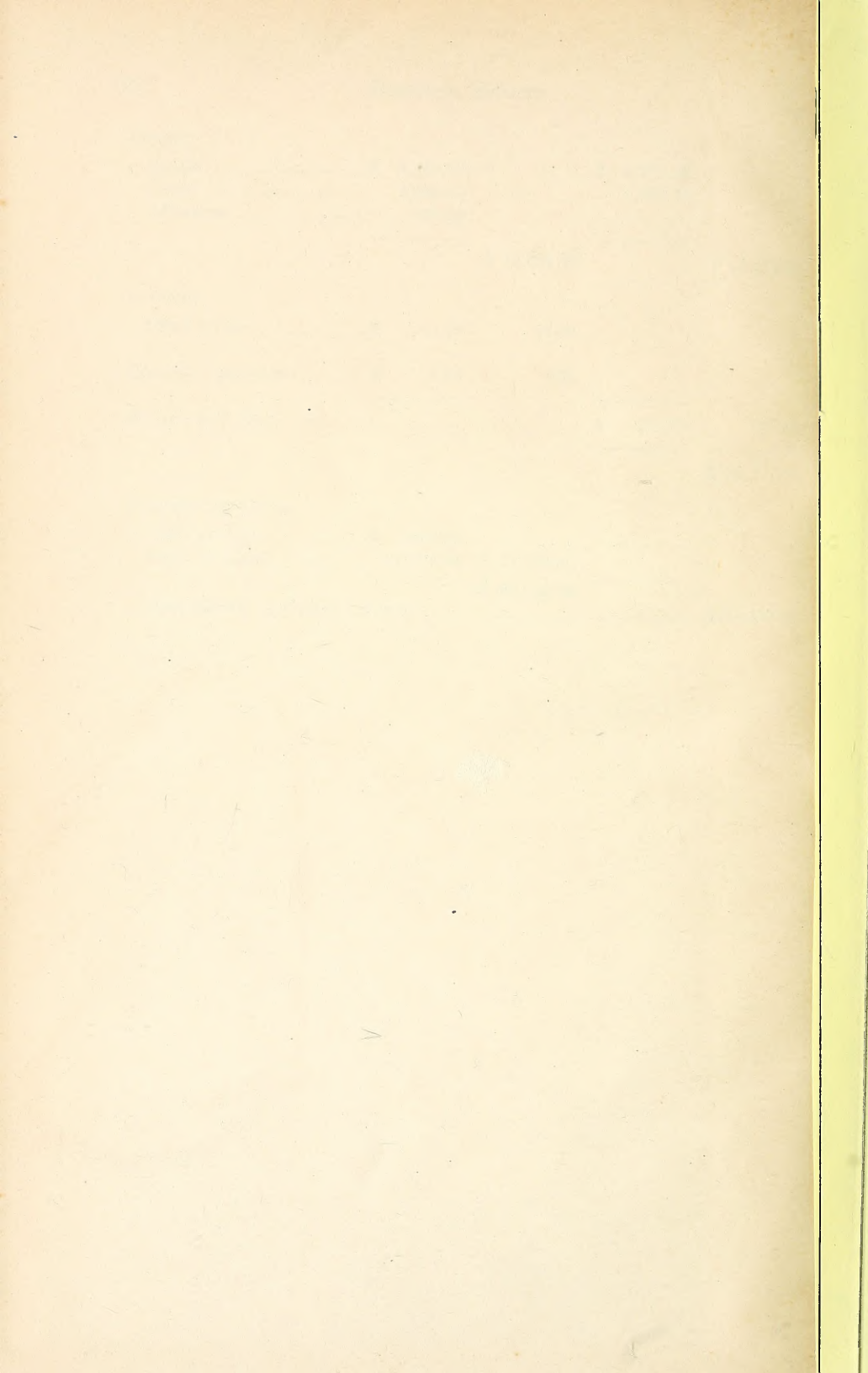
Printing:

Office forms	\$ 42.99	42.99		
<i>Repairs equipment</i>	\$ 4.50	4.50		
<i>Equipment office</i> .....	\$ .....	.....	\$ 157.20	157.20
			<u> </u>	<u> </u>
				\$ 30,777.06

Transfer of Funds:

Dept. to Dept.....	\$ 1,500.00		.....
