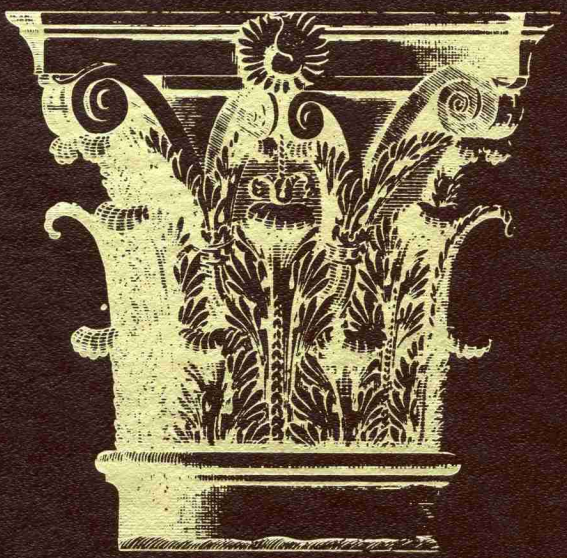
KNOWLEDGE IS POWER



William L. Carpenter
Dean W. Colvard

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A History of the School of Agriculture and Life Sciences at North Carolina State University 1877-1984

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Foreword

"History never looks like history when you are living through it. It always looks confusing and messy, and it always feels uncomfortable," John Gardner wrote in *No Easy Victories*. Certainly there were many uncertain and even uncomfortable circumstances that made for messy situations as the School of Agriculture and Life Sciences evolved. The authors, who have demonstrated an abiding commitment to unravel the past and note how it has provided the thrust for the adventurous advances in North Carolina agriculture, have recorded what the vision, courage, commitment, and energy of the school's early founders, supporters, and leaders have wrought against almost insurmountable odds.

When a need and a mission merge, amazing things can happen. Agriculture was much in need and the level of living of those on the farms had to be improved as our state entered the last quarter of the 19th century. Enhancement of educational opportunities and attainments, increasing the level of agricultural productivity, conserving and enriching the soil, reducing the human drudgery in farming, and raising the aspirations of farm families were urgent items on the agricultural agenda. Colonel Polk and the founders of North Carolina State University were keenly aware of the situation. They rallied the support of farm and political leaders to provide for a college, as had been envisioned for each state in the Morrill Act of 1862.

Finally, in 1887, the North Carolina College of Agriculture and Mechanic Arts was authorized to take as its leading objective the teaching of "such branches of learning as are related to agricultural and the mechanic arts . . ." The research unit, now known as the

North Carolina Agricultural Research Service, in 1877 began providing a research support to search out the answers to questions that would otherwise have impeded further progress. The beginning of extension demonstrations in 1907 gave rise to our Agricultural Extension Service, providing a means to deliver the knowledge gained from research to our citizens. It is fortunate that in our school the research programs of the Agricultural Research Service and the extension programs of the Agricultural Extension Service have developed in coordination with teaching programs. Research and critical inquiry contributed to the vitality of the academic effort and the production of new knowledge. Extending this knowledge to the farm, home, and community helped meet the needs of the human condition.

Agriculture was at the center of all these beginnings. It continues as a major thrust in today's economy and livelihood. Throughout the pages of this history its authors have recorded the growth and advancement of the school concomitant with the advance of agriculture in the state. The industry and the institution have grown in parallel, each providing a stimulus to the other — a need and a mission. The support of the people has prompted the legislature to provide for the essential buildings, laboratories, and personnel to develop and deliver the technology needed for agricultural and rural advancement. Close interaction of scientist and producer has provided an understanding of the problems and stimulated the search for their solution in fulfillment of the school's mission of service. As a result North Carolina now has one of the leading schools of agriculture and life sciences in the nation, and our state is also one of the leading agricultural states.

The authors of this history have viewed it from a unique vantage point. Collectively they have been associated with the school from 1938 to 1986. They have personally known most of the key personalities in this story—from the pioneers to the younger members of the faculty who will be producing the future history of this dynamic institution.

Dr. William L. Carpenter is a graduate of North Carolina State University and for over 30 years was a member of the Department of Agricultural Communications; for 21 of those years he was head of the department. He has observed and reported to the public many of the happenings that have been etched into the historical record. His "getting the facts out" to the public has had a major impact on the acceptance of the knowledge generated by this school and other land-grant institutions.

Dr. Dean W. Colvard, who was head of the Department of Animal Science and later dean of the School of Agriculture, also has been directly involved in shaping the history and contributions of the school. His leadership in promoting the "two-armed farming," earlier advocated by Dr. Clarence Poe, has now borne fruit. A balanced agriculture in which crops and livestock contribute nearly equally to total cash receipts has been realized. In addition to his direct involvement, Dr. Colvard has been able to view the contributions of the school from his subsequent positions as president of Mississippi State University and chancellor of the University of North Carolina at Charlotte.

The authors had to bring together information from a wide range of sources. Previous compilations—by I. O. Schaub in the 1950s, R. Y. Winters in the 1960s, and departmental and divisional histories more recently—have made valuable contributions to these efforts. These writings provided very valuable perspectives on how the broad impact of the school was realized. Thanks to each who made a contribution to these efforts.

We are indebted to Dr. Carpenter and Dr. Colvard for their personal commitment in preparing this valuable record of the history of the School of Agriculture and Life Sciences. They have sensed that knowledge in action has been a most important contributor to agricultural productivity and progress. They have forcefully shown further that knowing how is not sufficient. The "know-how" must be transferred to the minds and eventually the actions of others.

History will still remain "messy and uncomfortable" when it is being made, even down on the farm; yet, the experiences of the school and the industry in sharing their problems and solutions strengthens our faith that history's unfolding future can be faced with confidence. Certainly this history reveals that even the fondest dreams of our institution's founders have been more than realized as the school has developed, supported, and drawn support from a growing and sophisticated agriculture.

J. E. Legates
Dean of Agriculture, 1971-1986

Preface and Acknowledgments

This volume presents in historical perspective the story of North Carolina State University's School of Agriculture and Life Sciences. It is a story of service by highly skilled and dedicated people; it is a story of an educational institution constantly guided by the belief that verified information effectively used is indeed power.

Social philosophers early reflected on this idea by advocating the usefulness of knowledge in human endeavors. In the late sixteenth century, Francis Bacon, regarded by many as the father of scientific methods of inquiry, was more specific. Bacon said, "Knowledge is power." Commenting on Bacon's statement, T. W. Palmer said, ". . . but new knowledge is not power, it is only possibility, action is power. Its highest manifestation is when it is directed by knowledge." Learning simply by the trial and error of individuals has proved to be inadequate for the development of great societies. The provocative English statesman and writer, Disraeli, reminded us in 1866: "Individuals may form communities but it is institutions alone that can create a nation."

Growing recognition of the centrality of the foregoing observations provides a philosophical base on which was established, in 1887, a new type of college in North Carolina, currently known as North Carolina State University. From the beginning this unique educational institution viewed knowledge as a catalyst in human achievements and hence has focused, for nearly 100 years, on the discovery of knowledge and its wide application to human problems. Over time, the concept of a program including research to produce new knowledge, on-campus instruction to train professionals, and extension of knowledge to those off-campus has gained wide recogni-

tion as the foremost educational advancement in the history of American higher education.

It is believed that a wide-ranging audience may find this historical account of a major "people's college" to be of interest. Those with historical inclinations should identify with that important part of North Carolina's development; the masses of people involved directly or indirectly in the state's highly heterogenous agricultural industry may find satisfaction in learning more about the sources of messages they have received and found useful over time. Those professionally associated with the university—researchers, instructors, extension personnel, and administrators—will discover themselves in the scenario. Public policy makers, especially legislators, and leaders in other countries interested in adapting the land-grant college idea to their educational system as a means of accelerating agricultural production and rural development also may find useful information on these pages.

The authors of this volume, with assistance from many well-informed individuals, collected and synthesized information from a wide range of primary and secondary sources (see "A Note on Information Sources" following Chapter 19). Realizing that the broad and diverse nature of the school's activities, spanning more than 100 years, will result in a story whose parts will not be equally interesting to all readers, several techniques are used to make the information as readily accessible to the reader as possible.

First, the book has been divided into four main parts or divisions. Part 1, "The Beginnings," covers the period from establishment of the research program in 1877 through the creation of a teaching program 10 years later and through the implementation of the extension program before World War I.

Part 2, "Growing Up," represents a period of steady development in all areas of endeavor, considering limitation of funding and other handicaps. This period begins and ends with world wars—periods in U.S. history when the land-grant agricultural schools played significant roles.

Part 3, "Dynamic Development," begins with the late 1930s. A combination of new funding that made possible a significant increase in personnel and programs was really the beginning of the school's most productive periods. By combining this new support with recruitment of highly trained people, things began to happen with an increased tempo. This period extends through the early 1980s.

Part 4, "Epilog," is a summary of the century of service and a brief statement on the agricultural business in the mid-1980s. The transition from reliance on natural resources and muscle power to an almost complete dependence on science and its application makes the educational establishments more central than ever but falls short of solving agriculture's economic problems.

A second technique employed is the liberal use of subheads, which are capsuled at the beginning of each chapter. Although no page numbers are given in these capsules, the reader can select a section of particular interest from this paragraph and find it from its relative position within the chapter.

The authors are indebted to many people for their contributions to this book.

Dean J.E. Legates was responsible for the idea of writing the history of the School of Agriculture and Life Sciences. He authorized the plans by which the coauthors could devote the time required to do the research and writing. He also arranged with the Agricultural Foundation to provide the necessary underwriting.

At the suggestion of Dean Legates, the various departments and divisions prepared histories of their respective programs. Those have been of great value.

Sixty-four longtime leaders subjected themselves to tape-recorded interviews. Not a single person who was asked to participate declined to do so. Many who had retired or held positions at distant locations made special efforts to cooperate. It has not been feasible to quote directly from each document or interview. However, all of the information collected has provided breadth of understanding and has been preserved for future use.

The advisory committee appointed by Dean Legates has been most helpful. The members have generously critiqued a draft of each chapter, and their suggestions have been invaluable. Committee members were Fred D. Cochran, G. W. Giles, E. W. Glazener, Paul H. Harvey, J. Paul Leagans, Roy L. Lovvorn, Selz C. Mayo (deceased), and Elbert Reid.

Appreciation is expressed to personnel in the North Carolina State University archives, particularly Maurice Toler and Iona Neely. Special thanks are due to Marie Moore for her careful and thoughtful analysis and editing of the manuscript; to Thomas W. Knecht, who gave the manuscript its final editing and served as production manager; to Karl Larson who provided graphic consultation, including

cover and interior design; to Matt Carpenter, who provided proofreading services and offered useful criticism of the manuscript; and to Ann Dellinger for her contribution to developing the index.

Principal stenographic assistance was provided by Geraldine Richardson, Cynthia Dedrick, and Karen Odom in Raleigh and Moretha Hinson, Shirley Bear, and Linda Labat at The University of North Carolina at Charlotte.

The authors are grateful to all of these and many others.

William L. Carpenter
Dean W. Colvard
September, 1986

I

THE BEGINNINGS

SEVERAL FORCES CAME TOGETHER in the late 1800s in North Carolina that resulted in the dual creation of the N.C. Agricultural Experiment Station and what came to be known as North Carolina State University.

One was the plight and grievances of the farmer. These concerns included low prices for farm products, high interest rates, debt burdens in the form of crop liens or farm mortgages, discriminatory railroad rates, and other economic and political activities that seemed to favor nonfarm interests. As the fertilizer manufacturing industry developed, farmers felt that some manufacturers were offering them worthless products and others were overcharging.

A second force was a group of state leaders who felt that one of North Carolina's greatest needs was technical training that could best be offered by a state-supported industrial school.

A third force was a group of farm leaders who believed that a possible solution to farm problems was a better educated farm constituency. They fought for a viable land grant college as had been envisioned and provided for by the federal Morrill Act of 1862.

When these several forces finally came together, the North Carolina General Assembly created the North Carolina Department of Agriculture and the North Carolina Agricultural Experiment Station in 1877 and the North Carolina College of Agricultural and Mechanic Arts in 1887.

The first assignment of the new research organization was to ferret out fraud in the manufacture and sale of feed and fertilizer. A second assignment, pursued from the beginning, was to provide some

general information that would add to the farmer's knowledge of the plants and animals with which he worked.

A third—and the most important—assignment of the new experiment station was to create new knowledge of agriculture and to expand the technical base upon which farmers could operate. By 1881, as indicated in Chapter 2, simple experiments were being carried out with cooperating farmers, but little of what could be called research was done until an experimental farm was acquired in 1885. Early experiments were with field crops, undoubtedly reflecting the prominence of crops in the state's agriculture. But as the station expanded and additional expertise became available, attention turned to horticultural crops, livestock, and poultry. Until the end of the century, the research expanded in quantity and level of sophistication although it was still very primitive by later research standards.

The young college, which opened its doors in the fall of 1889, began with high promise and great ambition (Chapter 3). However, limited funding and limited student interest left little to show in the way of educated agriculturists by the end of the first decade. In North Carolina, however, there appears to have been more support for agricultural education from the farm citizenry than was true in many other states.

Politics interfered with both the research and educational processes, particularly from about 1897 through 1901 when four directors guided the research during the five-year period (Chapter 4).

Rejuvenation of programs came after the turn of the century when the impact of politics lessened and both financial support and interest in agricultural education increased. This renewal, which took place between 1901 and World War I, was made possible by the services of two energetic and dedicated directors of the research program and several outstanding teachers and researchers who served for varying periods of time (Chapters 5 and 6).

Increased research results needed to be transmitted to the farmers, who often showed little interest in better ways of doing things. Some early efforts at off-campus education indicated that a special breed of educator was needed to carry technical information across the state. Again, with joint federal and state funding, the Agricultural Extension Service was created in 1914, with specialists and county agents (Chapter 7).

This research and education institution, with a lot of growing pains behind it but solid proof that it could deliver, was available to support the expanded farming effort called for during World War I.

1

Farmers Help Create Two New Institutions

Land. People. Knowledge. The Morrill Act. Farmers to the forefront. Three leaders. The station is created. The college is born. The farmers' contribution.

THROUGHOUT THE HISTORY OF AMERICA—from the establishment of the first permanent English settlement at Jamestown in 1607—there has been a fascinating and meaningful interaction of *resources, people,* and *knowledge.* This has been the formula for power and progress.

At first there were few people with limited knowledge who were overwhelmed by the vastness and variety of the resources in this newly-discovered nation. Associated with the abundance of land was a plentiful supply of trees, minerals, fruits, rainfall, rivers, and wildlife.

Population growth by natural birth and immigration was far from adequate to occupy and cultivate the land which had been discovered. Tools were crude or nonexistent. The solution was to augment the human energy by importing slaves from various parts of the world. The human energy factor was gradually supplemented by the use of the muscle power of beasts. People, oxen, and horses were the principal sources of energy during the colonial period. Mules played an important role following the Civil War.

The knowledge factor in the formula for progress developed slowly. The early settlers brought little in the way of new technology

with them. The philosophers of that time had given expression to the usefulness of knowledge but educational opportunities were limited.

Land

In the early history of the United States land and slaves were the chief forms of wealth. Land not only provided the source of food and shelter but was also a medium of exchange. The nation had more land than money. Land was so plentiful and the desire so great to get the colony settled that some very large tracts were granted to individuals and companies. Following the war of 1812, each enlisted man between the ages of 18 and 45 was rewarded with a bounty of 160 acres of land. In 1850 the Illinois Central Railroad was granted 2,595,000 acres of land to subsidize its construction. The New York Central Railroad was granted 19 million acres from 1852 to 1856. Congress donated 7 million acres of wetland to the four prairie states to facilitate their drainage. Other institutional developments were supported by the government with grants of land.

Throughout the colonial period in North Carolina, land bore the major burden of production. Historian C. O. Cathey pointed out that "clearing ground therefore became an annual chore for the average farmer or planter in colonial North Carolina. The usual implements were the mattock, ax and fire."[1] The tobacco crop was a great contributor to this pattern. This crop performed best on new ground.

Although original grants of land to some individuals involved large acreages, North Carolina developed with relatively small holdings. In 1783, near the end of the colonial period, average size landholdings in North Carolina were: from 1 to 100 acres, one-fourth; from 101 to 200 acres, one-fourth; from 201 to 400 acres, one-fourth, and 400 acres or more, a little more than one-fourth. The average acreage per farm in 1860 was 316. Distribution of land among farmers has varied widely. The number of farms in the state was 56,963 in 1850; 225,000 in 1900; 300,000 (a peak) in 1930, and 79,000 in 1983. Following the Civil War there was a rapid increase in the number of farms and a reduction in average size, reflecting a breakup of the plantation system. With slave labor no longer available, patterns of sharecropping, tenancy, and family operations followed. With the expansion in technology after 1930, drawing many people away from

the land and requiring fewer people to perform jobs on the farm, the number of farms reverted by 1983 to approximately the number existing in 1860.

At first North Carolina farmers, like other colonists, experimented with a variety of European crops. Olives, silk, French grapes, and a few others failed. The major crops of the colony were corn, tobacco, peas, beans, wheat, and rice. Tobacco became the leading money crop. Methods of farming were generally backward and unscientific. One of the greatest handicaps to good farming was the inadequacy of tools and implements. Skilled workers were few.

People

Practically all of the people of North Carolina were involved in farming during colonial and antebellum days. Prior to the Civil War more than one-fourth of the people were slaves. The work of farming was performed with assistance from oxen as beasts of burden and horses for riding and some augmentation to the oxen for draft purposes. North Carolina had a low ranking among the other colonies in educational attainments for many years following the revolution. Cathey quoted William R. Davie, who wrote in 1805: "The friends of science in other states regard the people of North Carolina as a sort of semi-barbarians, among whom neither learning, virtue nor men of science possess any estimation."[2] It was 15 years after this statement that Archibald DeBow Murphey wrote to Thomas Ruffin:

> I know ten times as much of the Topography of this Circuit as the men who have lived here fifty years. I had no idea we had such a poor, ignorant, squalid Population, as I have seen. . . In the towns are found decent and well informed Men in Matters of Business, men who look well and live well. But the mass of the Common people in the country are lazy, sickly, poor, dirty and ignorant.[3]

After the American Revolution slaves were used extensively in the cultivation of crops. The tobacco crop was not as well suited to slave labor as rice and cotton and thus owner and tenant operations were encouraged. The largest slave owners were in the rice-producing areas of South Carolina and Georgia. Only a small proportion of North Carolina was well suited to rice production. England did not encourage the colonies to produce cotton for export, in competition with other cotton-growing colonies. The principal inputs were land

and human labor. With the discovery of the cotton gin in 1793 there followed some other significant discoveries, such as the use of steam power, which continued to increase the productivity of people and relieve some of the drudgery. Slaves were used extensively in the production of cotton. The freeing of 350,000 slaves in an economy based primarily on land and people wrought a great change in the pattern of farming. Educational opportunities for the people improved very slowly.

Following the Civil War, mules came into use as beasts of burden. The numbers of mules in North Carolina grew to almost 300,000 in 1924 and held about constant for 20 years. The mule economy required the production of large acreages of corn to feed the work animals. Much human labor was required to produce the corn. With the coming of gasoline tractors, the mule population declined gradually for about 10 years, from 1945 to 1954, and then declined rapidly until they were no longer recorded in the census. The mule was well suited to the pattern of farm tenancy and sharecropping that followed the emancipation of slaves. In 1880 more than one-third of the farms were operated by tenants, predominately sharecroppers. Although there were many black tenants, they were outnumbered by whites. With all of these changes the burden of production continued to rely heavily upon the physical inputs of people, largely their brawn rather than brains.

Such steps as had been taken to provide educational opportunity for the masses of people prior to the Civil War were completely frustrated by the economic bankruptcy and devastation which followed that war. The Public School Law of 1869 provided separate schools for whites and blacks with required cooperation of counties and townships. From that time there was a gradual improvement in the opportunities for all the people to improve their minds. For their basic livelihood they would continue to rely largely upon their muscles. This condition was destined to change as leadership emerged to promote education, technology, and the infusion of capital into farming.

Knowledge

In colonial times higher education was available in the United States only in a few institutions such as Harvard, Yale, and William and Mary. They were controlled privately. After the Revolutionary War state universities came into being under public control. During the

first half of the nineteenth century the institutions that were publicly controlled were influenced by the same great European universities that had helped to shape those under private control. University education tended to serve the professions, such as law and medicine, government leaders, and the leisure classes. The public universities made only slight adaptations to the needs of pioneer people. No great enthusiasm could be generated to serve people in agriculture and the mechanic arts. By the middle of the nineteenth century the agricultural societies of several states were beginning to be heard in their pleas for institutions designed to serve their needs.

In discussing the decreasing margins of profit from cotton and tobacco, Dennison Olmstead wrote in *American Farmer* in 1824 that what was needed was not a new crop but that it become "an object of thought" so that more pains and intelligence would be used in cultivating old crops.

In North Carolina agricultural research and education early received lip service but little action. In his message to the legislature in 1823, Governor Gabriel Holmes recommended the purchase of a farm near the University of North Carolina "to be put under the care of a scientific and practical farmer" on which experiments might be

Farming was primitive and labor intensive in the 1800s, even on the best of farms.

conducted, so the students might "see and learn the usefulness and beauty of husbandry." John M. Morehead made a similar recommendation in 1844.

A professorship of chemistry and the philosophy of medicine, agriculture, and the mechanic arts was established by the University of North Carolina in 1795, but little teaching of those subjects was done.[4] In 1854 the university employed a professor of agricultural chemistry.

In the 1830s Wake Forest Institute (later Wake Forest College and then Wake Forest University) and Davidson Seminary (later Davidson College) were both chartered as manual-labor schools. Agricultural instruction, both theoretical and practical, was emphasized in these and other manual-labor schools, but the manual-labor idea was abandoned after a few years because of practical difficulties.[5]

John M. Morehead also advocated in 1844 the establishment of an agricultural professorship at the University of North Carolina, or the creation of a school where agriculture might be taught as a science. The North Carolina Agricultural Society sent a memorial to the state legislature in 1852 which said, in part, that agriculture in North Carolina was "in a languishing condition, too much neglected by men of science." Discussions such as these reflected a growing opinion that agriculture was in need of an injection of knowledge if its condition was to improve. But for all practical purposes the only agricultural training available to North Carolina farm boys in the 1860s was what they could pick up from family members and friends.

The Morrill Act

During the 1850s the need for increased agricultural education was debated in Congress. In 1859 the Morrill Act creating such institutions was passed. It was vetoed by President Buchanan on the grounds that it was in violation of the traditional policy of the government. On July 2, 1862, the Morrill Act was passed again and was signed by President Lincoln. The purpose of the Morrill Act as stated in the act was to provide ". . . the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical

education of the industrial classes in the several pursuits and professions in life." The United States still had more land than money. Federal support was provided to each state by granting 30,000 acres of public land, or the equivalent in scrip, for each representative and senator. The states were expected to contribute to the operation of these new colleges.[6]

In 1866 the state of North Carolina accepted the provisions of the Morrill Act and 270,000 acres in scrip. In 1867 the "land grant" scrip was transferred to the University of North Carolina at Chapel Hill to be used in accordance with the terms of the grant. The scrip was sold for $125,000 and invested in North Carolina State bonds which yielded $7,500 per year. Income from the fund helped the University to remain open through the 1866-67 academic year.

Because of politics, lack of funds, and generally unsettled conditions, the university was closed from 1870 to 1875. When it reopened it was organized into six colleges, including a College of Agriculture and a College of Engineering and the Mechanic Arts.

John Kimberly, who had previously taught at the University, was employed as professor of agriculture. Although Professor Kimberly had requested $2,800 for his department, the sum allotted during 1876 was only $200—much less than the appropriations made for other departments. Soon individuals and organizations were saying that the university did not really believe in practical education for the masses and that the officials were barely meeting the requirements of the Land Grant Act.

In 1876 the State Grange (a farmers' organization) made inquiry of President Kemp P. Battle concerning the university's use of the income from the land scrip fund. Battle made a detailed reply that served to quiet public criticism of the university's policy for almost a decade. Among other things, he noted the objectives of the Morrill Act and called attention to the catalog, which showed that studies relating to agriculture and mechanic arts were receiving special consideration:

> For example, Chemistry, including the composition and analysis of soils, manure, etc.; Botany, Zoology, including domestic animals and their foes; Geology, including character of soils; Mineralogy, especially the minerals of our state; Mechanics, including agricultural implements; Physics, light and heat as influencing plant life; also Meteorology; Engineering, including road making, land surveying, etc.; Mathematics, necessary for Mechanics, Engineering, etc. All this in addition to the English Language and Literature, Political Economy, Constitu-

> tional and International Law, and the Greek and Latin and the German and French languages needed to make our students intelligent citizens.[7]

Whether or not the farmers were satisfied with this explanation, another issue in the mid-1870s was troubling them even more—fraud in the sale of fertilizer.

Farmers to the Forefront

Some 30 years earlier, scientists in Europe had developed the theory of mineral elements as a source of plant food, and this in turn resulted in the manufacture of commercial fertilizers. As processes were developed, the knowledge was brought to the United States, and fertilizer factories were built rapidly, particularly around Baltimore, Maryland. The response in increased crop yields from the application of fertilizers to soils was so marked that farmers in North Carolina adopted the practice as fast as their limited funds or credit would permit.

However, with the good also came evil. In this instance it was not only extravagant claims but genuine fraud in the manufacture and sale of commercial fertilizers. Dr. Albert R. Ledoux, the first director of the North Carolina Agricultural Experiment Station, described the situation as follows:

> In 1876, before the law providing for fertilizer control was passed, there were 108 brands of fertilizers sold in North Carolina. Some of them were miserable stuff, others down-right swindles. One, especially, with a large sale, was found to contain 60 percent sand, and others so poor that they were condemned in Georgia, were re-shipped and sold in North Carolina.[8]

With such situations and problems confronting them, the farmers organized themselves into associations and thus spoke with more power than was possible as individuals. The North Carolina Agricultural Society had been in existence for some 25 years, but its program was not so broad as to serve all the needs of the farmers. Thus the Grange, Patrons of Husbandry developed rapidly in the early part of the 1870s. By 1875 there were 559 local Granges with a membership of 17,000. I. O. Schaub wrote that the leaders were well-known, outstanding citizens, many of whom had been officers in the Confederate Army. He said the Grange was a potent organization politically and otherwise and that it largely shaped legislation, particularly as it applied to agriculture.[9] Lefler and Newsome, however, rated the organization differently:

> The Granger Movement in the early 1870's originating outside the state as a non-political organization to improve the social, educational and economic conditions of rural life, did not gain great strength in North Carolina, which was still engrossed in the problems of reconstruction. It reached the peak of its strength in the state in 1875-1876 with over 500 Granges and 15,000 members. Though relatively weak in North Carolina, it directed the attention of farmers to their deplorable condition and pointed the way to a more attractive rural life. . . .[10]

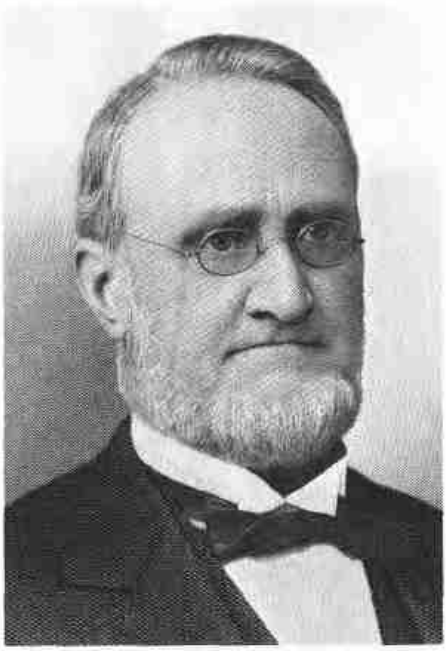
Whatever the quality of its leadership, farming was very important in North Carolina. Of the residents over 10 years old in 1870, 269,338 were engaged in farming, while only 82,061 were involved in other pursuits. Annual agricultural production amounted to $57,845,940, manufactures to only $19,021,327.

In 1875 a constitutional convention met to amend the state constitution. Prior to that time leaders of the Grange, the State Agricultural Society, and others advocated making mandatory in the constitution the establishment of a state department of agriculture. This provision was incorporated into a bill and passed with little opposition. Farmers then had a firm foundation on which to build. During the next two years many suggestions for a department of agriculture were offered by individuals and organizations.

Three Leaders

Leonidas L. Polk of Anson County was editor of a newspaper, *The Ansonian*. He was a member of the Constitutional Convention of 1875 that amended the state constitution to require the establishment of a department of agriculture. Polk vigorously advocated immigration, the development of industries, a live-at-home program for farmers, the establishment of a museum of the state's resources, and transfer of the office of state geologist and the Geological Museum to a department of agriculture. He held all the high offices of the Grange during these years and to a large degree guided the Grange action in relation to establishing a department of agriculture. Through his paper and speeches all over North Carolina he wielded an outstanding influence.

President Kemp P. Battle was a lawyer by profession prior to joining the faculty of the University of North Carolina but was immensely interested in agricultural improvement. He was president of the North Carolina Agricultural Society, which for many years operated the State Fair. It was largely through his efforts that the



Kemp P. Battle

Col. L. L. Polk

General Assembly of 1875 enacted legislation directing the state treasurer to issue a Perpetual Certificate of Indebtedness for $125,000 at 6 percent interest to replace the land scrip funds of the university which had been lost.

In 1876 Battle (and the state geologist, W. C. Kerr) visited several "agricultural colleges" and in Connecticut conferred with Dr. W. O. Atwater, the director of the first agricultural experiment station in the United States. He returned with enthusiasm for the work he had observed and strongly advocated the establishment of a similar station in North Carolina.

Battle may well be called the father of the experiment station, for it was largely his vision and influence that resulted in the passage of the necessary laws and determined the character of the work undertaken.[11]

Rhett Y. Winters, later director of the station, gave considerable credit to W. C. Kerr.[12] During the 1870s Kerr had the dual role of state geologist and professor of geology at the University of North Carolina. He spoke at agricultural organization meetings and at the special meetings called to promote the department of agriculture. In 1876 Kerr estimated that not less than $2 million was spent annually for fertilizers by North Carolina farmers and that at least half this amount was lost through fraud.

From 1875 to 1877, the Grange continued active in promoting the establishment of a department of agriculture. There were meetings with large attendance in various sections of the state where resolutions were passed calling on the General Assembly of 1877 to carry out the mandate of the Constitutional Convention of 1875.

The Station Is Created

President Battle took the lead in calling a conference of the leaders of various groups interested in the general movement. The result of this conference, held in Raleigh on January 2, 1877, was a united front before the legislative body. There was a compromise of viewpoints but primarily on minor details. A bill, "An Act to Establish a Department of Agriculture, Immigration, and Statistics, and for the Encouragement of Sheep Husbandry," was introduced in the General Assembly by Senator W. C. Troy of Cumberland County. After being passed by the Senate on February 27, it was brought up as a special order of business in the House on March 6, 1877.

The Raleigh *Observer*, on March 11, 1877, carried the following report:

> THE DEPARTMENT OF AGRICULTURE. — The bill to establish this department has become law. This we believe to be the only instance in the history of the state in which the farmers, as a body, have come before the legislature for aid and protection, and to the credit of the legislature it may be said that they promptly gave them all that was asked for, though not exactly in the shape proposed by them. The bill gives them a Department of Agriculture, Immigration and Statistics, and an experimental fertilizer station to be established at Chapel Hill. The appropriations to carry out these objects will, we think, after this year, be both ample and liberal.

To direct the new activities, the law established a Board of Agriculture consisting of the governor as ex-officio chairman, the state geologist, the master of the State Grange, the president of the State Agricultural Society, the president of the University of North Carolina, and two agriculturists (appointed by the board to give the different sections of the state near-equal representation). The board elected James R. Thigpen of Edgecombe and Jonathan Evans of Cumberland as the agriculturist members and then appointed L. L. Polk as the first commissioner of agriculture.

The act directed the Department of Agriculture to establish an agricultural experiment and fertilizer control station in connection

with the chemical laboratory of the University of North Carolina at Chapel Hill. To handle the new research activity, the university Board of Trustees, with the approval of the Department of Agriculture, would employ an analyst skilled in agricultural chemistry.

Two paragraphs in the law spelled out two distinct lines of work:

> It shall be the duty of said chemist to analyze such fertilizers and products as may be required by the Department of Agriculture, and to aid so far as practicable in suppressing fraud in the sale of commercial fertilizers.
>
> He shall also, under the direction of said Department, carry on experiments on the nutrition and growth of plants, with a view to ascertain what fertilizers are best suited to the various crops of this State; and whether other crops may not be advantageously grown on its soils, and shall carry on such other investigations as the said Department may direct.

The two main objectives prescribed by the law—to analyze fertilizers and products, and to carry on experiments—were comprehensive and basically authorized almost any type of research the department might care to undertake. From available records it appears that the Grange and farm leaders were most concerned with the first objective (analysis), while President Battle, and perhaps some of his scientific friends, were more interested in the long-term approach as authorized in the second (to carry out experiments).

Thus was established in 1877 the North Carolina Agricultural Experiment Station—the second in the United States. (The Connecticut station had been established in 1875.)

The College Is Born

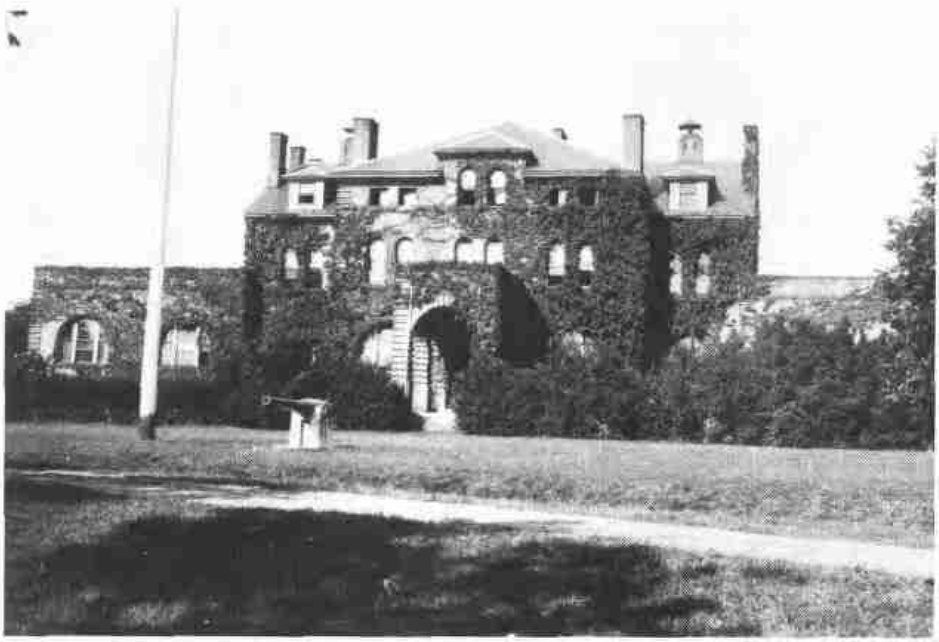
President Battle and the trustees at the University of North Carolina had probably made an honest effort to carry out the intent of the Morrill Act. But during the period under consideration, from 1875 to 1887, few students were enrolled in the practical course at Chapel Hill, and, lacking adequate buildings and equipment, the university could not well offer both theoretical and practical instruction on the slender appropriation of $7,500 a year. Despite the able defense of the university by the president and its friends, the notion persisted that to receive the education they needed the farmers and mechanics must have a school of their own.

There was some doubt as to just what form this separate school should take. As early as 1872 L. L. Polk had suggested "an agricul-

tural college somewhere in North Carolina with its branch schools in every county as feeders to the main school." He continuously called, in his columns in the *Progressive Farmer* and in his speeches, for an agricultural college.[13]

At this same time, the Watauga Club, made up of able young men in Raleigh who realized the value of a diversified economic system, sought a school of industrial and mechanic arts.[14] By the spring of 1886 plans were under way to develop such a school on land that had been secured for that purpose in Raleigh. Events of the next few months changed those plans.

In 1886 a legislature composed largely of farmers was elected. Many of these men were Polk's friends. With their backing and the support of the Board of Agriculture, he called for a meeting of farmers to be held in Raleigh on January 18, 1887, to consider the conditions and needs of the farmers of the state. The group passed a resolution asking that the land scrip fund be taken from the university and applied to the teaching of agriculture in a new institution. On the same date the Board of Aldermen of Raleigh suggested that the proposed industrial and agricultural schools should be combined. They stated that they would provide some funds to the new college if it were located in Raleigh.



Holladay Hall, called Main Building when it was constructed in 1889, served the office, classroom, library, dining hall, and dormitory functions of the new college for several years.

Backed by these resolutions, suggestions, and promises and realizing that the time was ripe to force the issue, Colonel Polk called for an official mass meeting of all organized farmers' clubs of the state to be held in Raleigh on January 26, 1887. Despite the season, expense, and the limited facilities for publicizing the meeting, more than 300 farmers representing some 40 counties met in Metropolitan Hall at noon on the appointed date. According to Walter Hines Page, writing in the *State Chronicle*, it was probably the largest gathering of farmers ever held in North Carolina up to that time, and their two days of political activity reflected credit on them.

The convention, after listening to addresses by Polk, former Governor Thomas J. Jarvis, and other notables, proceeded to express its views in no uncertain manner on the issues presented. The body adopted resolutions demanding that a college of agriculture and mechanic arts be established in accordance with the Morrill Act; that the income from the land scrip fund be paid to the college; that a sufficient amount from the state treasury be appropriated, together with convict labor, to establish, equip, and maintain said college; that the surplus funds of the Department of Agriculture be used in this connection; and that if the state treasury could not aid said college for want of funds, that the General Assembly enact a law imposing a tax of one dollar on every dog in the state for the benefit of the treasury and the college.

The dog tax resolution was passed with great unanimity, it being estimated that it would bring in a revenue of at least $300,000 a year. The farmers further resolved that the transfer of the land scrip fund should not work a diminution of the appropriations to the university; and that the funds and property of the industrial school, including the donations of the city of Raleigh, should be turned over to the proposed college.

A committee appointed at the farmers' meeting lost no time in presenting the resolutions to members of the General Assembly, which was then in session. Experiment Station Director C. W. Dabney, who was also a member of the Watauga Club, wrote a bill (with the aid of Augustus Leazar, a member of the House of Representatives and of the Board of Agriculture).

The passage in Congress at this time of the Hatch Act appropriating $15,000 to support the experiment station to be conducted in connection with the college undoubtedly helped to carry the bill through the legislature.

The Farmers' Contribution

Thus did The North Carolina College of Agriculture and Mechanic Arts come into being on March 7, 1887, not as an industrial school but as a land-grant college. Hundreds had worked for one cause or the other, but the chief credit for success belonged to Leonidas L. Polk. He had led the movement from the beginning for an agricultural as well as an industrial school and had insisted that a separate institution be established which would use the land scrip fund in accordance with the Morrill Act.

In his July 28, 1926, Polk Hall dedication address on the North Carolina State College campus, Clarence Poe, long-time editor of the *Progressive Farmer*, gave farmers the major credit.

The marriage of the two ideas (industrial school and agricultural school) proved to be very logical, but it was at the time influenced by practical politics. Walter Hines Page is reported to have said in 1885 that "we will never get the bill through the damn farmer legislature unless there is some agriculture somewhere in it."

In the early days of the agricultural colleges, agricultural education was not universally popular around the country. In many states criticism was heard more often than praise, and there were many suggestions that such institutions should be closed.

Fortunately, the mood appeared to be different in North Carolina. The March 6, 1888, issue of the *Progressive Farmer* carried a report on the North Carolina Farmers' Convention held on January 11 and 12 in Greensboro. Most of the report, written by Cumberland County delegates Jonathan Evans and G. W. Lawrence, praised the new college.

That the new school would be related to the people, and influenced by the people, was evident in a resolution passed by the North Carolina Horticultural Society in 1887:

> We believe that the Bd. of Trustees should and will carry out the expressed will of the public in pushing forward the work as rapidly as consistent with the means at hand, & arrange the course of study with special reference to the needs of agriculture in our midst.[15]

The act authorizing the establishment of The North Carolina College of Agriculture and Mechanic Arts was well drawn and comprehensive. It provided that the college should be located on the lands donated by R. Stanhope Pullen, lying west of and near the city of Raleigh; that the leading object of this college should be, without excluding other scientific and classical studies, to teach such branches

of learning as were related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life; that the management and control of said college should be vested in a board of trustees and that each of the major political parties should have equal representation on said board; that the 6 percent land scrip certificates of indebtedness for $125,000 should be transferred from the university to the college in accordance with the terms of the Morrill Act; that the Camp Mangum tract of 300 acres situated one-half mile west of the state fairgrounds should be given to the college; that 120 students should be admitted free, each county being entitled to a scholarship for every member it sent to the General Assembly; that every student should take a course in manual training or labor in addition to other prescribed work; and that the board of agriculture should remit to the new college the assets of the industrial school and its surplus from licenses on fertilizers.

One of the most important provisions of the act was that the North Carolina Agricultural Experiment Station would be made a part of the college.

NOTES TO CHAPTER 1

1. Cathey, Cornelius Oliver. *Agricultural Development in North Carolina, 1783-1860.* Chapel Hill: University of North Carolina Press, 1956, p. 13.
2. *Ibid.*, p. 43.
3. *Ibid.*, p. 43. This quotation was taken from the papers of Archibald D. Murphy as edited by W. H. Hoyt.
4. Lockmiller, David A. *History of the North Carolina State College.* N. C. State College, 1939, p. 6.
5. *Ibid.*, p. 9.
6. Many people familiar with the land-grant colleges associate the term "land" in the title with agriculture. While the colleges were created to give support to students from the farming and mechanical trades, the term "land grant" refers to the investment of land instead of money to create them. It is little known or remembered that the University of North Carolina at Chapel Hill received a grant of 20,000 acres of land at the time of its founding.
7. Lockmiller, *op. cit.*, p. 22.
8. *Annual Report of the North Carolina Agricultural Experiment Station for 1879.* N. C. Agricultural Experiment Station, 1879, p. 181.
9. Schaub, I. O. *North Carolina Agricultural Experiment Station: The First 60 Years 1877-1937.* N. C. Agricultural Experiment Station, Bulletin No. 390, 1955, p. 5.

10. Lefler, Hugh Talmage, and Albert Ray Newsome. *North Carolina: The History of a Southern State.* Chapel Hill: University of North Carolina Press, revised edition, 1963, p. 512.
11. Schaub, *op. cit.*, p. 6.
12. Winters, Rhett Y. *Washington Caruthers Kerr, the Farmers' Advocate of the 1870s.* School of Agriculture and Life Sciences, N. C. State University, History Series No. 1, 1964, 12 pp.
13. For a detailed account of Polk's activities, see Stuart Noblin, *Leonidas Lafayette Polk, Agrarian Crusader.* Chapel Hill: University of North Carolina Press, 1949, 326 pp. Polk was clearly the outstanding North Carolina farm leader in the latter half of the 19th century. He served as the first commissioner of the N. C. Department of Agriculture, founded the *Progressive Farmer* magazine, and was instrumental in the establishment of Meredith College.
14. The Watauga Club, organized in 1884, had among its members some of the most able and aggressive young men of that time. Many of them played important roles in the history of North Carolina. Walter Hines Page, Josephus Daniels, Charles D. McIver, William J. Peele, Charles W. Dabney, and Thomas Dixon, Jr. were some of its members. At a later time, Dr. Clarence Poe, editor of the *Progressive Farmer,* served as president of the Watauga Club for 30 years, from 1925 to 1956.
15. Minutes, N. C. Horticultural Society, North Carolina State Archives.

2

The Beginnings of Research (1877-1900)

Albert R. Ledoux—first director. The station expands. Charles W. Dabney, Jr.—second director. Field experiments. Soil studies. The phosphate episode. Weather service established. A new home and new director. The Hatch Act. Field crops research. Tobacco curing. Horticultural research. Research at Southern Pines. Livestock research. Botany and pathology. New poultry division. Chemical analysis. Reaching the people. Setting the stage.