Dept. to State.....	70,000.00	\$ 71,500.00		
	<u> </u>	<u> </u>		
		\$ 99,380.36		
Transferred to General Fund.....				\$110,118.93





North Carolina Crops, Season 1926, Revised 1927, and December Estimates for 1928

CROPS	Per cent of Crop Sold	Unit	Acreage			Yield per Acre			Production			Price per Unit (December 1)			Total Value			Value per Acre			Production Rank of State		Leading State in Production	CROPS		
			1926	1927	1928	1926	1927	1928	1926	1927	1928	1926	1927	1928	1926	1927	1928	1926	1927	1928	1926	1927	1927			
Corn, for grain	6	Bushels	2,296,000	2,251,000	2,207,000	22.00	22.80	18.50	50,512,000	51,323,000	40,830,000	.88	.91	1.03	44,450,560	46,703,030	42,054,000	19.36	20.75	19.10				Corn, for grain		
Corn, for silage	0	Tons	15,000	16,000	14,000	4.00	5.80	5.00	60,000	88,000	70,000	5.25	6.00	6.00	315,000	628,000	420,000	21.06	33.00	30.00				Corn, for silage		
Corn, for fodder		Bushels	65,000	85,000	84,000		2.10	2.00		178,000	108,000												Corn, for fodder			
Corn, all (except sweet and pop)		Bushels	2,376,000	2,352,000	2,305,000	22.00	22.80	18.50	52,272,000	53,028,000	42,642,000	.88	.91	1.03	45,990,360	48,799,690	43,921,260	19.36	20.75	19.05	18	16	Iowa	Corn, all (except sweet and pop)		
Corn, leaf fodder and tops	8	Tons	1,600,000	1,350,000	1,200,000	.47	.50	.51	752,000	675,000	612,000	30.00	28.00	28.00	22,560,000	18,000,000	17,130,000	14.10	11.00	11.28				Corn, leaf fodder and tops		
Corn, top fodder	2	Tons	360,000	376,320	380,000	.24	.26	.26	86,400	87,843	98,800	15.00	14.00	14.50	1,290,000	1,360,800	1,432,000	3.60	3.64	3.77				Corn, top fodder		
Winter Wheat, planted		Bushels	456,000	498,000	483,000																		Winter wheat, planted			
Winter Wheat, harvested	32	Bushels	447,000	483,000	444,000	14.10	10.70	11.60	6,303,000	5,168,000	5,150,000	1.43	1.45	1.52	9,015,290	7,493,600	7,828,000	20.16	15.52	17.63	21	21	Kansas	Winter wheat, harvested		
Oats, for grain	13	Bushels	310,000	273,000	191,000	22.00	21.00	22.00	6,820,000	5,733,000	4,202,000	.69	.72	.78	4,705,800	4,127,760	3,277,560	15.18	15.12	17.10	23	23	Iowa	Oats, for grain		
Barley, for grain	22	Bushels	15,000	20,000	32,000	26.00	24.00	23.00	390,000	480,000	730,000	1.00	1.10	1.20	390,000	528,000	883,200	26.00	26.40	27.60	27	26	Minnesota	Barley, for grain		
Rye, for grain	21	Bushels	104,000	94,000	89,000	13.00	12.00	11.50	1,352,000	1,128,000	1,024,000	1.25	1.35	1.45	1,690,000	1,522,800	1,484,800	16.25	16.20	16.68	8	10	North Dakota	Rye, for grain		
Buckwheat	52	Bushels	10,000	10,000	10,000	22.00	20.00	19.00	220,000	200,000	190,000	1.00	1.00	1.00	220,000	200,000	190,000	22.00	20.00	19.00	11	12	Pennsylvania	Buckwheat		
Sorghum, for sirup	53	Gallons	30,000	22,000	20,000	91.00	92.00	86.00	2,730,000	2,024,000	1,720,000	.90	.90	.90	2,457,000	1,821,600	1,548,000	81.90	82.78	77.40	5	7	Arkansas	Sorghum, for sirup		