THE LEGISLATIVE ACT establishing the North Carolina Agricultural Experiment Station in 1877 provided that the Board of Trustees of the university, with the approval of the Department of Agriculture, would employ a chemist who would direct the activities of the new station. (The next General Assembly in 1879 amended the act so that the Board of Agriculture employed the chemist but with approval of the University Board of Trustees.)

Undoubtedly, University President Kemp P. Battle made preliminary investigations to find a chemist trained and suited to the needs of the station, for it was on March 12, 1877, only two days after the passage of the act, when the university board met and elected Dr. Albert R. Ledoux as chemist. On April 19, 1877, he began his duties.

Albert R. Ledoux—First Director

Ledoux was a graduate of Columbia University and Goettingen University in Germany. He was a great admirer of the thoroughness of the German scientists and was well acquainted with the work of the

many experiment stations in Germany, where the first government-aided station was founded in 1851. His observations and the knowledge he gained in Germany guided him in his development of the work in North Carolina.

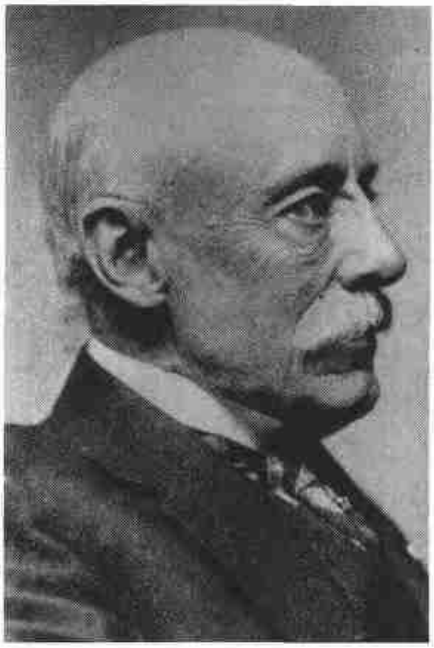
Ledoux approached his assignment with vigor, imagination, and confidence. Working with primitive equipment and sharing a laboratory with students, he completed 70 fertilizer, 22 sugar beet, 10 soil, 6 marl, and 5 mineral water analyses during his first year.[1]

Early in June, 1877, Ledoux published his first analyses—valuations of 23 of the 29 brands of fertilizer then sold in the state. The publication created a stir among manufacturers and farmers alike.[2] While several men in the fertilizer trade hailed the new station as relieving them from competition with "frauds and deceivers," other companies were not pleased and launched an attack against the young station. Their primary claim was that a chemist in a laboratory could not determine the merits of a fertilizer—its value could be ascertained only "by the behavior in the field year after year."

The fertilizer control law was challenged in the courts, and the fertilizer manufacturers won.[3] In August, 1890, the Circuit Court of the Eastern District of North Carolina held that Section 2190 of the code declaring that no commercial fertilizer should be sold or offered for sale in North Carolina until the manufacturer or importer obtained a license from the treasurer of the state, for which should be charged a privilege tax of $500 per annum for each separate brand, was in violation of the federal Constitution and void.

At the request of the Board of Agriculture, the General Assembly enacted another fertilizer fee and license law in which each fertilizer company was charged 25 cents for each ton of fertilizer sold in the state. This law was also challenged in court and finally resolved in favor of the state by the U. S. Supreme Court in 1898. The court concluded: "In any view the effect of the fertilizer control law on the commerce is indirect and incidental. The constitution of the United States does not secure to any one the privilege of defrauding the public."

A complaint by the Poppleine Silicated Phosphate Fertilizer Company of Baltimore led to the first field experiments by the station. Ledoux had in his regular routine analyzed two samples of Poppleine Silicated Phosphate. Both samples contained phosphoric acid and potash, but neither sample contained any ammonia. In placing a commercial value on any brand, Ledoux made his calculations on the



Albert R. Ledoux

basis of the amount of phosphoric acid, potash, and ammonia in the sample. In this instance, there being no ammonia, his valuation was low. The company claimed, "In the composition of our articles, we eliminate altogether artifically supplied nitrogen or ammonia, substituting therefore what we believe to be a necessary and valuable ingredient—Infusorial earth or Diatomaceous Silica." The company argued that the silica in their product should be given a commercial value but agreed to supply four tons of the fertilizer for a test under field conditions with Ledoux's supervision.

Ledoux arranged for the tests to be made by a number of farmers near Chapel Hill upon soils of different character and upon different crops. "The question," as stated by Ledoux, "was to determine whether a fertilizer containing soluble silica, but no ammonia could hold its own with, or excel a nonsilicated but ammoniated fertilizer."

Poppleine was tested in comparison with several grades of Peruvian guano and also different brands of commercial fertilizer carrying ammonia and regularly used by the farmers. The results reported by the farmers were not conclusive, although in most instances the fertilizers carrying ammonia outyielded the Poppleine. Ledoux reported the results in detail and then left it to the farmer to "satisfy himself—this time from a farmer's, not a chemist's standpoint." So far as the records show he never agreed to placing a commercial value on soluble silica, and he was definitely convinced that silica could not replace ammonia as plant food.

The Station Expands

The development of new industries was one of the objectives in establishing the Department of Agriculture. As a possibility along that line the board procured sugar beet seed and made distribution to 100 farmers in 34 counties. The analyses of the beets grown showed

that the sugar content was disappointingly low in most instances.

Ledoux cautioned that the seed situation was as critical as that of fertilizer. Indicating the possibility of fraud, he wrote:

> There are factories in Europe, notably at Prague and at Hamburg, where seed are manufactured out of quartz. The quartz is ground and sieved and stained with various dyes to imitate almost exactly in size and color almost any kind of seed, especially clover. These artificial seeds are sold to seed dealers in England (and possibly America) at $3.50 per cwt. As much as 15 tons have been purchased at one time by an agent of an English house! Specimens of these colored stones are among the collection of the Station and the most practiced eye would fail to detect a sample of clover seed adulterated 25 percent with the artificial article.[4]

The first comprehensive report of the station covered the first two years of work and was a document of 198 printed pages. It was not simply a report of the work performed in the laboratory; it also tried to provide information to add to the general knowledge of farmers. For example, 12 pages of the report analyzed and discussed the cowpea. While the cowpea had been grown for a long time, it had not been studied scientifically at that time (1879), and the relationship between legumes and bacteria on the roots through which the plant secures nitrogen from the air had not yet been discovered.[5]

A discussion of one product sent in for analysis indicated that "cure-alls" are not new. The product was called "Vitative Compound" and was sold in "pretty little boxes" containing about two ounces at $1.00 per box. It was claimed that it would destroy insects or parasitic enemies of the plant, protect the seeds from birds, furnish ingredients generally deficient in the soil, and provide "a perfect protection for the seed and shoot against wire-worms, cut worms and grubs." From the analyses Ledoux determined that the "compound" was a mixture of sugar, lead, and sulphate of zinc. He concluded his discussion by saying: "Three things are true concerning it.

1. It has no fertilizing value whatsoever, and can not replace manure.
2. It costs 24 times as much as it is worth.
3. It is most decidedly poisonous to animals—as the circular says."[6]

In its third year the station continued lines of work developed during the first two years but on an expanding scale. By then the staff had increased to four with the addition of two assistant chemists and a stenographer. Ledoux said in his printed annual report for the third year: "We entered our third year with almost no opposition and a

largely increased interest in our work, as shown by the greatly increased correspondence from nearly every county in the State."

The correspondence covered various subjects such as: why clover pasture "salivates" horses; when to turn under green crops; insects attacking rutabagas, which Ledoux identified as plant lice and recommended spraying with whale oil soap and tobacco water; composting peat and shad fish for manurial value; a "reptile" playing havoc with gardens (a cut worm); and how to make a good fertilizer for $11.00 per ton.

Ledoux resigned after his third year and returned to New York to establish a private chemical laboratory. In the short period of three years Ledoux had established the station and earned the respect of the people of the state. His devotion to the work, his honesty and courage in the face of criticism, and his intense desire to help the farmers of North Carolina served as inspiration to his successors.[7]

Charles W. Dabney, Jr.—Second Director

Ledoux was succeeded as director on November 1, 1880, by Dr. Charles W. Dabney. Dabney had just graduated from Goettingen University in Germany, the same institution Ledoux attended a few years earlier. Dabney was from Virginia and a graduate of Hampden-Sydney College and the University of Virginia. His observations and study in Germany, like Ledoux's, influenced his activities as director and chemist.

The 1881 General Assembly directed that the laboratory be moved from Chapel Hill to the Department of Agriculture Building in Raleigh. In writing about the move, Dabney gave the university due credit for its contribution to the station:

> The Station, which is in a great degree the child of the University of North Carolina, and to which it is indebted for sustenance and support during the trying times of its infancy, cannot omit at this time to acknowledge its great obligation to the Trustees, President and Faculty of this institution. The University allotted the Station apartments in her laboratory and supplied it with water, fuel, and in a large part apparatus, during its residence there. But it owes the University far more for the personal labors and enthusiastic support of its President and Faculty.[8]

The station personnel were quite happy with their new quarters. They had moved from semibasement rooms in Chapel Hill to occupy 10 rooms in the new building. There were two offices, a receiving room, a sample and store room, a dark room for spectroscopy and other such work, a small and a large laboratory, a balance and

instrument room, a furnace and assay room, and a room for noxious gases (stink room). Among other articles of apparatus were two Becker's balances, a Bunsen polariscope, a microscope, a springer pump, and a muffle furnace.

Charles W. Dabney, Jr.

Fertilizer analysis was still the primary objective of the station, so Dabney directed his activities to this routine work. The use of commercial fertilizers was rapidly increasing, having grown from less than 40,000 tons prior to the establishment of the station to 85,000 tons in 1881. Dabney recorded that the average composition of the fertilizer being sold steadily improved and that the average cash price decreased. Even so, he estimated that less than 10 percent of the fertilizer bought was paid for in cash. The remainder was paid for in November by delivering 300 pounds of middling cotton for a ton of acid phosphate and 425 pounds for a ton of ammoniated superphosphate. The price of cotton was about 11 cents per pound. This was equivalent to $33.00 per ton for acid phosphate and $46.75 for ammoniated goods. Making compost and home mixing of commercial fertilizers was encouraged.

Dabney devoted several pages of his first annual report to a discussion of cottonseed processing. The crushing of cottonseed was in its infancy. He stated that there were only 70 mills in the whole South, that less than 200,000 of the 3 million tons of seed produced in 1881 were worked, and that $12.50 per ton was paid for seed. Dabney charged that the crushing industry was "in the hands of capitalists who formed rings to keep the price of cottonseed down." He advocated building small mills for neighborhoods or possibly for individual farms. "A huller upon each farm would thus make the farmer perfectly independent of the oil-mill ring and would enable him to put his cottonseed into a merchantable state and still use the hulls."[9] His recommendations failed to materialize.

Field Experiments

Both Ledoux and Dabney recognized the real need for field experiments to supplement their laboratory work, but they were unable to expand work along that line because they had no land under their control. However, in 1881, Dabney outlined two "schemes" for fertilizer tests and invited farmers to undertake the work. Scheme No. 1 was a simple experiment to determine whether dissolved phosphate, muriate of potash, or sulphate of ammonia would repay best for their application in moderate amounts. Instructions were given as to preparation and cultivation of the one-tenth-acre plots. All plots were manured except three which were to serve as "standards" of comparison.

Results from only one farmer, John A. Mitchener of Selma, were reported. The phosphoric acid plots gave best results. The no-fertilizer plots averaged only 18½ pounds of seed cotton, while phosphoric acid alone gave a yield of 57 pounds. The season was very dry, however, and Dabney cautioned against jumping to a conclusion from one experiment.

The second scheme required a series of 20 plots and varying amounts of the various ingredients. This scheme appeared too complicated for the farmers to try, and no results were reported.

Soybeans, being tried by a number of farmers across the state, received attention in 1881. The bean and forage were chemically analyzed in the laboratory and the "soja" beans growing on the farm of Dr. R. H. Lewis near Raleigh were observed. Lewis reported that he produced three times as many bushels of soybeans to the acre as of cowpeas.

The year 1885 marked a milestone in the station's history.

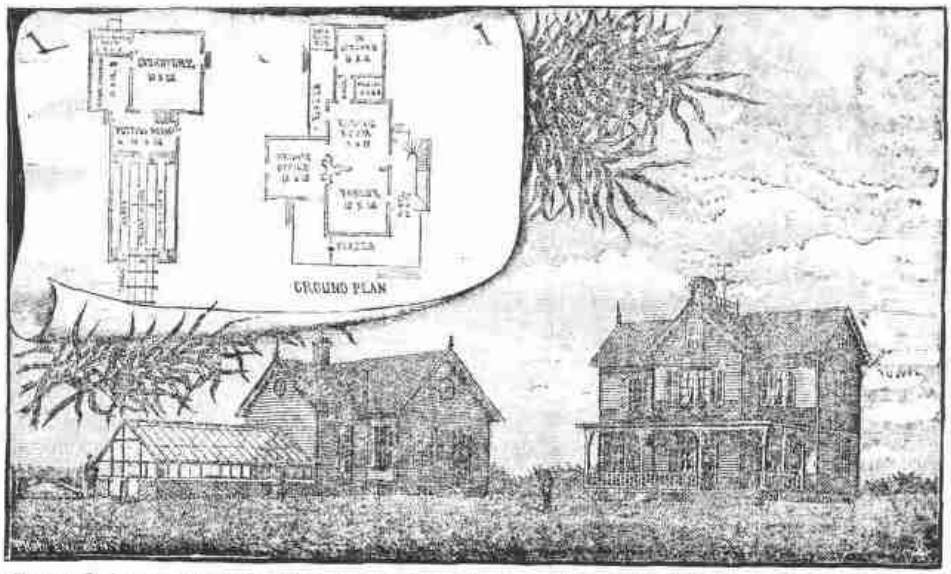
Each year during his administration Dabney urged the Board of Agriculture to provide land for field tests, but the demand for funds to support other activities of the department always seemed to take precedence. However, at its December meeting in 1885 the board finally responded to these requests by purchasing 10 acres of land adjoining the state fairgrounds at $50 per acre. The State Agricultural Society, which operated the State Fair, gave the use of about 25 additional acres. Dabney was exuberant: "This experiment farm makes this institution for the first time the complete thing which the Act of 1877, establishing it, contemplated. The soil is poor and thirsty, but it is in many respects well adapted to the purposes of experiment," he stated.[10] This was certainly better than no farm at all.

The land was located on the north side of Hillsboro Road (later named Hillsboro Street and then Hillsborough Street) in what was once known as Wilmont, a subdivision in the city of Raleigh. Later Brooks Avenue approximated the western boundary of the original 10 acres and Clark Avenue the north.

The main activity during 1886 was the development and organization of the work on the new farm. The field work had to be planned, buildings designed and constructed, land cleared, plots laid out, and different crops planted—all in a very limited time.

Milton Whitney, an employee of the Connecticut Experiment Station, arrived on April 1 to assume the duties of farm superintendent. "When we took charge of the farm, a greater part of the land was covered with a dense growth of scrub oak and blackjack, with one place some dwarf pine. It was said the land had not been under cultivation for from 15 to 18 years. The front of the land facing Hillsboro Road was very much cut up by wagon tracks, which had washed out a foot or more at places," Whitney reported.[11]

The land facing Hillsboro Road and extending back about 70 feet, considered too uneven to be used for plot experiments with fertilizers, was used to show, side by side, 15 of what were believed to be the most valuable grasses and clovers. Other plots contained 10 varieties of tobacco, five varieties of cotton, and a pasture mixture with seeds selected to mature at different times to give a longer growing period.



Farm laboratory, planthouse, and cottage at the experiment station farm.

Soil Studies

Whitney used another area, described as "an average poor soil of the state," to test the improvement of poor or worn out soils by cowpeas. His objectives were to compare the growing of peas with the application of commercial fertilizer and to test the different ways of treating the peas for best results.

He also undertook a detailed study of the root system of peas (and later of cotton and tobacco). To determine the amount of roots, stubble, and other plant matter per acre, and also their chemical composition, he attempted to remove all the roots from the soil to a depth of 10 inches. A trench of this depth was dug just outside of the plot, running across the rows, and the soil was dug up, a spadeful at a time, and the roots carefully picked out by hand. The work was so tedious "that 125 square feet required the steady work of one man for more than a week."

The first pot culture work undertaken at this station was begun by Whitney in 1886 in an effort to supplement the field trials. He used one-gallon candy jars and attempted to determine the plant food requirements of North Carolina soils for a maximum crop. He also tried to determine the amount of water evaporated by the cotton plant. That same year he grew tobacco by water culture with varying amounts of nitrogen in solution.

At the Connecticut station Whitney had made studies of the physical properties of soils. Here he began new studies, especially regarding temperature and moisture. Dabney stated, "North Carolina deserves the credit of having given him the facilities for making the first really important investigations on the subject made in this country, the investigations which caused him to be called to the Department of Agriculture where he was to carry out a complete study of the physical properties of soils of the United States, the largest piece of work of this kind ever done in the world."[12] Whitney resigned at the end of 1887 to accept the U. S. Department of Agriculture position.

There were no buildings on the experimental farm, so plans were drawn for a dwelling house, a plant house and laboratory, a barn, and a machinery shed. At a cornerstone laying on July 22, Governor A. M. Scales presided and made one of the six speeches during the day-long event. Both the commissioner of agriculture and state chemist represented the state of Virginia; South Carolina was represented by the state chemist.

The Phosphate Episode

Nothing else the station did during this period received as much attention as did the phosphate episode. In 1883 rock containing phosphate of lime was discovered near Castle Hayne in New Hanover County.

One of the objectives in establishing the Department of Agriculture had been to secure increased farmer immigration into the state.[13] To that end the board decided to exhibit such specimens as North Carolina ores, minerals, building stones, and woods at the American Exposition at Boston (and at other expositions). The station was charged with making the arrangements. Three of the five members of the staff concentrated their time from June to November on this assignment. However, an important benefit derived from these efforts was increased knowledge of the agricultural resources of the state, especially regarding soils, marls, and other agricultural products. One discovery, in particular, led to much work on the part of the station during the next few years and raised hopes for the development of a new fertilizer industry in the state.

One of the rock specimens brought to the laboratory was provided by Dr. Thomas D. Hogg of Raleigh. The specimen came from his farm at Castle Hayne in New Hanover County. A few days later another sample was received from George C. French's farm eight miles northeast of Castle Hayne. These rocks proved to be phosphate of lime and aroused Dabney's curiosity. He immediately went to Castle Hayne to make an inspection. What he found led him to report to the board that he deemed the subject worthy of thorough examination. The board made a small appropriation and directed Dabney to give the matter such time as he could find in the intervals of other work. The results were given publicity and "people commenced hunting phosphate everywhere."

By March, 1884, phosphate rock had been found in Sampson, Duplin, Onslow, Pender, New Hanover, Bladen, Columbus, and Brunswick counties—usually a few feet below the surface of the ground and along the banks of ditches and streams. The deposits were in pockets varying from small quantities to many tons. Some of the rock was dried, ground, and manufactured into superphosphate by the Navassa Guano Company of Wilmington.

The interest and enthusiasm for North Carolina phosphate continued through 1884 with further exploration and development of mining operations. The North Carolina Phosphate Company was

formed to put material on the market.

In the meantime, 20 tons of this superphosphate were distributed to 130 farmers all over the state for trial. Most of the farmers reported on their results, and in the main were well pleased, but the hopes and aspirations for a new industry developing around phosphate deposits were not to materialize at this time. The deposits were too limited, mining operations too expensive, and most of the rock mined was of too low grade to make the venture profitable.

Weather Service Established

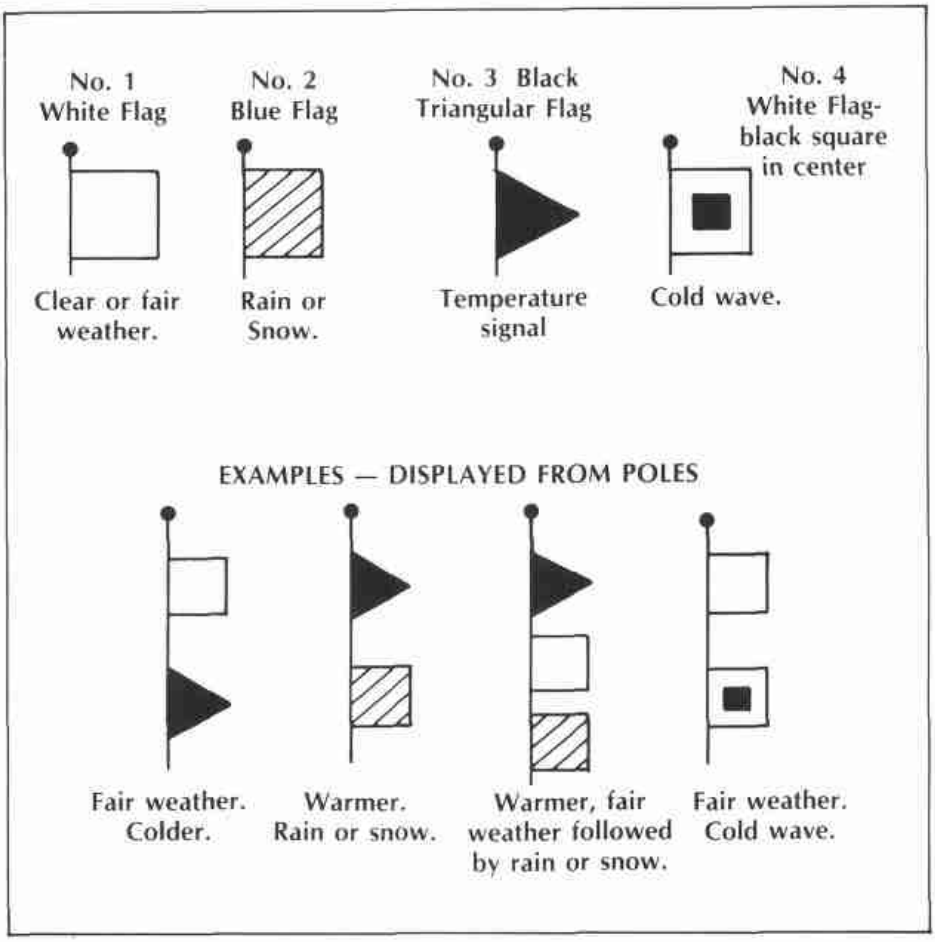
On December 1, 1886, a state weather service was established as part of the station. Mention has been made of Whitney's work on soil temperatures. After a few months' observations it seemed desirable to expand the work to include weather.

The board requested the U.S. Signal Service to establish a weather station at the farm. Gen. W. B. Hazen, chief signal officer, agreed to furnish an experienced weather observer and the necessary equipment on condition that the station would distribute the weather warnings throughout the state. These conditions were agreed upon, and W. O. Bailey was assigned by the Signal Service as station meteorologist. He held this position until the end of the year when he was replaced by H. McP. Baldwin.

When it was originally organized the State Weather Service included only the collection of meteorological data and the dissemination of weather forecasts. The latter was first accomplished by means of telegrams to railroad depots, which posted weather flags at the stations and sometimes upon the sides of their cars.

After a short time the collection of crop statistics each week was added. From early April through September, reporters across the state mailed in reports, and a weekly weather crop bulletin was issued. It contained a summary of state crop and weather conditions, with statements from selected points or reporters. These reports were apparently well received by farmers.

After the transfer of the U.S. Signal Service by congressional act to the U.S. Department of Agriculture, under the name of the Weather Bureau, the work was expanded. The number of locations receiving the daily forecasts greatly increased, weather information was transmitted not only by means of telegrams but also by a system of mail distribution. A daily weather map was also prepared giving tempera-



Signal flags used by the weather service.

ture, precipitation, barometric pressure, wind direction, and state of the weather at important points throughout the United States.

Three forms of weather publications were issued during this time: (1) monthly bulletins containing meteorological data collected by observers scattered over the state; (2) the weekly weather crop bulletin, giving the result of the weather upon crops each week during the growing season; (3) annual reports, which included summaries of the work.

C. F. von Herrmann replaced H. McP. Baldwin as meteorologist in 1889 and remained in that position until the weather service activities were discontinued in 1896, after 10 years as a station activity.

The system for recording and disseminating weather information was primitive compared to subsequent techniques, but almost a century later the data accumulated during the 10-year period were still being used whenever longtime weather records were analyzed.

A New Home and New Director

Dabney resigned as station director on September 1, 1887, to accept the presidency of the University of Tennessee. In later life he would serve as an assistant secretary of agriculture and president of the University of Cincinnati. He engaged in many activities and wrote several books.

While in Raleigh, Dabney was a member of the Watauga Club, a group that worked long and hard for a new college. He was probably in the legislative halls when on March 7, 1887, the bill creating the new college became law. One of the important provisions of that law was that the experiment station would be a part of the new college, which by coincidence was located within one-half mile of the experimental farm operated by the station. However, it would be more than two years before the new college opened (and many years after that before the station would become fully integrated into the college administration), so for the station director and other personnel, life continued as usual with headquarters in downtown Raleigh.

The third director was Herbert Bemerton Battle, the son of Kemp P. Battle, president of the University of North Carolina (who has been given much credit for the establishment of the station). Born and reared in Chapel Hill and Raleigh, Battle was well acquainted with both the agricultural and the state scene.

Battle received his preparatory education at the Lovejoy Academy in Raleigh. He early evidenced a strong interest in the sciences, especially chemistry. Following his graduation from the University of North Carolina with the B.S. degree in 1881, he served until 1887 as assistant chemist at the station. In 1887 he was awarded the Ph.D. degree by the University of North Carolina.

The Hatch Act

The first support for agricultural research from the federal government came with the passage of the Hatch Act on March 2, 1887. This act made an annual appropriation of $15,000 to each state for the establishment and maintenance of an agricultural experiment station.

The North Carolina General Assembly, on March 7, accepted the provisions of the federal act and directed that the funds received, "shall be devoted, under the direction of the Board of Agriculture, to the maintenance of the aforesaid Agricultural Experiment Station

under the laws of the United States and this State." Dabney had kept up with the progress of the Hatch bill through Congress, and it was largely through his efforts that the North Carolina legislature responded so promptly.[14]

H. B. Battle

However, the U.S. treasurer questioned whether Congress had actually made the appropriation in 1887, and the matter was not cleared until the session of 1888. Even then the funds, which were to be paid the state quarterly, did not come, so in March, 1888, Battle went to Washington in an attempt to obtain them. He explained what happened:

> For some reason, however, the first quarterly payment of $3,750, when due, was not promptly paid, nor could correspondence unravel the difficulty. This extended also beyond the time for the second payment, and so it seemed desirable for a personal visit to Washington. You will believe it or not, but I can testify of the truth, that with all of the red tape of official regulations, unnecessary requirements, etc., that in six hours after I arrived in Washington I walked out of the Treasury Building with a check for $7,500 in my pocket payable to our State Treasurer, and the next morning it was safely in his hands and placed to the credit of the Station. What influence helped me? I need mention only one name and you have the answer, and that name is Senator Ransom. A few words from him to the proper man of what he wanted, helped by two of my personal friends, fortunately in the Treasury Building, caused me to turn the trick. I venture to say that such a thing has never happened before nor since.[15]

Federal funding for research marked a complete change in the financing of the North Carolina Agricultural Experiment Station. For 10 years the expenses of the station had come entirely from the state Department of Agriculture, and the primary function of station activities had been the fertilizer control work with a secondary emphasis on research. The federal funds could not be allocated to fertilizer control; consequently, the full amount of $15,000 yearly was to be used in research. The state Department of Agriculture no longer

made appropriations for research but did pay the expenses for fertilizer analyses, which the station chemists continued to process for some years.

Field Crops Research

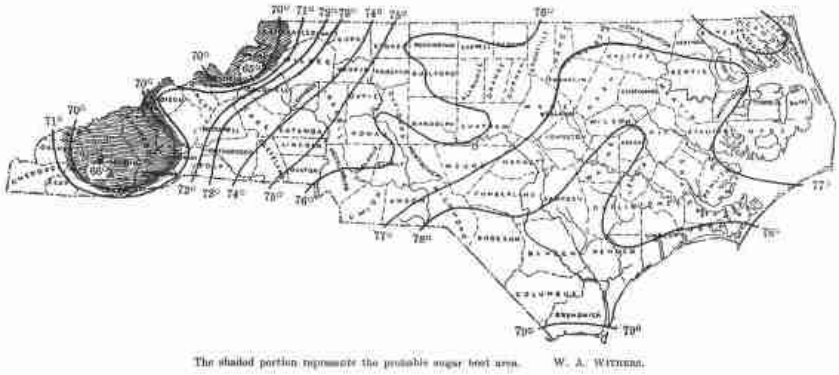
The farm, which had been started in 1886, represented the main research activity during the Battle administration. Work with cotton included variety studies, thickness of planting, earliness of maturity, and percentage of lint. However, variations in yield, attributed to soil conditions, were so marked that there was little faith in the data secured.

One experiment was done to see how much cotton could be grown per acre. One-tenth acre of rich strong land "in good heart" was selected. It was plowed deeply, four tons per acre of compost added, then plowed twice with a single plow and 1,000 pounds per acre of an ammoniated superphosphate added. The yield of 861 pounds of lint was a disappointment since the same variety planted on poor land made 807 pounds of lint per acre.

The permanent pasture plots seeded with varying fertilizer and soil preparation treatments also showed wide variations even with the same treatments. One manure plot gave a yield of 1,094 pounds per acre while another gave 2,808 pounds. One pasture experiment of real interest, in the light of developments 50 years later, was a series of plots with a large number of varieties of grasses and clover. One of them, seeded in April, 1891, was a clover seed from Italy that became known as Ladino. It was hardy and productive but produced very little seed.

> According to all records, this was the first trial of Ladino in the United States. Apparently from the reports, the plots here were plowed up during the winter of 1893 and it was more than 50 years before this clover was again tried in North Carolina with almost miraculous success. Apparently its failure to produce seed was the stumbling block.
>
> It is interesting to speculate as to what agriculture would be in 1953 in North Carolina had the people in 1893 recognized the value of Ladino and had they learned to grow the crop successfully. Would we have developed into the great tobacco state in which we find ourselves, or would we have turned to livestock as our main enterprise?[16]

Desiring to extend the cultivation of soja (soy) beans, in 1894 the station promised to mail to each of the first 400 people who would send in 10 cents to cover postage, enough soybean seed to plant one-tenth acre.



A map of North Carolina showing the area of the state (shaded) where sugar beets might be successfully grown.

In 1898 Chemist W. A. Withers took another look at the sugar beet. Early in the station's history, tests had shown that the beet would grow in the state but that sugar content was low. Throughout the 1890s, tests by the U.S. Department of Agriculture had cast doubt on profitable sugar beet production anywhere in the state except in the higher mountains, and there the terrain would inhibit mechanization.

In a 1901 bulletin, Withers concluded that there were about 730,000 acres of improved land on which sugar beets could be grown. He stated that one-fifteenth of this area, if suitable for beet culture, would produce enough sugar for consumption in the state.[17]

The station's crop research was simple by latter-day standards. It consisted mostly of trying to find out what would work. Various farming techniques and varieties were tested and potential new crops were tried.

Tobacco Curing

In 1889 tobacco was produced by 27,250 North Carolina farmers on 97,077 acres, ranking the state third among the states in acreage and fourth in production. The average yield per acre was 375 pounds, and the tobacco sold for an average of 14.2 cents per pound.

The first experiment with tobacco (other than observations of routine cultural practices) was carried out in 1891. The test, as described by authors H. B. Battle (director) and Assistant Chemists T. L. Blalock and F. B. Carpenter, was as follows:

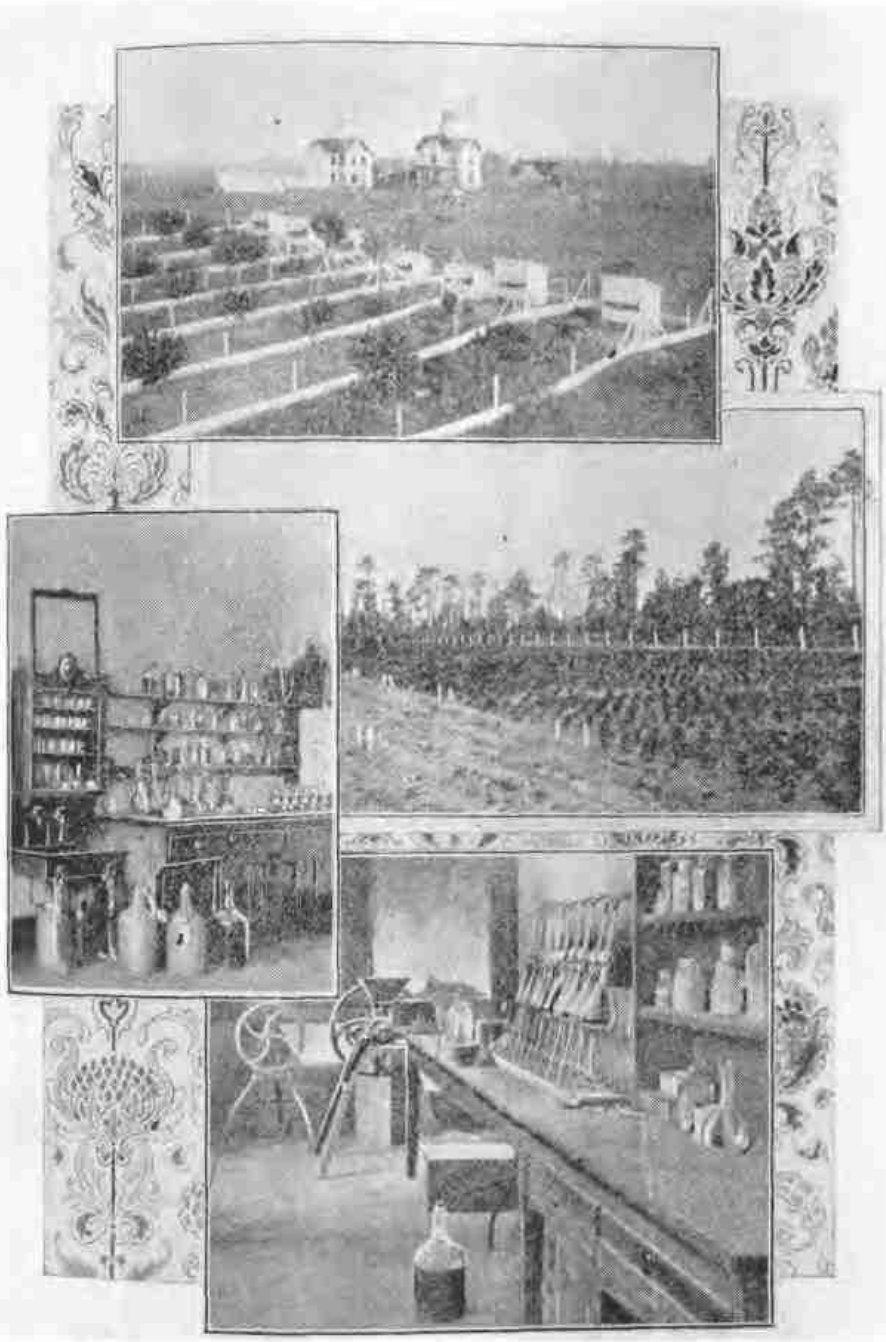
> The object of this experiment was to test the comparative merits of the two systems of curing tobacco for market, especially of the variety known as yellow tobacco, grown particularly in the States of North Carolina and Virginia—namely, the old style stalk-cure, and the newer method of curing the leaves alone, pulled from the stalk as they become ripe. Though not strictly new, public attention was specially drawn to the latter plan through the efforts of Capt. W. H. Snow, of High Point, N. C., in connection with an improved curing barn advocated by him. The main point of distinction between the two systems of curing is that in the stalk-cure, when the leaves are ripe on the stalk, the whole stalk is cut down, and with the accompanying leaves is cured on a stick in the old-style log-barn. In the leaf-cure system the leaves, as they mature on the stalk, are cut off (commencing at the bottom), stuck on wires and cured, while the stalk is still standing in the field. The cure is made either in an old-style log-barn, or, better, in a patented barn of improved construction, known as the Snow barn, which possesses principles that must commend themselves for their simplicity and scientific thoroughness.[18]

Two one-half acre plots were laid off in a field on the farm of J. M. Currin three miles west of Oxford. The researchers described the tobacco in the plots as growing finely, approximately four feet high, topped leaving 10 to 12 leaves on the stalk, and somewhat better than the average tobacco of the county. "The leaves were smooth, but badly 'bud-sucked' by the flea-bug, but not to any extent worm-eaten by the tobacco horn-worm."

The stalks from one of the plots were cured in the conventional way, with the stalks cut; on the other plot the leaves were pulled from the stalks. Representatives of the company producing the Snow barn assisted with the curing of the individual leaves. (This experiment was probably the first instance of joint station-industry cooperation on a project and quite in contrast with earlier station feuds with fertilizer manufacturers.)

The researchers concluded, as reported in a bulletin issued the following spring, that the new system offered several advantages: less wood was needed for curing; the several bottom leaves normally thrown away could be saved; and, if priming would speed up ripening, losses to frost could be lessened.

In 1896 North Carolina moved up to second in tobacco production among the states (behind Kentucky), and tobacco was the third most important money crop in the state. In this same year a new tobacco pest became of commercial importance. Researchers called attention to the tobacco leaf miner in 1897, and noted that the horse



Page from 1896 annual report showing four research scenes.

nettle or bull nettle was the host plant. Control measures recommended included clean cultivation of the tobacco crop, destroying all the host nettles, and plowing out the old tobacco stalks as soon as the crop was harvested.

Horticultural Research

In December, 1889, W. F. Massey was elected horticulturist of the station. A native of Virginia, born in 1839, Massey had had wide experience as a horticulturist—horticultural teaching, school administration, and operating his own nursery and florist business. He immediately developed an ambitious program of research.

During his first year, Massey compared over 40 varieties of tomatoes, 20 of Irish potatoes, 13 of sweet potatoes, nearly 50 of garden peas, 25 of turnips, and many others. Most of the seed was furnished by seedsmen so that "varieties" were most likely catalog names rather than true varieties. A house for grafting work was started. It was Massey's idea to cross French and Asiatic grape varieties on native "sorts."

Massey was fascinated with the possibility of growing vegetables under glass (in greenhouses and glass-covered beds), because he said, "There is a great increase of interest among our market gardeners, especially in the eastern part of the State, in winter gardening."[19] He had noted interest in lettuce as a winter crop grown in frames covered with plain cloth or glass.

In 1899-1900 he compared nine tomato varieties planted on September 5. Ripe tomatoes were gathered from December 25 through March 22. Several pollination techniques were tried.

In ornamental horticulture, the goal was to do "something toward showing our farmers how to make home beautiful" and to demonstrate the growing of flowers and bulbs that could be sold on the northern market.

In the mid-1890s a new pest showed up to plague the budding North Carolina fruit industry. In 1887 the San Jose scale was brought from California to New Jersey on some plum trees. Within a few years it had spread into all the eastern states.

Experimental tests on control of the pest were started in North Carolina in 1896. Sprays containing sulphur, salt, lime, soda, rosin, and fish oil were found to be somewhat effective in controlling the pest. Fumigating with hydrocyanic gas was believed to be the most effective treatment but very dangerous, expensive, and difficult. It was suggested that this practice should not be carried out by anyone except a professional with some ability as an engineer. It was pointed out that lady beetles would feed on the scales, but the orchardist could not depend on natural control and "must depend upon himself and the remedies science has placed at his command."[20]

The State Horticultural Society, aided by the station, caused a bill to be introduced in the 1897 General Assembly to provide for a state commission with power to examine all nursery stock and to quarantine, treat, or destroy all stock infested with the scale.

In the early 1890s Massey began a search for a better sweet corn for the South. He stated that there had always been a serious difficulty in getting an early sweet corn with stamina sufficient to succeed in this climate. He said the later-maturing varieties gave fair crops, but it was very hard to get an early one that was of any value. The trouble came largely from the fact that southerners bought sweet corn seed that had been produced in the North and was not acclimated to North Carolina conditions.

Massey's approach was through a crossbreeding and selection program. By 1898 he had what he considered a pretty good variety, resulting from a cross of Leaming field corn and Mammouth sweet corn. He shipped the seed out to farmers across the state, but by 1902 he stated that he believed the corn was no longer in existence.

Research at Southern Pines

Long-term cooperative work with a commercial concern, with a producer association, and at a branch station all came about with an arrangement made in 1895.

In 1879 the horticultural interests in the state joined together into an organization known as the North Carolina Fruit Growers' and Nurserymen's Association. A year later the name was changed to the North Carolina Fruit Growers' Association. A second name change came in 1885, when the organization became the North Carolina Horticultural Society.

Although membership was small, the impact of the society was large. Considerable information was presented at the annual meetings and later published. An annual "fruit fair" was held at different locations around the state. Beginning in 1886 the group enticed the North Carolina Board of Agriculture to put up $500 to $1,000 each year for horticultural premiums at the State Fair. A transportation committee gave attention to the problem of transporting horticultural crops.

All fruits except citrus could be grown in the state, and the decade between 1885 and 1895 had been one of expansion. Particular interest had been focused on the Sandhills in the central Piedmont, where

loggers' ax and saw had removed the huge stands of longleaf pines and left small pines, scrub oaks, and wiregrass to inhabit the dunes. Thousands of acres were available at from 50 cents to one dollar per acre.

These light, sandy soils were judged to be too dry for forage production, and animal manure was not available for fertilization. Use of commercial fertilizers seemed to be the only practical approach to profitable production, but they were too expensive for the row crops that could be grown

There was interest in fruit growing in the Sandhills. Near Southern Pines, J. Van Lindley, of a longtime fruit growing family from Greensboro, set 500 acres of peaches in 1891. Nearby, the Niagara Vineyard Company set 250 acres in grapes. The Douglas Vineyard and Orchard was planning to plant 600 acres of grapes and peaches. From 1887 to 1890 the grape industry in North Carolina expanded by 400 percent.

Members of the Horticultural Society believed that this land, until now considered unproductive, could be transformed into fruitful orchards and vineyards and were willing to put time and money into it:

Planting the first fruit tree at Southern Pines, April 4, 1895. Present at this historic occasion were H. B. Battle, B. W. Kilgore, H. L. Thurston, B. von Herff, D. D. F. Cameron, and two laborers.

> In order to embody its views in practical form and furnish an object lesson in improving such lands, the Society has long sought the establishment of an experimental fruit and vegetable farm upon a typical light soil, whereon might practically be determined upon a commercial scale whether or not these lands, when aided by the most advanced scientific ideas of fertilization and improved methods, could be successfully cultivated in fruit and truck crops.[21]

In carrying out its plans, the society obtained two tracts of land on the north side of Southern Pines and accepted an offer of the German Kali Works (the world's principal supplier of potash) to donate a certain sum for the purpose of assisting the experiments. To assure scientific and accurate methods and authoritative results, the society sought and obtained the active cooperation of the North Carolina Agricultural Experiment Station.

The objective of the research was to determine the proportion of the different fertilizing ingredients necessary and the optimum soil treatment needed to obtain the best growth and development of orchard and garden fruits and other horticultural and agricultural products.

A six-member supervising committee was appointed to carry out the work. Battle and Massey represented the experiment station. From the Horticultural Society were J. Van Lindley, president; C. D. Tarbell, a member of the executive committee of the society; and Gerald McCarthy, secretary of the society and also station researcher. B. Von Herff, who had been an assistant chemist with the station from 1883 until 1887, represented the German Kali Works. D. D. F. Cameron was selected as farm superintendent. Alexander Rhodes, appointed an assistant horticulturist of the station in 1892, was located at this station, and Massey moved much of his research from Raleigh to Southern Pines.

The clearing of the fruit tract, with mattock and mule, began on February 18, 1895. On April 4 the first trees were set. The vegetable tract was developed during the year and was in full production by 1896. Nine fruits and eight vegetables were grown. Fruits were grapes, peaches, plums, pears, apples, chestnuts, strawberries, blackberries, and raspberries. Vegetables were sweet and Irish potatoes, cucumbers, snap beans, tomatoes, asparagus, cabbage, and sweet corn. In addition to fruit, vegetable, and bulb studies, fertilizer trials were run on cowpeas, peanuts, and tobacco.

The availability of the research farm at Southern Pines must have warmed the hearts of the horticulturists and evoked envy on the

part of the agriculturists at the college. Evidence of ample funding showed up in the high-quality publications produced.

The work there, however, did not last long. The cooperative arrangement was discontinued in 1898. The available records do not provide much enlightenment, and the reason(s) for this action is not clear. The 1898 station annual report stated that by order of the Board of Trustees the work there had been discontinued. A note in the preface to a report of the experiments simply stated that on October 31, 1898, the station "withdrew from the management of the farm, and in consequence assumes no responsibility and claims no credit for the management and publications since that date."[22] The minutes of the North Carolina Horticultural Society do not mention the termination of the contract between the society, the German Kali Works, and the station.

A review of the station literature of this period indicates that the best research being done was that at Southern Pines. But there was some dissatisfaction. At a meeting of the College Board of Trustees on June 28, 1897, a letter that Director Battle had written to J. Van Lindley of Greensboro, president of the Horticultural Society, withdrawing the station from the agreement, was read. The trustees voted that such action was not within the authority of the director and that the agreement of February 7, 1895, was still binding. Van Lindley was present at this meeting and apparently discussed some of the problems of the horticultural industry, including the San Jose scale.

The minutes of the board show that on August 19 of the same

Harvesting potatoes, vegetable department, Southern Pines.

year Acting Director Withers appeared before the executive committee of the board and "made some statements in regard to the work at Southern Pines." The committee put Chairman Harris, Trustee Chamberlain, and Withers "in charge of the Southern Pines matter."

The next reference to the matter came one year later, from the trustees meeting on August 9, 1898. At that meeting, "Mr. Chamberlain moved that it is the sense of this Board that the arrangement now in existence with the German Kali Works, concerning the Experiment Farm in Southern Pines, be discontinued as soon as practicable. Adopted."

Records of the North Carolina Horticultural Society indicate that this group existed at least through 1906. For some time after 1898 the society continued experimental work at the Southern Pines locations.

Alexander Rhodes, superintendent of the Southern Pines Station, transferred to Raleigh. A plot of land was rented in Raleigh for the relocation of some of the trees and bulbs that were moved from Southern Pines.

Livestock Research

Whitney, as the station agriculturist, was succeeded by Joseph R. Chamberlain sometime during 1888. Chamberlain, born in 1861, was a native of Bath in upstate New York and a graduate of Cornell University. He was hired with the title of agriculturist—a new title among station personnel.

Chamberlain exhibited interest in livestock research, and the new stable and dairy building on the research farm made such research possible. Feeding tests were started in 1889 with several oxen on an exclusive diet of cottonseed hulls and cottonseed meal. The hulls and meal were weighed for each feeding and the animals weighed once each week. The description of the animals was as follows:

No. 1—Black ox, about six years old, poor type for good feeder. Long legged, light hips.
No. 2—Bob-tail, about eight years old, good feeding form.
No. 3—Scrub, about 12 years old, hard looking specimen.

The experiment ran for about 2½ months. The animals neither gained nor lost any appreciable amount.

There was a considerable number of animals but not much of a

Two cows used in 1895 experiments. "Miss Haley" on the left produced 226 pounds of butter and 3,962 pounds of milk during the year and "Spot" on the right produced 296 pounds of butter and 5,078 pounds of milk.

livestock industry in the state at that time. The approximately 160,000 farms in the state (on which about four-fifths of the state's 1.5 million people lived) contained some 430,000 sheep, 1.5 million hogs, and 620,000 head of cattle (of which about one-third were milk cows). Director Battle set down some observations on the dairy industry in 1888:

> The dairy interest in this State is yet in its infancy, but is as vigorous and healthy in this infancy as can be hoped. It will grow at first more quickly nearer the larger towns and cities, where the products can be more easily disposed of; yet it is certain that it will extend to more interior points in a short time. In the vicinity of Raleigh, through the means of energetic citizens, this work is growing surely. This year there will be in the neighborhood of 20,000 pounds of first-class butter made and sold to supply the home demand. A much larger quantity is imported to this city from other states (somewhat over 50,000 pounds), so that it will be some time yet before our home dairies can supply over the Raleigh market, before shifting to other localities.[23]

In about 1896, tuberculosis developed in the station herd. The U.S. Bureau of Animal Husbandry cooperated in testing all the animals. At a second test in May, 1897, six animals reacted and these were destroyed. A separate herd maintained by the college was tested at this same time, and a number of reactors found.

Botany and Pathology

Botany work as a distinct activity began on October 1, 1888, with the employment of Gerald McCarthy as botanist. McCarthy had previously been employed by the National Museum at Washington. He was sent to North Carolina in the spring of 1888 to collect specimens of plants in the western area. He met with the board and offered to collect extra specimens for the station at $8.00 per hundred. His offer was accepted, and later the minutes show approval of a bill for $80.00.

The station's botanical laboratory consisted of one room with the following apparatus:

1. A collection of labeled seed samples.
2. A collection of dried plant specimens.
3. Two microscopes with accessories.
4. A seed sprouting apparatus.
5. An analytical chemist's balance.
6. A reference library.

In 1892 McCarthy's title was changed to botanist and entomologist. He was never listed in the college catalog as a member of the college faculty, but he did teach one or more courses in entomology during the mid-1890s.[24]

McCarthy's work covered a wide area. He is credited with the first plant pathology work, and he gave attention to livestock and poultry insects and diseases. His 1891 formula for controlling lice on poultry was called a "kerosene ointment." It consisted of 1 pound of lard, 2 ounces of powdered sulphur, and ¼ pint of kerosene oil.

In 1894 McCarthy wrote about the chestnut weevil, a pest of both native and imported chestnut and chinquapin nuts, that destroyed perhaps as much as one-fourth of the crop each fall. The weevil laid eggs into the nut while it was developing. About two weeks after the nut fell to the ground, the maggot-like larva emerged, where in the pupa stage it overwintered in the ground. The only control measures that could be offered were to pick up all nuts as they fell to the ground (not practical with trees in the woodlands) and to place the nuts in water where the infested nuts would float and could be skimmed off.

The bulletin noted that root disease had destroyed much of the original stand of the magnificent chestnut trees—at one time the most numerous tree in western North Carolina.[25]

New Poultry Division

As reported in the U.S. Census, the following fowl were on North Carolina farms on June 1, 1890: Chickens 7,507,593; Turkeys 197,420; Geese 375,991; Ducks 169,409.

The first poultry department was set up in 1895 after the Board of Trustees recommended "that a poultry yard be established and several varieties of the best breeds of chickens, etc., be bred and a few bees kept for the instruction of the students." Frank E. Hege, a commercial poultryman from near New Bern, was selected to be the first head of the poultry department and took up his duties on December 1 of that year. New buildings were erected and poultry yards were established on the 10 acres of station land west of the state fairgrounds.[26]

During his 2½ years in the position, Hege conducted research and wrote up the results. He established a monthly newsletter called "Poultry Pointers." Hege also traveled the state making talks, judging poultry at fairs, and advising poultry producers. His research covered evaluation of the different breeds, various feeding trials, and other management practices. Turkey research was less successful because the death rate of young poults was high. But 56-day feeding experiments with 18 Pekin ducks showed a profit of 25.2¢ per duck.

Hege resigned during the summer of 1898 and his work was assigned to F. E. Emery and J. M. Johnson, the agriculturists with the station. They endeavored to determine the amount of feed consumed by the chickens but met much difficulty. One of the chief obstacles was the "swarm of English sparrows which hung around and fed with the fowls." Several methods of getting rid of the sparrows were considered. "To poison sparrows is out of the question as the sparrows falling in some yards will be eaten by the fowls. Whiskey, in baited pens, has several times been tried but we have not caught any birds though they have eaten the soaked grain put out for them."

Chemical Analysis

In the chemistry laboratory, the analysis of fertilizers and feedstuffs was big business. Fertilizer analyses to detect fraud on the part of the manufacturers and sellers were continued. Various livestock feeds were examined to determine their nutritional values, and the station was asked to analyze samples of drinking water for the public.

The passage in 1895 by the North Carolina General Assembly of "An Act to Prevent the Adulteration or Misbranding and Sale of Foods" made the adulteration or misbranding of articles of food a misdemeanor, but no one was charged with the duty of executing the law. The law did encourage the station to "ascertain the extent to which adulteration is practiced on some of the most common articles of food sold in the State."

In 1898 the station chemists examined and published their findings on 20 samples of vinegar, 20 samples of coffee, 9 samples of tea, 25 samples of baking powders, and 73 samples of flour.[27] They found that 95 percent of the 20 samples of vinegar tested were not pure cider vinegar. Two samples had been diluted with water; the remaining 17 samples indicated spirit vinegar (made from potato brandy in Germany or from whiskey in the United States) with the addition of organic coloring matter to produce a nut brown color. They concluded that the adulterants were not injurious to health, but their presence was for the purpose of deception and therefore fraudulent.

Sixteen percent of the flours examined contained corn meal; one sample contained alum. The authors stated that foreign flour was adulterated with mineral matter, such as clay and plaster of Paris, but no mineral additions were found in the 73 samples examined. Alum was the major adulterant found in baking powders. Of the samples examined, 56 percent were straight alum powders while 81 percent contained alum and other substances.

In the beverage area, the story was similar. A large percentage of the coffee samples contained screenings (immature and light grains, broken grains, and foreign matter), and 82 percent of the samples had been glazed by the addition of sugar or syrup at the time of roasting.

The classic case among these investigations was undoubtedly the case against Mineraline. A company in Greensboro, in an 1898 trade magazine advertisement, proposed to sell the flour mills an adulterant called Mineraline. For a high-grade flour, the company suggested the use of 15 percent Mineraline; for medium-grade flour, 12 percent; and for feed meal, 18 percent. A representative of the station visited the company in Greensboro and determined that the substance was soapstone being made from rocks mined in Randolph County.[28]

During the station's second decade, approximately half of the staff members were chemists with the title of assistant chemist (H. B. Battle served as director of the station and also state chemist).

Reaching the People

During the 1890s the station issued six types of bulletins on a variety of subjects. Most dealt with general farm information rather than on results developed by the station. The total income of the station was $15,000 annually and for several years 10 to 15 percent of this fund was used for printing and distribution of publications. The 1895 annual report described the six types of bulletins:

1. Regular—14,000 to 26,000 copies, for popular reading to names on the mailing list.
2. Technical—3,000 copies, sent only to scientific list.
3. Meteorological Division—1,800 copies, sent to special list.
4. Special—500 to 60,000 copies, for special purposes, as occasion demands.
5. Weekly Weather Crop—1,600 copies giving effects of weather on crops during the growing season, to crop bulletin list only.
6. Press Bulletins—600 copies, to newspapers and to chairmen of experimental committees of Alliances and Granges (the two major farm organizations in the state at that time).

The station began sending the press bulletins to newspapers and magazines in 1890. These seemed to meet general approval, and in 1893 the press releases were sent on a monthly schedule.

In addition, 1,000 copies of the annual report, 2,000 to 4,000 copies of the annual report of the Meteorology Division, a biennial report to the General Assembly, and questionnaires designed to collect information from farmers were published during the period.

The station annual report for 1893 recorded: "The members of the staff also visit, whenever practical, farms, farmers, and their meetings, attend farmers' institutes and deliver addresses, write for agricultural journals and newspapers."

Horticulturist Massey was a prolific writer, preparing bulletin manuscripts and articles for newspapers and farm magazines and carrying on extensive correspondence. A group of Waldensian colonists from northern Italy settled near Morganton in Burke County in 1893 and requested aid from the station. Massey visited them, talking through an interpreter. On his return to Raleigh he prepared a bulletin on wheat, corn, potatoes, cabbage, and other horticultural crops. This bulletin was printed in English with their native French language printed alongside in the hope that the bulletin would not only give the Waldensians instruction in horticultural crops but would aid them in learning English.[29]

F. E. Emery had a column in the *Biblical Recorder*, a Baptist publication which he felt reached many people not otherwise contacted.

There was some promotion. Many of the annual reports repeated the reason the station was established and there were frequent comments that indicated appreciation on the part of those receiving information. The 1896 report contained 33 pages of materials excerpted from letters received from farmers commending the station on its activities. The letters originated in 95 counties, 34 states, and 5 foreign countries.

Setting the Stage

It is hard to place a value on or to appraise the work of these pioneer educators and researchers. Neither is it possible to measure objectively the impact of their work on the agriculture of the state. They had few tools and little financial support. Each was responsible for a wide range of subject matter.

Then, as later, the personnel experienced many problems. The well on the farm went dry, so a storage tank to catch rain water was constructed. The labor on the farm, whether college students or others, was not reliable, creating a serious handicap in securing reliable data on the experiments. Dogs killed some of the sheep.

There was the problem of apportioning the time of the workers between teaching and research. Several of the men, after the station became a department of the college, taught part time. Some stated that teaching activities interfered with their research.[30]

I. O. Schaub labeled the 1890s as one of the most interesting decades in the history of the Experiment Station. The passage of the Hatch Act and the transfer of the station from the Department of Agriculture to the new land-grant college were to have profound effect on the policies and work of the station. "Dr. Battle served well and faithfully during a trying period."[31]

At the very least, standards were being set. Farmers could now know what was the potential for a unit of production. And there were some relationships being developed between various inputs, such as animal manures versus commercial fertilizer, or the relative benefits from various livestock feeds. The economics of production were entering the picture. Although their studies were not labeled as economics, the researchers did put prices on the various inputs used in

their experiments, and they reported the cost of production and profits under the varying techniques they tried.

Lines of work that would become departments were beginning to form in the administration of the college and the station. At this time they were called divisions. Most important of all, joint research-teaching positions were established, and the administration and other activities of the station and college were slowly being welded together.

NOTES TO CHAPTER 2

1. For a more complete treatment of the trials and tribulations of the station directors through the first 60 years of the Agricultural Experiment Station, see I. O. Schaub, *North Carolina Agricultural Experiment Station: The First 60 Years 1877-1937.* N. C. Agricultural Experiment Station, Bulletin No. 390, 1955, 120 pp.
2. *Ibid.*, p. 16.
3. Winters, Rhett Y. *Early Fertilizer Control Laws Challenged by the Fertilizer Industry.* School of Agriculture and Life Sciences, N. C. State University, History Series No. 4, 1967, 16 pp.
4. *Annual Report of the North Carolina Agricultural Experiment Station for 1879.* N. C. Agricultural Experiment Station, 1879, p. 25.
5. Schaub, *op. cit.*, pp. 18-19.
6. Annual Report . . . for 1879, *op. cit.*, pp. 146-47.
7. Schaub, *op. cit.*, p. 20.
8. *Ibid.*, p. 22.
9. *Annual Report of the North Carolina Agricultural Experiment Station for 1881.* N. C. Agricultural Experiment Station, 1882, pp. 116-19.
10. Schaub, *op. cit.*, p. 27.
11. *Ibid.*, pp. 27-28.
12. For a detailed report of Whitney's experiments, see Schaub, pp. 28-29, and *Annual Report of the North Carolina Agricultural Experiment Station for 1886,* 1887.
13. Following the Civil War there was a shortage of labor in North Carolina because of casualties and the emancipation of slaves. Immigration as a solution to this problem was promoted by the state for many years; however, it was never successful except in a very limited way.
14. Schaub, *op. cit.*, p. 31.
15. *Ibid.*, p. 31.
16. *Ibid.*, p. 47.
17. Withers, W. A. *The Sugar Beet in North Carolina.* N. C. Agricultural Experiment Station, Bulletin No. 180, 1901, 20 pp.

18. Battle, H. B., T. L. Blalock, and F. B. Carpenter. *Tobacco Curing by the Leaf Cure on Wire and the Stalk Processes.* N. C. Agricultural Experiment Station, Bulletin No. 86, 1892, p. 5.
19. Massey, W. F., and A. Rhodes. *Gardening Under Glass,* N. C. Agricultural Experiment Station, Bulletin No. 170, 1900, p. 34.
20. *San Jose Scale in North Carolina,* N. C. Agricultural Experiment Station, Bulletin No. 138, 1897, 14 pp.
21. For a detailed account of the establishment and operation of the horticultural station at Southern Pines, see N. C. Agricultural Experiment Station Bulletin No. 129, *Horticultural Experiments at Southern Pines, 1895,* 1896, pp. 157-202; and Bulletin No. 159, *Horticultural Experiments at Southern Pines, 1896,* 1898, pp. 93-174.
22. *Ibid.*, Bulletin No. 159, Preface.
23. Schaub, *op. cit.*, p. 43.
24. For more details on the early development of the biological sciences, see G. R. Noggle, *A History of the Botany Department,* processed report, Department of Botany, N. C. State University, 1978, 22 pp; and D. E. Ellis, *Plant Pathology in North Carolina 1776-1976,* School of Agriculture and Life Sciences, N. C. State University, 1976, 184 pp.
25. McCarthy, Gerald, *The Chestnut Weevil.* N. C. Agricultural Experiment Station, Bulletin No. 105, 1894, 12 pp. It is interesting to note there were problems with chestnut trees before the advent of the blight which was discovered in New York State in 1904.
26. Morris, Tom. *Poultry Can Crow at NCSU.* Raleigh, N.C.: Published by the author, 1980, p. 15.
27. Withers, W. A., and J. A. Bizzell, N. C. Agricultural Experiment Station. See Bulletin No. 153, Vinegar; No. 154, Coffee and Tea; No. 155, Baking Powder; and No. 156, Flour.
28. Withers, W. A., and H. W. Primrose. *Mineraline.* N. C. Agricultural Experiment Station, Bulletin No. 157, 1898, 8 pp.
29. Massey, Wilbur F. *Agricultural Suggestions to the Waldensians.* N. C. Agricultural Experiment Station, Special Bulletin No. 28, 1895.
30. Schaub, *op. cit.*, pp. 48-49.
31. *Ibid.*, p. 49.

3

The Farmers' College (1887-1900)

The first faculty. Courses of study. The first classes. Time for play. Increased facilities. Agricultural students needed. Poor with potential.

"MR. PULLEN WALKED AHEAD OF A PLOW, held by a small negro boy, and Mr. J. Stanhope Wynne led the mule over the lines indicated by Mr. Pullen."[1]

Thus did the grantor of the land for the North Carolina College of Agriculture and Mechanic Arts divide his land between the new institution and the city park (Pullen Park), using the best of agricultural technology (a plow and a mule) as it was known in 1887.

Available agricultural know-how was also useful in getting the college grounds in shape. Following the laying out of walks and drives, a landscape program was started. On December 9, 1887, the trustees authorized the executive committee to plant grapevines, shade trees, and fruit trees. B. S. Skinner was employed as superintendent of farm and garden and instructed by the trustees to plant the college grounds in peas, "using by way of experiment . . . several kinds of fertilizing matter, such as lime, phosphate, etc., on the same kind of ground and noting results of same for future use." By May, 1889, Skinner was able to report that the college lands were all reclaimed and in cultivation, except about seven acres which were ditched.[2]

Alexander Q. Holladay, the first president, had been described as a lover of nature and one of the first to advocate the observance of

Arbor Day. He is credited with getting the first trees planted on the campus—originally an open field.

The First Faculty

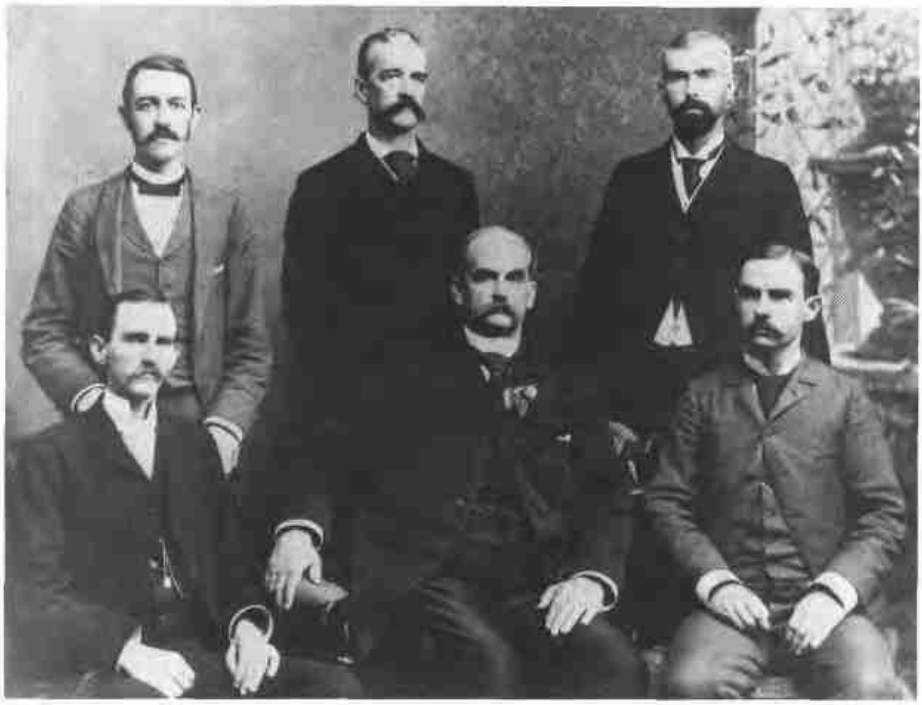
Fully aware that land, money, and buildings alone would not make a college, the trustees on December 6, 1888, began to make plans for a faculty, courses of study, and entrance requirements for students. The board approved the establishment of a professorship of agriculture, livestock, and dairying; a professorship of horticulture, arboriculture, and botany; a chair of pure and agricultural chemistry; a professorship of practical mechanics and pure and applied mathematics; and a chair of English and bookkeeping. The trustees also provided for an assistant in the mechanical department to teach drawing and carpentry, a foreman of farms and garden, a steward, and a matron.

The trustees elected Joseph R. Chamberlain to be professor of agriculture. He had come to North Carolina as an agriculturist with the Agricultural Experiment Station shortly before the opening of the college.

Wilbur Fisk Massey was chosen to fill the chair of horticulture, arboriculture, and botany. He was trained as a civil engineer at Washington College in Maryland, but following his service in the Civil War Massey served as an administrator in the Kent County, Maryland, school system and at the same time developed a nursery and florist business. From his experiences and his own horticultural enterprises, Massey formulated strong ideas about the sensible use of land that he determined to promulgate as an educator. Consequently, in 1884 he took a position as professor of horticulture at the Miller School near Charlottesville, Virginia. His teaching of practical agriculture brought him to the attention of land-grant-college educators in both Virginia and North Carolina. Twice he declined offers of a professorship at Virginia Polytechnic Institute before accepting the position in Raleigh.

W. A. Withers of Davidson College in North Carolina was elected professor of pure and agricultural chemistry. He held A.B. and A.M. degrees from Davidson College and had done postgraduate work at Cornell University. Since 1884 he had been assistant chemist with the North Carolina Agricultural Experiment Station—his first job.

B. S. Skinner remained as superintendent of farms until around 1910.



The first faculty. Left to right, front row—W. A. Withers, President A. Q. Holladay, D. H. Hill, Back row—J. H. Kinealy, W. F. Massey, J. R. Chamberlain.

In 1890 the trustees employed Frank E. Emery as assistant professor of agriculture and as agriculturist of the experiment station. He held B.S. and M.S. degrees from Maine State College and had been farm superintendent of Houghton Farm in New York and superintendent of the New York Agricultural Experiment Station.

Benjamin Irby replaced Chamberlain as professor of agriculture in October, 1892. With B.S. and M.S. degrees from the Mississippi Agricultural College, Irby had served as a professor of agriculture there during 1887-88. He was manager of the Cycloneta Experiment Farm of the Georgia Southern and Florida Railroad from 1888 to 1892. Chamberlain apparently left the college and station to go into business. At about the time of his departure he formed his own corporation, the Caraleigh Phosphate and Fertilizer Works, in Raleigh.

From the beginning there were joint appointments between the college and the station. Chamberlain, station agriculturist, was elected professor of agriculture in the college in 1889 but continued the supervision of the station farm until the end of the year. In December, 1889, Massey was elected to serve as horticulturist of the station in addition to his faculty position.

Courses of Study

Only two general fields of instruction were available—agriculture and mechanics—when the students arrived in October, 1889. Agriculture included courses in general agriculture, horticulture, arboriculture and botany, chemistry, history, English, and bookkeeping. Also, agricultural freshmen were required to take shop and drawing to give them "dexterity in the use of wood working tools and in mechanical drawing." Graduates received the degree of Bachelor in Agriculture.

The first catalog issued for the young college in June, 1890, proclaimed that full courses of everything relating to the economy of the farm, including the utilization of waste, would be thoroughly studied.[3]

There would also be required manual labor, mainly work on the college farm. The 1890 catalog stated:

> While all students in this course are required to perform such manual labor in the hours for practice as in the opinion of the professors is necessary and instructive, they are not required to waste time in matters of mere drudgery, of which the majority of them have already learned before coming to us. We endeavor to keep in view the fact that our course is not intended as a training school for farm laborers, but for the development of brain power in Agriculture and Horticulture, and the training of the administrative ability of students in directing the great army of uneducated muscle which constitutes our farm hands. While taught that no labor is beneath the dignity of a thorough farmer when necessary, the chief effort will be to form habits of close observation and economical administration, and to inculcate broad ideas as to the possibilities of American agriculture, and thus send them out as *leaders in improvements*, instead of mere followers in ruts of other men's making.

In addition, if not a part of the coursework, certain work could be done by students on the farm and about the college at 7 cents an hour.

There was ample land on which the students could work. The two or three buildings took up only a small amount of the 60 acres donated by R. S. Pullen. About one-third of this tract was on the north side of the North Carolina Railroad, between the railroad tracks and Hillsboro Road in sort of a triangle. The eastern leg roughly followed Pullen Road next to the land Pullen had granted the city for a park. The northern leg ran about 1,000 feet along Hillsboro Road. The western leg of this triangle ran almost due south from Hillsboro Road for 1,385 feet, across where the Link Building (between Tompkins and Winston buildings) was completed in 1981, across the area where

Riddick Stadium was later constructed, to the railroad and a point almost touching the eastern line following Pullen Road.

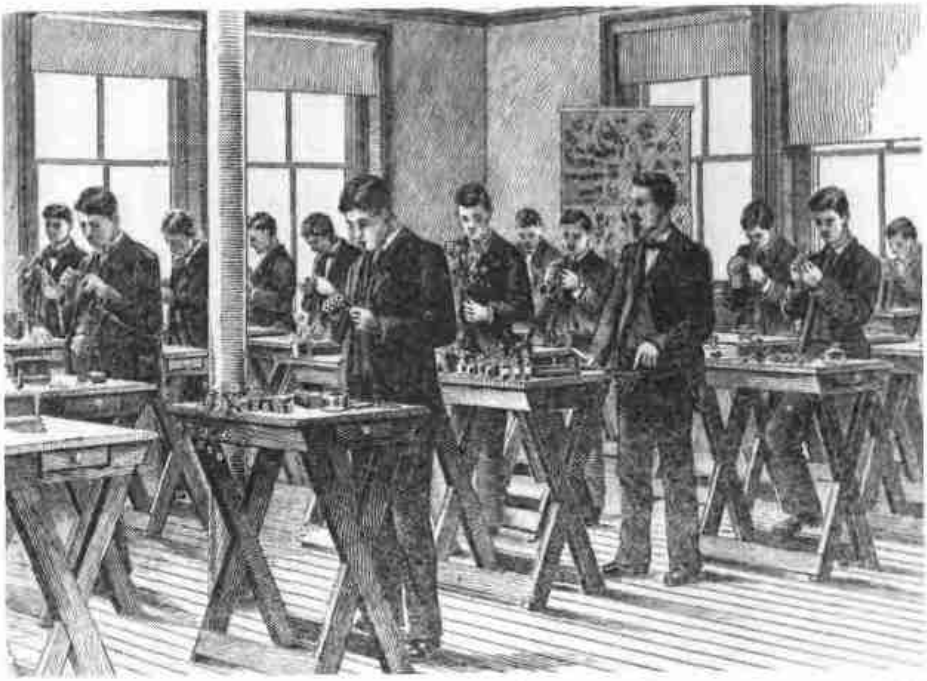
The area of the Pullen grant on the south side of the railroad followed the tracks and extended from Pullen Road on the east to beyond the later location of the William Neal Reynolds Coliseum on the west, then south to (and at one point across) the small stream known as Rocky Branch.

Professor Chamberlain viewed a proper mix of theory and practice as necessary for students studying agriculture. "Science is the foundation on which improved agriculture is based," he wrote in the first catalog. On the other hand, he said field and shop work supplemented the lectures and recitations in such a way that the application and value of the principles taught might be thoroughly understood and remembered by the students, and as much time as possible would be given to practical shop and field work.

Gulley's *First Lessons in Agriculture* was the reference book listed for the freshman year, when students concentrated on "the fundamental and essential principles of agriculture." Second-year students concentrated on livestock, while seniors looked closely at crops and soils. The junior year contained the study of both plant and animal agriculture, along with engineering aspects.

In the Department of Horticulture, Arboriculture, and Botany, Professor Massey also advocated that theory went hand in hand with practice in the study of vegetable culture, small fruit culture, nursery

The first class, spring, 1890, working on the college farm at a location southwest of Holladay Hall.



The first class, with Professor Massey, in the botanical laboratory, 1889-90.

practice, orchard culture, and ornamental gardening. He envisioned his graduates as being prepared to be professional horticulturists, adept in such occupations as greenhouse propagation, floriculture, forestry, landscape; and the forcing of fruits, flowers, and vegetables under glass. The students in this department were provided some study in insects, "so far, at least, as to enable the student to gain a general acquaintance with those insects which are injurious or beneficial to Agriculture and Horticulture." This study was the first entomology offering in the new college. In 1892 Massey reported that he was providing some instruction in forestry.

In the Chemistry Department, juniors in agriculture and horticulture received instruction in plant physiology, fertilizers, animal feeds, and chemistry of animal products.

As to the future of these young men when leaving the institution, the first catalog declared: "The College is intended, not to produce theorists, but practical young men, who will become intelligent farmers, horticulturists, cattle and stock raisers, dairymen—men who will be interested in their work, and who will make their work profitable."

In the fall of 1893 another course of study—applied science—was added. Outside of the required general studies, it included electives in entomology, zoology, and botany.

Beginning with the school year of 1893, the college offered post-graduate courses in agriculture and mechanics. The work, extending through one year, included courses "carefully adapted to the expansion and development of the special lines of study selected by graduate students for a professional calling." The work in agriculture led to the degree of master of science, and the work in mechanics to the degree of mechanical engineer. The trustees apparently had doubts concerning the college's ability to finance a graduate department, but they approved such instruction provided the expense to the college did not exceed $250 a year.[4]

In 1893 Professor Irby proposed a short winter course in January and February, when farm work would be light, for the young men who did not have the time, money, or opportunity to take the regular four-year course. (Such a course was introduced into the program in 1901, with winter short courses in agriculture and dairying.)

There were three "courses of instruction" offered from 1896 to 1899—agriculture, engineering, and science. The 1899-1900 college catalog listed three somewhat different "lines of study." They were agriculture, engineering, and textile industry. The agriculture line included agriculture, animal industry, and horticulture.[5]

The student could choose from full courses, short courses, or special courses. The full course offered a combination of practical and theoretical work, with about half of the time in lectures and recitations and the other half in the shops, laboratories, drawing rooms, greenhouses, dairies, fields, and mills. This course was intended to furnish both technical and liberal education, and the bachelor's degree was conferred upon completion of the course.

Short courses concentrated on the practical work, with less theoretical instruction, and ran for one or two years. Special courses were available for mature and experienced persons, under the guidance of the faculty. These special courses could include only a single subject. The students who took them were excused from military exercises and were not expected to room at the college.

Military instruction was required of all regular students, and the freshman program was the same for all. When George T. Winston became president in 1899 he instituted and taught two required courses—civics for freshmen and political economy for the seniors.

All students seeking admission to the freshman class of the four-year courses were required to take entrance examinations.

Applicants to the one- and two-year courses were admitted without examination if they were 18 years of age.

The subfreshman class, which had been organized during President Holladay's administration, was discontinued by President Winston. Those students found to be deficient in one or more subjects were allowed to register as regular students, but they were required to take "condition" examinations and remove any deficiencies marked on their rosters. The residence requirement for advanced degrees was raised from one to two years, and the course requirements and research work for graduates were considerably broadened.

The First Classes

Student attrition was high. Of the 72 who started in the first class, only 19 made the graduation line in the spring of 1893.

Although 72 percent of the 79 students in the second freshman class in 1890 were sons of farmers (63 percent in 1891), only three of the first graduating class studied or majored in agriculture. Charles Edgar Seymore returned to his home of Louisburg, where he farmed until his death in 1907 or 1908. George Pender Gray worked as a farm manager in Florida and Tennessee until about 1907 when he became a salesman in Alabama. A year later he returned to his hometown of Tarboro as a representative for a phosphate company. He died at Tarboro in 1932. Frank Theophilus Meacham stayed on to receive in 1894 the first master's degree given by the college. From 1895 to 1898 he was foreman of Biltmore Dairy near Asheville, followed by four years as superintendent of a state-owned farm at Morganton. In 1903 he was named superintendent of the new Piedmont Test Farm near Statesville, where he remained until his death in 1930.

For the two from the first class who would make the greatest records in agriculture, the commencement program listed their major course as chemistry. Charles Burgess Williams was born at Shiloh in Camden County in 1871. In college he was captain of the first football team and class valedictorian. He spent the balance of his life at the college, where he became the first head of the Department of Agronomy, a director of the Agricultural Experiment Station, and the first dean of agriculture. Samuel Erson Asbury graduated second in the class for B.S. recipients (behind Williams). After a brief stint as assistant chemist with the Agricultural Experiment Station he jour-

Students in the first class. Middle row, second from right—C. B. Williams. Back row, left—S. E. Asbury, fourth from left—F. T. Meacham, second from right—C. E. Seymore, right—G. P. Gray.

neyed to Texas, where for 42 years he was a chemist with the Agricultural Experiment Station there.

Upon graduation, the agricultural graduates went into a wide variety of activities. From the class of 1894, Charles Edward Corpening was a farmer and lumber dealer at Lenoir. Benjamin Franklin Walton spent most of his lifetime on a Wake County farm, but he did return to the college campus and worked with the Agricultural Experiment Station from about 1902 to 1908. He was listed as an assistant in field experiments. Robert Donnell Patterson, Jr., farmed with his father for five years after graduation. Then he returned to the campus and received a master's degree in chemistry, after which he spent some five years with the American Tobacco Company. In 1904 he joined the First State Bank of Chase City, Virginia. In 1910 he was made president of the bank.

From the class of 1895, Edwin Speight Darden was associated with tobacco warehouses in Wilson until he moved to Stantonsburg in 1912, where he was listed in the alumni directories (printed as a part of the early college catalogs) as a farmer and merchant. On his death in 1921 at age 41, a local newspaper described him as "a prominent business man of Stantonsburg." James Adrian Bizzell,

who was awarded a bachelor's degree in chemistry in 1895, received a master's degree from his alma mater in 1900, where he had been an assistant in chemistry and an instructor since graduation. He received the Ph.D. in chemistry from Cornell University in 1903 and remained there as a chemist at the New York Experiment Station and professor of agronomy for 41 years. James Washington Brawley, after a brief stint as a farmer near Mooresville, spent the remainder of his working lifetime in insurance and real estate in Greensboro. Walter Austin Bullock supervised farming operations in Georgia and Puerto Rico until he moved to a farm near Red Springs in 1915.

A number of students who would contribute much to practical agriculture, including I. O. Schaub, majored in the science program in the late 1890s. On the other hand, others, like Edwin B. Owen, graduated in agriculture (with the class of 1898) but never practiced the profession for which they were trained. Owen did, however, support his alma mater throughout his life. After serving as an English instructor and librarian at the college, he held the post of college registrar from 1907 until 1928. He also served part time as the first alumni association secretary and during World War I established the *Alumni News* as a means of maintaining communications with the many graduates in the armed forces. Owen dormitory on the campus was named for him.

Student achievement was singled out. In 1893 a system of prizes was set up. To the student who most distinguished himself in the agricultural work would go a gold medal valued at $10. A medal or the $10 would go to the student who, in addition to his class work, earned the most money by his skill in agricultural labor outside the classroom. The student earning the next highest amount would get $5 or a medal worth this amount.

The awards were first offered in 1894. The medal was presented to Laurence Jay Rumple of Mecklenburg County; the other $10 medal to Marion Jackson Green of Rutherford County; and the $5 medal to Webb Chitmond Yarborough of Caswell County. These were sizable amounts of money, considering that their labor was worth only 7 cents per hour and tuition for a session was $20.

The 1896 commencement program, as printed in the 1896-97 catalog, listed the graduate theses for the first time. Two were from agriculture and horticulture: Daniel Allen of Wake County, "The use of glass in plant forcing;" and William Colbett Jackson of Pitt County, "How to drain the soil of surplus water, and at the same time store up a normal supply for future use."

Time for Play

Formal student activities included membership in such organizations as the YMCA, a branch of which was established on the campus during the fall of 1889; the Pullen and Leazar literary societies; and the Agricultural Society. Physical education and some sports were available for the students.

Informal student pastimes supplemented the formal activities, often with a rural flavor.

> Rivalry between dormitories, classes, and the farmers and the engineers was often keen, and occasionally they settled their differences in a "rough-house free for all" or by individual combat. The agricultural students, who in the early days received considerable field practice, were sometimes hard to control. It is reported that clods flew rather freely at times and that students could "burn one another up" painfully with Irish potatoes or green apples. The lessons in plowing and milking afforded considerable pleasure to the boys when it fell to the lot of a city chap to hold the handles and guide the mule or to persuade the cow to stand still and be milked.
>
> College pranks did not begin or end with Halloween. It was great sport to whistle in the halls, especially when it was known that President Holladay strongly disapproved of whistling indoors. It was still more fun, however, to pour a bucket of water on an unsuspecting cadet or to turn Mr. Skinner's pigs out and then proceed to catch them and put them back in the pen again.[6]

Increased Facilities

Excepting a small barn and the experiment station buildings, Holladay Hall housed all other college activities in the beginning; during the 1890s, however, the college experienced a slow but steady growth.

A model barn was completed in 1892 "containing silos, stables, cowstall, etc., of the most approved description." It was 50 by 72 feet in size, three stories high, and was just west of Holladay Hall in the area later occupied by Leazar Hall. A dairy barn, 20 by 40 feet, was soon added, the upper story of which was used as the Agricultural Society Hall.

Primrose Hall was completed in 1896. It was named in honor of William S. Primrose.[7] The 42-by-42-foot structure contained two stories, all for use by the Department of Horticulture, Arboriculture, and Botany. The lower or basement floor contained the horticultural laboratory and boiler room. On the second floor was Professor Massey's office and the botanical laboratory. Attached to Primrose Hall were five greenhouses.

The first barn, from 1892 to 1911, where Leazar dining hall was later located.

Other buildings in use by 1896 were Watauga Hall, which housed the dining facilities on the first floor and 26 dormitory rooms on the two upper floors; the engineering building, located about where Peele Hall was later built; and four small brick dormitories, named First, Second, Third, and Fourth in the order of their completion.

The purchase of a second tract of land, 17.8 acres from J. C. L. Harris in 1892, between Hillsboro Road and the railroad, extended the campus westward across a small stream and up the slope to about where Ricks Hall was later located.[8] The slope on both sides of this stream, like most North Carolina land, was subject to erosion when in cultivation. Mangum terraces were built on both sides of the stream about 1895.[9]

Experiment station facilities were available to the teaching program. In 1896 Massey reported that the "glass grapery at the Experiment Station, where exotic grapes are grown under glass, furnish means for practical study and illustration." However, a resolution of the new college Board of Trustees on December 5, 1889, had spelled out that "the students of the College are not permitted to interfere in any way with important experiments."

Major campus expansion occurred in 1898 and 1899. In 1898 the college bought 15 acres from the North Carolina Agricultural Society, which operated the State Fair located on the north side of

Hillsboro Road. This tract joined the Harris tract (bought in 1892) and, except for some small lots along Hillsboro Road and in the area where Patterson Hall was later built, extended the campus westward to about where Harrelson Hall and the D. H. Hill Library were later located.

Two tracts, totalling 288 acres on the south side of Rocky Branch, were bought from C. H. Belvin in 1899. This large tract joined the Pullen grant on its southwestern side and extended well south of Western Boulevard. It included the area between the branch and Western Boulevard that would later be used for the School of Forest Resources, Weaver Laboratories, Schaub Hall, King Village (married student housing) and the research complex on Method Road. Also on this property, south of Western Boulevard, were later located the Jane S. McKimmon Continuing Education Center, the television studio, and Fraternity Court. This purchase represented one of the few times in the history of the institution that land was obtained well ahead of the time when there was a critical need for it.

There was limited contact with other institutions:

> In 1890 the Second Morrill act appropriating Federal funds for land grant colleges was passed. Col. L. L. Polk and other North Carolina leaders lost no time in advancing the claim of the A&M College for the financial support provided by the act. Immediate payment, however, was questioned because North Carolina did not offer technological instruction to Negroes. To meet the requirements of the law, pending the establishment of the Negro A&T College near Greensboro, President

Primrose Hall with its accompanying greenhouses, built in 1892, housed the horticultural department.

Holladay and the trustees made arrangements with the officials of Shaw University in Raleigh for A&M College professors to give technological courses to the Negro students of that institution. The plan was a success and for a short time Shaw was considered an annex of the College. With the establishment of the Negro A&T College in 1891, the official relationship between the institutions came to an end.[10]

Agricultural Students Needed

During the 1890s there was slow but steady growth in the A & M College student population—from 100 to 300 students. But a large number of students failed to graduate—only 12 in the class of 1898 received their bachelor's degrees. Although most of the students came from rural areas of North Carolina, only two from this graduating class had majored in agriculture. The proportion of agricultural graduates in other years were 8 of 21 in 1897, 2 of 16 in 1899, and 2 of 22 in 1900. The board of trustees minutes of June 6, 1899, summed up the situation: "President Holladay then made his report, showing marked growth and development in the entire institution except in the department of agriculture which was not a satisfactory condition."

This lack of interest in agricultural education was not consistent with either the economic health or needs of the state. The 1900 Census of Population showed 1,893,810 citizens of the state—a healthy 17 percent increase for the 1890s decade. Some 64 percent of all workers in the state (male and female) were employed in farming.

There were 224,637 farms in the state, with an average of 101.3 acres each. As shown in the table below, members of both white and black races made up a significant number of farmers, and both groups were represented in the large number of tenant-operated farms.

Farms in North Carolina in 1900, by Tenure and Race

Type of Operation	White	Black
Number of farms	169,773	54,864
Percentage of all farms	75.6%	24.4%
Owners	100,320	13,204
Part owners	11,224	4,230
Owners and tenants	1,508	86
Managers	936	121
Cash tenants	9,585	10,331
Share tenants	46,200	26,892

The annual value of farm products was around $90 million. Some $10 million of this amount went to feed the farmers' livestock. A count of the animals at the feed trough revealed 1,410,000 hogs, 561,000 cattle of all types, 220,000 sheep, 157,000 horses, and 135,000 mules. Chickens ran around most farmyards but were raised mainly to put meat and eggs on the farmer's table. About one-tenth of the farms in the state were classed by the census takers as livestock farms.

This left a lot of room for crop production. A total of 2,700,000 acres were in corn, with an average yield of around 12 bushels per acre. The state's cotton farmers were averaging slightly more than 200 pounds of lint per acre on their one million acres. Tobacco yield averaged 580 pounds per acre on the 205,000 acres grown in 1900. Selling price was 7 cents per pound. Wheat acreage was at 800,000, with a yield average of around 8 bushels per acre. Some half million acres were in hays of all types, and oats used up 250,000 acres. Other important crops were peanuts, sweet potatoes, and peaches.