Sorghum, for forage	3	Tons	20,000	22,000	20,000	1.25	1.40	1.50	25,000	31,000	30,000	19.00	18.00	17.50	475,000	558,000	525,000	23.75	25.20	26.25				Sorghum, for forage		
Cotton, planted			2,015,000	1,749,000	1,919,000																		Cotton, planted			
Cotton, harvested (lint)	100	Pounds	1,985,000	1,728,000	1,890,000	*292.00	238.00	212.00	*1,213,000	801,000	840,000	.115	.105	.185	69,718,000	83,948,000	78,625,000	35.11	48.58	41.60	7	7	Texas	Cotton, harvested (lint)		
Cottonseed	94	Tons	1,985,000	1,728,000	1,890,000	543.00	443.00	394.54	539,000	382,834	372,840	22.00	37.00	40.00	11,858,000	14,105,000	14,913,600	5.97	8.20	7.89	7	7		Cottonseed		
Tobacco	100	Pounds	565,000	659,000	730,000	684.00	736.60	651.00	386,460,000	485,395,000	475,055,000	26.40	22.90	20.00	102,025,440	110,310,000	94,863,000	180.58	167.38	129.95	1	1	North Carolina	Tobacco		
Potatoes, Irish (all)	52	Bushels	67,000	72,000	95,000	94.00	102.00	111.00	6,325,000	7,368,000	10,545,000	1.60	1.50	.65	10,120,000	11,052,000	6,854,250	150.40	153.00	72.15	16	17	Minnesota	Potatoes, Irish (all)		
Potatoes, Irish (commercial early)	97	Bushels	32,000	36,000	46,400	120.00	120.00	138.00	3,840,000	4,320,000	6,403,000	1.68	1.91	.54	6,451,000	8,251,200	3,458,000	201.60	229.20	74.53				Potatoes, Irish (commercial early)		
Potatoes, sweet	28	Bushels	84,000	89,000	80,000	80.00	114.00	98.00	7,560,000	10,146,000	7,840,000	1.00	.80	.85	7,560,000	8,116,800	6,664,000	90.00	91.20	83.30	3	3	Texas	Potatoes, sweet		
Sugar cane	8	Gallons	1,000	1,000	1,000	112.00	115.00	105.00	5,000	115,000	105,000	.95	1.00	.90	106,400	115,000	94,500	115.00		94.50				Sugar cane		
HAY CROPS																										
Clover	11	Tons	91,000	100,000	116,000	1.00	1.00	1.10	91,000	100,000	128,000	26.50	20.00	20.00	2,411,500	2,000,000	2,560,000	26.50	20.00	22.07	20	24	Kansas	Clover		
Timothy	20	Tons	21,000	23,000	21,000	.90	.90	1.10	19,000	21,000	23,000	24.00	21.00	20.00	456,000	441,000	473,800	21.60	18.90	22.56	33	33	West Virginia	Timothy		
Clover and timothy, mixed	21	Tons	39,000	43,000	43,000	1.00	1.15	1.10	39,000	49,450	47,300	27.00	24.00	25.00	1,053,000	1,176,000	1,182,500	27.00	27.60	27.50	32	34	West Virginia	Clover and Timothy, mixed		
Alfalfa	11	Tons	5,000	6,000	7,000	1.90	1.85	2.00	9,500	11,150	14,000	24.00	22.70	21.00	228,000	253,105	294,000	45.60	42.00	42.00	41	41	California	Alfalfa		
Annual Legumes																										
Cowpeas	17	Tons	81,000	105,000	80,000	.93	.95	.93	75,330	100,000	74,400	25.50	23.00	24.00	1,920,915	2,300,000	1,785,600	23.72	21.90	22.32				Cowpeas		
Soybeans	18	Tons	121,000	120,000	108,000	1.00	1.15	1.10	121,000	138,000	119,000	26.50	24.00	25.00	3,206,500	3,312,000	2,975,000	26.50	27.60	27.55				Soybeans		