The value of all land and buildings figured out at $9 per acre, or less than $1,000 per farm.

Poor with Potential

Progressive Farmer Editor Clarence Poe, speaking at the 1953 dedication of Kilgore Hall, gave his recollection of North Carolina agriculture at the turn of the century:

> The outlook for North Carolina agriculture was certainly not good in the first half of 1899 when Dr. Kilgore came back, nor in the latter half when I became editor of the *Progressive Farmer*. North Carolina at that time was still called 'The Rip Van Winkle State' it had so long been asleep, and some punster has said that if Resurrection Day had come and North Carolina had heard the call to 'Come forth,' it would have come fifth. Even a distinguished and brilliant President of State College, Dr. George T. Winston, publicly declared in substance that as he could see no real future for North Carolina as an agricultural state we should concentrate on its industrial development. Ten times more people farmed by the moon's phases than farmed by our agricultural colleges.[11]

Agriculture was not booming in 1899, but the situation was considerably brighter than it had been 10 years earlier when the whole economy was depressed and the poor farming picture had led to the formation of the Farmers Alliance and the Populist protest movement.

But productivity and efficiency were low. Big changes were

needed. What were the steps that should be taken to improve the state's agriculture?

Agricultural science—if there was such a thing—did not have many answers. Vaccine to prevent the costly blackleg disease in cattle had been developed in 1897. A year later the first standards for processed foods were established, and soil classification and mapping had begun.

In 1899 plants were bred to resist disease, and methods of pasteurizing milk had been improved.

The relationship between the housefly and human health would be pointed out in 1901. The cause of hog cholera would be discovered in 1903. Of particular significance to North Carolina, researchers in the Bureau of Animal Industry of the U.S. Department of Agriculture had in 1889 recognized and described the organism responsible for the cattle tick fever. They discovered that the intracellular parasites (Protozoa) which were the direct causative agents of the disease required the cattle tick as an intermediary host for the organism. This was the first experimental proof furnished on the subject of disease borne by insects or diseases that could be carried from one animal to another by an intermediary host. Additional experiments from 1895 to 1897 had demonstrated the feasibility of immunizing cattle against tick fever, and a chemical solution in which to dip tick-infested cattle had been developed.

Professor F. E. Emery and a student lay off a Mangum terrace on the campus in the 1890s. Emery (right) is standing about where South Dormitory (later called Syme) was later constructed. The student is standing on the newly-constructed terrace. Buildings include (right to left) dormitories, the power plant, and the barn. Just to the left of the barn is the dairy building. In the background to the left can be seen the pavillion on the state fairgrounds. Just to the right of the barn is the home of J. R. Chamberlain on the north side of Hillsboro Road.

And the professors of A & M College had inculcated in their young, and perhaps sometimes eager, students a belief that there was a better way. In 1897 a student had spelled it out. Albert Hicks Oliver of Mount Olive was one of five students selected to speak at the 1897 commencement. His topic was "The New Agriculture":

> There is today the new modern in almost everything except agriculture, and now the time has come when even the farmer must awake and seek to improve his mode of labor and economy of time and energy. Brain must be mixed with brawn in the corn field as well as in the counting house or giant factory.
>
> Land is becoming limited in quality and high in price as the population of the world grows, and something must be done to increase the productiveness of what is available to the small farmer. Science must be called in and aid in pushing forward the work which art and simple toil can no longer accomplish.
>
> Farming, more than any other calling in life, gives opportunity for the use—the practical and profitable use—of all the sciences. He needs to know chemistry, botany, geology, biology and the whole catalog of science. He may never know them all, but if he does he will find good use for them. The farmer ought to be one of the best educated men in the land.
>
> Why should there not be special training for farmers as there is for the lawyer or doctor? The condition of the farmer today is bad, the discontent is great and various reasons have been assigned for it, but one reason that is not often spoken of, though it is the greatest and most potent reason of all—ignorance. The farmer toils long and late, but finds himself growing steadily poorer, and all because he does not work intelligently.[12]

Was it time for the sleeping giant to be aroused? Could this young college lead the way?

There had been good support and steady growth for 10 years. But in the elections of 1896 the fusion of the Populists and the Republicans brought new faces to the state capitol in Raleigh. The General Assembly of 1897 provided for a new board of trustees for the college, to be appointed by the governor.

The Populist party was made up of farmers who had given loud support to the founding of the college in the first place. But when they came into power they showed no reluctance to tear down what they had contributed so much to building.

The new Board of Trustees met on June 19, 1897. Heads rolled. Two long-term agricultural professors and the director of the Agricultural Experiment Station were the first to go.

NOTES TO CHAPTER 3

1. Lockmiller, David A. *History of the North Carolina State College.* Raleigh, N.C.: N.C. State College, 1939, p. 27.
2. *Ibid.*, pp. 37-38.
3. *Catalog of the North Carolina College of Agriculture and the Mechanic Arts, 1890,* pp. 10-11, pp. 13-24.
4. Lockmiller, *op. cit.*, p. 49.
5. As listed in the 1899-1900 catalog, the courses under agriculture were "Elements of Agriculture, Staple Crops, Farm Drainage, Meteorology, Experiment Station Methods, and Agricultural Economics." Animal Industry courses included "Dairying, Breeds of Live Stock, Dairy Bacteriology, Cattle-feeding, Veterinary Science, Stock-breeding, and three courses of practical work." Horticulture courses were "Market Gardening, Floriculture, Landscape Gardening, Green-house Propagation and Garden Practice, Plant-breeding, Pomology, Horticultural Practice, and Forestry."
6. Lockmiller, *op. cit.*, pp. 56-57.
7. William S. Primrose (1848-1909) was the first chairman of the Board of Trustees, a long-time member of the Watauga Club, and one of the strongest proponents of an agricultural and industrial college. He was well educated and had been prominently mentioned as first president of the college. Business connections in finance and insurance, as well as his keen interest in the progress of the state, made him constantly aware of the need for technical education in North Carolina. In addition to 20 years on the college's Board of Trustees, the lifelong Raleigh resident supported the college in other ways.
8. This stream was placed underground in a 41-inch concrete culvert, from its beginning along Hillsboro Road to Rocky Branch. Presumably this work was started when Riddick Field was developed as an athletic field in 1907.
9. The Mangum terrace was developed by Priestly Hinton Mangum (1829-1907) in 1885 on his farm near Wake Forest. It was the first scientifically designed system of erosion control in the United States. The main feature of this terrace was that it was low and broad. In addition to moving the water gradually from the land, it could be farmed and crossed over with farm equipment. This development was hailed as a major contribution to agriculture at the time, and Mangum terraces replaced open ditches on many North Carolina farms, or added water control systems to otherwise gullied fields. At one time a campus building housing the Department of Agricultural Engineering carried Mangum's name. (See A. M. Fountain, *Place-Names of State College Campus,* N.C. State College, 1956, p. 21.)
10. Lockmiller, *op. cit.*, pp. 64-65. (A & T was originally named A. and M. College for the Colored Race. It became Agricultural and Technical College in 1915.)
11. Kilgore Hall dedication program, in N.C. State University Archives.
12. The *News and Observer,* Raleigh, N.C., June 10, 1897, p. 3.

4

Political Ferment

Board changes through 1895. Populists and Republicans. Withers named acting director. More political change. Recommendations for change. Money problems. Castigation from Washington. Board of Visitors. A new board of trustees in 1907. Back to the drawing board in 1911-12.

IN ITS EARLIEST DAYS, the North Carolina Agricultural Experiment Station traveled a rough political road.

Board Changes Through 1895

The act establishing the Agricultural Experiment Station as a part of the North Carolina Department of Agriculture in 1877 created a board of agriculture consisting of the governor, president of the State Agricultural Society, state geologist, master of the State Grange, and president of the state university. These five then selected two farmers for membership on the board.

In 1883 the composition of the board was changed by eliminating the state geologist and the two farmers and adding one member from each congressional district.

Another change in the composition of the Board of Agriculture came in 1887 when the president of the State Agricultural Society and the president of the university were dropped from the board. This arrangement continued for two years.

In 1887 the General Assembly passed the bill creating the Agricultural and Mechanical College and directing the transfer of the teaching of agriculture and mechanic arts from the university at

Chapel Hill to the new location in Raleigh. The same General Assembly directed the transfer of the Agricultural Experiment Station from the Board of Agriculture to the board of trustees of the A & M College as soon as the physical facilities would permit. This transfer took place in 1889 and has been called "the first divorce" of the Agricultural Experiment Station from the North Carolina Department of Agriculture.[1]

But it was not a full separation. The 1887 action directed that this new board of trustees for the college would be composed of the Board of Agriculture (which had 10 members at that time) plus five others to be appointed by the governor with the consent of the Senate, thus creating a 15-member board. It is doubtful if the bill could have been passed without the support of the Republican members of the General Assembly, so the bill specified that the board should be composed half of each political party.

There must have been some difficulty in dividing 15 so as to have half Democrats and half Republicans, for this provision was eliminated by the next General Assembly in 1889.

The agreement regarding the transfer of the station to the college's Board of Trustees provided that the station would continue to make the chemical analyses in connection with fertilizer control, which remained a legal responsibility of the Department of Agriculture.

This Board of Trustees served from 1889 to 1895 when the Board of Agriculture was again made the Board of Trustees for the college—the second marriage for these agencies. However, this 1895 arrangement lasted only two years.

Populists and Republicans

In the election of 1896, the fusion of the Populists and Republicans elected a governor and the majority of the members of the General Assembly.[2] The General Assembly of 1897 provided for a new board of trustees for the college to be appointed by the governor and brought about the second divorce of the Agricultural Experiment Station from the Department of Agriculture.

J. C. L. Harris of Raleigh headed the new College Board of Trustees. The majority of its members were Republicans, but some Democrats were included. One of the most active members was J. R. Chamberlain, who had been agriculturist for the station when it was

first made a part of the college and who was the first professor of agriculture at the college. At the first meeting of the new board on June 10, 1897, Chamberlain offered a set of 36 resolutions, most of which dealt with the station.

Discharged by the board at its first meeting were Experiment Station Director H. B. Battle; professors R. E. L. Yates (Mathematics) and Benjamin Irby; assistant chemists W. M. Allen, S. E. Asbury, and B. W. Kilgore; and Secretary A. F. Bowen. Gerald McCarthy, botanist and entomologist, felt the ax on September 1; two clerks and another assistant chemist were dismissed in February, 1898.[3]

Botanist Gerald McCarthy brought what is believed to be the first suit against the college or station as employer. Since joining the station staff in 1888, he had had a series of two-year appointments, the last one made on June 30, 1896. When he was fired on September 1, 1897, McCarthy claimed that there were still 10 months on his contract, and he filed suit in court to force the station to pay him for the remainder of his contract.

On March 22, 1900, a committee of the Board of Trustees appointed to consider the claim reported that they had employed counsel to defend the case and that the suit was then pending in Wake superior court.

Apparently McCarthy's case was dismissed by the court, and McCarthy appealed to Gov. Charles B. Aycock. Aycock asked Attorney General Robert D. Gilmer to investigate the matter. Gilmer advised the governor on May 23, 1902, that McCarthy had no legal right to compensation, but he felt that some compensation was in order. This information was passed on to the board, and McCarthy's lawyer appeared before the board to ask for compensation.

One question raised at this time was whether the station, receiving an annual appropriation from the federal government, could make a commitment to an individual for more than one year at a time. A second question was whether funds could be used to compensate someone for a service that had not been rendered regardless of the merits of the claim.

On July 18, 1902, it was noted by the board of trustees that the case was still active, and the matter was referred to the finance committee of the board.

The last entry on this matter in the board of trustees meeting minutes was recorded on May 26, 1903. At that time the board instructed the chairman to "submit Mr. McCarthy's claim to the

decision of our Attorney, and if the Attorney shall decide that the Board has the right to pay the accord out of the earnings of the Experiment Station then the chairman is authorized to settle the case on such term as he deems just . . . that the amount of settlement shall not exceed $500." The final disposition of this case is not known.

Withers Named Acting Director

Dr. W. A. Withers, professor of agricultural chemistry at the college since its opening in 1889, was named acting director of the Experiment Station at that first meeting of the new college Board of Trustees on June 10, 1897. Withers later stated that he had no knowledge that such action was to take place when he was named acting director and he was "highly appreciative of this distinguished mark of confidence." However, Withers served as director in a trying period, and whatever the intention of the board to name a permanent director, Withers continued as acting director during the two-year life of this board.[4]

There were many personnel changes. Other new appointments on July 1, 1897, were C. B. Williams to be chief chemist to the Fertilizer Control Station, and four assistant chemists. On September 1, James M. Johnson was named assistant agriculturist and C. W. Hyams assistant botanist.[5]

In the veterinary science area, Dr. F. P. Williamson resigned in 1898 and was succeeded by Dr. Cooper Curtice. Curtice remained with the college and experiment station only a few months, when he was transferred to the North Carolina Department of Agriculture. The Veterinary Division was established in the department, and he was named state veterinarian.[6]

The question of consulting came up with the Curtice appointment in 1898. The minutes for the August 9 meeting of the board of trustees stated: "Mr. Bonitz moved that Dr. Cooper Curtice be elected as Biologist and Veterinarian, with the condition that he shall not do any private veterinary practice except under the direction of the Board of Trustees. Adopted."

The 1897 college Board of Trustees was in control and acted in an arbitrary manner down to the last detail. Work was assigned and salaries allocated. Where applicable, each person had both college and station duties assigned, in the words of the board, "In order to unite the Experiment Station more intimately with the College and to

W. A. Withers

make the Department more efficient, and at the same time to save funds."

The board was quite free with station funds, making allocations and division of salaries with little regard to work activity of the recipient. The chairman of the board and of the executive committee was voted a salary of $250 per year, $50 to be paid by the college and $200 by the experiment station. At a later meeting of the executive committee it was voted to pay for the telephone in the residence of the chairman—one-half from the college and one-half from the station.[7]

The executive committee on June 29, 1897, ordered the administrative headquarters moved from the Department of Agriculture building in downtown Raleigh to the college. It had been 10 years since the General Assembly made the station a part of the college, but there had been no physical transfer. Since the director reported directly to the board, the union with the college had been largely in name only.

The college Board of Trustees appointed a station council under which the research work would be guided. On the council were President Holladay, Acting Director and Chemistry Professor Withers, Professor of Agriculture Emery, and Professor of Horticulture Massey. When Cooper Curtice joined the station staff as veterinarian in 1898 he became the fifth member of the council.

Meetings of the council dealt largely with minor details, but there was some serious business from time to time. The matter of finances arose more than once, for expenses each year were greater than income. This problem was usually solved by reducing the allotments for supplies during the last few months of the fiscal year.

There were clashes of personalities, especially between Emery, the agriculturist, and Massey, the horticulturist. One area of conflict was control and use of the 10-acre station farm.

At a meeting in September, 1897, Director Withers proposed a system of weekly reports from each division on work completed, work

in progress, work proposed, and recommendations. Objection was raised to the increased routine, so a compromise was reached by making the reports monthly.

More Political Change

The Democrats gained control of the state administration in the November, 1898, election and the General Assembly that met in January, 1899, provided for a new Board of Trustees of the college which, of course, was largely Democratic.

W. S. Primrose of Raleigh was named head of the new board, which interestingly included J. C. L. Harris and four members of the outgoing board among the 21 members. Not surprisingly, Joseph R. Chamberlain was not one of them.[8]

The new board of trustees moved immediately to countermand some of the actions of the Republican-Populist board. To that end a committee was appointed on investigation and reorganization of the college. This committee met on April 18, 1899, and invited the head of each department and the president to appear before the committee the next day to explain the work of his department and to submit a written statement showing the duties performed by the head of the department and of each assistant. The statement was to also include any recommendations which "in the opinion of the head of said department will make the work more efficient and without increase of expenses or equipment for the next year."

All department heads appeared before the committee, and written reports were received from all except Emery, who had been informed after his appearance that he was being dismissed as agriculturist. Emery had succeeded Benjamin Irby under the old board. Irby, who had been in business selling farm supplies, was reappointed to take Emery's place, but two years later his position was declared vacant.

In his report Massey was critical of the administrative organization and he expressed bitterness regarding the action of the former board in appointing C. W. Hyams as his assistant. He had recommended another man for the place, but the board had appointed Hyams "in my absence." Massey pointed out that Hyams was paid $1,200 per year, while he, Massey, received only $1,000 from the station. He recommended that Hyams be discharged.[9]

Recommendations for Change

Massey also complained about the lack of land for horticultural work and requested that the 10-acre farm, then used for poultry, be assigned to horticulture. He further suggested that the divisions of agriculture and horticulture be combined under him: "I believe that if the chairs of agriculture and horticulture are placed in my charge with Mr. Skinner and Mr. Rhodes as assistants, we can develop the commercial features in a way that will soon show for itself."

Massey recommended several organizational changes. He stated: "I believe that the organic law of the Hatch Stations requires that they be departments of the College and not something merely glued on to the College by association." He recommended further that since the station was a department of the college, the logical head was the president of the college and "there should be no divided authority between him and the Station staff." He felt that the members of the station staff should be responsible to the president of the college, "just as the professors of the College faculty are, and should not be expected to divide their allegiance with someone termed Director."[10]

He further advocated that every station worker should also have a teaching assignment in the college but should not be expected to take a full load. Part of each person's salary would be paid by the station and part by the college. "My idea is to do away forever with the double-headed monstrosity of College and Station and to unify the work completely except so far as it is necessary to keep the account separate in both funds."

Professor Withers, who had served as acting director of the station for the past two years, pointed out "that the President of the College is Ex-officio President of the Experiment Station, and as such exercises the same general supervision over his work that he exercises over the other departments of the College." He recommended that the director be responsible to the president and to the board of trustees for the technical work of the experiment station and that the chief of each division of the station be responsible to the director for the performance of his duties.

In addition to the director's office, there were then the four technical divisions: agriculture; horticulture, botany and entomology; chemistry; and veterinary science. Withers recommended a division of field crops, a division of animal industry, a division of horticulture and biology, and a division of chemistry.[11]

The committee on investigation and reorganization of the college did not accept the full recommendations of either Professor

Massey or Professor Withers. The committee recommended the abolishment of the station council at its meeting on April 19, 1899. The committee met again on May 2, at which time a motion was passed "that the Executive and Governing Officer of the Institution be known as President and Director." This was in line with Massey's recommendation. Undoubtedly, his recommendation had influence with the committee, but probably the financial condition of the institution as a whole was also a factor.[12]

George T. Winston

Money Problems

There was a deficit in the college budget of approximately $12,000 on July 1, 1899. The anticipated income was as follows:

Morrill fund (second act)		$16,235
Land scrip fund		7,500
State appropriation		10,000
Student fees		3,000
	Total	$36,735

In addition, there was the Hatch fund amounting to $15,000, which in actual practice became a part of the general fund and to a large degree was used to tide the college over during periods of financial stress. All of the teachers in agriculture and chemistry, plus the president, the treasurer, chairman of the board, janitor, night watchman, and clerical help received part of their salaries from the Hatch fund.

As to the organizations of the divisions or departments, the committee recommended that the heads be responsible for the teaching and the research work in their respective fields, with assistants who usually had some teaching duties and also supervised such research as was undertaken. Professor Massey was given the 10-acre farm, and the poultry flock was moved to the campus and located approximately where Page Hall was later built.

President Holladay, who had been in ill health for some time, submitted his resignation to the board early in June. Dr. George T. Winston, president of the University of North Carolina from 1891 to 1896 and subsequently president of the University of Texas, was elected on July 5, 1899, as the institution's second president.

Winston's term as station director was short—only two years. He had many problems in connection with the administration of the college and had little time and probably not too much inclination to give direction and leadership to the station. Also, the board of trustees exercised more authority and direction over details of every kind than was the case in later years.[13]

In June, 1901, Winston offered his resignation as director of the station, believing that the college president should not also be the director. He further recommended that the research work of the state Department of Agriculture and that of the station should be under one head and to that end recommended that Dr. B. W. Kilgore, the state chemist, be appointed director. The 1901 General Assembly had again made the Board of Agriculture the Board of Trustees of the college, and the change recommended by President Winston met with the approval of the board. Winston's administration of the station expired June 30, 1901, and he was succeeded on July 1, by Dr. B. W. Kilgore—the fourth director in five years.

Castigation from Washington

The Hatch Act very carefully protected the stations from any form of federal control. It did state, however, in Sec. 3 of the Act:

> That in order to secure, as far as practicable, uniformity of methods and results in the work of said situations, it shall be the duty of the U.S. Secretary of Agriculture to furnish forms, as far as practicable, for the tabulation of results of investigations or experiments; to indicate from time to time such lines of inquiry as to him shall seem most important, and in general, to furnish such advice and assistance as will best promote the purpose of this act.

The research operation in North Carolina had not gone unnoticed in Washington. On June 24 and 25, 1901, A. C. True, director, Office of Experiment Stations, U.S. Department of Agriculture, visited the college and the experiment station. His report, in the form of a letter dated July 2, 1901, to Commissioner of Agriculture S. L. Patterson, was a stinging indictment of the station's operation.[14]

True called attention to the inconsistent policy and frequent

personnel and organizational changes. He believed too much power was vested in the governing boards and suggested that Director Kilgore should be fully responsible for the management of the station.

True found the financial arrangement most unsatisfactory and chastized the operation for use of station funds for nonresearch activities. (He also noted that the college was not sufficiently financed to do a respectable job.) His long and detailed letter outlined the relationships which he thought should exist regarding joint personnel appointments and use of land and facilities by the various parties.

As to the research which should be carried out, True suggested that "the lines of work of the Station should be few in number and petty enterprises should be avoided." As a guide, he suggested that the station research operations should be planned "with reference to the benefits of agriculture to the whole State."

Board of Visitors

In addition to again making the Board of Agriculture the Board of Trustees for the college, the 1901 General Assembly provided for a Board of Visitors for the college. This Board of Visitors had no authority but was directed to inspect the college from time to time and make recommendations to the Board of Agriculture. Commissioner of Agriculture S. L. Patterson was ex officio chairman of the Board of Agriculture, and W. S. Primrose was chairman of the Board of Visitors.

In view of the poor research output in recent years and criticism from the U.S. Department of Agriculture, this new arrangement, which placed authority with the director instead of the chairman or a committee of the board, undoubtedly appeared perfectly logical. However, President Winston did not forsee the complications that were to arise.

The president of the college was consulted regarding many matters, but he exercised little control. While the station was by federal statute a part of the college, the director's office was in the state Department of Agriculture some distance away. The work of the station was soon interwoven financially and in scope with that of the Department of Agriculture, and quite naturally the public soon looked upon the station as a function of the department rather than of the college.

This was the situation in the spring of 1902 when the Board of Visitors came to the college. The members of that board took their

duties seriously and apparently felt they had more authority than was conferred by the law that created the body. They made two proposals to the Board of Agriculture.

The first proposal was that a joint committee composed of representatives of the two boards be created to serve as a college committee to act on all matters concerning the college when the board was not in session. The argument was that the college was concerned not only with agriculture but with various phases of engineering and the textile industry and those interests should be represented on the board.

The Board of Agriculture took the request under advisement and after several meetings informed the Board of Visitors that the legislature had charged the board with the governing responsibility and therefore the request was declined. Later a visiting committee representing the two boards was appointed. This committee made joint recommendations to the Board of Agriculture and in the main such recommendations were approved.

The second request of the Board of Visitors specifically asked that the experiment station be returned to the college and placed under the professor of agriculture. President Winston appeared before the Board of Agriculture at its meeting on May 27, 1902, in

Old agriculture building, downtown Raleigh.

support of the second resolution. He stated that he had made a mistake when one year earlier he had taken the initiative in resigning the directorship.

In its long and detailed response, the Board of Agriculture cited the several changes that had taken place regarding control and management of the research activities since the establishment of the station 25 years earlier. The statement included the letter written by President Winston a year earlier, the letter from the U.S. Department of Agriculture in July, 1901, severely criticizing the management of the station, and a news release quoting a U.S. Department of Agriculture official who on a recent visit to Raleigh had praised the station operation. It noted that North Carolina was not alone in having the state chemist serving as the director of the research station. At least 18 stations were "under the directorship of the chemists."

The statement concluded:

> 1. The Experiment Station clearly bears the same relation to the College now as in the past. It has not been removed, and there is, therefore, nothing to be returned.
>
> 2. The Experiment Station has had four directors in five years. The Board considers these frequent changes not only unwise but demoralizing to the work of the Station. This is shown by the lack of very much important work from the Station in this period of frequent changes and interruption of work. Agricultural experimental work, to be of value, must be carefully planned and conducted for a number of years under continuous and competent management.

The unequivocal answer of "no" was in line with the legislation that had placed the responsibility of governing the college on the Board of Agriculture. The Board of Visitors accepted the decision without apparent question and during the existence of that board continued to function in an advisory capacity and made many suggestions for the improvement of the college which were approved by the Board of Trustees.[15]

Kilgore was then firmly established as director and with the necessary authority to administer and develop a program of research. But stability was not yet to be.

A New Board of Trustees in 1907

The 1907 General Assembly provided for a new Board of Trustees—again divorcing the college and station from the Department of Agriculture.

The Board of Visitors in 1902, in a conference with the Board of Agriculture, had pointed out that the function of the college was broader than just agriculture and that there should be representation from industry and textiles on the board.

At a meeting of the Board of Agriculture (then the Board of Trustees) in December, 1906, Governor R. B. Glenn recommended separate boards for the Department of Agriculture and the college and that the Board of Trustees have industry as well as agriculture represented. The 1907 General Assembly provided for a new board of trustees composed of members appointed by the governor with the advice and consent of the Senate and to include the governor as ex-officio president of the board.

The act creating the new board also carried sections applicable especially to the experiment station:

> Sec. 12. The Agricultural Experiment and Control Station shall be connected with the College and controlled by the board of trustees thereof.
> Sec. 14. The agriculture building (Patterson Hall) built under the authority of Chapter six hundred of the Laws of one thousand nine hundred and three shall be used for conducting investigations and for instruction in respect to milk and beef cattle, diseases of animals, trucking, fruit growing, commercial fertilizers, diversified farming and other subjects pertaining to practical agriculture.

Taking these sections alone it appears that it was the intent and directive of the General Assembly that the experiment station, including all research, would be a part of the college and under the control of the Board of Trustees. Such a conclusion, however, would be contradicted or confusing, for the same legislature passed an act pertaining to the research work of the Department of Agriculture:

> Amending Chapter 87 Revisal of 1905, Sec. 5. That section three thousand nine hundred and forty four be amended by adding at the end thereof the following: 16. The work of investigation in agriculture required in this Chapter may be designated by the Board of Agriculture as an agricultural experiment station, and the four test farms now in operation be and the same are hereby designated and established as branch experiment stations, to be conducted as at present under the auspices of the Board of Agriculture and out of its fund.

The Code of 1905 and section 3944 directed the department to make certain investigations relating to the improvement of agriculture; the beneficial use of commercial fertilizer and compost; improvement of milk and beef cattle; diseases of cattle, ravages of insects;

Horticultural section of the North Carolina exhibit at the 1902 Charleston, South Carolina, Exhibition. Preparing these exhibits was one of the station's responsibilities in the early days.

experiments directed to introduction of new agricultural industries adapted to various climates and soils, especially truck and market gardenings; drainage and irrigation; diversified farming, rotations, etc. None of these directives were repealed. The amendment was an addition and gave the Board of Agriculture additional authority, if such was needed, regarding the four test farms which had been established between 1900 and 1905 (see Chapter 5).

Thus, by legislative action was created a situation in which two experiment stations were working in the same field. Such an arrangement would surely make for "duplication, confusion in the minds of the people to be served, jealousy between workers, and a lack of sufficient financial support for either agency to perform most efficient service."[16]

That was the condition in North Carolina from 1907 to 1911.

The station at the college was supported only by federal funds and a small income from the sale of farm products. Fortunately, the funds accruing under the Adams Act (1906) were increasing annually by $2,000, so there was some chance for expansion. The state Department of Agriculture had its own receipts from fertilizer, feed and other tag sales, plus the receipts from farm sales on the test farms located in

Edgecombe, Iredell, Pender, and Transylvania Counties. The Board of Agriculture had authority to use these funds largely as it saw fit.

The new college Board of Trustees at its first meeting on May 29, 1907, was confronted with the problems of taking over the experiment station, appointing a director, and approving a research program within a budget of $24,000 for the next fiscal year. Evidently the board felt it was possible that the research work of the Department of Agriculture and that of the college could be handled under one director as it had been for six years. The college trustees proposed to the Board of Agriculture that the two agencies join together to carry out agricultural research. Equal funding coming from each agency would be used to build up the four test farms and to maintain the college farm as a model experiment farm. Also, the director would be a full-time position and all of his time would be devoted to the experiment station work.

On June 20, 1907, the Board of Agriculture received the proposal of the college trustees. There was considerable sentiment for joint activity by the two groups, but the Board of Agriculture was particularly reluctant to make the director position a full-time job and rejected the proposal.[17]

After receiving the above answer from the Board of Agriculture, the college trustees tried to secure the services of Kilgore as director of the college station. His reply declining the offer implied a belief that because of the outlying test farms the Department of Agriculture was in a better position than the college to research the varied farming conditions across the state.[18]

The executive committee of the Board of Trustees then asked Kilgore to recommend a person to head up the Agricultural Experiment Station at the college. He recommended C. B. Williams. The committee authorized President Winston to tender the directorship to Williams at a salary of $2,250 per year. Kilgore was then elected director of the Agricultural Experiment Station of the North Carolina Department of Agriculture.

Williams moved from his position in the Chemistry Department in the downtown Raleigh building of the state Department of Agriculture to an office in Agricultural Hall on the campus. His staff consisted mainly of those men who had some teaching responsibility as well as research.

Back to the Drawing Board in 1911–12

The effect of the 1907 legislation on the relationships between the state Department of Agriculture and the college was the most dramatic of any legislative actions up to that time. Nevertheless, despite confusion and other problems, both agencies moved ahead in the search for new and useful farm information, and some good research was going on, both at the college and on the test farms of the Department of Agriculture.

The fourth wedding between the Department of Agriculture and the college was consummated in 1912.[19] Early in the legislative session in 1911 a bill was introduced to consolidate the two agencies. Before this bill came back from the committee (on March 7, 1911) a resolution was approved to create a commission composed of three representatives and two senators to meet with the Board of Agriculture and the college Board of Trustees to ascertain the wisdom of such consolidation. Also during the month of March, both governing boards decided that a meeting between the two was in order and took steps to bring it about. This meeting took place on May 4. A committee composed of representatives of the two agencies was appointed to develop plans and report to their respective boards.

Throughout the summer and fall of 1911 there were many conferences of the committee and officers of the two agencies. Each agency naturally wanted to maintain its identity. Each was charged by law with specific responsibilities, some of which did not overlap. Regarding these there was no controversy. In the field of research, however, both agencies were directed by the General Assembly to carry on experiments, largely in the same field. Also, both were developing various kinds of extension activities that overlapped.

From these discussions, three choices emerged:

> First, for the College Station to be conducted as at present under its Director and for the State Department to continue such experiments as it sees proper, but hereafter for the two officials in charge to confer frequently and see that there is no duplication of such experiments.
>
> Second, that the College Station and the Experiment work of the State Department be continued practically as they are now organized, that is, in the nature of two entities, but that they be put under a Director and a Vice-Director and that a closer union of the two be ultimately brought about.
>
> Third, That all the workers in the College Station and in the Department of Agriculture who are engaged in investigational or experimental work be grouped into one compact station under Director and a

Vice-Director who shall each give all his time to this Station; and that this Station be organized into the present divisions and with the present workers, but be put on a strictly scientific basis.

The third proposal was adopted. Also, a joint committee representing the two agencies was appointed to give guidance to the work. Appointed to this committee were W. A. Graham, commissioner of agriculture; D. H. Hill, president of the college; B. W. Kilgore, named director of the new research program; and C. B. Williams, named vice-director of research. The new arrangement became effective on July 1, 1912.

The reports of the period state that the two agencies voluntarily worked out the arrangement for cooperation. The arrangements were made voluntarily, but during this time the legislative committee, appointed in the spring of 1911 to investigate the two institutions, was the motivating force. It is doubtful that an agreement could have been reached without this political force in the background.

NOTES TO CHAPTER 4

1. Schaub, I. O. *North Carolina Agricultural Experiment Station the First 60 Years 1877-1937.* N.C. Agricultural Experiment Station, Bulletin No. 390, 1955, p. 10.
2. For a detailed account of fusion politics, see Helen G. Edmonds, *The Negro and Fusion Politics in North Carolina 1894-1901.* Chapel Hill: The University of North Carolina Press, 1951, Chapters 1-4.
3. Battle went into industry, organizing the Southern Chemical Company in Winston (later Winston-Salem) to manufacture agricultural fertilizers. When this company was sold to the Virginia-Carolina Chemical Company in 1901 he joined the Southern Cotton Oil Company. In 1906 he organized the Battle Laboratory and operated it in Montgomery, Alabama, until his death in 1929. Asbury journeyed to Texas, where for 42 years he was a distinguished chemist with the Agricultural Experiment Station there. Kilgore returned to his home state of Mississippi to work with the state and the agricultural college. McCarthy became the first North Carolina state botanist, employed by the N.C. Department of Agriculture. Bowen was appointed secretary and clerk to President Winston in 1899. He was appointed bursar in 1901 (title changed to treasurer in 1922). Bowen dormitory on the campus was named for him.
4. Schaub, *op. cit.*, pp. 50-58.
5. R. S. Curtis, who has written on the history of livestock in the state, described Johnson as "the first worker employed for the specific consideration of livestock subjects." Curtis stated that F. E. Emery had the teaching and research work in animal husbandry proper under his direction while Johnson devoted his time to the subjects of dairying and forage crops. When Irby succeeded Emery as professor of agriculture in 1899, "Johnson took charge of animal husbandry work proper including dairying." When F. E. Hege resigned as poultryman in 1898, this work

was placed under the specific direction of Johnson with William Carroll as poultryman. This arrangement continued until 1901 when John C. Kendall succeeded Johnson in the dairy work and John S. Jeffrey came in as poultryman in a position independent of animal husbandry in 1903. ("History of North Carolina Experiment Station, Animal Husbandry Work," Typewritten report prepared about 1927, in N.C. State University Archives.)

6. Cooper Curtice remained with the N.C. Department of Agriculture until 1900, returning to the Bureau of Animal Industry in the U.S. Department of Agriculture, from which he had come to North Carolina. During his brief period in North Carolina, Curtice started some significant livestock disease work, including attention to the Texas fever tick. He later contributed significantly to the program to eradicate this and other important livestock diseases.
7. Schaub, *op. cit.*, pp. 11, 52.
8. Apparently Chamberlain turned most of his attention to his business interests. The Caraleigh Phosphate and Fertilizer Works, which he had formed, pioneered in many manufacturing and research projects, including the making of potash from domestic sources while the supply from Germany was cut off during World War I. The company built its own sulfuric plant, and maintained a potash plant in Utah. Chamberlain also had interests in cotton mills in Raleigh, in cotton oil mills in Wilson, in fertilizer plants in Norfolk, and in the Capudine Chemical Company in Raleigh. He operated an 800-acre farm in western Wake County and was active in local civic clubs. He died in 1926. A Raleigh street in the college area was named for him. On the campus Chamberlain Drive, running on the south side of Patterson and Ricks halls, bears his name.
9. Hyams, despite his being unwanted by his supervisor, Massey, made a sizeable contribution during his short tenure in the job of botanist, according to G. R. Noggle, who wrote a history of the Botany Department. Noggle said Hyams made extensive collections of plants across the state, and new species of fungi and flowering plants were discovered. He published a list of all the known flowering plants growing wild in the state (2,685 species) and wrote bulletins on medicinal plants and edible fungi. He was with the station from 1897 to 1901. (*A History of the Botany Department North Carolina State University*. Processed, 1978, pp. 1-2.)
10. Schaub, *op. cit.*, p. 63.
11. *Ibid.*, p. 64.
12. *Ibid.*, p. 65.
13. *Ibid.*, pp. 62-67.
14. *Ibid.*, pp. 77-80.
15. *Ibid.*, pp. 68-77, 81.
16. *Ibid.*, pp. 88-89.
17. Minutes, Executive Committee, Board of Trustees, June 20, 1907, in N.C. State University Archives.
18. Schaub, *op. cit.*, pp. 91-92.
19. *Ibid.*, pp. 95-98.

5

Rejuvenation with Capable Leaders (1901-1907)

Five good men. Other faculty changes. Agricultural Hall.
New courses of study. Student activities. Kilgore in charge.
Test farms. Granville wilt and other diseases. Texas fever tick eradication.
The Adams Act. Do we need a dean?

BENJAMIN WESLEY KILGORE, born in 1867, was reared on a cotton farm in Mississippi. He received B.S. and M.S. degrees from Mississippi A & M College and did some special work in chemistry at Johns Hopkins University.[1] Kilgore joined the North Carolina Agricultural Experiment Station as an assistant chemist in 1889 and remained in this position until dismissed by the governing board on July 1, 1897. Kilgore returned home to Mississippi, as professor of chemistry at the college and as state chemist, but for only two years. In 1899 he returned to North Carolina as state chemist. On July 1, 1901, he assumed the directorship of the North Carolina Agricultural Experiment Station.

Five Good Men

Once the suggestions of the board of visitors had been rejected by the board of agriculture in May, 1902, Kilgore was firmly established as director with the necessary authority to administer and develop a program of research. The six years of his administration were marked by expansion and broadening of the research program and particularly by the addition to the staff of a few vigorous, well-qualified men who got things done and who laid the foundation for fundamental and applied research in the years to come.[2]

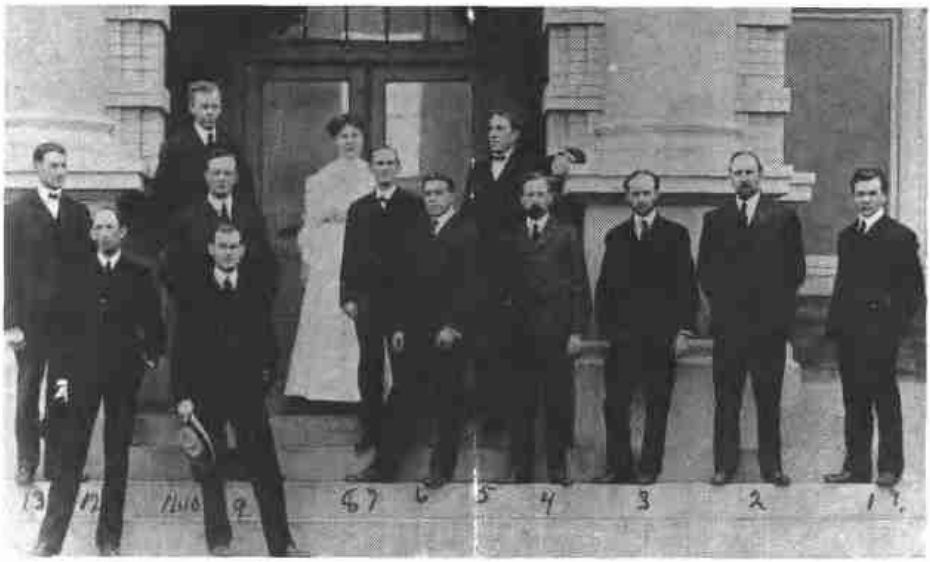
The first of these was Dr. Charles W. Burkett, appointed to succeed Benjamin Irby, whose position was declared vacant in June, 1901, as agriculturist of the experiment station and professor of agriculture at the college. Although he had received his bachelor of science degree at Ohio State University only six years earlier, in 1895, the Ohio native had packed a lot of activity into those six years. He received the master of science degree from Ohio State University in 1898 and the Ph.D. from Lima College in 1900. He served as assistant in agriculture, Ohio State University, 1895-98; agricultural editor, *Ohio State Journal*, 1896-98; and professor agriculture and agriculturist, New Hampshire College Experiment Station, 1898-1901. He also wrote *History of Ohio Agriculture*, published in 1900.

After arriving on the A & M campus, Burkett immediately revised both the four-year and two-year courses in agriculture. He was young, vigorous, aggressive, and a man of imagination. "He supplied the necessary spark to get the agricultural work of the college on a respectable basis and thus began the long climb to its proper recognition."[3]

The second outstanding man to join the staff was Dr. Tait Butler as veterinarian. His arrival on the A & M campus followed veterinary work in Iowa and Mississippi and with the U.S. Department of Agriculture. He was thorough, aggressive, and a man of imagination in various fields. His main efforts were devoted to the eradication of the Texas cattle tick. He was recognized as an outstanding farm leader, interested in all phases of livestock production, and very active in farmers' institutes (an early extension-type activity).

In 1902 Dr. Frank L. Stevens was appointed professor of biology and biologist of the station. With teaching and other experiences at Racine College, Rutgers University, and the University of Chicago, he was the first man trained in the field of plant pathology to join the staff. He had a fine personality, made friends easily, and was soon recognized as an authority in his field.

The fourth man of this group was Franklin Sherman, Jr., who was appointed entomologist of the station and instructor in the college during 1902-03. He had been employed since 1900 in pest control by the North Carolina Department of Agriculture. Sherman was competent in his field, a man of pleasing personality, and mentally and physically energetic. He did not carry on much research but enhanced the entomology teaching program and left a lasting impression on the future of agriculture in the state.



This photograph, provided by C. J. Lange of Jamestown, N.C. in 1978, was labeled "Agricultural Faculty 1904 or 05." Identification was as follows: 1. F. C. Reimer 2. C. W. Burkett 3. H. H. Hume 4. Tait Butler 5. J. C. Kendall 6. G. A. Roberts 7. W. A. Withers 8. Miss Dew 9. R. S. Woglum (?) 10. F. L. Stevens 11. Morgan 12. Charles Walker 13. C. K. McClelland.

The official records do not indicate how much influence Kilgore had in the selection of this quartet, but those who knew Kilgore and his smooth, quiet way of getting things done gave him full credit. At any rate these five—Kilgore, Burkett, Butler, Stevens, and Sherman—were largely responsible for shaping the policies and programs of the station and college during the period from 1901 to 1907, and the full fruition of their efforts came several decades later.[4]

Other Faculty Changes

Horticulturist W. F. Massey resigned from his college position as professor of horticulture and biology in 1901 but remained as a member of the experiment station staff until the end of 1905.[5] His departure removed from the faculty a rugged individualist who had been somewhat of a storm center for several years. Massey was educated as a civil engineer, but his real interest was in horticulture. In addition to his own experiments and tests, he read the available literature in his field. He was a popular speaker at farmer meetings and received a large volume of mail. Without question he left his mark on the college and station and made a large contribution to the agriculture of the state.

At Massey's death in 1923, *Progressive Farmer* Editor Clarence

Poe ranked him with L. L. Polk and Seaman A. Knapp (whose farm demonstrations beginning in 1904 evolved into the Agricultural Extension Service). When a chapter of Alpha Zeta was established by the students on the campus in 1904, it was named the W. F. Massey chapter in his honor. In 1917 the North Carolina A & M College awarded him an honorary doctor of science degree—the first honorary degree presented by the institution.

For a few months, H. H. Hume, who had taught horticultural courses for a year, filled Massey's position, but Hume resigned in 1906 and was replaced by W. N. Hutt. Frank C. Reimer was employed as assistant horticulturist and instructor of horticulture in 1905. Hutt left in 1907 and Reimer was moved to horticulturist.

In the teaching program, C. K. McClelland was an assistant professor of agriculture from 1903 through 1906; Charles W. Martin was an assistant in botany in 1903; and Mrs. Frank L. Stevens was an instructor in biology and zoology in 1903 and 1904. The Stevenses were the first husband and wife combination on the faculty.

John C. Kendall continued the dairy teaching and research until 1907, when he was succeeded by John Michels. John S. Jeffrey carried on the poultry research during this period, beginning in 1903, and reinstated courses in poultry production in 1906. Guy A. Roberts joined the faculty as assistant professor of veterinary science in 1905.

During the early years of the new century, there was steady growth in the agricultural program and the institution in general. During the period from 1899 to 1908, when George T. Winston was president of the college, the total college teaching force increased from 24 to 40. The experiment station staff experienced similar growth, increasing from 9 to 16 positions. Much of the station growth resulted from passage of the federal Adams Act in 1906, which increased the annual federal appropriation from $15,000 to $30,000.

Agricultural Hall

By 1903, 14 years after the college opened its doors and 26 years after the experiment station and the North Carolina Department of Agriculture were created, buildings to house the agricultural establishment consisted of one building in downtown Raleigh, tiny Primrose Hall on the campus, and several farm buildings. Classrooms and laboratories for both teaching and research were in short supply.

Presumably the state's agricultural leaders decided in 1903 that it

was time to ask for a new building. Many individuals helped guide it through the 1903 General Assembly. President Winston requested the building in his report to the governor in the fall of 1902. Governor Charles B. Aycock, in his message to the General Assembly in January, 1903, urged approval of an agricultural building, provided that the necessary money could be found.

The leader in the General Assembly was Senator Robert W. Scott of Alamance County.[6] He argued that the college was agricultural and mechanical but that agriculture had been neglected as compared with mechanic arts. Scott introduced a bill making appropriation from the general fund. Although it was generally supported by the legislators, it became evident as the bill moved through the legislative channels that the general fund was not sufficient to take care of all the departments and agencies of the state. Accordingly, the bill was amended so that the cost of the building, not to exceed $50,000, would come from the agriculture fund, which was derived largely from the fertilizer tax.

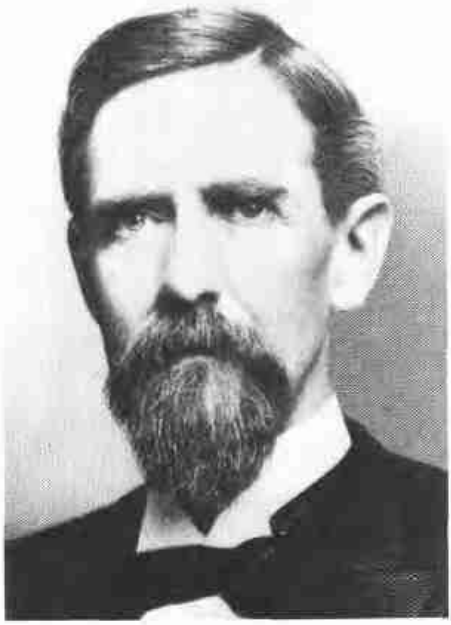
But the fight was not over. Commissioner of Agriculture S. L. Patterson, and likely others, wanted the building located in downtown Raleigh rather than on the campus. Whatever discussion might have been involved, the building, called Agricultural Hall, was placed somewhat removed from and west of the other buildings of the college. Significantly, it was located on top of a hill, the highest point on the campus at 420 feet above sea level. "Ag Hall" placed on top of "Ag Hill" was becoming a tradition on land-grant campuses around the country.

Commissioner Patterson, R. W. Scott, C. N. Allen of Auburn in Wake County, William Dunn of New Bern, and A. T. McCallum of Red Springs, all members of the board of agriculture, comprised the building committee.

Professor Burkett surely had much to do with stimulating the president's thinking about the need for a new building. It was said that when Burkett came to the campus he brought with him the plans of a recently built agricultural building on the Ohio State University campus. At any rate, he seems to have obtained the plans that had been used to construct Townshend Hall on the Ohio State campus in 1897. These plans were followed almost in toto when the new building was built.

The three-story buff brick building with granite trimmings was 208 feet long and 74 feet wide in the center section. It was erected during the 1904-05 school year at a cost of approximately $43,000.

R. W. Scott



S. L. Patterson

Many modifications have been made over the years, and the cost of repairs and modifications has been many times the original cost of construction.

The classrooms and laboratories of the basement floor were used by the Department of Animal Husbandry and Dairying. The second floor contained the administrative offices for agriculture, agronomy classrooms, and laboratories for soil physics and farm machinery. The rooms of the third floor were devoted to botany and vegetable pathology, zoology, physiology, and veterinary medicine.

The naming of Primrose Hall for a man who had rendered distinguished service to the institution started a pattern which was to be repeated.[7] The name of Agricultural Hall was changed to Patterson Hall in 1912. It is interesting that the building whose location Patterson opposed should bear his name.[8]

One of the last projects of the noted landscape architect Frederick Law Olmsted, Sr. (1822-1903), before his retirement in 1895, was Biltmore Estate near Asheville. This project was taken over by his son, Frederick Law, Jr. The elder Olmsted had exhibited special interest in college campuses (particularly that of Stanford University). In 1899 President Winston contacted the younger Olmsted about obtaining his services to advise on the planning of the A & M campus, hoping that Olmsted could visit Raleigh during one of his two trips per year to Biltmore. Olmsted was willing to come to the

Agricultural Hall, opened in 1905 and renamed Patterson Hall in 1912.

campus, but Winston could not raise the $200 fee (plus expenses) asked by Olmsted. However, four years later the services of Olmsted were obtained. In addition to general recommendations he specifically recommended the location of Agricultural Hall.[9]

The construction of Agricultural Hall marked a definite westward expansion of the campus into an area known as Cook's Hill or Beef Hill. A dozen or more homes were located on and near the brow of this hill. Some of the houses were bought for the college by William R. Crawford, Jr., and others were secured after the General Assembly had passed an act condemning the property for public use.

In addition to Cook's Hill, President Winston, again with considerable help from Senator R. W. Scott, was able to purchase for the college three tracts of land, each approximately 25 acres, between 1902 and 1905. These tracts were secured from William R. Crawford, Sr., who conducted an extensive meat business in Raleigh. One tract extended the campus westward some four blocks from Patterson Hall, between Hillsboro Road on the north and the railroad on the south. The second tract joined the original Pullen grant on the west, between the railroad on the north and Rocky Branch and the Belvin tract on the south. The western boundary of these two tracts approximated the location of Dan Allen Drive. The third tract joined the second tract on the west and extended the campus between the railroad and the branch through the area where dormitories and Doak Field (a baseball field) were constructed in the 1970s.

Some assistance was coming from the private sector by this time. The 1901-02 catalog carried a list of materials and equipment that had been donated to the several divisions of the college by individuals and

commercial concerns. Following is the listing for agricultural instruction:

Acme Harrow Company, Millington, N. C.—Acme pulverizing harrow.
John Deere & Co., Moline, Ill.—One disc plow.
Chattanooga Plow Company, Chattanooga, Tenn.—One two-horse turning plow.
Bucher & Gibbs Company, Canton, O.—One two-horse turning plow.
D. M. Osborne & Co., Charlotte, N.C.—One two-horse mowing machine.
B. F. Avery & Co., Louisville, Ky.—One two-horse corn planter and check rower, one one-horse corn planter, and one two-horse cultivator with spring-tooth attachment.
Cornell Incubator Company, New York, N. Y.—Four incubators and four brooders.
Star Incubator and Brooder Company, Roundbrook, N. J.—One incubator and one brooder.
McCormick Harvester Company—One mower, one harvester, one rake, one corn harvester, and one corn shredder.[10]

There is indication that the meager funds available did not produce the facilities and equipment needed for a first-class operation at the turn of the century. Nevertheless, the writer of the 1900-01 college catalog seemed proud of what was available:

> The College possesses the following equipment for instruction in Agriculture: The farm includes six hundred acres, with one hundred and fifty acres under cultivation; a large basement barn, 50 by 72 feet, three stories. The first floor is occupied by farm implements and machinery; second story is occupied by horses, grain bins, cutting implements, etc.; third story, by hay, which is elevated by a Ricker and Montgomery hay carrier. Just outside the barn are two 70-ton silos. These are connected with a No. 18 Ohio feed and ensilage cutter. Power for cutting is supplied by an eight-horse power Skinner engine. The farm is supplied with all necessary machinery for the most successful and up-to-date farming.
>
> The Dairy Building contains three rooms and cellar, and is supplied

Rear view of campus buildings, taken in 1903 or 1904 from about where the 1911 building was later located.

with DeLaval, Sharpless, United States, and Reid Separators, Babcock Testers, various kinds and makes of churns, butter-workers, etc.

The live stock consists of necessary horses and mules, a herd of dairy cattle, also a herd of twenty young Aberdeen-Angus beef cattle. Poland-China and Berkshire swine are bred pure, and from high-class specimens, from which breeding-stock is sold as part of the farm products.

The Poultry-yard is divided into sixteen lots. The buildings consist of incubator cellar, brooder-house, and hen-houses. Several different incubators are used. The Poultry-yards contain the following breeds: White Wyandotte, White and Barred Plymouth Rock, Black Minorca, Brown Leghorn, Light Brahmas, and Pekin Ducks.[11]

It may be said that the college began to be a part of Raleigh when the city sewer line and water main were extended to the college buildings. Sewer connections were made in 1906, largely through the efforts of Professor Wallace C. Riddick and a group of citizens who agreed to use the line when completed. With the coming of indoor plumbing the outdoor privies could be abandoned. (Coincidentally, the outdoor toilets were located where a playing field bearing Professor Riddick's name was later placed.) The pipes of the Raleigh Gas Company reached the college in 1907. City water was piped to the campus by about 1908, and gradually the campus wells were abandoned.

New Courses of Study

The 1900-01 catalog announced two new courses or programs of study in agriculture. In addition to the four-year course in agriculture, there would be a two-year course in agriculture and winter courses in agriculture and dairying.

For the four-year students, the faculty continued to emphasize a need for both scientific and practical training. Also, the catalog described the course as "essentially scientific rather than literary" but said reasonable attention to "English literature and Political Economy" was required.

In the two-year course, students were exposed during the first year to botany, horticulture, pomology, dairying, agricultural chemistry, arithmetic, algebra, English, and military drill. During the second year they selected from a long list of courses.

The 10-week winter courses were held during the winter quarter, starting in early January. They were designed to meet the needs of young farmers who would not otherwise be going to college. Courses included buttermaking, milk and butter production, farm chemistry,

dairy farming, bacteriology, winter gardening, diseases of cattle, entomology, feeds and feeding, stock raising, bookkeeping, and farm economics.

There is evidence that the first woman student in agriculture was Miss Eula Dixon of Alamance County, one of the 22 students attending the 1901 winter course in dairying.[12]

The faculty taught in all three programs but information is not available on differences in course content and teaching techniques. It is also not known whether students from the three levels were ever put into the same class.

Agriculture was not a popular college subject at the beginning of the twentieth century at agricultural colleges across the country. At the twelfth annual commencement of North Carolina A & M College in 1901, only two of the 24 graduates majored in agriculture. (See table.)

Six graduates who would make notable contributions to the agriculture of the state were Robert Walter Scott, Jr., of Melville (class of 1905), who became superintendent of the Edgecombe Test Farm the next year; Joseph Graham Morrison, Jr., of Mariposa (class of 1906), who had a long career as a county extension agent in Lincoln County; L. A. Niven of Cairo (class of 1906), who was the longtime horticultural editor of the *Progressive Farmer*; Frank Parker of Hillsboro (class of 1907), who headed the State-Federal Crop Reporting Service; and B. B. Everett of Palmyra (class of 1907), farmer and farm organization leader.

Four-Year Graduates and Short Course Students in Agriculture at North Carolina A & M College, 1901-1906

Program	1901	1902	1903	1904	1905	1906
Four-Year	2	2	1	4	8	13
Two-Year	33	51	48	40	43	27
Winter Courses	22	30	25	29	23	13

As the table indicates, the agricultural short courses were more popular than the four-year agricultural course, although change was indicated over the six-year period. Burkett, as leader of the agricultural instruction program, vigorously promoted the college and its agricultural instruction. Whether because of this publicity, a change

in the times, or other reasons, the four-year agricultural enrollment was on the increase when the popular Professor Burkett left the college in 1906.

All students seeking admission to the freshman class of the four-year courses were required to take entrance examinations. Applicants to the two- and one-year courses were admitted without examination if they were at least 20 years of age.

Normal courses and summer school were added to the program in 1903. Separate one- and two-year courses and summer instruction were offered for rural teachers (teachers in rural schools) and city teachers. The former specialized in agriculture and nature study and the city teachers in drawing and manual training.

Student Activities

Several student clubs were active, and most students participated.

The Biological Club, organized in 1901, met semimonthly for the discussion of biological subjects in relation to practical agriculture. Students presented results of their own investigations and observations and gave reviews of current publications, particularly those from the U.S. Department of Agriculture.

The Rural Science Club was organized in 1902. It met semimonthly for the discussion of agricultural subjects, reviewed current agricultural publications, and reported on personal experiments and the work of the college farm and experiment station.

The Farmers' Institute was an organization or activity for the students in the winter courses in dairying and agriculture. The students met weekly during the winter term for a discussion of practical agricultural problems.

The W. F. Massey chapter of Alpha Zeta was established on the campus in 1904. Burkett had been one of the cofounders of this honorary fraternity when he was a student at Ohio State University. The North Carolina chapter, under the leadership of Burkett, was the eighth chapter to be established and the first in the South.

Another honorary organization came into being in 1906, under the leadership of Professor F. L. Stevens. Membership in the Biological-Agricultural Honor Society was limited to 10 members from the junior and senior classes who had demonstrated special ability, scholarship, exemplary character, and good standing with the student body.

MASSEY CHAPTER OF ALPHA ZETA

Members of Alpha Zeta, pictured in the 1905 *Agromeck*.

In about 1902 a publication called *Agricultural Education* was initiated by the Rural Science Club. The annual yearbook, the *Agromeck*, from its inception in 1903, carried the names and a group photograph of the *Agricultural Education* participants, but a copy of the publication or details about it have not been found. Credit for establishment of *Agricultural Education* must surely go to Burkett, who was the founder and editor of similar publications when he was at Ohio State and the New Hampshire College. The quarterly publi-

cation carried advertising and had a subscription price of 25 cents per year.

A number of agricultural students were attracted to the two college-wide student publications—the *Agromeck* (1903), and the *Red and White* (1899). The latter publication was sponsored by the Athletic Association and received its revenue from advertising and subscriptions. It covered the wide spectrum of college activities, including fiction written by students, humor, sports, and social activities. Sports, particularly football and baseball, had become popular on the campus during the first years of the twentieth century.

The homes of the professors, who lived on or near the campus, were centers of social activity. As reported in the *Red and White*, the Burketts hosted the agricultural students at the beginning of the fall term in 1903, and the Burkett home was the scene of a Halloween party given by the junior faculty in 1905.

The Massey home was the site of a Valentine party for the agricultural students in 1902. In January, 1904, Elizabeth Massey, daughter of the professor and a senior at St. Mary's College in Raleigh, entertained the senior girls from St. Mary's and the senior men from A & M.

Kilgore in Charge

Kilgore, immediately on his appointment as director, combined—or perhaps more accurately scrambled—the research work of the college and the state Department of Agriculture. In the main, Hatch funds were used to pay for the research at Raleigh, and the experiments at the test farms were conducted and paid for by the North Carolina Department of Agriculture. These were arranged, Kilgore said, to fit into and supplement the station work. "In this way the two institutions, working according to one general experimental plan, hope to eventually cover reasonably well the broad field of agriculture in the State."

Reporting on the condition when he assumed the directorship, Kilgore said in his first station annual report (1901-02):

> Practically no experimental work was found in operation in the Agricultural Division of the Station on July 1, 1901. It was, therefore, necessary not only to plan and put in operation an entirely new set of experiments to deal with our important agricultural problems, but new land had to be prepared on which to conduct the experiments. This

> necessarily delayed operations, and will still longer delay the obtaining of results of field experiments for publication in bulletin form, as this class of work, to be of the greatest value, must not only be carefully planned and carried out, but must be continued for a number of years, so as to make reasonably sure of the accuracy of the conclusions.[13]

A start was made at once. A field of 65 acres on the Belvin tract on the southwestern corner of the college land across Rocky Branch from the campus was laid off into 1/20- and 1/10-acre plots. It was on these plots that Burkett performed most of his crops research during his stay at the college. The studies were practically a duplication of the tests already under way at the test farms then in operation and of those put on the new Iredell Test Farm, which was added to the system in 1903.[14]

Generally, the results of the research at Raleigh were reported in station bulletins and the station annual report; the work of the Department of Agriculture was reported in the department's monthly *Bulletin*.

Test Farms

During Kilgore's tenure as state chemist, and largely through his influence, the state Department of Agriculture had initiated lines of research separate from that conducted by the experiment station, some of which was to be of great significance in future years.

One important step was the initiation of soil survey work in the state. At a Board of Agriculture meeting in December, 1899, the board ordered "That the State Chemist be directed to investigate the soils of the State with a view of classifying them for the purpose of conducting experiments with a view to ascertain the fertilizers suitable to improving the crops of the different soils." Also, "That three members of the Board be appointed by the Chair to act with the Commissioner of Agriculture and the State Chemist in carrying out this work, and that $1,000 be appropriated for conducting this work."[15]

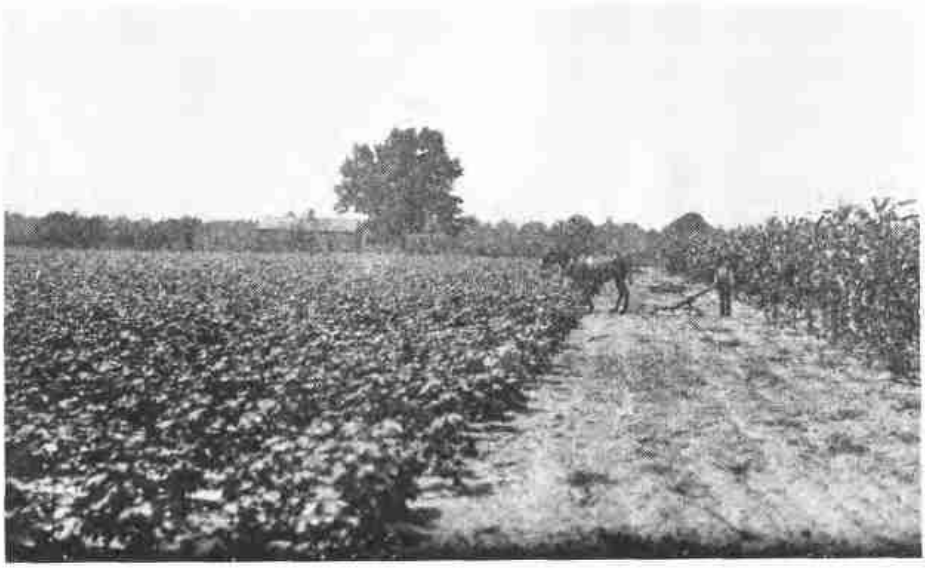
In the meantime, Kilgore had been in touch with those in charge of soils investigations of the U .S. Department of Agriculture and proposed cooperation between the USDA and the state Department of Agriculture in making soil surveys. At a meeting of the Board of Agriculture in March, 1900, an appropriation of $500 was made to support the work of the soil survey in cooperation with the USDA.

At this same meeting A. T. McCallum of Red Springs, representing the committee on soil and fertilizer work, submitted a report on the location of farms for soil experiments, and a motion was passed "that the soil experiments in the different parts of the State are to be known as 'Test Farms'." Five hundred dollars was appropriated for that purpose, a farm was rented at Red Springs in Robeson County, and J. L. McKimmon became the state's first test farm superintendent. The second such site was on the Battle-Bryan farm near St. Anne's Episcopal Church south of Tarboro. This 200-acre tract was called the Edgecombe Test Farm.

At the June, 1900, meeting of the Board of Agriculture, McCallum again reported for the committee on test farms and soil survey, approving the work that had been done and recommending its continuance. Later the board appropriated $1,000 for test farms and $1,250 for soil survey work.

A year later, in May, 1901, the minutes record: "Dr. Kilgore entertained the Board for an hour with an interesting recital of work on the farms, and exhibited samples of vetches, grasses and soils. He described the work of the Soil Survey, the progress so far made, and spoke of its future prosecution."

Kilgore concluded after two years of renting land that it would be better for the station to own the land and have larger acreages at its disposal. Larger tracts, he felt, would help the farms to bear the expenses of the tests and show farmers that research was "not merely of plot and garden order" but could have broad application.



A 1901 scene at the Edgecombe Test Farm.

As a result of the work of the Kilgore committee, the board at its December meeting approved the purchase of a 201-acre farm owned by John W. B. and Cornelia Battle, near the station of Kingsboro, about halfway between Rocky Mount and Tarboro. The board took an option on the land on January 1, 1902, and exercised the option on March 3, 1903. The board paid $9.52 per acre for the tract. Another $1,000 was authorized for buildings.

Kilgore said he chose eastern North Carolina for the first test farm because the soil in the area was more uniform and because farmers there used more fertilizer than elsewhere in the state. A soil survey conducted on a strip eight miles wide along the railroad from Raleigh to New Bern showed that the fine sandy loam of Edgecombe County, with clay subsoil 15 to 20 inches below the surface, represented 60 percent of the agricultural lands of eastern North Carolina.

One of the main projects at the new station was a three-year rotation test. Involved were 30 acres divided into three 10-acre plots planted with hairy vetch and oats, cotton, corn, and peas. Other early research involved the testing of fertilizers, cultural practices, and 30 varieties and mixtures of native and foreign plants. The raising of Berkshire hogs was the first animal project. R. W. Pou was selected as the first superintendent of the station.

In 1903, with the purchase of a tract of land 1½ miles northwest of the corporate limits of Statesville, the Iredell Test Farm came into being. G. T. Bullock was the first superintendent. In 1904 Bullock moved to Red Springs, and F. T. Meacham replaced him at the Iredell Farm.

The Pender Test Farm, near Wallace, was established in 1905 with John H. Jeffries as superintendent. That same year a farm was bought at Blantyre on the west side of the French Broad River 12 miles west of Hendersonville. F. C. Lamb was superintendent briefly, replaced by R. W. Collett in 1906.

In the meantime, G. T. Bullock moved to the Edgecombe Test Farm for a brief period, followed by J. C. Beavers, as superintendent of that station. By January, 1907, Robert W. Scott, Jr., was the superintendent of the Edgecombe farm. In 1907 the test farm at Red Springs went out of existence.

The soil survey mentioned above, from Raleigh to New Bern, had been an extensive project. The area mapped, along the line of the Southern and The Atlantic and North Carolina railways, was a distance of 105 miles, about eight miles wide, and contained approximately 1,000 square miles or 640,000 acres.

The North Carolina Department of Agriculture paid all the field expenses of the survey party as well as all expenses incident to the making of a base map showing wagon roads, railroads, houses, towns, and streams.

A 28-page booklet describing the survey and the general findings was published, along with four full-color maps 22 by 29 inches in size. The maps delineated the various classes of soil identified.[16]

Granville Wilt and Other Diseases

In 1881 a farmer near the village of Hester in southern Granville County noticed that some of his tobacco plants were dying.

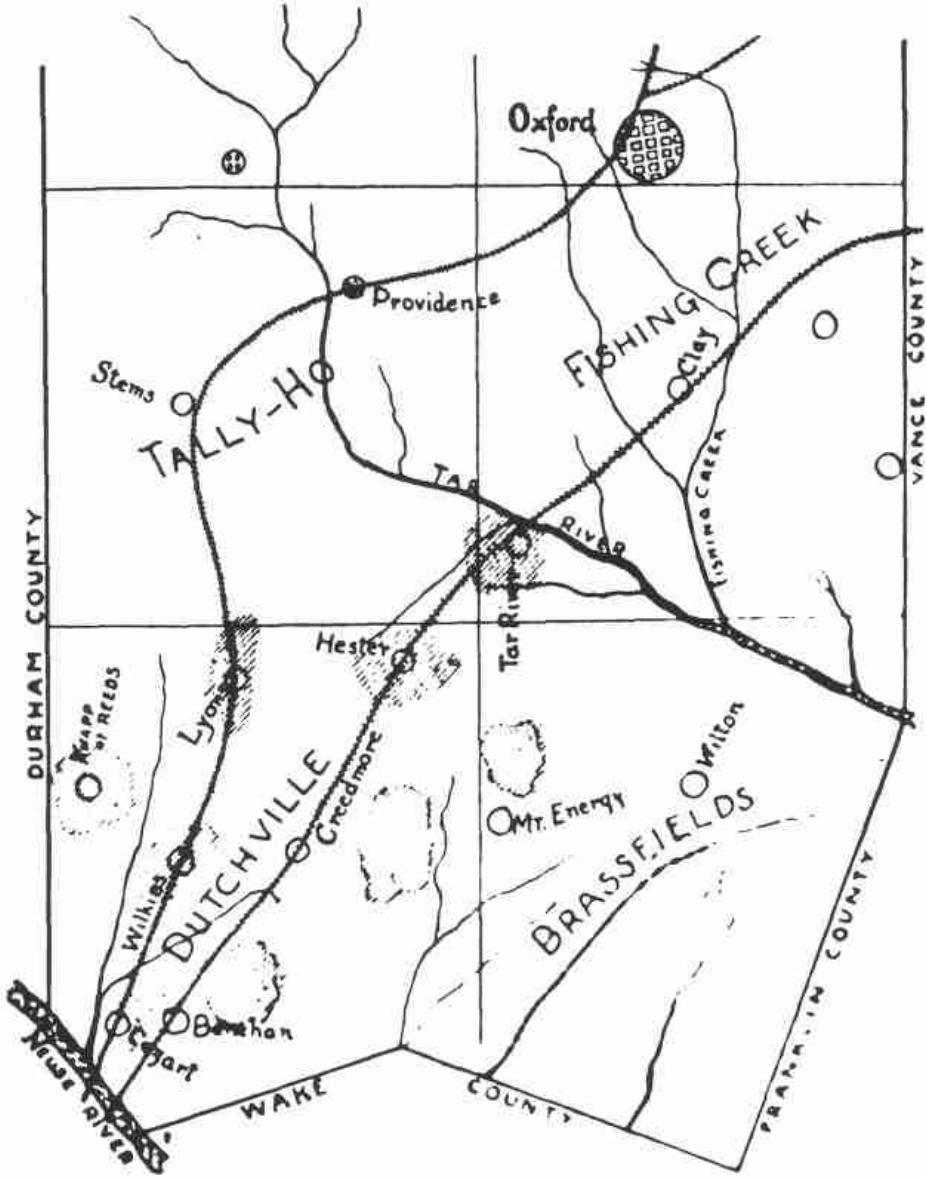
Down the road, past Creedmoor near the village of Bennehan, there was a serious outbreak of a similar problem in 1890 and 1891.

By the time researchers Stevens and Sackett got involved, the problem had appeared in a number of locations across southern Granville County between the Neuse and Tar rivers. F. L. Stevens carried the title of biologist with the station; W. G. Sackett was assistant biologist from 1902 until 1905.

The cause of the disease was determined to be a bacterial infection. The name—Granville Wilt—came from the location and the effect of the disease upon the plant. The first indication of the disease was a drooping of the tobacco leaves. They became soft and flabby as if suffering from lack of water. The wilted leaves dried up, and the whole plant died, usually from the ground up. The dead stalk remained standing—a traumatic sight to tobacco farmers who could only speculate on the cause and the cure. Possible causes advanced by farmers included fertilizers, improper crop rotation, climatic conditions, tillage, worms, bugs, condition of the seed bed, etc.

Stevens and Sackett found that the disease organism was soil-borne. It could be carried by rainwater and soil washing and moved about by tillage instruments. Once a field was infected, the disease would grow worse each year if tobacco production was continued. Rotation would reduce the disease incidence but would not eliminate it.

In an experiment station bulletin published in 1903, Stevens and Sackett called Granville wilt "a disease of tobacco so destructive that its spread throughout the country would imply annihilation of the industry of tobacco growing."[17] This publication passed on to the farmers several suggestions to control the spread of the disease: avoid



Map of the southern portion of Granville County showing locations of Granville wilt infestations in 1903.

moving soil from one field to another on farming tools; prevent contact between diseased plants and healthy ones; and use crop rotation. The only recourse they saw for the farmer with an infected field was rotation—a long one of perhaps eight to 10 years between crops of tobacco.

Looking ahead, they saw possibilities for controlling the disease by some method of soil treatment or discovering disease-resistant

varieties. The authors believed that the germs could be destroyed through soil sterilization but doubted that any practical system could be worked out. Wilt-resistant varieties of cotton and cowpeas had been discovered, and the authors speculated that there might be similar hope in regard to the tobacco wilt. They said that if one or more plants were to survive in a severely infected field, seed from these plants should be saved and tested on "sick soil." They believed a few years of seed selection from resistant plants could result in the development of a race of wilt-resistant tobacco similar to the way in which wilt-resistant cotton and cowpeas had been developed.

Any threat to the tobacco crop in the state was cause for concern. In 1900 North Carolina was the second leading tobacco-growing state, behind Kentucky. In 1905 Virginia had edged ahead of North Carolina into the number 2 spot, based on acreage grown, poundage, and value of the crop produced.

Another wilt was causing serious problems for the state's watermelon growers, especially in the area between Raleigh and Goldsboro. Work on this problem was carried out in cooperation with the Bureau of Plant Industry of the U.S. Department of Agriculture. Comparison of variety resistance and selection of seed from apparently wilt-resistant plants were the main lines of attack. Each year there would be some promising results, but, as with Granville wilt, the solution to the problem was some years and many hours of research away.

Grape growers were also faced with a disastrous disease—black rot. Some plantings, particularly of the Niagara variety, were being eliminated. Neither the experiment station nor the state Department of Agriculture was able to put an expert into the field to study the disease, so the U.S. Department of Agriculture was called on for help.

The USDA responded, and in 1902, A. W. Edson was sent to the state. The two state organizations jointly covered the expenses for carrying out his work. Edson made observations and carried out control experiments near Tryon and at Southern Pines. It was a good year for his work, as frequent showers followed by periods of hot sunshine in May made it a bad year for black rot. Edson found that spraying with Bordeaux (a mixture of copper sulfate and lime) and tying paper bags over the bunches of grapes were both effective control measures. The spraying, of course, was the most practical.

Texas Fever Tick Eradication

The problem of the Texas fever tick was not new. In 1795 the North Carolina General Assembly passed a law requiring that:

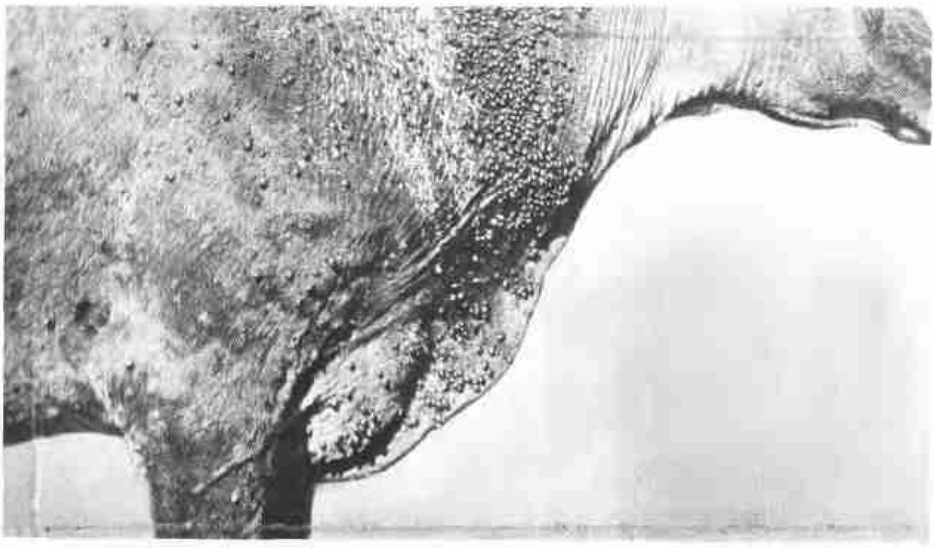
> No person shall hereafter drive any cattle from those parts of this State, where the soil is sandy and the natural production or growth of timber is the long-leaf pine, into or through any of the highland parts of the State where the soil or growth of timber is a different kind, between the first day of April and the first day of November in every year, under the penalty of four dollars for each and every head of cattle so driven, to be recovered and applied as before mentioned.

In 1836 the General Assembly passed a law to prevent the driving of cattle into the state from either South Carolina or Georgia between April 1 and November 1.

In 1891 a quarantine line was drawn restricting the movement of southern cattle into the northern states during hot weather.

These laws were enacted because of the devitalizing and deadly disease known as Texas fever in cattle—one of several livestock diseases that for many years inhibited the growth of the North Carolina livestock industry.

In 1889 researchers in the U.S. Department of Agriculture discovered that the intracellular parasites (Protozoa), which were the direct causative agents of the disease, required the cattle tick as an intermediary host for the organism. This was the first experimental proof that a disease could be borne by insects or carried from one animal to another by an intermediary host. This discovery led to the identification of mosquitoes as carriers for malaria and yellow fever in man.



A cattle tick infested cow.

The cattle tick quarantine line moved eastward as the eradication program made progress.

Additional experiments from 1895 to 1897 demonstrated the feasibility of treating cattle against tick fever, and a chemical solution in which to dip tick-infested cattle was developed. The results obtained in these experiments were so promising that it was believed to be feasible to completely eradicate the fever tick from the United States. In 1906 Congress appropriated $82,500 to begin this work.

Detailed procedures for controlling the tick were described by Dr. Tait Butler, veterinarian with the station and state veterinarian in the North Carolina Department of Agriculture, who was in charge of the tick eradication program in the state.[18] Gradually the quarantine line was pushed eastward, so that most of the Piedmont counties had been declared tick free by 1908. The hardest task, however, was yet to come as farmer opposition developed over much of the Coastal Plain and Tidewater regions. State laws would help, along with a satisfactory and "sure kill" dip that would be developed and widely used.

The Adams Act

The passage by Congress of the Adams Act in March, 1906, was a distinct milestone in the development of agricultural experiment stations. It provided an initial appropriation of $5,000 to each state and an increase of $2,000 annually until the total reached $15,000. This brought the total federal funding for agricultural research to $30,000 annually for each state.

Adams Act funds were "to be applied only to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States, having

due regard to the varying conditions and needs of the respective states or Territories."

Secretary of Agriculture James Wilson, on March 20, 1906, sent a letter to all directors of experiment stations giving instructions for the administration of the law. He advised that Adams funds were for the "more complete endowment and maintenance of the experiment stations" and "accordingly, expenses for administration, care of buildings, and grounds, insurance, office furniture, and fittings, general maintenance of the station farm and animals, verification and demonstration experiments, compilations, farmers' institute work, traveling, except as is immediately connected with original researches in progress under this act, and other general expenses for the maintenance of the experiment stations, are not to be charged to this fund."

During the next year, 1906-07, salaries from the Adams Fund totaled more than $4,000, and the next largest item was $714 for scientific apparatus. No specific projects under the Adams Fund are mentioned. However, the reports do show expansion in personnel. Between June, 1906, and June, 1907, three new positions were added to the station staff, increasing professional personnel from 13 to 16.

Do We Need a Dean?

A question concerning the organizational structure of the agricultural division arose in 1905. At the Board of Trustees meeting on June 2 the question of naming a dean of agriculture was brought up, and President Winston suggested that Professor Burkett be named to this new position. In the discussion that followed it became clear that other members of the faculty did not approve of one of them being named to a deanship of one of the several divisions.

The brief statements in the official minutes of the Board of Trustees do not shed much light on why it was suggested that the position of dean be created or why the idea was rejected at that time. One reason may have been to relieve the president of some of his duties.[19] In May, 1905, D. H. Hill, professor of English since the opening of the college, was made vice president. The same year E. B. Owen was selected as registrar and proctor.

The notion has also been advanced that the offer of deanship made to Burkett was part of an effort to retain his services on the faculty.[20] Whatever the reason(s) for proposing the change, it was

opposition from the other faculty members that killed the proposal. More than a decade elapsed before deans of the several schools were appointed.

Burkett, the first of Kilgore's four heralded appointments made shortly after he took over as director, was the first of the four to leave. In 1906 he became director of the Kansas Agricultural Experiment Station.[21]

It is clear from the minutes of the Board of Trustees that the college officials were upset with his leaving and made efforts to persuade him to remain. During his short tenure he had resurrected the work in agriculture from a nonentity to a place of eminence in the college as a whole. When he came to the state less than a dozen students were registered in agriculture. When he left five years later enrollment was more than 100. In addition, he had stimulated the thinking of the public at large as to the value and necessity of a farmer receiving an education comparable to that of any other profession.[22] In 1942 North Carolina State College awarded him an honorary degree of Doctor of Agriculture.

On Burkett's departure, the decision was made (possible because of new Adams Act funds) to split the position of agriculturist into two positions—agronomist and livestock specialist. C. M. Conner was selected for the livestock position. C. B. Williams, who had been on the state Department of Agriculture staff, was selected for the agronomist position.

NOTES TO CHAPTER 5

1. In 1918 Kilgore was awarded an honorary doctorate from Davidson College.
2. Schaub, I. O. *North Carolina Agricultural Experiment Station The First 60 Years 1877-1937.* N.C. Agricultural Experiment Station, Bulletin No. 390, 1955, pp. 81-83.
3. *Ibid.*, p. 82.
4. *Ibid.*, p. 83.
5. After leaving the College in 1905, Massey went into full-time editorial work. He was an editor of the *Practical Farmer*, published in Philadelphia, for three years. For the remainder of his life he was a contributor to a number of agricultural periodicals. These included the *Southern Planter, Southern Farm Gazette, Market Growers' Journal, Southern Agriculturist,* and the *Progressive Farmer.* He regularly wrote for the *Progressive Farmer* until shortly before his death at the age of 83. His contribution to that magazine included a regular column in which he

practiced one of his favorite forms of education—responding to questions sent in by farmers. In the pages of those journals he was a crusader for more progressive agricultural practices, especially those that contributed to soil improvement. He sought to interest farmers in planting legumes, especially the cowpea, for their nitrogen-enriching capabilities. So dedicated was Massey to this task that he became known as the "apostle of the cowpea." Massey also wrote *Practical Farming for the American Farmer* (1907) and *Massey's Garden Book for the South* (1910).

6. Robert W. Scott of Alamance County was the first of three generations of the family that would contribute more than any other family to the School of Agriculture between 1900 and 1984. From 1901 until 1928 Scott was a member of the state Board of Agriculture and was defeated in a bid to be commissioner of agriculture. In the General Assembly he served two terms in the Senate and five terms in the House. He was the first president of the State Farmers Convention and was named one of the first North Carolina Master Farmers in 1927. He was much involved in the negotiations regarding the organizational structure of the experiment station and the Department of Agriculture and was accorded the major credit for obtaining funds to build Patterson Hall and to obtain lands purchased by the college early in the century. Of his children, daughter Margaret was one of the first home demonstration agents, hired in 1912. Three sons and one grandson, all graduates of the School of Agriculture at North Carolina State, would have a significant impact on both the political and farm life in the state. Robert W., Jr. (class of 1905), was an early superintendent at the Edgecombe Test Farm, one of the state's foremost beekeepers, and a leader in the state beekeeping association. W. Kerr (class of 1917) served briefly as an extension specialist and with other government agencies, was farm agent in Alamance County from 1920 to 1930, Master of the North Carolina State Grange for three years, commissioner of agriculture from 1937 to 1948, governor from 1949 to 1953, and U.S. senator from 1955 until his death in 1958. Ralph H. (class of 1924) operated Melville Dairy in Burlington, was a leader in the formation and operation of the North Carolina Dairy Foundation, served in the State Senate from 1951 to 1955 and from 1961 to 1979, and was labeled "the prime mover" in securing funds from the 1963 General Assembly for the construction of Schaub Hall (the food science building). He was university trustee and officer of the NCSU Alumni Association. From the third generation of Scotts, Robert W. (son of W. Kerr) (class of 1952) was master of the North Carolina State Grange from 1961 to 1963, lieutenant governor from 1965 to 1969, and governor from 1969 to 1973. In 1982 he became president of the North Carolina community college system.

7. Lockmiller, David A. *History of the North Carolina State College.* N.C. State College, 1939, p. 101.

8. Samuel Ledgerwood Patterson, Jr. (1850-1908), was a grandson of Revolutionary War General William Lenoir and the son of State Treasurer Sam Patterson. Samuel Patterson, Jr., early took an interest in educational and agricultural affairs. After attending Faucette's, Bingham's, and Wilson's academies, he entered the university at Chapel Hill, only to find that institution closed the following year in the aftermath of the Civil War. He attended the University of Virginia one year and then served as a bookkeeper in his brother's business in Winston-Salem. But

his interests were still with agriculture, and he returned to the farm and to active participation in local and state politics. Though nominally a Republican, he maintained an independent approach to public office, supporting Cleveland's policies on tariff and serving in the General Assembly from Caldwell County as a nominee of the Populist party. He was appointed commissioner of agriculture only to be removed by the Fusion party which took over in 1897. But he fought to retain his position and was four times elected to the office by popular vote. He was a leading force in many progressive movements such as the enactment of pure food laws and tick eradication laws, appointment of a state veterinarian and state entomologist, and establishment of test farms.

9. See correspondence, N.C. State University Archives, and Laura Wood Roper, *A Biography of Frederick Law Olmsted*. Baltimore: Johns Hopkins Press, 1973, 555 pp.
10. *N.C. State College Catalog, 1901-02*. 1902, p. 91.
11. *N.C. State College Catalog, 1900-01*. 1901. p. 56.
12. Ross, Geo. R. "Miss Dixon of Alamance," *State College News*. Vol. XX, No. 5 (Nov. 1947), p. 7.
13. *Twenty-fifth Annual Report of the N. C. Agricultural Experiment Station*. N.C. Agricultural Experiment Station, 1902, p. 7.
14. The 1901 General Assembly made the Board of Agriculture the Board of Trustees for the college. While legally the station was still a part of the college, in the public mind it was a part of the North Carolina Department of Agriculture. This arrangement made Kilgore director of both the department and the station and placed him firmly in control of the total research program including planning and selection of projects to be carried out. (See chapter 4).
15. Schaub, *op. cit.*, p. 68.
16. Smith, William G. *Soil Survey from Raleigh to Newbern, N.C.* Apparently a part of a larger publication entitled *Field Operations of the Division of Soils, 1900*, pp. 187-205, bound in plain covers. (In possession of senior author.)
17. Stevens, F. L., and W. G. Sackett. *The Granville Tobacco Wilt; A Preliminary Bulletin*. N.C. Agricultural Experiment Station, Bulletin No. 188, 1903, 20 pp.
18. Butler, Tait. *Twenty-Ninth Annual Report of the North Carolina Agricultural Experiment Station*. 1906, pp. 21-23.
19. Lockmiller, *op. cit.*, p. 90.
20. Statement in N.C. State University Archives attributed to I. O. Schaub.
21. After two years as director of the Kansas station and one year studying cereal problems in Turkey and Russia for the state of Kansas, Burkett went into journalism fulltime. He was editor of *American Agriculturist* from 1908 to 1922; editor for Macfadden Book Company from 1923 to 1932; and president of Orange Judd Publishing Company from 1932 to 1937. He was the author or coauthor of 13 books.
22. Statement in N.C. State University Archives attributed to I. O. Schaub.

6

Research and Teaching Programs Expand in a Time of Parity (1907-1915)

Personnel changes, 1907 to 1915. Funding problems. Land and buildings. The cottonseed meal feeding era. Food processing. More attention to economics. Problems with pests. Attention to breeding. More students. Williams's contribution. Kilgore returns. A time of parity for farmers. A celebration.

WHEN THE 1907 GENERAL ASSEMBLY separated the college from the state Department of Agriculture, the first decision facing the new college Board of Trustees was the selection of a person to head up the Agricultural Experiment Station of the college. When B. W. Kilgore declined this position, the trustees named C. B. Williams as director (see Chapter 4).

Personnel Changes, 1907 to 1915

Williams presented a familiar face when he moved his office into Agricultural Hall on the campus. A native of Camden County, he was the outstanding student in the first graduating class of the young A & M College in 1893. Following graduation, Williams remained at the college as an instructor in chemistry, an assistant in the Agricultural Experiment Station, and a part-time graduate student. He received the master's degree in 1896, and followed that with a year's study of chemistry at Johns Hopkins University. Williams served as a chemist with the North Carolina Department of Agriculture from 1897 until he was named director of the college's Agricultural Experiment Station in 1907.