Velvet Beans*	3	Tons	3,000	3,000	2,700	.50	.80	.80	1,500	2,400	2,160	17.50	17.00	18.00	26,250	40,800	38,880	8.75	13.60	14.40				Velvet beans*		
Vetch	2	Tons	14,000	15,000	16,000	1.00	.90	1.20	14,000	13,500	19,200	26.50	25.00	24.00	371,000	337,500	460,800	26.50	22.50	28.80				Vetch		
Peanuts	11	Tons	174,000	175,000	160,000	.70	.65	.70	121,800	113,750	112,000	14.00	15.00	15.00	1,705,200	1,706,250	1,680,000	9.80	9.75	10.50				Peanuts		
Total annual legumes	16		393,000	418,000	366,700	.85	.88	.89	333,630	367,650	326,760	21.67	20.93	21.24	7,229,805	7,696,550	6,940,280	18.42	18.41	18.93	3	2	Illinois	Total annual legumes		
Grains cut Green for Hay*																										
Wheat	0	Tons	1,000	1,000	1,000	1.05	1.00	.80	1,050	1,000	800	16.00	15.00	14.00	16,800	15,000	11,200	16.80	15.00	11.20				Wheat		
Oats	9	Tons	62,000	75,000	59,000	.80	.95	.91	49,600	71,250	53,690	19.00	18.00	18.00	942,400	1,282,500	966,420	15.20	17.10	16.38				Oats		
Barley	1	Tons	2,000	2,000	2,400	1.50	1.30	1.00	3,000	2,600	2,400	18.00	17.00	17.00	54,000	44,200	40,800	27.00	22.10	17.00				Barley		
Rye	6	Tons	29,000	34,000	33,000	.86	.88	.80	25,000	29,920	26,400	17.00	16.00	15.50	425,000	478,720	409,200	14.62	14.08	12.40				Rye		
Total grains cut green		Tons	94,000	112,000	95,000	.83	.95	1.00	78,650	100,400	95,000	18.29	17.11	15.03	1,438,509	1,820,420	1,427,620	15.18	16.25	15.03	15	13	California	Total grains cut green		
Other tame hay	22	Tons	120,000	122,000	122,000	1.00	1.00	1.00	120,000	122,000	122,000	20.55	20.00	20.00	2,466,000	2,440,000	2,440,000	20.55	20.00	20.00	26	29		Other tame hay		
All tame hay (total)	14	Tons	759,000	824,000	770,700	.90	.94	.98	681,000	777,650	756,060	20.00	20.35	20.26	13,620,000	15,827,075	15,318,200	18.00	19.21	19.88	31	31	New York	All tame hay (total)		
Old meadow hay	16	Tons	160,000	155,000	155,000	.90	1.00	1.10	144,000	155,000	170,400	16.00	16.00	16.50	2,304,000	2,480,000	2,816,000	14.40	16.00	18.18				Old meadow hay		
All wild hay	13	Tons	58,000	52,000	52,000	.90	1.10	1.15	52,000	57,200	59,800	16.00	13.40	13.40	832,000	763,800	801,320	14.40	14.74	15.41	22	22	South Dakota	All wild hay		
LEGUMES FOR SEED																										
Dry field beans	32	Bushels	2,000	2,000	2,000	4.00	5.00	4.50	8,000	10,000	9,000	4.25	4.25	5.00	31,000	42,500	45,000	17.00	21.25	22.50				Dry field beans		
Soy Beans																										
Total (equivalent solid)			295,000	304,000	304,000																			Total (equivalent solid)		
For beans, total production*	62	Bushels	174,000	184,000	196,000	12.00	17.00	15.00	2,088,000	3,128,000	2,940,000	1.75	1.50	1.65	3,654,000	4,692,000	4,851,000	21.00	25.50	24.75				Illinois	For beans, total production*	
Soy beans, acres actually harvested (equiv. solid)		Bushels	106,000	94,000	94,000	13.00	15.00	11.50	1																	

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~~DEC 4 1961~~