C. B. Williams

Transferred full time to the college with Williams were Dr. W. A. Withers, chemist; Dr. F. L. Stevens, whose title was changed from biologist to vegetable pathologist; J. S. Jeffrey, poultryman; and F. C. Reimer, promoted from assistant horticulturist to horticulturist. Among those remaining with the Department of Agriculture, in addition to Kilgore, were Dr. Tait Butler, veterinarian; W. N. Hutt, horticulturist; and Franklin Sherman, Jr., entomologist.

Several important research personnel changes occurred in 1911 and 1912 near the end of the Williams administration. J. P. Pillsbury replaced F. C. Reimer as horticulturist; H. R. Fulton replaced F. L. Stevens as vegetable pathologist and bacteriologist; T. H. Taylor replaced J. S. Jeffrey as poultryman; Zeno P. Metcalf replaced R. I. Smith as entomologist; and Dan T. Gray was a new addition as animal husbandman. In the 1913 reorganization, Gray was named chief of the Animal Industry Division, and H. R. Fulton was named chief of the Plant Diseases and Bacteriology Division.

Fulton, Taylor, and Gray served only short terms with the station and college, but for Metcalf (who had been an assistant entomologist with the State Department of Agriculture since 1908) joining the A & M faculty marked the beginning of a distinguished career and affiliation with the college that would last until 1954. Pillsbury remained with the college until 1946.

On the teaching faculty, C. L. Newman replaced C. M. Connor as professor of agriculture in 1910. As an indication of increasing specialization, in 1910 Newman's title was changed to professor of agronomy; M. E. Sherwin was added to the faculty as professor of soils; and J. C. McNutt was appointed professor of animal husbandry and dairying. I. O. Schaub joined the faculty as professor of agricultural extension in 1909. In 1913 Schaub was replaced by T. E. Browne.

In reporting to the Board of Trustees on May 10, 1911, President D. H. Hill announced that C. L. Newman had been named head of the

Agronomy Department and that J. C. McNutt had succeeded John Michels as head of the Animal Husbandry Department. (This was one of the first official references to the agricultural subdivisions as departments.)

Funding Problems

Funds from the Adams Act were increasing $2,000 annually when Williams assumed the directorship of the Agricultural Experiment Station in 1907. By the 1911-12 fiscal year these funds had reached their maximum of $15,000 per year. With these funds Williams was able to fill the vacancies created by those personnel who had remained with the state Department of Agriculture and also to increase his staff to some extent.

There were restrictions on the use of these funds, however. The 1906 federal legislation that provided them stipulated that the funds could be "applied only to paying the necessary expenses of conducting original researches and experiments bearing directly on the agricultural industry of the United States, having due regard to the varying conditions and needs of the respective States or Territories."

During the 1910-11 fiscal year, the following Adams projects were being carried out:

> Investigations of lettuce and apple diseases.
>
> Soil nitrification with reference to the bacterium concerned and its isolation.
>
> Relation of geology and chemistry of soils to productivity and fertilizer requirements.
>
> Investigation of the cause of the development of suckers on corn and the relation of their production, and prolificacy in ears, sustain to total yield per stalk under different conditions of soil and season.
>
> Investigations on double-flower of blackberries and dewberries and sterility of blackberries, dewberries and muscadine grapes.
>
> Investigations into the nature of the cause for cottonseed meal feeding resulting disastrously frequently when fed to swine.
>
> Field and laboratory studies of yellow sides.
>
> Biological studies of injurious species of corn bill bug occurring in North Carolina.
>
> Study of the transmission of characters in hybrids of rotundifolia grapes.
>
> A life history study of the Gloomy Scale, Chrysomphalus thnerbricosus, Comstock, together with an inquiry into the effectiveness of certain remedies.

There were also restrictions on use of the Hatch funds. Williams particularly deplored the lack of available building and repair funds.

All funds available for these purposes totaled only $750 annually. Printing was limited to publishing the results of experimental work that had been carried out by the station. There were no funds available for pursuing any kind of extension work.

Williams severely castigated the state for lack of support in the 1909-10 station annual report:

> The average income of the Experiment Stations of the United States from sources provided by the several states is something like $20,000 annually. As North Carolina is not appropriating one cent, the North Carolina Station is not keeping pace, nor can it, with the advancement that is being made by other Stations of the Union located in States that are aiding the Stations by direct appropriations and in other ways financially.[1]

Land and Buildings

It is not known to what extent the college facilities and land were available for research. At this time the station owned only 10 acres of land on the north side of Hillsboro Street acquired in 1885. The adjoining tract of 25 acres made available by the North Carolina Agricultural Society was no longer available after about 1914. Presumably the 288 acres of the Belvin tract were available for station use. Little is known about the use made of the 300-acre Camp Mangum tract acquired when the college was established and sold by the college in 1910.

The administration of President Daniel Harvey Hill (1908-1916) was noted for the physical growth of the college. Agriculture was no exception. The 1908-09 station annual report announced that "a new up-to-date gambrel-roof barn has been finished. It is 100 feet long and 42 feet wide and has haymow space for holding something like 150 tons of forage. It is ideally located, well lighted and ventilated and is provided with roomy granaries, with stalls and driveways and sliding doors at all openings."

This barn and several other farm buildings were built where the William Neal Reynolds Coliseum was later constructed. (In 1912 Leazar Hall [dining rooms and cafeteria] was constructed on the site of the old barn replaced by these new facilities.)

In 1911 the station chemical laboratories were moved from Holladay Hall to the newly constructed engineering building—Winston Hall.

A new agricultural building was built in 1912 with state Department of Agriculture funds. Located south of Patterson Hall

The Animal Industry Building, later renamed Zoology Building, was built in 1912 and torn down in 1956. The entomology laboratory and insectary are shown at the rear of the building.

and just north of the railroad on property obtained from the North Carolina Agricultural Society in 1898, it was called the Animal Industry Building. Later the name was changed to Zoology Building; it was torn down in 1956. When first occupied it contained the laboratories and lecture rooms of animal husbandry, poultry, entomology, and zoology.

A greenhouse and service building were erected in 1913. This was the first greenhouse available after horticulture was moved from Primrose Hall to Agricultural Hall in 1905 and the Primrose Hall greenhouses were torn down.

The Cottonseed Meal Feeding Era

Problems with row-crop agriculture, improvement in cattle, the push to rid the state of the Texas fever tick, and perhaps other events focused attention on cattle production in North Carolina during the early years of the twentieth century. This period came about midway in the decades Tait Butler labeled "the cottonseed meal feeding era of 1875-1920."[2]

Despite the presence of the cattle tick over most of the state, cattle could be summer pastured in the mountains, where the best stock was located, and sent to the eastern part of the state for fattening during the winter. While this system of feeding was not extensively followed, it was widely proclaimed as a method for securing both the feed and fertilizer value from the cottonseed meal.

Not much cottonseed meal or hulls were used for livestock feed in

the South until about 1880. Better use of both of these products would be of benefit to the cotton farmers and ginners producing them.

Robert S. Curtis, who joined the station staff in 1907 as animal husbandman (the first time this title appeared), was a leader in the cottonseed meal feeding research.[3] He found that cattle fed cottonseed meal had the highest daily rate of gain, but the net profits were less than when the cattle were fed corn silage alone. Those cattle that received their roughage in the form of cottonseed hulls made reasonable gain for 60 to 90 days but seemed reluctant to eat the hulls after that.

Cottonseed meal was recommended as a feed for other livestock, but the practice was not without some problems. In tests with workstock, Curtis found that up to two pounds (10 to 15 percent of total feed) could be cottonseed meal. If more than this amount of meal was added the feed was likely to be rejected by the animals. With the use of cottonseed meal the cost of feeding would not be decreased, but as with beef cattle, the fertilizer value of the manure would be greater.

In feeding tests with dairy cattle, Dairy Husbandman John Michels found that corn stover had feeding value equal to cottonseed hulls, and he demonstrated that substituting rolled oats for whole milk could reduce the cost of feeding dairy calves by about 60 percent.

Feeding cottonseed meal to hogs presented a major problem. Corn alone proved to be an undesirable ration for growing hogs, resulting in small gains and unthrifty conditions. Linseed meal made a good protein concentrate, but the cost was even greater than cottonseed meal. Curtis's experiments with hogs indicated that farmers could feed cottonseed meal to 75-pound shoats in quantities ranging from one-sixth to one-fifth the total ration, by weight, for a period of 75 to 90 days. If cottonseed meal was fed in greater amounts, or for a longer period, severe toxicity developed. Similar problems developed when cottonseed meal was fed to chickens.

In addition to the animal husbandry, dairy, and poultry divisions, the divisions of chemistry and veterinary sciences studied the problem of cottonseed meal toxicity. A division of animal pathology was created in 1910, specifically to work on the cottonseed meal problem. J. D. Cecil staffed this one-man division.

Veterinarian G. A. Roberts used both guinea pigs and rabbits in his studies of cottonseed meal toxicity. In the 1913-14 station annual report he described the toxicity in three animals:

> The most characteristic clinical symptoms in swine, as noted from the beginning of our experiments in feeding cotton-seed meal, have

been: rather firm feces (though diarrhoea was present in a few cases); rough coarse hair, indicating unthrift; irregular or loss of appetite, especially for the cotton-seed meal; weakness; unsteady gait; more or less loss of sight and very difficult breathing. Animals would finally get down unable to rise and lie there either in a comatose condition or in a constant struggle to regain their feet—often grunting as if in pain or distress. Death would follow in a few hours to several days. Many animals, however, that appeared hale and hearty at the evening meal were found dead the following morning.

The most conspicuous symptoms in rabbits and guinea pigs consisted of rapid breathing, lassitude, prostration and death in a few hours. Sometimes there were continuous movements of limbs after prostration as if to regain their feet while in others there were no such movements.[4]

In 1915 Chemists W. A. Withers and F. E. Carruth succeeded in separating from the cottonseed a substance called gossypol which they found to be poisonous to rabbits. It was the material causing the problem when cottonseed was used as livestock feed.

A herd of purebred hogs owned by the station and pictured in front of the dwelling house on the experiment station farm in 1916.

Food Processing

Milk handling and processing was the first activity that would come to be called food processing. An 1898 bulletin discussed the pasteurization of milk. A 1905 bulletin titled *Farm Dairying* included sections on the making of butter and cheese.[5] The announcement of a 10-week dairy course in the 1900-01 catalog stated that it would be "a course in practical butter-making in accordance with the most approved methods of the modern creamery." In the four-year course, the handling of milk and milk products were covered in classes on "Dairying" and "Dairy Bacteriology."

During his first year on the staff, John Michels wrote a bulletin on handling and marketing milk and cream. In 1909 he wrote another that covered the manufacture and marketing of cottage cheese, skim milk, buttermilk, and ice cream. A 1910 publication covered "improved" methods for making cottage and neufchatel cheese.[6] Michels left in 1910, but during his short time on the staff this Wisconsin native gave attention to the processing of farm products that continued and eventually developed into the food processing area, a subject that grew in importance through the years.

Most of Michels work was directed toward dairy manufacturing on the farm. During the fall of 1909 and in 1910, four commercial creameries were organized in North Carolina—one in Gaston County, two in Cleveland, and one in Catawba County.[7] Curtis said the plants in Cleveland and Gaston were established by commercial creamery promoters whose sole purpose was the selling of creamery machinery. From the beginning the cream supply from the farmers was so limited that it was impossible to operate economically. The Gaston plant closed its doors permanently; however, the two plants in Cleveland were backed financially by businessmen who held on until more cows could be secured by the farmers. These two plants had some very difficult problems to overcome at the beginning, but both developed a good business. Together they increased patronage to 1,200 producers. In 1925 their combined annual output of butter was just a little less than 500,000 pounds.

The Catawba creamery was organized differently. Agricultural extension workers held meetings with farmers to explain the number of cows needed to make a creamery successful, the plan of organization, and ways to obtain more cows. This procedure prevented the establishment of creameries where a sufficient amount of cream was

not available.

Additional creameries were established at Hendersonville in 1912, at Wilmington in 1914, and at Asheville, Lexington, Asheboro, Monroe, and Mooresville in 1915. Also in 1915, a portion of the basement of Patterson Hall was assigned to the station to operate a cooperative creamery that would handle milk from Wake and adjoining counties.

The manufacture of muscadine wine was big business in some parts of the state, starting with Medoc Vineyard in 1835—the nation's first commercial winery—in Halifax County. By 1897 the Niagara Vineyard near Southern Pines had 1,200 acres of grapes under cultivation, and the Tokay Vineyard Winery near Fayetteville produced 100,000 gallons per year. By 1903 Edgecombe County native Paul Garrett had become America's largest winemaker, with five wineries in North Carolina. The largest was at Aberdeen. In 1902 the Sol Bear Winery at Castle Hayne built a new winery in Wilmington with a capacity of 200,000 gallons a year. Other wineries were located at Conover, Eagle Springs, Gibson, Littleton, Louisburg, Manteo, Murphy, Peachland, Pettigrew State Park, Holly Ridge, Samarcand, Tryon, Warrenton, Willard, Edenton, and Icard.[8]

By 1906 the demands of the wineries had exceeded the supply of native scuppernongs, and in 1908 Assistant Station Agronomist W. C. Etheridge was suggesting an increased production of these native grapes. But it was too late. North Carolina's thriving wine industry ended in January, 1909, with the adoption of statewide prohibition.

As for alcohol of another sort, in 1907 Chemist W. A. Withers speculated on the potential of sweet potatoes in making alcohol. He judged that about one gallon of alcohol could be produced from one bushel of potatoes, considering the amount of starch (over 20 percent) and fermentable sugar (high as 6 percent) contained in sweet potatoes.[9]

More Attention to Economics

From the beginning, the researchers had put money values on the results of their experiments, often citing the cost of operating under certain conditions, and the profit to be derived from certain management practices.

In the classroom, a course entitled Agricultural Economics was given by Benjamin Irby in 1897-98, and was required of all seniors. In 1901-02 this course was replaced by one called History of Agricultural and Rural Economics taught by C. W. Burkett. Also, in 1901-02 President George T. Winston taught a course in farm economics. A course in farm management was substituted for the Burkett course in 1905-06. No course of any kind was offered in 1906-07. Farm management was again taught in 1907-08, and from that year until 1920, a number of new courses were added. Some of these early courses were entitled: Banking and Farm Credit, Organization for Farm Marketing and Credit, and Marketing Distribution.

By 1913 the Farmers' Union had become the dominant farm organization in the state. In reporting to the trustees that year, President Hill said this organization and several other agricultural groups were urging that the college establish a chair of rural economics.[10] He said the instruction given in such a department would cover the economic buying and selling of farm products, cooperation among farmers, saving and thrift on the farm, and relative cost of production of different crops. Hill declared that such a position—to deal with the business side of farming—should be established.

The college responded favorably and W. R. Camp, placed in charge of the Division of Markets and Cooperation, apparently found plenty to do. In reporting to the trustees on May 25, 1915, Hill stated:

> Mr. Camp has . . . given attention to the creameries, their organization and the sale of the products; aid has been given the apple growers in grading, packing, and marketing; an important service has been rendered the corn growers in the eastern part of the State by the securing of markets with the mills and merchants of the State, reduced freight rates and milling-in-transit privilege; help has been given the Eastern Carolina Truck Growers' Association in the marketing of truck crops, and a decided success was made in grading cotton at Tarboro, in cooperation with the Bureau of Markets of the National Department of Agriculture. The melon growers and sweet potato growers have been given assistance in organizing and selling and the Farmers' Market Bulletins have been valuable to both growers and consumers.[11]

Problems with Pests

Agricultural scientists across the nation discovered a wilt-resistant flax, and seed were distributed in 1903. A hog cholera serum was successfully used in 1907. That year brown rot of peaches was con-

trolled with a fungicide. In 1911 it was discovered that rotations would control cotton nematodes. But the successes were few compared to the problems for the growers of both crops and livestock. North Carolina was no exception, and station researchers invested a considerable amount of time in insect and disease problems.

Growing lettuce under cloth was first carried out by D. W. Trask near Wilmington in 1892. By 1910 between 75 and 100 acres were being grown around Wilmington. The idea spread rapidly over southeastern North Carolina, starting around New Bern in 1894, Fayetteville in 1895, Warsaw in 1897, and Maxton in 1902. Some lettuce was also grown for shipment at Faison, Willard, Wade, Tarboro, Chadbourn, and Mt. Olive.

Sclerotiniose, commonly called lettuce drop, soon showed up in the farmers' fields. The winter of 1908-09 was a particularly bad one. A 1911 station bulletin described the symptoms:

In this 1915 tobacco test at the Oxford Station, the tobacco followed cowpeas and crimson clover, was fertilized with acid phosphate and sulfuric potash, planted 24 inches on drill in 3-foot, 9-inch rows, topped 14 to 16 leaves, and primed.

> When first observed, a single leaf may be drooping or wilting; a day or so later the whole plant appears involved, the outer leaves dropping flat on the ground, the central head alone remaining standing. At this stage the plant appears as though scalded by an application of hot water. The head also soon succumbs to the rot and topples over.[12]

The recommendations offered by Vegetable Pathologist and Bacteriologist F. L. Stevens and Assistant J. G. Hall were to prevent the occurrence of the disease the following year. They advised farmers to inspect the bed carefully each day and remove every plant that showed indications of the disease, then drench the bed with a Bordeau mixture at every place where sick plants were removed. If these steps were followed, they said no sclerotia would mature and the number of live sclerotia present in the beds the following year would be very small.

In 1907 Granville wilt of tobacco spread into Vance and Durham counties. A year or two later it was discovered in Wake County. The search continued for plants with resistance to the disease. By 1910 at least 29 selections of Italian, Sumatra, and native types were being tested. A variety of Sumatra showed considerable resistance, but the outcome was still uncertain. Director Williams reported to the trustees that the investigations being conducted near Creedmore had been much enlarged by entering into cooperative relations with the Bureau of Plant Industry of the U.S. Department of Agriculture.

In seeking a solution to the watermelon wilt problem, Stevens and Hall had made hundreds of crosses between watermelons and citrons. By 1910 they said they had produced a plant with high resistance to the disease and capable of producing a high percentage of edible melons of excellent quality. A disease known as "double blossom" threatened the growers of blackberries and dewberries. In 1910 the disease was diagnosed as *Fusarium rubi.* Anthracnose had become a serious disease of cotton, and concern was voiced over the problems of molds in corn and smut in small grain.

R. I. Smith, who had replaced Franklin Sherman as station entomologist, spent considerable time on two pests—melon worms of cantaloupes, and bill bugs in corn. There was an armyworm outbreak in 1914.

A major insect problem in 1910 occurred right at home—in West Raleigh. On May 22 Director Williams sent out a circular letter to the residents of the area, asking their cooperation in an attempt to make the township a sanitary district. Smith said that reports of typhoid

fever, and the undoubted presence of many flies, were responsible for this action. Smith began an investigation to determine the principal breeding places of the flies, and a method of poisoning flies with formaldehyde was successfully demonstrated. He said the flies around the college horse and dairy barns were reduced to small numbers by removing the stable manure each week or oftener and by poisoning the flies with formaldehyde.[13]

The fly episode occurred two years after ants invaded Agricultural Hall. Smith described the incident:

> The common little red-house ant, *Monomorium pharaonis*, became very abundant last August in the agricultural building, and an attempt was made to eradicate them, or at least to devise some means of preventing their presence in undesirable places. For nearly four weeks this work continued with partial success, by collecting thousands of the ants on sweetened baits and by attempting to attract them to poison mixtures. The sweetened baits served to trap thousands of ants, but the poison baits were of little if any value.
>
> It was demonstrated that ants may be kept off laboratory tables, desks, shelves, etc., by the use of a saturated solution of bichloride of mercury, one application being effective for several weeks, except for an occasional stray individual. Any tape, made by soaking strips of cotton cloth in the solution, may be tied around the legs of tables, chairs, etc., and serves to repel the ants for a considerable time.[14]

Attention to Breeding

In the poultry yard, J. S. Jeffrey installed trap nests in his laying houses in 1906 to determine the number of eggs laid by each hen. He found great variation in the rate of lay among the hens. He selected eggs for hatching from the best producers, speculating that this trait would be passed along to the offspring. However, three years later he noted in the 1908-09 station annual report that he had found no conclusive evidence that the quality of heavy egg production was inheritable. He said that in almost every case the daughters of hens making the best records had been poor layers. He suggested to the farmer that it would be more profitable to make rigid selections for constitutional vigor and strength in the breeding stock than to select from the heaviest layers.[15]

Variety testing continued with corn, cotton, soybeans, and cowpeas. Mammoth and Haberlandt produced the best yields of the 17

soybean varieties tested. Adsuki and seeta beans also were tested. They did not yield as much as soybeans but produced more hay.

The research techniques being used showed more sophistication than seen in earlier efforts. Work begun with cotton in 1908 included individual plant selections for length of staple, earliness, prolificacy, size and uniformity of bolls, production of double and tripple bolls, disease and drought resistance, and combinations of these characteristics. Assistant Agronomist W. C. Etheridge said the selections were made to obtain improved strains of the parent varieties and to secure excellent purebred stocks for crossbreeding, by which method a trial would be made to produce new and desirable varieties.[16]

Wheat and oat varieties were added to the tests in 1906. Five years later Etheridge reported that the three wheat varieties yielding the highest were Purple Straw, Currell's Prolific, and Red May.

In other research, Horticulturist F. C. Reimer studied the problem of self-sterility in blackberries, dewberries, and muscadine grapes; the agronomists found that the corn plants where the suckers were not removed produced more corn than those from which the suckers were pulled off; there was a slow but steady increase in knowledge of characteristics of soils and the effects of various fertilizing materials; and alfalfa research was expanded.

More Students

The industry of agriculture was on the upswing in the early years of the twentieth century, as reflected in agricultural enrollment at the agricultural colleges. In the four-year agricultural course at North Carolina A & M College, enrollment increased from 59 students in 1907-08 to 190 in 1913-14. Total enrollment in agriculture, including short courses, increased from 126 to 315 in the six-year period.

The two-year agricultural course, discontinued in 1907, was brought back in 1911 and ran until 1916 with an average enrollment of around 20 students each year. A two-year course in veterinary medicine was offered from 1911 through 1914. Dr. Guy A. Roberts directed this program and is credited with inducing approximately 40 men to pursue the study of veterinary medicine. The majority of these students graduated from Kansas City Veterinary College and returned to North Carolina.[17]

The one-year course, instituted when the two-year course was discontinued in 1907, had from 12 to 40 students during this period.

A unique work course was started in 1908, designed for those students the catalog described as "needy and ambitious." The program was four years in length; up to 10 new students could be added to the program each year. The schedule was one week in classes followed by one week of work. The program, and the one dollar per day salary, was designed to "defray immediate college expenses." In 1914 the work course was reduced to a two-year program. Twelve students were admitted each year and the students pledged themselves to remain in the program for the full two years.

The seven-week winter course was reduced to six weeks in 1911 and to four weeks in 1913. Attendance averaged from 35 to 66 during this period. The winter course usually started in mid-January during the second week of the winter term. From 1908 until 1912, one-week courses covered the study of corn, cotton, and stockraising.

Normal courses for rural teachers were conducted in the summer. One was called the "May School for Teachers." It came immediately following the end of the regular school term. From 1906 until 1912 it was one week in length; it was expanded to two weeks in 1913. Subjects covered were agriculture and nature study. Attendance ranged from 10 to 32. In addition, school teachers could receive agricultural instruction in the regular summer school courses; a special summer school for demonstration agents was started in 1912;

Looking west from the front of Patterson Hall at the orchard in 1916. The house in the pecan grove in the distance was occupied by Professor Pillsbury. The Nelson Textile building was later located on the site of the dwelling.

and in 1914, principals of 14 agricultural and rural high schools attended a one-month summer school course.

Several four-year graduates during this period became pioneers and leaders of the emerging demonstration and extension program. Included were B. Troy Ferguson, John A. Arey, James M. Gray, R. W. Graeber, Sam Kirby, Roy D. Goodman, Enos C. Blair, C. M. Brickhouse, J. R. Frank, and F. E. Patton.

A Veterinary Club was started in 1911. In 1908 the *Agricultural Student,* published by the Rural Science Club, was replaced by the *North Carolina Student Farmer.* The intention was to publish 10 monthly issues each year, but the project was short lived. By 1911 the publication had gone out of existence leaving professors Williams and Newman holding a note they had signed from the printer in the amount of $271.66. In reporting the matter to the Board of Trustees on May 30, 1911, President Hill suggested that the college "should take this obligation off the shoulders of these endorsers, but at the same time warn the kindhearted that this will be done in no other cases."

More than one-half of the students were receiving financial assistance from their own work or from the limited scholarships available. The 1913 General Assembly allowed the trustees to give 100 additional scholarships to "worthy and needy young men who wish to stay in agriculture." Recipients would be required to pledge that for two years after leaving school they would engage in some form of agriculture.

In 1913 the Southern Railway gave four scholarships for "needy young men who want to study agriculture." In 1914 the Norfolk and Southern Railway and the Roper Lumber Company each added two scholarships for the same purpose.

Williams's Contribution

A bill was introduced in the 1911 General Assembly to consolidate the research activities of the North Carolina Agricultural Experiment Station at the college and the North Carolina Department of Agriculture. The bill was not passed, but instead a resolution was adopted that directed the two organizations to ascertain the wisdom of such consolidation or to secure closer cooperation. In 1912 the two agencies developed a plan whereby the research of the two agencies would be consolidated under a director and vice director. Williams thus

relinquished the directorship on June 30, 1912, after serving in that capacity for five years. B. W. Kilgore was named director and C. B. Williams was named vice director (see Chapter 4).[18]

During Williams's tenure, the Adams Act increased the total available funds by 100 percent. He was responsible therefore for the initiation of practically all the new lines of work required under the act, and it should be noted that the type of projects developed were largely of a more fundamental nature than had been the case in the past. More effort was made to find out the reasons behind what was observed rather than simply using the trial-and-error method to learn what happened under a given condition.

The nature of the work that was started and continued during his administration was reflected in the type and number of publications issued in the succeeding years. A large number of the bulletins and circulars issued before that time consisted primarily of academic discussions, but beginning in 1911 most publications reported results of North Carolina experiments.

The future organization of the agricultural program began to take shape during the Williams years. With the creation of the animal pathology division in 1910, there were 10 divisions—agronomy, chemistry, plant pathology and bacteriology, poultry husbandry, horticulture, animal husbandry, dairy husbandry, entomology, veterinary science, and animal pathology. Many of these designations would become the names of departments in the years to come.

A special committee of the board inspected the college farm each year. It looked at everything, including condition of the livestock, soil conservation techniques employed, and sanitation of the stock watering troughs. The reports of the farm committee were generally high in praise of the farm operation.[19]

Kilgore Returns

Kilgore entered upon his duties as director with the same vigor he had shown when he directed the program several years earlier. However, the division or departmental organization worked out in 1912 did not last very long. Concern soon arose about the poultry research program. In reporting to the Board of Trustees in 1914, Kilgore stated that "very little has been accomplished along experimental lines with poultry."

A year later Kilgore reported that as the result of dissatisfaction

B. W. Kilgore

with the program, the Washington office of Experiment Stations had "served notice that expenditures for poultry work would not be allowed, under the present arrangement, in the future." Consequently, no salary was provided for Poultryman T. H. Taylor. Shortly thereafter the poultry work was made a part of the Animal Industry division.

B. F. Kaupp, DVM, was named to the chair of poultry science in November, 1914. Within a year he had developed an ambitious poultry research program at the campus and at one or more of the test farms and had worked out what he termed "a complete course in poultry science." Thus came into being the first major in poultry husbandry.

This new marriage between the college and the Department of Agriculture brought back several persons who had been associated with the college at an earlier period. These included B. W. Kilgore, director; W. N. Hutt, horticulturist; and Franklin Sherman, Jr., entomologist. Hutt and Sherman served as heads of the horticulture and entomology divisions under the reorganization. Other division heads were Williams in agronomy, Gray in animal industry, Fulton in plant diseases and bacteriology, and Withers in chemistry.

Again a part of the Agricultural Experiment Station were the superintendents of the several test farms. They now carried the title of assistant director. F. T. Meacham was still at the Iredell farm, R. W. Scott was at Edgecombe, J. H. Jeffries was at Pender, and R. W. Collett was in the mountains. Collett's responsibilities had been expanded when the Buncombe Test Farm 12 miles east of Asheville was purchased in 1908. This farm was added because the one at Blantyre in Transylvania did not have enough tillable land to meet research needs. Collett served as superintendent of both farms until 1913 when he was moved into the state office as assistant director of branch stations. F. S. Puckett then became the leader for the mountain farms.

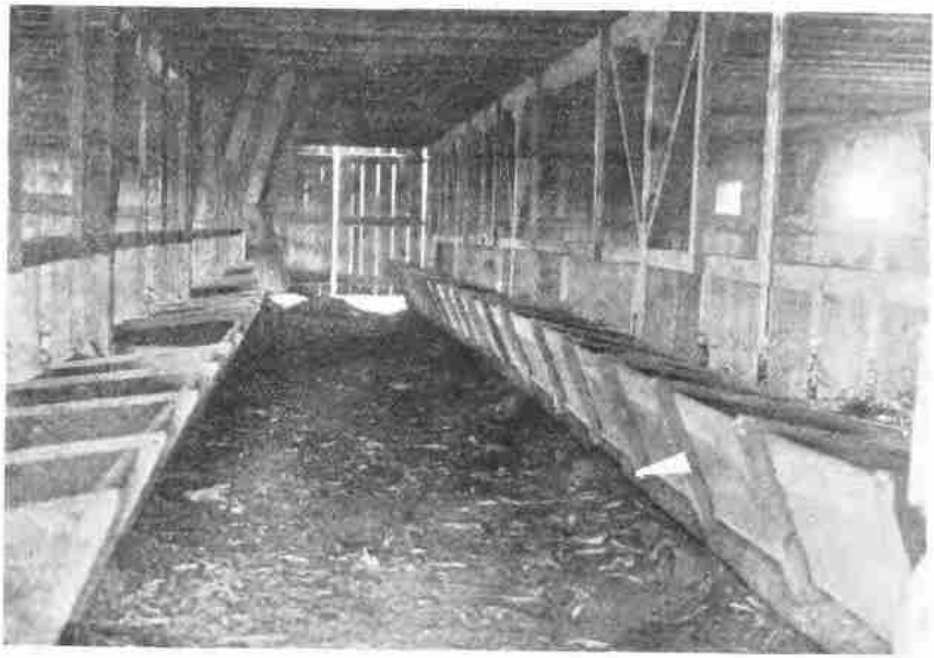
The Granville Test Farm came into being in 1911 on 250 acres along the Old Durham Road on the west side of Oxford. E. G. Moss was selected as the first assistant director for this test farm. The Blackland Test Farm was established on 362 acres at Wenona in Washington County in 1912. S. O. Perkins was the first superintendent, replaced in 1914 by H. E. Wills. The primary purpose of the farm was to ascertain the best manner of farming and preserving the muck or blacklands of the Tidewater area.

A Time of Parity for Farmers

Farmers and agricultural leaders may not have recognized it as such at the time, but the second decade of the century was a good one for agriculture. The stability of prices for farm products and for the supplies farmers bought was such that the period from 1910 to 1914 would become a benchmark for comparing the economic well-being of farmers for the next half century. Farm parity would be based on this period.

How good was it? The number of farms in North Carolina increased from 225,000 in 1900 to 260,000 in 1914. During this 15-year period, the average value of these farms, including land and buildings, increased from $900 to $2,000 per farm.

Average prices for farm products for the five-year period from



Interior of the cattle barn at the Iredell Test Farm.

1909 to 1914 were 90 cents per bushel for corn, $1.21 per bushel for wheat, 13 cents per pound for cotton, 7.6 cents per pound for hogs, and 19.5 cents per dozen for eggs.

Crop yields increased. For the five-year period from 1910 to 1914, compared to the period from 1900 to 1904, corn yields increased from 13 to 17 bushels per acre; cotton yields from 224 to 302 pounds of lint per acre; and wheat from 7 to 9 bushels per acre. Tobacco yields increased slightly, from 618 to 629 pounds per acre.

Agricultural enrollment during the 1914-15 academic year reached a record 374. President Hill told the trustees at their meeting in May, 1915: "The increase in the number of agricultural students is gratifying, as it shows an awakening to the possibilities of wealth and comfort on the North Carolina farm."

The optimism—out on the farm, in the agricultural halls on the campus, and elsewhere—was surely tempered by the many persisting problems. But the increased appropriations for the agricultural agencies—old and new—reflected the fact that progress was being made and a realization that there was still plenty of room to grow.

The *Progressive Farmer* had become the dominant southern farm paper from the Atlantic Ocean to the Mississippi River. Editors Clarence Poe, Tait Butler, W. F. Massey, and other contributors continually campaigned for soil building and conservation, more livestock and feed, crop diversification, better rural credit, cooperative marketing, government assistance, and improved rural homes.

A Celebration

In 1914, 25 years had passed since the college had opened its doors. An appropriate celebration was in order. It occurred on October 1-3.[20]

The event included meetings of the alumni, class reunions, receptions, teas, a parade by the regiment, and an educational program. Many speeches were made. Early professors Chamberlain and Massey were there.

The celebration closed with an address by President Hill in which he described the growth of the college and the achievements of its graduates. He concluded with the following rededication and challenge to the future:

> It is, I hope needless for me to say, that whatever has been done in the past twenty-five years is only an earnest of what this institution sets

before it to do. It is here for unselfish, unremitting service. It proposes to put every ounce of its vitality in the great constructive work of the State and Union. It wants to minister, not to be ministered to. It feels that the two supreme temporal needs of North Carolina today are (1) a race of farmers so intelligent, so thrifty, so capably fitted that it can win from the soil a more adequate return for its labors and thereby add to its comfort and education and wealth of the State; (2) a specifically educated class of men who can turn our raw products into more highly organized wares and who can skillfully and unhesitatingly lead the industrial progress of our people. To contribute more and more each year to the rearing of such men, is the State appointed mission of our college, and on this, our Anniversary Day, we pledge ourselves anew to this clearly conceived mission.[21]

As the professors of agriculture returned to their offices after the celebration—either in the agricultural buildings on the campus or in the agricultural building in downtown Raleigh—and perhaps wondered about the next 25 years, they should have been aware of new extension personnel coming in. The next quarter century would be greatly influenced by the new kids on the block.

NOTES TO CHAPTER 6

1. *Thirty-Third Annual Report of the North Carolina Agricultural Experiment Station. 1910*, p. 16.
2. Curtis, Robert S. *The History of Livestock in North Carolina*. N.C. Agricultural Experiment Station, Bulletin No. 401, 1956, pp. 23-24.
3. For detailed reports on feeding experiments with cottonseed meal by Curtis and others, see the following N.C. Agricultural Experiment Station, bulletins: No. 199 (cows and calves, 1908); No. 200 (hogs, 1909); No. 213 (cows and calves, 1910); No. 215 (horses and mules, 1911); No. 216 (draft animals, 1911); No. 218 (beef cattle, 1911); No. 222 (beef cattle, 1912).
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5. *Pasteurization of Milk*. N.C. Agricultural Experiment Station, Bulletin No. 146, 1898; and J. C. Kendall, *Farm Dairying*. N.C. Agricultural Experiment Station, Bulletin No.192, 1905.
6. Bulletin No. 198, *Handling and Marketing of Milk and Cream*, (1908); Bulletin No. 202, *Manufacture and Marketing of Cottage Cheese, Skimmilk-Buttermilk, and Ice-Cream* (1909); and Bulletin No. 210, *Improved Methods for Making Cottage Cheese and Neufchatel Cheese* (1910).
7. Curtis, *op. cit.*, pp. 51-52.

8. For a detailed report on the North Carolina winemaking industry, see Clarence Gohdes, *Scuppernong: North Carolina's Grape and Its Wines.* Durham, N.C.: Duke University Press, 1982, 115 pp.
9. *Thirtieth Annual Report of the North Carolina Agricultural Experiment Station,* 1907, pp. 13-14.
10. Minutes of May 27, 1913, meeting of the executive committee of the Board of Trustees, p. 13. During the second decade of the twentieth century the Farmers' Union was the dominant farm organization in the state. For details of its activities see the printed proceedings of the annual state meetings.
11. Page 7 of the experiment station and extension directors' report in the minutes of the Board of Trustees for May 25, 1915.
12. Stevens, F. L. *A Serious Lettuce Disease.* N.C. Agricultural Experiment Station, 1911. p. 8.
13. *Thirty-fourth Annual Report of the North Carolina Agricultural Experiment Station,* 1911, p. 36.
14. *Thirty-Second Annual Report of the North Carolina Agricultural Experiment Station.* 1909, p. 32.
15. *Ibid.,* p. 24.
16. *Thirty-Third Annual Report of the North Carolina Agricultural Experiment Station,* 1910, p. 74.
17. Mimeographed statement on the role of N.C. State University in the development of veterinary medicine in North Carolina. N.C. State University Archives.
18. Williams served as vice director of research from 1912 to 1917, head of the Agronomy Department from 1907 to 1940, and as the first dean of agriculture from 1917 to 1923. Schaub said he was meticulous, conservative, and "long winded" when appearing before groups, but he rendered invaluable service to the agriculture, not only of North Carolina but the nation as a whole, and the naming of Williams Hall was a well-merited tribute to his memory.
19. Reports of the farm committee of the Board of Trustees were not always complimentary. Committee members were looking for and expecting the college (and branch stations) to give the appearance of a model farm and to produce a considerable amount of produce for sale as well as to conduct research. R. H. Ricks of Rocky Mount (for whom Ricks Hall was named) headed the committee for many years. Reports of the farm committee were included with the Board of Trustees minutes.
20. *Lockmiller, David A., History of the North Carolina State College.* Raleigh: N.C. State College of Agriculture and Engineering, 1939, pp. 116-119.
21. D. H. Hill personal papers, N.C. State University Archives.

7

Extension Reaches Out to the Farm

Early farmers' institute work. Varied programs. Farm demonstrations. First North Carolina demonstration. Hudson moves to Raleigh. Boys' and Girls' club work. Home demonstration work. Personnel and program changes. The Smith-Lever Act. An agricultural editor.

IN 1885 THE GENERAL ASSEMBLY OF NORTH CAROLINA assigned to the Board of Agriculture the duty of forming and holding farmers' institutes at regular intervals in every county of the state. The sum of $500 annually was allocated for this purpose. Despite the limited funding, an ambitious program with the goal of holding an institute in each county every two years was set up. The goal would be reached, but it would take a long time.

Early Farmers' Institute Work

College and Experiment Station personnel participated "by invitation of the Commissioner of Agriculture." In 1890, the first full year of the college's operation, Professors Massey and Chamberlain and President Holladay participated in at least 11 institutes, apparently the total number held that year. Commissioner John Robinson regularly participated in the two-day events, and leading farmers were on the programs.[1]

Local citizens arranged the institutes. A committee selected the location, the dates, and the topics to be covered. It handled publicity and made the necessary arrangements on the days of the institute. A few institutes were held in the winter, but most were scheduled in July and August between layby and harvest.

For four years, beginning in 1887, a "Grand Encampment and Farmers' Institute" was held at Mt. Holly in Gaston County. Attendance records are not available, but one report states that on one day of the 1888 event there were between 700 and 800 wagons on the grounds.

There was slow but steady growth in the farmers' institute program, as indicated by the following figures:

Year	Number of institutes	Number of counties
1898	28	27
1904	58	58
1905	79	76
1906	136	91
1907	169	93
1908	234	95
1909	247	93
1910	392	96
1911	471	97
1912	502	99

In 1912, the number of institutes and attendance was as follows:

At 236 regular institutes for men	32,493
At 231 regular institutes for women	18,413
At 35 railway institutes	3,903
At 3- and 5-day short courses	1,332
At 11 orchard demonstrations	223
At other special institutes	1,405
At state farmers' convention	2,300

Total attendance for the year was 60, 069.

Institute attendance hit a peak in 1914 when 35,632 men attended 250 regular institutes and 33,227 women attended 240 regular institutes. Highest attendance at a single location was at the Iredell Test Farm, where approximately 1,200 men and 300 women attended institutes in 1909 and 1910.

By 1907 a farmers' institute organization or committee existed in 95 of the state's 98 counties. But Commissioner of Agriculture S. L. Patterson was not satisfied. He said in 1909 that in too many places the farmers still seemed to look on the institutes as belonging not to them but to the Department of Agriculture. He suggested that if more local interest were not shown in several counties, the institutes there should be discontinued.[2]

Varied Programs

In 1906 North Carolina became the first state in the South to hold institutes for women. In that year 21 institutes were scheduled for women in 19 counties. In 1907 the number increased to 50 institutes in 38 counties. The usual practice was to hold the women's institute on the same day and at the same place as the institute for men but in a separate hall. Topics included the farm fruit garden, the farm vegetable garden, farm poultry, making butter, beautifying the home surroundings, home conveniences, literature for the farm home, homemaking, home nursing, the nutritive value of foods, cooking meats and vegetables, making bread, and educating the girls on the farm.

The farmers' institutes took other forms as well. In 1908 the Agricultural Experiment Station, in cooperation with the Norfolk and Southern Railway, operated a Corn Special train through the eastern part of the state from March 22 to April 1. Visits of two hours or more were made in 20 villages and towns along the railroad. Exhibits in one of the rail cars supplemented the talks given by the experts from the college. Later that year, under the auspices of the farmers' institute, both agricultural and "domestic science" instruction were provided by a similar arrangement along the Southern Railway Company lines.

The first farmers' convention was organized by the A & M faculty and held on the campus in July, 1903, with around 500 in attendance. Some farmers brought their families. Speakers covered a wide range of agricultural topics. The event was to become an annual one. Robert W. Scott of Alamance County was elected the first president of the convention and Professor Charles W. Burkett was elected secretary.

At the annual meeting of the convention in 1906, it was affiliated with or made part of the farmers' institute work conducted by the state

Department of Agriculture. Later called farm and home week, this annual event was held each summer for the next 50 years on the campus and jointly sponsored by the college and the state Department of Agriculture. In the early years, a women's program was added.

Special institutes were developed at various locations in the state, such as orchard demonstrations in the commercial fruit areas.

In 1911 T. B. Parker was appointed director of farmers' institutes in the state Department of Agriculture, and T. J. W. Broome was named assistant director. One year later James M. Gray replaced Broome as assistant director.

Throughout the farmers' institute days, college and experiment station personnel spent much time on the institute circuit, in addition to their other activities and contacts with farmers. In 1898 Acting Director Withers reported about 10,000 letters received and answered, in addition to the many requests for publications. College and station personnel must have been pleased when a new activity promised to relieve them of some of their off-campus work.

Farm Demonstrations

In 1892 the cotton boll weevil crossed the border from Mexico and 10 years later had covered a large part of the cotton territory of Texas. This insect brought almost complete destruction of the cotton crop in many areas. Bankers and other businessmen, along with farmers, called on the federal government for help.

The government responded. In 1903 Congress appropriated $250,000 to combat the boll weevil. Half was assigned to the Bureau of Entomology, half to the Bureau of Plant Industry. The Bureau of Entomology directed its efforts to finding means of killing the weevil, while the Bureau of Plant Industry worked on producing new crops and developing farm management practices that would make farming successful in spite of the boll weevil. Dr. Seaman A. Knapp, who had spent a lifetime as a farmer, as a professor of agriculture at Iowa State, and in several other positions related to agriculture, was hired to go to Texas with $40,000 of the special appropriation to fight the boll weevil.[3]

Late in 1903, at a mass meeting of businessmen and farmers at Tyrrell, Texas, Knapp submitted a proposition to establish a demonstration farm under the auspices of the U.S. Department of Agricul-

ture, provided that the community would select a suitable place and raise by subscription a sufficient amount to cover any losses that might be sustained by the owner and operator of the farm as a result of following the department's directions for planting and cultivation.

His proposal was accepted, and farmer Walter C. Porter volunteered his farm of 70 acres. In spite of boll weevil damage, Porter estimated at the end of the year that he received a profit of $700 more than he probably would have made if he had followed his old practices.

The success of the Porter demonstration attracted wide attention and gave rise to a strong demand for similar demonstrations throughout the state. By the end of 1904 demonstration agents had been hired in Texas, Louisiana, and Arkansas. In 1905 the work was expanded to include Oklahoma and Mississippi, and more than 7,000 farmers agreed to conduct demonstrations on their farms that year.

The funds appropriated by Congress to combat the ravages of the boll weevil were limited to expenditures within the infested area. In 1906 the John D. Rockefeller-supported General Education Board decided to supplement federal appropriations so that work could be started in areas not infested with the boll weevil. It signed an agreement with the secretary of agriculture which provided that the U.S. Department of Agriculture would appoint and supervise the agents in this extended territory. The agents were paid a salary by the General Education Board and each was given an official commission from the Department of Agriculture at a salary of $1.00 per year. This gave them official status and enabled them to use the franking privilege for official business.

First North Carolina Demonstration

As the appropriation from the General Education Board increased, Knapp took in additional territory and in the fall of 1907 sent C. R. Hudson, a graduate of the agricultural college in Alabama, to North Carolina to initiate the work.

Hudson first went to Raleigh with the intention of making that city his headquarters. He arranged for a demonstration on the farm of W. W. Smith, just east of Raleigh, but he reported that the attitude of the people at the state Department of Agriculture was so cold that he moved his headquarters to Statesville. Hudson said the college was willing but had no money to put into the work.[4]

C. R. Hudson

A meeting was held in Statesville on November 18, 1907, and according to the best information available, James A. Butler was appointed as the first county agent in North Carolina. He began his new duties as of that date. On November 20, 1907, Butler arranged with J. F. Eagles of Route 1, Statesville, to be the first farmer to undertake a demonstration under the supervision of the county agent. Eagles agreed to grow 2½ acres of corn and 2 acres of cotton according to the recommendations of the U.S. Department of Agriculture.

Eagles had been on his farm about five years when he participated in the first demonstration. Some years later, he said, "It took me 15 years to get the old place started on a profitable basis; I don't think I ever would have succeeded had it not been for the use of limestone and clover. The best medicine for old worn out soils is good plowing; liberal applications of limestone, phosphoric acid and red clover."[5]

Hudson soon appointed agents in Rowan, Gaston, Lincoln, Union, Catawba, Mecklenburg, and Cabarrus counties. Twelve additional counties came into the program in 1909.

Almost without exception the first agents were not college graduates. Rather, Hudson tried to select men who were recognized as good farmers and leaders in their communities. Many of them worked only a part of the year, for which they received a salary of $75 per month.[6]

By 1910 there were 46 agents in 43 counties. To help administer the program, E. S. Millsaps and T. E. Browne were named district agents to assist Hudson. A third district was created in 1911-12, and T. D. McLean was named supervisor of that district. In 1912 the agents reported 2,100 corn demonstrations and 990 farm demonstrations with cotton.

Other crops were added to the demonstration program, which comprized a total of 4,052 demonstrations in 1914. Also in the program were farm cooperators, increasing in number from 2,600 in 1909 to 4,832 in 1914.

Hudson Moves to Raleigh

Hudson continued to make his headquarters at Statesville for a little more than two years. However, Knapp recognized the unsatisfactory relationship between the land-grant colleges and the U.S. Department of Agriculture; and during the winter of 1908-09 discussed with a number of southern college presidents the desirability of a coordinated program. These discussions led to the signing of memoranda of understanding between the Bureau of Plant Industry and a number of colleges to become effective on July 1, 1909. North Carolina holds the honor of signing the first of these agreements.[7]

It was under this agreement that I.O. Schaub began work as boys' corn club agent in North Carolina on July 1, 1909.

While it was not specified in the memorandum of understanding, it was agreed by the college and the department that Hudson would transfer his headquarters from Statesville to an office provided by the college as soon as the move could be arranged. Hudson moved to Raleigh during the winter of 1909-10 and shared an office with Schaub in Agricultural Hall.

The memorandum of understanding stated that the funds to support Schaub's position would come from appropriated funds. However, in a report to the Board of Trustees on May 30, 1911, President Hill stated that the money was derived from the General Education Board—$2,000 per year for salary plus travel expenses expected to total about $1,000 per year.

In 1911, the North Carolina General Assembly passed an act authorizing boards of county commissioners to make appropriations in cooperation with the farmers' cooperative demonstration work, and farmers in various counties made contributions of a few hundred dollars toward the expenses of the work.

Boys' and Girls' Club Work

When Schaub began working with the farm boys of the state in 1909, he found he was not alone in this work—the state Department of Agriculture was already there. In 1907 T. B. Parker had been hired by the department for demonstration work, and the department provided funds to be used as prizes. Parker did not have a field organization through which to work, but he was successful in enrolling a considerable number of boys in corn clubs and stimulated general interest.[8]

I. O. Schaub

Jane McKimmon

Schaub and Parker cooperated in the exchange of names and other activities. In 1912 the department transferred its activities to the college and provided funds to hire a second person for the work. Frank Parker, who had been with the department, moved to the college as Schaub's assistant.

Although it was not officially a part of his work, Hudson had carried out some type of poultry club work in Iredell County before Schaub joined the college staff.

Schaub's initial work was largely through the county school superintendents. Dr. J. Y. Joyner, state superintendent of education, was enthusiastic about the work and invited Schaub to all meetings of county superintendents. During the first full year, 1910, Schaub reported an enrollment of nearly 4,000 boys and some girls in corn club work. He also met with the demonstration agents, and most of them were active in promoting club work in their respective counties.

In reporting to the trustees on May 28, 1912, President Hill said: "Four hundred and thirty-five boys under Mr. Schaub's tutelage made an average yield of 60.7 bushels, at a cost of 45 cents per bushel. One hundred and twenty-five made over 75 bushels an acre. Charles Parker, of Hertford County, made 196 bushels of dry shelled corn." The average corn yield in the state for these years ranged from 13 to 18 bushels per acre.

In 1911 Schaub received word from Washington that funds were available from the General Education Board to employ someone to handle girls' club work. Mrs. Jane S. McKimmon, who had spent two years on the farmers' institute circuit, was hired, and in 1912 home demonstration agents were at work with girls' tomato clubs in 14 counties. These agents ranged in age from about 40 down to 23-year-old Margaret Scott, daughter of agricultural leader Robert W. Scott of Alamance County.[9]

Two others from this first group of home demonstration agents who gave considerable time to the effort were Mrs. Lillian W. Capehart in Granville County and Mrs. Blanch Miller in Wilkes.[10]

During the first year 230 farm girls in the 14 counties grew the required one-tenth acre of tomatoes, and from them they prepared 35,000 cans and sold an unknown amount of fresh tomatoes. All but a few of them showed a profit on their project at the end of the year.

The growing and canning of tomatoes led almost immediately into other canning activities. A soup mixture was especially popular, and once the techniques of canning had been perfected, daughters and mothers began canning a wide variety of fruits and vegetables.

The canning led to marketing. After much effort, a standardized product was produced and marketed under the 4-H label throughout North Carolina and elsewhere.

By 1914, 32 counties were involved in the program, and 1,500 club members reported a total of 259,091 tin cans and glass jars filled with vegetables and fruit. A year later 2,914 girls and 37 counties participated in the program.[11]

Home Demonstration Work

The mothers of the girls were, of course, interested in the success of their daughters, and in most instances assisted with the canning operation. As the girls expanded their projects to include other vegetables, the interest of the mothers grew accordingly. By the end of the second or third year the mothers themselves were beginning to ask for assistance with other problems in connection with the home.

Knapp wanted to work in the farm home. He realized, however, that this could not be done through a direct approach.[12] He had visualized that the garden would lead into the kitchen, from the kitchen to the rest of the home and all of its activities. It was also only a short distance from the family garden to the hen house, and most of

Farm demonstration agents at a 1911 meeting in Asheville.

Iredell County pig club members receive their pigs, around 1915.

the early home agents became poultry specialists—just as they were recognized as gardening and canning specialists.

Ready cash in most of the homes in the South was almost nonexistent. The families' needs and desires were there, but the means to satisfy them could not be found, so most of the projects in the early days had to do with commodities that might be sold and thus increase the family income. The few dollars earned from the sale of canned goods, eggs, and chickens enabled thousands of homemakers to start buying the labor-saving equipment that would lessen the drudgery of homemaking.

One of the first labor-saving devices to gain wide popularity was the fireless cooker. Someone discovered that if one could confine heat in a small space, the cooking process could continue for hours.[13]

To most people it was unbelievable that a hot stone placed in an insulated container would cook an old rooster until it was tender. But seeing was believing, and in the course of two or three years thousands of homemade fireless cookers were in use on southern farms. It relieved the housewife of hours of labor over a hot stove, and for many of them it meant that a hot dinner could be cooked while the housewife labored in the field with the husband and the children.

From the kitchen, demonstration work quickly broadened into other areas of the home, especially the making and renovation of clothing and the design and construction of ladies' hats.[14] Home agents were soon looked upon as specialists in those fields, also.

Both Schaub and McKimmon traveled extensively. In July and August, 1912, they operated a demonstration train over the Coast Line Railway that traveled 1,200 miles and reached 10,000 people. This train hauled drainage implements, livestock, and field implements. The animals were shown and the tools demonstrated at the several stops.

John A. Arey, one of the pioneer agents and specialists, recalled that travel was primitive at that time. The specialist would generally travel by train to the county seat, where he would be met by the local agent. While in the county, the agent would provide the transportation—either by buggy or car. Arey said the first agents were encouraged to travel by buggy or horseback; agents riding in automobiles might be perceived as too socially distant from the farmers they were trying to help.[15]

Jane McKimmon was out almost constantly, traveling to the counties, during the canning season. She described some of the trials and tribulations of early extension work:

> One day as I came down a long red clay road with the August heat shimmering in the dust before me, the driver flicked the flies from his horse and I wondered what I had done in this life that I should be traveling on that dreary road, with the thermometer hovering around ninety degrees, to teach somebody how to can tomatoes. But as the old horse and I rounded a bend in the road, the answer came in the smoke curling from two big canners which were puffing away on the courthouse green and in the fifty or more girls peeling fruit, filling cans, and getting ready for my coming.[16]

An announcement in 1915 gave additional insight into the working of Extension:

> Mr. R. L. Sloan, Assistant Director of Farmers' Institutes, will be in Davidson County March 15 to 19 inclusive with stereopticon lantern and slides giving illustrated lectures at night. A variety of slides on field crops, livestock, and a few scenic slides will be shown. In day time, short talks will be made at schools and farms visited.[17]

Personnel and Program Changes

In the spring of 1913, I. O. Schaub announced that he was leaving the college to become an agricultural representative for the Frisco Railroad. In the four years he had been in charge of extension work at the college he had obviously become one of President Hill's favorite faculty members. In 1910, one year after Schaub joined the staff, Hill reported to the Board of Trustees: "He has been very active, efficient, and zealous in this most important work."

In 1912 Hill reported that overtures had been made to Schaub to accept a position elsewhere at a larger salary and recommended that the college supplement Schaub's salary by $150 per year. Hill said: "His work is hard, and requires constant travelling and leaves him little time at home with his family. In order that we may show our appreciation of his recognized ability and recompensate him somewhat for an unusually hard life, I recommend that the College pay him $150 a year."

In reporting to the trustees in 1913, Hill said: "The Extension Department of the College, under the leadership of Prof. Schaub and Mrs. Charles McKimmon . . . has brought the college into closer touch with the people of the state than any other instrumentality yet tried."[18]

Following Schaub's departure, T. E. Browne was placed in charge of boys' club work. In 1916 Browne reported that poultry and pig club work came into the program in 1914. The following year there were some 3,504 boys enrolled in the corn club, 768 in pig club work, and 1,056 in the poultry clubs.[19]

A reorganization of the work took place in 1915 with Browne in the title of agent, boys' agricultural clubs. A. K. Robertson served as assistant in boys' clubs. J. D. McVean assumed responsibility for the pig club work, and Allen G. Oliver directed the poultry clubs. Despite the title, girls could and did participate in the several areas of work.

A department of Negro boys' farm clubs was added in 1915 with John D. Wray as agent. This work was carried out in cooperation with the Agricultural and Technical College at Greensboro. A crop rotation club was added in 1916, and by 1917 the peanut club, the potato club, and the cotton club had been formed.

Much of the recruiting was done through the public schools. Browne reported that each fall a mailing was made to county school superintendents. The package contained letters to be mailed to each school in the county. A teacher in each school compiled a list of all boys in his class who expressed interest in the work, and this list was mailed to the state office. The state office then contacted the prospective members. Extensive correspondence and instructional material were mailed to the club members from the state office throughout the year.

In 1915, 13 club schools were held in 13 counties. In one or two days, the boys were instructed in the fundamental principles of growing plants and animals. In August, 1915, 222 boys and one girl attended a four-day short course at the college.

The Smith-Lever Act

The demonstration method of education was very successful, or at least very popular, from the beginning. By 1909 in North Carolina, just five years after Seaman A. Knapp's first demonstration in Texas, the A & M College, the state Department of Agriculture, the U.S. Department of Agriculture, and the General Education Board were all funding or sponsoring farm and home demonstration programs. By early 1914, the 66 farm demonstration agents and the 32 home demonstration agents located in the counties outnumbered the combined college, experiment station, and state Department of Agriculture staffs located in Raleigh.

Despite the rapid growth of the demonstration program, most college administrators did not believe the necessary job could be done without funding from the federal government. Along with some farmers, and commercial interests such as the National Soil Fertility League, they began to push for federal legislation to fund a nationwide extension program.

The first bill was introduced in Congress in 1909. There was considerable opposition, however, particularly from those who did not see a federal role in education and from those in demonstration work who believed their program would be destroyed.[20] Also, the details of the arrangement required considerable discussion and negotiation among the several interested parties. Particularly troublesome was the basis on which the federal funds would be allocated. Debates also occurred about what educational methods should be used.

Finally in 1914, bills introduced in both houses by Senator Hoke Smith of Georgia and Representative A. F. Lever of South Carolina were passed, and on May 8, 1914, President Woodrow Wilson signed the Smith-Lever bill into law.

Basically, the Smith-Lever Act provided that extension agents would provide instruction and practical demonstrations in agriculture and home economics to persons not attending college. The system would be organized at county, state, and federal levels.

An early county agent demonstrating sheep shearing.

The administrators at North Carolina A & M College had kept up with the progress of the legislative action. On March 26, 1914, the executive committee of the Board of Trustees directed the president of the college to allocate a sufficient amount of money to prepare rooms in the agricultural building for the new workers in extension.

When the executive committee met on August 27, President Hill was authorized to sign, on behalf of the Board of Trustees, the memorandum of understanding between the U.S. Department of Agriculture and the college pertaining to cooperation in extension work.[21] A second motion established a Division of Extension Work to be carried on in cooperation with the U.S. Department of Agriculture and the state Department of Agriculture. A third motion elected B. W. Kilgore director of the Division of Extension Work. Technically, extension was regarded as a branch or part of the North Carolina Agricultural Experiment Station.

In his first extension annual report, covering the period from July 1, 1914, to June 30, 1915, Kilgore listed 13 projects under which the work was being conducted: (1) administration, (2) printing and distribution of publications, (3) county agents, (4) home economics, including girls' club work, (5) boys' club work, (6) dairy extension work, (7) fruit and truck growing, (8) agronomy, (9) cotton grading and marketing, (10) plant diseases, (11) Negro boys' club work, (12) drainage, and (13) beef cattle, sheep, and swine.

Kilgore said the extension force consisted of a director and 18 fulltime extension workers or specialists. In addition, 11 other workers were giving approximately half their time to the extension service, with nine devoting the rest of their time to the experiment station, and two to college teaching. The county force had grown to 71 farm demonstration agents and 37 home demonstration agents. In addition, 137 women were in charge of local clubs for girls and women. They received a small payment for their work.

An Agricultural Editor

The Smith-Lever Act provided that cooperative extension work should consist of "the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident of said colleges in the several communities, and imparting to such persons information on said subjects through field demonstrations, publications, and otherwise." The act further specified that up

Early home agents at a canning demonstration.

to 5 percent of each annual appropriation could be applied to the printing and distribution of publications.

Frank H. Jeter was hired in the new position of agricultural editor in November, 1914, thus beginning his 40-year tenure with the college. He was housed in downtown Raleigh. In addition to extension publications, he was responsible for the editing and printing of publications of the experiment station and the Department of Agriculture.[22]

On February 13, 1915, a systematic method of putting information of an agricultural nature before the people of the state was instituted with the first weekly issue of *Extension Farm-News.* The paper was devised mainly as a "clipsheet" for newspapers and agricultural papers circulating in North Carolina, but it also went to the demonstration agents and other employees of the station, college, and Department of Agriculture, and to county superintendents of education, superintendents of city schools, members of the faculties of other colleges in the state, and teachers in farm life schools. Each issue averaged about 1,000 copies. On special occasions, when the sheet contained an item of particular interest to a group such as the Farmers' Union, additional copies were printed for distribution to their local secretaries.

The new extension service assumed the cost of printing publications containing recommendations for farmers. A primary objective of the new agricultural editor in editing and distributing extension publications, in Jeter's words, was "to make them in popular style so that they may be easily read and understood. Very simple style has been used because many of them are used in some of the projects with the young people's clubs."

Jane McKimmon reported that readability of publications in the early years was a problem:

> Sometimes we found information sent out from the U.S. Department of Agriculture so technical in the terms used and so terse in directions for procedures, that it became necessary for us to interpret them to the people. As I read canning formulae, it sometimes seemed as if the scientist were writing his bulletin for the benefit of his brother scientist, not for the person who desired to can; the bulletin language was not intelligible to the laity. The trouble, however, was not with the information the bulletin contained. The scientist's careful research and his pronouncements on what he had found necessary in food conservation were invaluable, and we followed his advice; but we tried to make what he had to say more understandable to the people who were canning on the farm.[23]

During 1915-16, Jeter reported that the issuing of multigraph letters to the members of the agricultural clubs, the homemade meat clubs, the dairymen, the credit unions, and other groups continued to be an important part of the work. The multigraph and mailing equipment had been used to turn out, on an average, approximately 75,000 form letters each month.

The new organization was off to a good start. Western District Agent E. S. Millsaps, writing to his agents on the last day of 1915, told them that 1915 was "for us in demonstration work the best year that we have ever known." He urged them to "press forward for greater things for the New Year."

There would be opportunities. Food and feed exports from the United States to Europe that had totaled $132 million in the eight-month period ending in March, 1914, increased to $388 million for the same period ending in March, 1915. During the same period, the demand for cotton had dropped. North Carolina farmers needed to adjust their production to meet the demands of a world at war.

NOTES TO CHAPTER 7

1. For detailed reports on the farmers' institutes, see James Finley Kretschmann, "The North Carolina Department of Agriculture," graduate thesis, University of North Carolina at Chapel Hill, 1955, and *The Bulletin,* periodical of the North Carolina Department of Agriculture throughout the years that the Institute program was in operation. From 1903 until 1910 the October issue carried an annual summary of the activities.
2. *The Bulletin.* North Carolina Department of Agriculture, October, 1909, 80 pp.
3. Martin, O. B. *The Demonstration Work.* San Antonio, Texas: The Naylor Co., 3rd Edition, 1941, pp. 4-5.
4. C. R. Hudson personal papers, North Carolina State University Archives.
5. Schaub, I. O. *Agricultural Extension Work: A Brief History.* N.C. Agricultural Extension Service, Circular No. 377, 1953, P. 17.
6. Some of the early agents were T. J. W. Broom, Union County; J. W. Cameron, Anson; F. S. Walker, Rockingham; R. D. Goodman, Cabarrus; G. W. Falls, Pasquotank; J. P. Herring, New Hanover; A. G. Hendren, Wilkes; F. E. Patton, Yancey and Rutherford; R. W. Gray, Graham, Jackson, and Cherokee; C. S. Mitchell, Gates; G. W. Herring, Sampson; W. L. Smarr, Lincoln and McDowell; J. R. Sams, Madison and Polk; E. B. Weaver, Buncombe; R. W. Graeber, Mecklenburg and Iredell; and H. E. Webb, Sr., Guilford, Alamance, and Vance.
7. Schaub, *op. cit.*, p. 19.
8. *Ibid,*. p. 22.
9. McKimmon, Jane Simpson. *When We're Green We Grow.* Chapel Hill: The University of North Carolina Press, 1945, pp. 15-21.
10. Other agents beginning long extension careers during this period included Rosalind Redfearn, Anson County; Marcia Albertson, Pasquotank County; and Mrs. Mary H. Lamb, Sampson County.
11. For a detailed account of 4-H work in North Carolina, see James W. Clark, Jr., *Clover All Over.* Office of 4-H and Youth, N.C. State University, 1984, 300 pp.
12. At the first meeting of women agents held in Washington, according to Schaub, Knapp told them not to go into the farmer's house and tell him they had come to teach his wife to cook. He told them the man of the house would knock them down, and that he would be justified in doing it out of respect to his wife—whether or not she was a good cook (Schaub, p. 28).
13. To operate the fireless cooker, a stone was heated in a fire and then placed in a container of water. Heat from the stone heated the water and the product being cooked. Schaub wrote that the fireless cooker of that day represented as great an advance in the standard of living as did the electric range of a later day (Schaub, p. 28)
14. A little later one of the popular projects of farm women was the making of dress forms. Thousands of farm women for the first time saw them-

selves as others saw them, and Schaub speculated that this project aided in the promotion of nutrition work (Schaub, p. 29).

15. Personal interview with William L. Carpenter, 1976.

16. McKimmon, *op. cit.*, p. 25.

17. *Extension Farm-News.* March 13, 1915. In the stereopticon lantern, forerunner to the electric-powered slide projector, a kerosene burner provided the light.

18. Most land-grant college and university administrators, like President Hill, viewed an extension or off-campus program as an important and necessary adjunct to their research and resident teaching programs. The level of farming was still at a mediocre state, while information which could improve the situation was backing up on the shelves of the research establishment.

19. Browne, T. E. *Boys' Club Work.* N.C. Agricultural Extension Service, Circular No. 8, 1916, 16 pp.

20. C. R. Hudson received a letter from the Office of Farmers' Cooperative Demonstration Work in the U.S. Department of Agriculture dated April 11, 1912, which was signed "23". This letter claimed that the proposed Smith-Lever bill would "undermine and destory the Demonstration Work." It suggested a lobbying effort with Senators and Congressmen in an effort to get the bill changed or killed. In a note attached to this letter (C. R. Hudson personal file, N.C. State University Archives) I. O. Schaub wrote that the writer was O.B. Martin, then in charge of club work nationally.

21. Schaub, *op. cit.*, pp. 37-38.

22. Jeter was assisted by A. O. Alford who started as a mailing clerk in about 1919 and advanced to assistant editor before becoming an early manager of the college print shop in 1941. For a detailed account of agricultural information activities, see William L. Carpenter, *Let The People Know.* N.C. Agricultural Extension Service and N.C. Agricultural Experiment Station, 1978, 172 pp.

23. McKimmon, *op. cit.*, p. 42.

II

GROWING UP

IN RELATION TO OTHER WARS before and since, World War I was short in length but long on impact to the agricultural community. Food was desperately needed by the United States and its allies. A shortage of farm labor developed, and some of the supplies needed by farmers were in short supply.

Fortunately for the nation, the agricultural instruction, research, and extension programs were in place and on a sound footing. All responded. In many ways the land-grant college campus resembled a military establishment. Special courses were provided for military personnel, and students were fully involved in ROTC and other military training activities.

Researchers tilted their effort toward the special needs of the time. An expanded extension force carried both routine and special instruction to the rural areas. Food and feed production broke all records.

The 1920s prosperity was not universal. For farmers it was a depression period (Chapter 9). Special efforts were made in marketing in an effort to solve the price dilemma. Funds for research and extension programs were short, but the work continued. Many innovative extension programs were developed by agents and specialists. Researchers brought forth new crop varieties, the cattle tick was eliminated, and progress was made in fighting other crop and livestock pests.

On the campus, a major reorganization brought about a unified and complete school of agriculture. Courses in forestry were developed and other instructional areas strengthened.

As the depression deepened in the 1930s, the search continued for better farm living (Chapter 10). Research focused on new and improved varieties and saving the soil. But extension workers were called away from their routine tasks as they were asked to temporarily administer some of the federal agricultural adjustment programs.

University consolidation proposals sent shock waves across the campus, particularly suggestions that the schools of agriculture and engineering be transferred to Chapel Hill.

As the decade neared its end, new state and federal funds provided support for several new positions that would lead to dramatic research output in the years ahead.

World War II brought conditions similar to World War I a generation earlier (Chapter 11). An all-out effort resulted in dramatic accomplishments on the farm home front. But unlike any event of the past, this war brought about lasting changes in how people worked and lived. Fortunately, starting about the time the war began, steps were taken that would make it possible for the college to provide leadership for the agricultural revolution that was destined to come.

8

Support for a World at War

Response to the war needs. Number 1 in soybeans.
Pushing for purebred livestock. Butter and cheese.
Death from the white snakeroot. Active students.
A student uprising. Fine tuning instruction. Agricultural
engineering. Marketing and credit unions. Meet me at the fair.
At last a dean. Buildings and grounds. Winding down.

THE FIRST SIGNIFICANT CHANGE in farming operations brought about by World War I was announced in the January 15, 1916, edition of *Extension Farm-News*. It concerned a shortage of potash. Up to 1916 most of the potash used in the United States had been imported from Germany at a cost to the farmer of $40 to $50 per ton. The war had cut off the supply and any available potash was priced at $450 to $500 per ton, which made it prohibitive for use in agriculture.

Response to the War Needs

Immediately, experiment station experts set about revising fertilizer recommendations for the 1916 growing season built around phosphate and nitrogen. For tobacco, with its high potash requirements, they urged that farmers save wood ashes and tobacco stems to use on the crop.

The need for expanded food and feed production became even more critical when the United States entered the war on April 6, 1917.

Director Kilgore spelled out the challenge that faced the farming community and agricultural leaders:

> When the part that agriculture must play in the successful conduct of the great war in which the democracies of the world are now engaged with imperialism was fully realized, those in executive positions began to call on the farmer to produce food and feed for man and beast, lest the lack of these cause the defeat of the noble purposes to which the democracy of the United States had set itself. In turn, the farmers of the country began to call on the established agricultural institutions for advice and assistance in the production of these food and feed stuffs. In no State of the Union was this truer than in the State of North Carolina; and in no other State was the response more satisfactory than in North Carolina.[1]

Farmers were called on for all-out (maximum) food and feed production, including food production for home use. The housewives were asked to save sugar, fats, wheat, and meat.[2] Boys and girls in the several clubs were viewed as "a small army of food producers and conservers."

In addition to an all-out food production and conservation effort, extension agents and specialists conducted two statewide food and feed surveys, participated in the distribution of nitrate of soda for farmers, and sold Liberty Bonds and Thrift Stamps. In the fall of 1918 they were enlisted in the fight against influenza.

Plans were made in 1918 for the poultry researchers to train carrier pigeons for the army. Lofts were constructed near the poultry farm and Camp Polk on the north side of Hillsboro Street, but apparently the war ended before any pigeons were trained.[3]

Without question, the research and extension program provided a firm foundation from which to proceed with the wartime activities. Federal emergency funds made possible an immediate expansion of the extension forces. The number of farm agents increased from 72 in 66 counties in 1916 to 104 in 90 counties in 1918. Likewise, the home demonstration program expanded from 47 counties in 1916 to 72 counties in 1918. In addition, there were a number of part-time workers in the county home demonstration programs. By 1918, several special agents had been placed in the larger cities and with a number of cotton textile manufacturing concerns.[4]

The results were phenomenal. Despite a shortage of labor, record crops were produced. Some old crops were given new emphasis, and some new ones were promoted. A shortage of sugar led to a campaign for sweet sorghum to use in making molasses and syrup. Production

reached 3½ million gallons in 1920, ranking North Carolina third among the states. Tapping maple trees for sap was advocated in Ashe, Watauga, and Avery counties. In 1920 maple syrup valued at $1,500 was produced in these three counties.

In 1918 total club enrollment of women, girls, and boys reached 36,663 members. For the years of 1917 and 1918, almost 15 million containers of food were canned under the direction of the home demonstration agents. Governor and Mrs. T. W. Bickett grew vegetables on the mansion lawn, and Mrs. C. R. Hudson (formerly Josephine Scott, daughter of Robert W. Scott of Alamance County) took the state prize for the best emergency war garden and its canned products for 1917.

As the war was ending, the flu epidemic struck. The home agents, particularly, dropped regular programs to assist with the emergency. Home agents were not trained nurses, but practically all of them had taken courses in home nursing. They were called on to perform nursing duties and to set up emergency hospitals. They operated soup kitchens to help feed those individuals and families too sick to prepare their own food.[5]

Number 1 in Soybeans

The station's interest in soybeans was paying off.

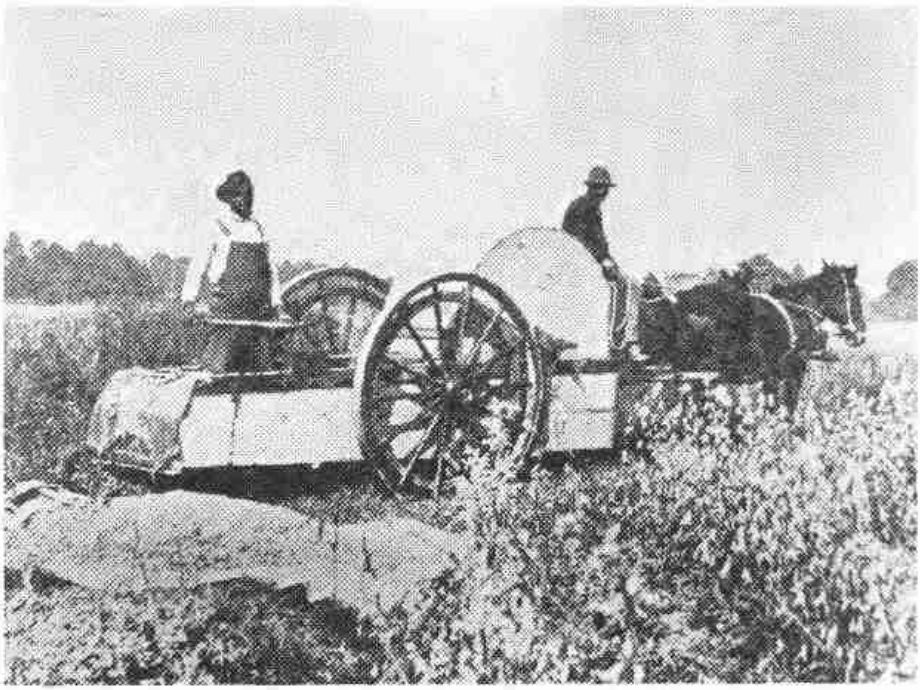
The soybean, a legume, originated in China long before recorded history and became a domesticated crop as far back as the eleventh century B.C. The crop slowly spread over eastern Asia and is recorded as being grown in an experimental garden in England in 1790.[6]

The first reference to soybeans grown in the United States is of a planting in Pennsylvania in 1804. The Japanese expedition of Admiral Perry (1853-54) brought back soybean seed, and interest in the "Japan pea" was heightened. In 1879 soybean seeds were planted at the New Jersey Experiment Station. North Carolina researchers were observing the plant growing in North Carolina in 1882. Within several years a number of experiment stations, including the one in North Carolina, were growing and analyzing the plant, which seemed to have great potential as a crop in the United States. Government production records are not available before 1924, but there does not appear to be any challenge to the claim that by 1915 North Carolina was the leading soybean-producing state in the nation.

Agronomist C. B. Williams was a strong promoter of soybeans, especially for northeastern North Carolina, and his annual reports reflected this interest. His soybean research led to his 1918 selection by the *Country Gentleman* magazine as one of seven blue ribbon men and women in American agriculture.

In 1916, Buxton White, assistant in agronomy, listed the several uses for soybeans—for seed, the seed for oil, for hay, as a pasture crop, as a soiling crop (for soil improvement), and for silage. Also, White said the seed of this legume was attracting some attention as a human food, and the oil and cake from them had become commercial products. Under ordinary circumstances, White said the farmer should expect from 20 to 30 bushels per acre from the best varieties. In 1916 the seeds were bringing $1.25 to $2.50 per bushel if sold to seedsmen, or $1.00 per bushel if sold to an oil mill.[7] At the oil mill, a ton of beans would yield approximately 30 gallons of oil and 1,650 pounds of meal. Soybean meal was rated as a richer feed than cottonseed meal.

Soybean oil and meal were first produced in the United States in 1911 by a crushing plant in Seattle, Washington, from soybeans imported from Manchuria. The first processing of American-grown soybeans in the United States was by the Elizabeth City (N.C.) Oil and Fertilizer Company in 1915. Before the year was out several other cottonseed oil mills in North Carolina processed soybeans. A surplus



An early soybean harvester in the field.

of soybean seed and a scarcity of and high price for cottonseed brought about the processing of 80,000 to 100,000 bushels in North Carolina during the 1915-16 season. However, during the 1916-17 season, few domestically grown soybeans were processed for oil because of the high price of seed, which was in demand for food and for planting. Large quantities of Manchurian soybeans were imported for processing. Operators of cottonseed oil mills in the South saw the possibilities of soybeans as an oil seed and contracted with planters for their 1917 crops, which stimulated larger acreage. The boll weevil, spreading east and northward, threatened the cotton crop, so the soybean was seen as a possible replacement or supplement to cotton.[8]

Soybeans could be planted in rows or broadcast. A common practice was to plant them with corn—every other row—or seed them in the corn field at the last cultivation. Mammouth Yellow was the most popular variety, although several others gave good hay production and seed yields. The beans could be harvested by hand by cutting and hauling them to some point to dry (within a building or in a stack at the edge of the field), and threshed with a grain thresher.

By 1916 there were at least five plants manufacturing portable soybean threshers in North Carolina. In his circular, White described how one thresher worked. It was a two-wheeled machine that straddled the row and was drawn by two horses. One man sat on the front and drove the rig; another on the back operated or adjusted the harvesting mechanism. As the machine moved along the row, four series of rapidly revolving arms shattered the seed into a receptacle at the rear. It was recommended that the machine not be used until the plants had shed their leaves and that the crop be on a slight ridge elevated not less than six to eight inches above the water furrow. Under favorable conditions the two men and two horses could harvest an acre of soybeans in two hours. There was some wastage of beans, but the loss would be more than compensated by the saving of time and labor.

Also in the agronomic area, the velvet bean was promoted vigorously for several purposes. It measured up well for soil improvement, but the seed did not show up well for livestock feed.

Irish potatoes were the most important truck crop in the state, and research showed that spraying to protect the crop (particularly the late crop) from beetles and blight was a very profitable operation. An arsenate of lead—bordeaux mixture was recommended.

A new corn variety was available. Called "First Generation Cross

No. 182," it was developed by the U.S. Department of Agriculture from a cross of Hickory King and Boone County White. By 1917 it had become the highest-yielding variety in the mountains. The yield was 42 bushels per acre in experiment station tests. (And apparently somebody had decided that numbers would make good names when new varieties were developed.) From genetic studies at the Connecticut station came in 1917 the four-way cross that made hybrid corn practical.

North Carolina was still the number two state in tobacco production, but cotton was by far the number one money crop, with production ranging from 616,000 to 923,000 bales between 1915 and 1920. However, the dreaded boll weevil reached Brunswick, Columbus, Robeson, and New Hanover counties in 1919 and spread to eight additional counties the following year. Predictions were that the pest would lower cotton yields by 25 percent in the southeastern counties and 10 percent in the northern and western counties.

Rotation was the best recommendation the researchers could come up with for Granville wilt of tobacco, and wildfire and flea-beetles could be added to the problems of growing that crop.

Pushing for Purebred Livestock

Of all the states in the country by 1920, North Carolina had become the fourth-ranking state in crop production. But the state's farmers did not take well to livestock. From 1900 to 1920 the number of all cattle on farms had increased from 561,000 to 645,000. But hog numbers for the same period had decreased from 1,410,000 to 1,217,000. Sheep numbers had declined from 220,000 to 91,000 during the same 20-year period.

North Carolina farmers were reluctant to move away from their traditional cash crops despite the admonition of the professional livestock leaders and the farm press. Some native North Carolina farmers did make a name for themselves in livestock production.[9] R. L. Shuford of Newton was a master Jersey cattle breeder known throughout the state and nation for his constructive program. R. W. Scott of Alamance County, Fred P. Latham of Beaufort, and Sydenham B. Alexander of Mecklenburg County were also purebred breeders.

But a purebred herd of livestock was more likely to be someone's hobby, such as the Ayrshire cattle herd of Leonard Tufts, owner of Pinehurst, Inc.; the Berkshire hog herd of Edgar B. Moore, proprietor

of the Selwyn Hotel of Charlotte; or the state's first purebred Guernsey cattle breeder, Dr. H. T. Bahnson of Salem.

The owner of an early purebred herd of livestock was also likely to be someone who was not native to the state such as A. L. French, who moved to Fitzgerald from Ohio and established a top Aberdeen-Angus cattle herd; or W. W. Shay, who moved to North Carolina from Michigan and became a hog farmer.

In 1908 Mr. and Mrs. W. W. Shay located on a small farm at Cruso in Haywood County. In 1918 Shay moved to Raleigh to head the swine extension work. During the next 14 years his work gained for him a reputation as the "father of the state's commercial swine industry."[10]

SHAY'S PIG SAYS:

The feller that sold his brood sows when the price of hogs fell, met himself coming back when it riz last month. He usually travels in a circle but the turn wuz too quick fer him this time.

Extension Swine Specialist W. W. Shay used a variety of educational techniques, including cartoons and poetry in *Extension Farm-News*.

Shay began his work by launching a system of swine-feeding demonstrations that embodied five simple points. For a farmer with fairly fertile land to succeed in properly feeding and efficiently marketing hogs, Shay said it was necessary that he should do only five things:

1. Adjust the number of brood sows to the amount of home-raised corn available for them, allowing 150 bushels of corn per sow per year.
2. Use good, thrifty animals and keep them so by giving due attention to proper housing, sanitation, and parasites.
3. Control breeding dates so as to profit by the average seasonal trend of hog prices.
4. Full feed, either by hand or through a self-feeder on pasture when possible, all that hogs intended for market will eat every day from the age of four weeks until they are sold.
5. Stick to the system outlined above regardless of changes in the price of corn or hogs.

Butter and Cheese

The commercial creamery operation idea had caught on well with new creameries started at Asheville, Lincolnton, Durham, and Charlotte in 1916; a second at Charlotte and one at Tarboro in 1917; at North Wilkesboro in 1918; at High Point, Raleigh, and Winston-Salem in 1919; and at Greensboro, Durham, Kinston, and Fayetteville in 1920.[11]

The experiment station creamery, which started in the basement of Patterson Hall, had a 5 percent increase in butter output during 1918 over the same period in 1917. In October, equipment was fitted up to pasteurize milk for Camp Polk, the tank training camp located across Hillsboro Street from the college. This was the first instance of milk pasteurization in the state.[12]

But there were problems and headaches. Dairy Extension Specialist Alvin J. Reed, in a report at the end of 1918, said that overall the condition of the creameries was healthy and output had held up despite the scarcity and higher price of both feed and labor. His report noted management, personnel, and financial problems at some of the creameries, both cooperative and commercial. The Monroe creamery, established in 1915, closed during the year. Reed noted that "the buttermaker at Hickory left without notice, which is probably the best thing that ever happened to that creamery. Mr. Mitchell's ideas of creamery management were not of benefit to that concern or to others in the area."

The extension service input in these new enterprises ranged from management advice to carrying out the details of establishing the operation, especially the cooperative creameries. But in 1918 Reed said the dairy field office had no part in the establishment of the one to be opened at Winston-Salem in 1919 because, "we believed that the success of such a concern was rather doubtful."

An additional 22 creameries were established in North Carolina during the 1920s, followed by 17 more in the 1930s. Through the years most of them would go out of existence or merge with others, but most or all of the milk processing firms established in the state could trace their beginnings to these early buttermaking and milk processing plants.

Cheesemaking was another outlet for the milk from North Carolina farms. A 1910 survey by dairy extension workers indicated that the climate and other conditions in western North Carolina were favorable for cheese manufacturing. Farmers appeared interested,

especially after several cheesemaking demonstrations were held in Ashe and Alleghany counties in 1913.

F. R. Farnham was hired to conduct the work in September, 1914. By June, 1915, he had production under way at the Cove Creek Cooperative Cheese Factory in Watauga County and the following month at the Grassy Creek Cheese Factory in Ashe County. Each of these factories made and sold around $1,500 worth of cheese by the end of the year.

Although centered in the three northwest counties of Ashe, Allegheny, and Watauga, by 1918 cheese factories had spread throughout the mountain counties. With poor roads and limited transportation, local farmers brought their milk to the small factories by wagon, by wheelbarrow, by special carts, and in milk cans carried on their backs.

For a number of years livestock experts had advocated the use of purebred, or at least quality, males as an efficient way to upgrade farmers' livestock herds. One approach was through cooperative bull associations whereby the owners of several small herds would unite and purchase one good bull to provide service for all their herds. With this arrangement they could make a larger investment in a bull than any one of the cooperating herd owners alone could afford to make.

The first North Carolina cooperative bull association was the

Farmers delivering milk (carried in harness on their backs) to a cheese factory in western North Carolina.

Forsyth Cooperative Guernsey Bull Association with headquarters at Winston-Salem. The organizational work was done by A. J. Reed, John A. Arey, and County Agent Bruce Anderson. The organization was completed in May, 1916. During the next three years, eight additional associations were organized in Lincoln, Mecklenburg, Catawba, Rowan, Rutherford, Chatham, Randolph, and Alamance counties. Some trouble arose among the members of some of these associations about the keep of the bull, but by the beginning of 1920 these nine associations had 718 members and 52 high-class bulls.

Death from the White Snakeroot

From the days of first settlement, farmers in western North Carolina and westward through the upper Midwest had lost livestock to a peculiar malady known as "trembles." The condition received this name because the most common early symptoms were trembling, shaking, and inability to stand. Horses, cattle, sheep, and hogs all died from the disorder.

In sections where this disorder was present, there was a firmly held belief that man could contract the disease through ingestion of milk, butter, and meat from infected animals. Thus the name "milk sickness" had been applied to the disorder in humans.

A considerable amount of material had been written on this disorder, going back to 1810. The writers, mostly physicians, had ascribed the condition to mineral poisoning, germs, or poisonous plants.

In response to many complaints from farmers and county agents in the mountains, researchers F. A. Wolf (plant pathologist), R. S. Curtis (animal husbandman), and B. F. Kaupp (poultry investigations and pathology) undertook a two-year study in 1916 to determine if a plant growing in shady, woody areas of western North Carolina—white snakeroot—might be the culprit.

White snakeroot plants shipped in from Shooting Creek in Clay County were fed to animals located in the college barns. Thirty-one fatal cases of trembles and milk sickness developed among the 44 ewes and lambs employed in the experiment. One of the two hogs and 15 of 29 guineapigs died from the feeding of white snakeroot or its products. Cases of milk sickness developed when milk and butter from infected animals were fed to suckling lambs and mice, but seven dogs fed infected sheep carcasses failed to contract the disease.

Prevention was determined to be the practical and only cure—keeping animals away from the growing plants or getting rid of the white snakeroot plants by destroying them or disrupting the moist, shady environment where they grew.[13]

Much research was still done in direct response to farmers' problems, but a mix of practical and basic or theoretical research was beginning to emerge. Director Kilgore described the research program in 1918:

> As heretofore, the Station has sought to anticipate the needs of the farmers of the State; and, while it has engaged in experimental work of a practical nature, which would make available ready information to be carried by the Extension workers directly to the farmers, it has also studied those technical problems indirectly related to the every day practical problems, but which serve to give additional information about the obscure truths of agriculture from which an application of these to the practical agriculture can be deducted.[14]

During the 1920-21 school year a faculty research club was organized, largely through the efforts of Dr. Z. P. Metcalf and Dr. B. W. Wells. This organization encouraged original research, the publication of articles in scientific journals, membership in learned societies, and attendance by members of the faculty at the annual conventions of such societies. The enthusiasm and productive scholarship of this club led to the establishment of a research fund for faculty members by the Board of Trustees.[15]

Active Students

There was an unusual amount of student extracurricular activity during the war years. It may have been because of some unusual condition or situation at this time, or there may have been some unusual students majoring in agriculture during those years. Several 1916 to 1918 graduates were to have a big impact on the college and agriculture in the coming years.[16]

Two new student clubs made their appearance during the 1914-15 school year. They did not last long, but the Plant Industry and Baa and Bellow clubs set the stage for the agronomy, livestock, and horticultural clubs that would follow. That same year the first livestock judging team was organized, with J. C. McNutt and S. M. Salisbury as coaches. Establishment of the Poultry Science Club and the creation of the first poultry judging team came during the 1916-17 school year.

W. Kerr Scott

D. S. Coltrane

The Agricultural Club was established in 1915 with W. Kerr Scott and D. S. Coltrane as two of the semester officers during the first year.[17] An annual corn show, held from about 1914, developed into the Student Agricultural Fair (in connection with the State Fair) in 1920. For several years a reception for agricultural students was held in February in Patterson Hall. The annual Barnwarming Dance started about the same time.

A chapter of Alpha Gamma Rho, described as an agricultural social-professional fraternity, was established on the campus in 1919.

Agricultural Day (later called Livestock Day) grew out of a major prank by the agricultural students on November 21, 1916. The *Red and White* reported the event:

> Immediately after breakfast, the Aggies assembled in front of the Agricultural Building and, while the bewildered faculty looked on, marched off in a body to the farm of Mr. Jack Harden. Here they fell to with a hearty good will and proceeded to shuck corn. The shucked corn was husked, the corn cribbed, and the stalks hauled up and shredded. While the shucking was under way, five hogs were being barbecued over glowing coals.
>
> Short work was made of the corn. Various forms of amusement were then indulged in. These were quickly forgotten when the call for dinner sounded. The appetizing barbecue rapidly disappeared.
>
> With the finish of the barbecue, speech-making was next in order. Short talks were made by A. S. Cline, president of the Agricultural Club, W. K. Scott, W. R. Redford, and J. W. Hendricks, each discussing various phases of the club work and emphasizing the importance of every agricultural student becoming a member of the club. These talks were followed by speeches from Dr. B. W. Kilgore, Major W. A. Graham, Dr. F. A. Wolf, Dr. A. E. Handley, and Prof. T. C. Reed, all urging a spirit of earnestness and cooperation among the students. The well-timed remarks of these speakers were received with hearty applause.
>
> Speech-making over, the crowd began the homeward march, feeling satisfied with a day well spent. But, alas, "every rose has its thorn," as proved true in this case. For their grievous sin in failing to notify the faculty beforehand, the agricultural students were required to attend classes on December 1, while the engineering students were given a holiday.[18]

Some years later Kerr Scott recalled that Dr. Kilgore and Com-

missioner of Agriculture Graham had both attended the event not knowing that the students had left the college without authority and were quite embarrassed when they discovered the truth of the matter. President Riddick did not find the event very funny either, Scott recalled.[19]

This event was carried out as a prank—one of many by the students who were under close supervision and very restricted as to their outside activities. On the other hand, there was considerable strain or friction between students and faculty and between students and administration.

A Student Uprising

Information is not available to indicate that agricultural students were more or less involved than other students in the several student uprisings that took place. However, there is evidence that agricultural students were among the leaders when one of the college's most severe incidents of student unrest occurred in the spring of 1919.

On April 14, 1919, a petition signed by approximately 425 students (about half the student body) was presented to President Riddick requesting his resignation. The Raleigh *News & Observer* on April 15 said the request followed a wave of dissatisfaction among the agricultural students:

> President Riddick, according to the students, had indicated to members of the faculty that he proposed to curtail the agricultural course and extend the engineering department of the college. This plan would have cut out three professorships, and the statement was made last night that President Riddick had virtually requested the resignation of Professors Newman, McClure [spelled McCluer in some publications and official reports] and Roberts.
>
> Specifically, the students listed five grievances:
>
> 1. Abolition of the honor system.
> 2. Actions resulting in the withdrawal of various members of the faculty and curtailment in several of the college departments.
> 3. Absence of any policy looking toward the development of the college and the extension of the collegiate activities.
> 4. Lack of diplomacy and tact in dealing with students.
> 5. Unsatisfactory conditions in the mess hall with respect to quality of food and its service, poor sanitation due to inadequate janitor service.

In his rebuttal, Riddick said he was sure the student complaints were the results of a misunderstanding.[20] He went into detail to

explain how the notion that the agricultural program might be reduced had come about. He said that the Federal Board of Vocational Education had requested the temporary services of some member of the agricultural faculty in their Atlanta office. Riddick said his recommendation of C. L. Newman, G. A. Roberts, and Daniel McClure for this position in no way indicated that their services were no longer needed at the college. Newman had been hired for the Atlanta job.

President Riddick asked the trustees for a complete investigation, which was carried out. In a 12-hour session, the trustees interviewed the president of the senior class (an engineering major) and 11 other students (not identified); ROTC Commandant Maj. Charles N. Hulvey; Dan Gray, head of the Animal Industry Division; J. E. Ivey, assistant in poultry investigations; and Daniel McClure, instructor in animal husbandry.

After their investigation the trustees concluded that "the difficulties have arisen from the fact that a portion of the student body has failed to appreciate the unsettled conditions incident to the fact that the college was practically commandeered by the Government during the war, and to the changes necessitated thereby." This investigation exonerated Riddick and produced a resolution of confidence in his leadership. At the same time, the trustees asked the students to cooperate with the administration. While this ended the incident, echoes of discontent continued until President Riddick stepped down four years later.

A committee of six students presumably led the protest. The chairman and two others were engineering students; three were agricultural majors—Alvah Dunham, J. G. Stuart, and S. L. Homewood. In correspondence with the secretary of the board of trustees, C.L. Newman, on assignment in Atlanta, vigorously denied any involvement in and claimed only limited knowledge of the student uprising.

Evidence is not available to indicate direct linkage to the student event, but Newman's contract was not renewed for the coming year.[21] Roberts resigned in May, 1919; McClure left sometime during the following year. Ivey switched to full-time research and extension in 1919 and left the college in 1922. Gray resigned in 1921.

Riddick stepped down from the presidency of the college in 1923 to become the first dean of the School of Engineering—the division of the college he had earlier been accused of favoring.

Fine Tuning Instruction

There were no major changes in the agricultural instruction program during the war years, but every year there was some change—fine tuning, some might call it.

The number of agricultural graduates was 30 in 1916, 35 in 1917, 23 in 1918, 17 in 1919, and 37 in 1920. The number receiving master's degrees in agriculture ranged from zero to six during this period.

During the 1916-17 school year, four-year majors were offered in agronomy, animal husbandry and dairying, agricultural chemistry, horticulture, vocational education, poultry science, and veterinary science. A biology major was added the following year, and a four-year course in general agriculture for the 1919-20 school year.

The one-year course continued through 1920. The college catalogs of the period described it as designed to "prepare young men to become farmers, farm managers, and teachers of agriculture and allied branches in the public schools." This description was a response to the interest in agricultural instruction in the public schools. The Farmers Union, at its meetings, continually passed resolutions asking for more agricultural instruction at the newly established Farm Life Schools and at others.

The federal Smith-Hughes legislation of 1917 was surely a reflection of this interest. This law provided federal aid for the teaching of vocational agriculture in high schools and for the training of vocational teachers in land-grant colleges. On March 28, 1917, the executive committee of the trustees directed that $3,000 of the Smith-Hughes funds be used to establish a Department of Vocational Education at the college. At the Board of Trustees meeting on May 29, T. E. Browne was named head of the new department and Leon E. Cook was named assistant professor.

All student enrollment was down during the war, but the short courses were especially hard hit. In 1916 a four-month "Farmers' Course" replaced the work course. In this program instruction was offered in two eight-week terms—one beginning in October and the other in January. There were 35 students in this course the first year.

Summer school was reinstated in 1917—the first since 1903. Agricultural courses were among those offered, mainly for school teachers. The county agents went back to school for one or two weeks each summer, and there was a special one-week graduate-level course for veterinarians.

Participation in the annual farmers' convention and the 4-H

short course increased. Attendance at the 4-H event was 354 in 1916 and 576 in 1917. The farmers' convention attendance reached 1,500 in 1920. Riddick reported that this number severely taxed the college facilities, and a large number of the participants were housed off campus.

Like his predecessor, President Riddick was pleased with the extension activities and with the short courses and summertime activities held at the college. He was concerned, however, with who got the credit. When reporting to the trustees on May 31, 1921, he noted that the funds had reached very large proportions and had enabled the joint committee to do a great deal of work for agriculture in the state:

> I have no criticism to offer in regard to this work. It seems, however, that under the present arrangement, the college does not get the incidental publicity and prestige which should accrue to it through the expenditure in the State of this large amount of money. For some reason it seems that in the minds of the people of the State the college is gradually being left out of this work and it is more and more looked upon as a part of the State Department of Agriculture. I would not have the efficiency of the work interfered with for the benefit of the college. If, however, the people of the State could be taught to look upon this extension service as a part of the college, as it is in every other state in the Union, the college would incidentally have a most powerful influence towards enlarging its usefulness, especially with regard to our Agricultural Department.

Agricultural Engineering

Agricultural engineering activities started in several locations on the campus. A farm drainage short course was offered in the early years of the century, but enrollment figures indicate it was not a popular subject. In 1900 a course titled Farm Drainage, taught by Benjamin Irby, was required of all juniors. The course dealt with "open ditches, pole drains, stone drains, plank drains, and last and best of all, tile drains." Students were taught to "reconnoiter the ground, survey the land, take the levels, dig the ditches, and lay the tile."

Farm drainage was taught in the developing Department of Soils. Agricultural drawing, shop work, and gasoline engines were taught in the Department of Mechanical Engineering. Agricultural Engineering was officially listed as a department in 1917, but there is nothing on record to indicate that it was implemented with funds and faculty. However, the instructional program received increased emphasis in 1920-21 when R. E. Bosque was hired as a professor of

Thirteen makes of tractors were demonstrated at the 1919 state farmers' convention (Farm and Home Week).

agricultural engineering and H. D. Lewis was hired as an instructor. During this period a four-year specialized course was offered but attracted no students for several years.

Farmland drainage was a statewide problem; even the bottomlands in the mountains often required artificial drainage to make them productive. In the Tidewater it was a requisite before farming could begin.

Much attention was given to rural roads in the years before World War I. The advent of the automobile particularly called attention to this need. The professional extension engineering positions of the college were established in cooperation with the Office of Roads and Rural Engineering of the U.S. Department of Agriculture. H. M. Lynde, with the title of senior drainage engineer, and F. R. Baker, assistant drainage engineer, joined the staff during the 1913-14 year.[22]

F. D. Bartel replaced Baker during the 1918-19 fiscal year. A year earlier E. R. Raney had joined the staff as the first extension farm machinery specialist. Farm mechanization was still in a primitive stage, but by January 1, 1919, there were an estimated 2,400 farm tractors in the state, and 13 different makes of tractors were exhibited at the state farmers' convention in 1919.

Marketing and Credit Unions

Cooperative marketing moved to the forefront during the second decade of the 1900s. Cooperative activity was one of the big planks in the Farmers' Union platform. Through Farmers' Union, neighborhood farmers collectively purchased threshing machines, sawmills, cotton gins, and similar machinery. They established stores and

purchased purebred bulls for community use. Many agricultural experts viewed cooperative marketing as the best solution to the marketing problems that seemed to always hold farm prices down.

W. R. Camp held the title of chief, division of markets, in a division called Markets and Rural Organization. He was assisted by E. E. Culbreth, assistant superintendent of credit unions, through 1916. Then the staff expanded to five by 1918 with personnel responsible for the marketing of cotton, livestock, and fruits and vegetables.

Farmers were assisted in organizing marketing associations to handle strawberries, sweet and Irish potatoes, apples, and cabbage. A cotton grading service was available where the counties opted to pay a part of the cost. Beginning in 1917, hog and corn shipping clubs were organized at shipping points where carload lots of the two could be brought together.

The chief of the marketing division served as the superintendent for credit unions. By 1920 some 33 credit unions had been organized in the state. In addition to lending money, they made cooperative purchases of feed and foodstuffs for their members.

Meet Me at the Fair

The young extension service assumed a major responsibility for the several types of agricultural fairs being held around the state and promoted them vigorously. In 1917 S. G. Rubinow was moved from his boys' club work to a position as assistant to the director with "agricultural fairs, movable schools, and agricultural meetings" his responsibility.

Looking north from the front of Patterson Hall across Hillsboro Street to the state fairgrounds.

Extension's role was to furnish judges, provide programs and speakers, and "to demonstrate to the public the educational value of agricultural, livestock, and home economics fairs." Extension personnel worked with 207 fairs in 1917 (compared to 25 in 1915) in the following categories: 154 community fairs, 33 county fairs, 8 district fairs, 1 state fair, and 11 Negro fairs.

Even bigger things were planned for 1918. Some 250 fairs had been organized, but the Camp Polk artillery personnel occupied the state fairgrounds, so the big one was cancelled. Across the state the flu epidemic cancelled most of the others.

Fairs were back in full swing in 1919. Extension workers held or assisted with a total of 244 fairs for white citizens and 31 for Negroes. Rubinow said the fairs gave extension personnel an opportunity to meet the farmers and their families, was good promotion for extension work, and they provided good public forums for the discussion, exhibition, and demonstration of agricultural things of value.

But Rubinow's opinions may not have been shared by all. Dan Gray used one-fourth of his section in the 1919-20 extension annual report to condemn the operation of the State Fair:

> For a number of years I have been watching the tendency and spirit of the State Fair at Raleigh. It has never, as far as I knew, reflected the agricultural spirit and agricultural growth and development of the state. In fact, there seems to be very little, if any, serious attempt made to have it represent our real agricultural interests and developments. It is just about as far away from things agricultural as it can get. All of its efforts and thoughts seem to hinge around commercialism and midways—two of them this year. This is unfortunate. Fairs are places where whole families go for outings. And when they do go I'm convinced they do not wish to be met with questionable and indecent amusements, gambling booths, and games of chance.

Gray suggested that the college should not be associated with the State Fair unless major changes were made.[23]

At Last a Dean

After several years of discussion, a dean of agriculture was named when the Board of Trustees met on May 29, 1917. In discussing the matter with the board, President Riddick said he was convinced that the various departments of the agricultural work could not be properly correlated until a dean was elected.

C. B. Williams was elected to the post with the dual title of dean

of agriculture and professor of farm management, but he seems to have retained the titles of vice director of the experiment station and chief of the agronomy division.

What were the duties of the dean? Riddick said the person "shall have general supervision of all the departments of the College devoted to agricultural instruction," and would also "do extension and experiment station work, devoting one-third of his time to educational work with the College, and the remainder to the Experiment Station and Extension work."

One of Dean Williams' first assignments must have been to give attention to the college farm, which was undergoing some changes or at least having some problems. The executive committee of the Board of Trustees, at its meeting of August 30, 1916, noted: "On motion, it was agreed that in planning the farm for a grain and cattle farm, in accordance with a former resolution of the Executive Committee, that about one-third of the farm be left so that it can be run as a typical North Carolina tenant farm." Also, it was recommended that the land, stock, and equipment be divided between the Animal Husbandry and Agronomy Departments and that a firm budget be established for the farm operation.

The trustees in May, 1917, allocated $4,000 for additional funds for the Agronomy and Animal Industry Departments, and directed Dean Williams to divide the money between them. The trustees also put the farm under the general supervision of Williams and assigned the details of dividing the farm lands between the two departments to Williams and Riddick.

In reporting to the board a year later, Riddick said the new dean had been of great assistance in coordinating and systematizing those departments of the college devoted to agricultural instruction. The college farm had been divided between the two departments, and Williams had assumed general supervision over the operation of the farms.

Riddick said there had hardly been time to determine the wisdom of the new farm arrangement, but he believed the situation had been considerably improved. However, the farm committee of the Board of Trustees, looking over the farm in August, 1918, did not think so.

> We rode over the farm and were not impressed with its good condition. However, the western part of the farm seemed to be in much better state of cultivation and the crops better than on any other part of the farm. The stock seemed to be in fair condition, possibly not the very best. Much of the farm lies uncultivated, for reasons which we do not know,

but presume that much of this has been for the want of efficient help. The sanitary conditions were good, so far as we observed.

We would advise using all the domestic manures upon the farm, and sowing all the crimson clover that can possibly be sown this fall. Owing to the shortage of labor, we would advise as much of the farm as practicable be planted in small grain, and that each superintendent use his best effort to make his department self-sustaining. We regret very much the losses generally incurred by the cultivation of the farm and hope that the showing will be better in the future.

Buildings and Grounds

The lack of "efficient help" was also a problem to Horticulturist J. P. Pillsbury, who had responsibility for the college grounds. In 1919 and 1920 President Riddick complained about and apologized for the condition of the college grounds but said that with the limited funds and the high cost and shortage of labor there was not much more that could be done. Between 1919 and 1920 the only improvement Pillsbury was able to make was to build a sidewalk where the college fronted on Hillsboro Street. Some help came a year later when the 1921 General Assembly appropriated $20,000 for permanent improvement of the college grounds.

As enrollment increased and the extension forces grew, there was talk of an extension building. At least as early as January 22, 1919, it was discussed by the executive committee of the Board of Trustees. Even earlier, in August, 1916, at the annual convention of farmers and

Loading harvested tobacco for hauling to a curing barn at the Oxford station.

farm women, the women had passed a resolution asking for a woman's building on the campus because "the teaching of farm women short courses in dairying, poultry raising, gardening, home demonstration work and other kindred subjects, is needed for the proper development of the farm women of the state. . . ." It was suggested that this building might be a part of a new extension building.

If there were to be a new extension building, where should it go? Director Kilgore kept his office in the Department of Agriculture in downtown Raleigh where some of the research and extension personnel were housed. As was the case of Patterson Hall in 1903, some thought the extension building should be downtown while others thought it should be on the campus. The campus forces won out, and Ricks Hall was built in 1922. In addition to the extension service personnel, the new building housed the School of Agriculture administrators after a time.

Ricks Hall was named for Robert Henry Ricks, a native of Nash County. Born a poor boy, he had done well as a farmer, banker, and industrialist. He served a long tenure on the college Board of Trustees until his death in 1920 and was particularly active as a member of the executive committee and the farm committee.

A special building for the extension service surely came in recognition of the rapidly increasing budget for this work. While the college portion of the experiment station budget remained static at $30,000 of federal funds from the Hatch and Adams Acts from 1912 to 1925, the extension budget increased each year. It went from a total of $94,000 in 1916-17 to $350,000 in 1920-21.

Other capital improvements for agriculture during the Riddick administration (1916-1923) were dwelling houses for the foremen of the agronomy and dairy farms and an insectary and greenhouse added to the back of the Animal Industry building.

Winding Down

On November 11, 1918, the war ended just as suddenly as it had begun. It would take the college a while to get back to normal. Many of the students whose college careers had been disrupted by the war would return, and enrollments would soon increase. More teachers would be needed. Also, personnel changed very rapidly during and immediately after the war because some who went into service chose not to return. In the wartime inflation, the college was not able to keep up with wages paid elsewhere.

In major administrative changes, James M. Gray replaced S. G. Rubinow as assistant extension director; C. D. Matthews replaced W. N. Hutt as chief of the Horticulture Division; B. F. Brown replaced W. R. Camp as chief of the Markets and Rural Organization Division; F. A. Wolf replaced H. R. Fulton as plant pathologist; John A. Arey replaced Alvin Reed as dairy specialist; W. C. Reeder replaced G. A. Roberts as veterinarian; and R. W. Green replaced F. H. Jeter as agricultural editor.[24]

In extension there was a major personnel reduction. Funds for emergency agents and specialists allocated by the federal government during the war were withdrawn. The number of men agents declined from 113 in 80 counties in 1919 to 66 in the same number of counties in 1920 and to 56 in 1921. Likewise, the number of home demonstration agents declined from 72 in the same number of counties in 1918 to 49 in 1921.

What about the future? If the fate of the college was to be tied to the condition of the farm economy, the future did not look very bright. The high farm production built up during the war continued after the war ended, with a drastic decline in farm prices. Across the nation, the average price for corn dropped from $1.51 per bushel in 1919 to 62 cents in 1920. During the same one-year period cotton prices fell from 35 cents to 16 cents per pound; tobacco from 31 to 17 cents; and wheat from $2.16 to $1.83 per bushel.

So it may not have been a wise time for a reduction in force. At least the editors of the *Progressive Farmer*, writing in the December 25, 1920, edition did not think so:

> We regret to learn of a disposition in a few counties to try to get along in 1921 without a county agent.
>
> Such a policy is the dropping of the pilot just as the ship enters the most dangerous seas. It is like shutting up the lighthouse just as the storm comes on.
>
> The farmers of the South will need the help of the county agent more in 1921 than ever before.

NOTES TO CHAPTER 8

1. Third Annual Report North Carolina Agricultural Extension Service. N.C. Agricultural Extension Service, 1917, pp. 9-10. By way of review, it should be noted that the research and extension programs were a part of both the state Department of Agriculture and the college from 1912 to 1923. The work was directed by the Joint Committee for Agriculture which was made up with several representatives from the Board of

Agriculture and the college Board of Trustees. During this period many staff members were employees of both the college and the Department of Agriculture.

2. McKimmon, Jane Simpson. *When We're Green We Grow*. Chapel Hill, N.C.: The University of North Carolina Press, 1945, pp. 117-131.
3. For some details on the effects of the war period on campus activities, see David A. Lockmiller, *History of the North Carolina State College*, N.C. State College of Agriculture and Engineering, 1939, pp. 127-132.
4. Some county agents beginning extension careers during the 1917-1920 period were R. W. Pou, Forsyth County; C. M. Brickhouse, Lenoir; J. W. Hendricks, Catawba; N. K. Rowell, Chowan; O. O. Dukes, Robeson; O. H. Phillips, Stanly; J. C. Anderson and L. H. Roberts, Wake; A. K. Robertson, Wayne; B. Troy Ferguson, Wilson; W. Kerr Scott, Alamance; and Elizabeth Gainey, Cumberland County. Expansion at the state level included George W. Shay as swine specialist and George Evans as sheep specialist. Extension districts were expanded to five. The district farm agents were E. S. Millsaps, T. D. McLean, R. W. Freeman, J. M. Gray, and O. F. McCrary. District home demonstration agents were Laura Wingfield, Mrs. J. H. Henley, Mrs. Lizzie Edgerton, Mrs. Estelle Smith, and Mrs. Cornellia Morris.
5. McKimmon, *op. cit.*, pp. 132-136. District Agent R. W. Freeman died from influenza followed by pneumonia.
6. Caldwell, B. E. (editor). *Soybeans: Improvement, Production, and Uses*. Madison, Wis.: American Society of Agronomy, Inc., 1973, pp. 1-7.
7. White, Buxton. *The North Carolina Soybean Industry*, N.C. Agricultural Extension Service, Circular No. 9, 1916. Also see V. R. Herman, *Soybeans and Cowpeas for North Carolina*, Station Bulletin 241, 1919, 40 pp.
8. Caldwell, *op. cit.*, p. 7.
9. For a detailed account of early livestock production in the state, see Robert S. Curtis, *The History of Livestock in North Carolina*, N.C. Agricultural Experiment Station, Bulletin No. 401, 1956, 116 pp.
10. Curtis, pp. 92-93.
11. *Ibid*, pp. 53-55.
12. In 1919 the creamery located at the college was moved to Salisbury Street in Raleigh and operated under the name of Pine State Creamery, which was still in existence in 1984.
13. Wolf, F. A., R. S. Curtis, and B. F. Kaupp. *A Monograph on Trembles or Milksickness and White Snakeroot*. N.C. Agricultural Experiment Station, Technical Bulletin No. 15, 1918, 86 pp.
14. *Forty-First Annual Report of the North Carolina Agricultural Experiment Station*, 1918, p. 7.
15. Lockmiller, *op. cit.*, p. 136.
16. Agricultural graduates in 1916 included P. H. Kime, field crops researcher; E. S. Millsaps, Jr., who followed his father as a county agent; and V. A. Rice, who became dean of agriculture at the University of Massachusetts and finished out his career as director of instruction in

agriculture at N.C. State. The 1917 graduating class included J. W. Artz, long-time county agent; J. W. Hendricks, county agent and research station superintendent; G. K. Middleton, small grain breeder and agronomy professor; J. Hawley Poole, peach grower, member of the state Board of Agriculture and state senator; and W. Kerr Scott, son of Robert W. Scott of Alamance County and later county agent, master of the State Grange, commissioner of agriculture, governor, and U.S. senator. The 1918 graduating class included E. B. Garrett, county agent, farm manager, and head of the Soil Conservation Service in North Carolina; W. D. Lee, USDA soil survey work and soils specialist with extension and SCS; and D. S. Coltrane, county agent, assistant commissioner of agriculture and state budget director.

17. This was not the last time these two would team up. On February 17, 1917, in Pullen Hall, an estimated 1,000 persons saw them lose a close debate to the Guilford College team. The question was on private or government ownership of the railroads. Later the two served together in the N.C. Department of Agriculture, and Coltrane was the state budget officer beginning in the Scott regime as governor.

18. *The Red and White*, Dec. 14, 1916, p. 109.

19. March 26, 1958, letter from W. Kerr Scott to I. O. Schaub, Schaub personal papers, N.C. State University Archives.

20. For a detailed account of this student unrest see minutes of meetings of the board of trustees, the Raleigh *News & Observer*, and H. Thomas Kerney, "Student Activism at NCSU," *The Stater*, (NCSU Alumni Association), August, 1981, p. 3.

21. However, after about two years on the assignment in Atlanta, Newman returned to North Carolina as county agent in Scotland County. Long a contributor to the *Progressive Farmer*, in 1923 he became a full-time editor of that magazine.

22. Giles, G. W. *A Department Grows to Maturity*. Department of Biological and Agricultural Engineering, N.C. Agricultural Research Service, N.C. Agricultural Extension Service, N.C. State University, 1979, p. 1. Giles said such a start was natural since the drainage difficulties, particularly in eastern North Carolina, along with those associated with the construction of rural roads, were undoubtedly major problems. Lynde and Baker were listed under the departmental heading of drainage in the combined station-extension listing in the 1914-1915 annual reports. Giles said he believed their work was wholly extension, as it would come to be defined.

23. See Melton A. McLaurin, "The North Carolina State Fair, 1853-1900," master's thesis, East Carolina University, 1963 for background on the State Fair. An excerpt appeared in the July, 1982, issue of the *North Carolina Historical Review*.

24. Other professors and extension specialists beginning long tenure during the 1916 to 1920 period included R. H. Ruffner, Earl Hostetler, A. C. Kimrey, and F. M. Haig in animal industry; G. K. Middleton, P. H. Kime, W. D. Lee, E. C. Blair, W. F. Pate, J. B. Cotner, and W. H. Darst in agronomy; F. W. Sherwood in chemistry; S. G. Lehman in plant pathology; B. W. Wells and I. V. Schunk in botany; and A. G. Oliver in poultry.

9

The Not-So-Roaring Twenties

Cooperative marketing. Extension's input. Live-at-home and other campaigns. Fighting the boll weevil. The cattle tick goes. Fighting diseases. Mr. Zook's report. The new Ag School. Personnel changes. Test farm developments. Polk Hall. Instructional opportunities. Forestry comes south. Rural Sociology. For better seed. Master farmers and homemakers. Long-range planning.

AGRICULTURE PRECEDED THE REST OF THE AMERICAN ECONOMY into the big depression by almost a decade. The high level of farm production called for and obtained during the war years continued, building up price-depressing surpluses early in the 1920s. The resulting low prices meant bankruptcy for farmers and many merchants while the small banks and businesses that survived were handicapped for several years following this collapse in prices.

Cooperative Marketing

As a solution to the problem of low farm prices, shortly after 1920 the cooperative marketing idea swept the country. Interest in cotton marketing was stimulated by the passage of the Warehousing Act by the North Carolina General Assembly in 1919. Loans from the state were available for warehouse construction. At the end of 1921 there were 32 warehouses with a capacity of 49,050 bales. One year later there were 78 warehouses with a capacity of 212,620 bales. Warehouse construction and operation was a function of the Division of Markets

and Rural Organization of North Carolina State College and the State Department of Agriculture.[1]

But it was reports from California that really started North Carolina farmers thinking about cooperative marketing:

> Since the cooperative movement in California had been for the most part successful, the cotton grower of the South looked to the creation of a cooperative form of organization to solve his troubles. The powder was set off when Aaron Sapiro, attorney at the time for many of the California cooperatives and a versatile public speaker, addressed the meeting of the American Cotton Association, April 13-16, 1920, in Montgomery, Alabama. (This Association was organized in 1918 with the primary object to promote the continued high cotton prices.) Sapiro had made an extensive study of cooperative marketing both in the United States and in Europe, and had been instrumental in the formation of some of the most successful cooperatives of the West. By force of personality, eloquence, and candor, depicting the success of the California cooperatives and the resulting prosperity he gripped the delegates with the feasibility of his plan.[2]

The Oklahoma Cotton Growers' Association, in June, 1920, became the first of the statewide cotton associations to be organized on the so-called Sapiro plan. At the invitation of interested cotton producers, Sapiro delivered many speeches throughout North Carolina, reiterating as he went that he was not preaching a theory but presenting a plan that had worked successfully for many years in California.

At a called meeting in Raleigh on January 22, 1921, of all cotton growers interested in organized marketing, a resolution was passed calling for the formation of the North Carolina Cotton Growers' Cooperative Association. This meeting came just one day after tobacco growers had met and proposed a similar organization.

A campaign committee, with the aid of Aaron Sapiro, prepared the legal documents and arranged the campaign for members.

> Barbeque dinners with eloquent speakers praising in glowing terms the tremendous success of the California Cooperative were arranged throughout the State. Immediately after these addresses, and while their emotions were still running high, cotton growers signed the contracts, believing in a great many instances that they had signed away forever their agricultural trouble.[3]

When he became a member of either the cotton or tobacco association, the farmer committed himself to deliver all of his cotton or tobacco to the appropriate association for a period of five years (1922-26). The farmer would receive partial payment for his crop

when it was turned over to the cooperative, with second and third payments when the cooperative had disposed of part and all of the crop. By the end of the signup period, 26,000 cotton growers with an estimated production of 340,000 bales had become members.

Whereas the cotton association covered only North Carolina farmers, the Tri-State Tobacco Growers Cooperative Association covered Virginia and the two Carolinas. More than 90,000 growers joined this association.

Approximately 16 percent of the North Carolina cotton crop was delivered to the cooperative (135,912 bales) during the first year. Through 1929 (after contracts were renewed in 1926) the percentage received by the cooperative ranged between 15 percent and 5.39 percent. Although handling only a small portion of the crop, this association was still in operation in 1984.

In the spring of 1928 a subsidiary called the Cotton Growers' Supply Company was incorporated with an authorized stock of $100,000. During the second year of operation this service obtained and sold to its members cottonseed and fertilizer amounting to $200,000. This operation later became a part of the Farmers Cooperative Exchange (FCX).

While the cotton association had relatively smooth sailing, the tobacco association had difficulties from the start. Most analysts put the blame on lack of communication from the officers to the members (an undemocratic operation); excessive salaries for the officers; organized and well-financed opposition from tobacco companies, warehousemen, bankers, time merchants, and others; farmer disappointment with the payment schedule; and members breaking the contract and not delivering all of their crop to the cooperative. During the first year of operation the cooperative received only 163 million of an expected 250 million pounds.

Under pressure from loyal members, the association began a number of legal actions to enforce its contract and obtained some injunctions against delivery of members' tobacco outside the association. At the same time disenchanted growers entered suits against the association.

The first of these actions to come to trial was heard at Greenville, N.C. in August, 1923. This suit was won by the association and none of the other similar cases ever came to trial.

The straw that broke the back of the tobacco association came in 1925 when it was revealed that two officers of the association had interest in the redrying plants being used by the cooperative, followed

by a Federal Trade Commission investigation and a seeming reluctance of the officers to put their house in order.

The peanut growers had a similar cooperative marketing association. In addition, there were a number of local or area marketing cooperatives. The exact number is hard to determine. One writer in 1925 said there were at that time 126 articles of incorporation on file with the North Carolina secretary of state for farmers' cooperative associations. He estimated that 31 of these were inactive.[4] These associations ranged from small educational groups to buying clubs, creameries, county and group associations of truckers, fruit growers, warehouses, cotton gins, stores, and state and regional associations like those for cotton and tobacco.

In his 1922 extension annual report, Director Kilgore stated that "in addition to these large associations (cotton, tobacco, peanuts), cooperative buying and selling has been encouraged among various small groups of farmers to the extent that 901 such organizations were found in the State last year, and these organizations did a business amounting to $1,614,116.80."

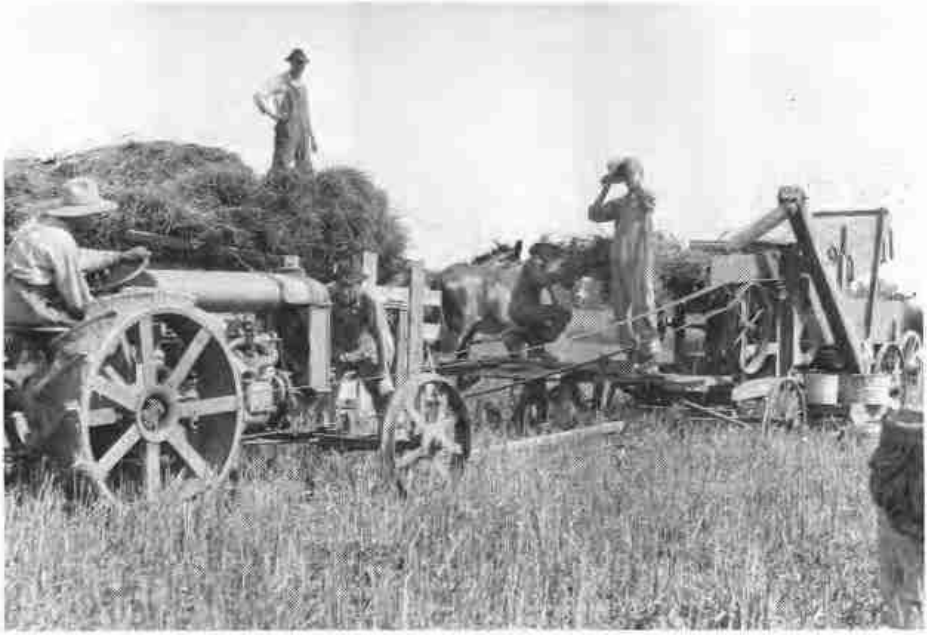
Extension's Input

The extension forces were very much involved in the establishment and operation of the cooperatives at all size levels. Director Kilgore was one of the key promoters of these associations and for months used all members of his staff in the campaign.[5] While holding the positions of director of extension and dean of the School of Agriculture, Kilgore served as president and chairman of the board of directors of the cotton association.

Several extension employees resigned to work for the associations, including Assistant State Agent H. H. B. Mask (cotton association) and Agricultural Editor R. W. Green (tobacco association).

Kilgore said in his 1922 annual extension report: "It would not be too much to say that had it not been for the agricultural extension workers, the successful promotion and organization of the cotton, tobacco, and peanut marketing associations could never have been accomplished."

Extension workers also got involved to some degree in the formation and operation of farm organizations, although extension in North Carolina never had the close ties to the Farm Bureau Federation as did the extension service in a number of states. College per-



Threshing wheat grown on soil fertility plots, Iredell Test Farm, 1923.

sonnel did assist in the reestablishment of the North Carolina State Grange when the 1927 farmers' and farm women's convention asked that a committee be appointed to study the possibilities of a state farm organization.[6]

From the early days of extension there were local advisory groups. State Agent C. R. Hudson reported in 1921 that there were 35 county organizations giving full support to white county agent work and five supporting Negro work. He said these organizations were "very effective in helping county agents to plan and carry out important county projects. Usually they are composed of both men and women, often including boys and girls, so that the home problems are given attention along with those of the farm, the home demonstration agent cooperating in the home work."

There was also an indication of a deep philosophical change. In his 1920 annual report Kilgore said the idea of personal service, while not being lost sight of, had been more limited. The guiding principle was not to do for the farmer what he could be instructed to do through the medium of demonstrations and talks. Whole neighborhoods and townships could be reached through group action.

Extension's county program gradually expanded during the 1920s. Before the decade was out there were farm agents in 79 counties

and home agents in 54. In 1929 agents visited on 37,251 farms and in 12,907 homes. The 26,259 meetings held were attended by 1,200,480 persons. A total of 27,293 boys and girls were enrolled in club work.

Live-at-Home and Other Campaigns

"North Carolina will Live at Home This Year," proclaimed the banner headline atop the February, 1923, issue of *Extension Farm-News*, which announced that a new campaign was under way. In cooperation with Governor Cameron Morrison and the state Department of Education, extension embarked on an organized attempt to call the importance of living at home to the people of the state.[7]

Some 200,000 forms were printed and mailed to county superintendents of public instruction, who distributed them to the teachers under their supervision. The teachers were responsible for calling a meeting of all farmers in their school districts on Washington's birthday. Each farmer attending heard a discussion of the program and was asked to fill out a form on which he promised to produce all the corn and hay he would need for his livestock; have a 12-month garden, and produce meat, milk, and eggs to fill the family's needs; improve the orchard and upgrade the fertility of his fields; enroll one or more of his children in club work; add some home convenience; and beautify his homestead.

In return, the farmer would receive a "Certificate of Honor," awarded by the governor and signed by Extension Director B. W. Kilgore and state Superintendent of Public Instruction E. C. Brooks.

The live-at-home program was pushed for several years, with renewed emphasis in the early 1930s when Governor O. Max Gardner made it a featured part of his program.

Other campaigns during the 1920s included one to rid the state of scrub dairy bulls, one to eradicate the Texas fever tick in cattle, and one to promote milk for health in the largest cities of the state. The Texas fever tick was eradicated in the state in 1925. In 1928 Gaston County, under the leadership of County Agent L. B. Altman, became the first county in the state and the fourth in the nation to get rid of all scrub bulls. In 1925 Alamance County Farm Agent W. Kerr Scott won the first prize in the State Better Sires Campaign. He placed 57 Jersey bulls in the county that year.

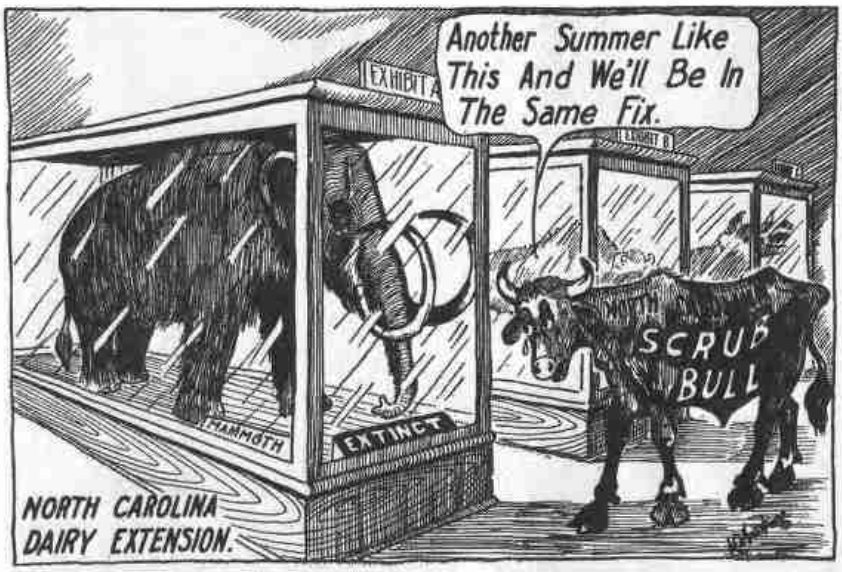
Fighting the Boll Weevil

Other than the efforts to market the farm surplus, the farm education program of the 1920s placed major emphasis on the boll weevil problem. Moving steadily northward, by 1922 the boll weevil had reached a line running east and west across the state at about the Raleigh area. In 1923 all cotton-growing areas of the state had the boll weevil.

In 1922 it was suggested that on farms in those areas where full injury could be expected not more than six to eight acres of cotton should be planted for each plow. It was also suggested that preparation should be made at once for growing feed, food, and other crops and for dealing with the boll weevil so as to make the loss the first year as light as possible rather than waiting until the insect had arrived in full force before getting experience with it.

It was further suggested that farming to best advantage under boll weevil conditions would require community and county programs and cooperation among farming, banking, and business interests. Community and county organizations should be formed where they did not already exist, and immediate action should be taken in conferences to develop and decide on a plan of action which all would follow.

For weevil control the farmer should locate cotton fields away from woods and other winter cover for the weevils; burn the edges of



FAST DISAPPEARING

A cartoon in *Extension Farm-News* to call attention to the scrub bull eradication campaign.

woods and other trash and litter next to cotton fields; destroy the old cotton stalks as soon as the harvest was finished; plant early to get ahead of the weevils; pick weevils from the plants and pick up infested squares; and poison with dry calcium arsenate powder.

Also on the insect front, the Mexican bean beetle, following somewhat the same route as the boll weevil, reached Cherokee and Clay Counties at the western end of the state in 1921 and in a few years had moved all the way to the coast.

The Cattle Tick Goes

Through 1915 tick eradication had moved steadily and the quarantine line had been advanced eastward and southward across the state. That year the counties of Cumberland, Greene, Lenoir, Harnett, Wayne, Bladen, Johnston, and Sampson were declared free of ticks and released from quarantine.

But then the pace slowed. No counties were released in 1916. Duplin, Pender, and Northampton were declared tick free in 1917. And with 22 counties still under federal and state quarantine, at times progress came to a complete standstill.[8]

It was necessary to secure the moral and financial support of the county commissioners in each county before the work could proceed in that county. This support was often slow in coming or only half-hearted. However, farmers themselves constituted most of the opposition to the eradication program, which required that they take their cattle to a dipping vat for treatment and then keep their cattle enclosed in fences instead of permitting them to roam free.

A. M. Fountain, who grew up in Onslow County, recalled that in eastern North Carolina at that time cattle and other livestock roamed freely in the open range; farmers put fences around their fields rather than around their animals. Through a major part of each year the cattle were self-supporting, as the grasses and low-growth bushes came into spring greenery.

Any interruption in or variation from this routine met violent opposition from the owners.

> After the excitement of the War had subsided, and a minor depression had aroused the people to the dangers of exterior overlordship, feeling ran so high that violence was hung over the head of any property-owner who would allow one of these damnable installations [dipping vats] to be placed in his field or forest. But the work went on very slowly, and to the tune of roars in the middle of the night, as great dynamite

> blasts ruptured the concrete walls, and let the foul-smelling liquid into the ground. The muffled boom of these explosions developed a peculiar and recognizable sound that led many of the people to mutter in the middle of the night, that there went another of the accursed invasions of all the individuality that had been left to the community.[9]

North Carolina, unlike most states, did not have a statewide tick eradication law. Such a law was introduced but failed to pass the General Assembly in the 1919 and 1921 sessions. A law was passed in 1923 which relieved the counties of a large part of the expense of conducting the program. This law ameliorated the feelings, in part at least, of those so bitterly opposed to tick eradication. From this point on, the program progressed and on December 1, 1925, the state was released from quarantine.

For the farmers who had been accustomed to letting their cattle roam free in the swamps and canebreaks, it meant an entirely new system of raising cattle. The result was a stalemate in cattle raising in the east. "Not short of 10 years or even longer did the new and now unhampered livestock possibilities begin to take positive effect following final eradication."[10] The figures bear this out. Beef cattle numbers in the state, at 212,000 head in 1920, dropped to 122,000 head in 1925 and to 96,000 head in 1930.

Tick eradication was primarily an assignment for the U.S. and state Departments of Agriculture, but extension agents were involved in the educational program (and undoubtedly got some of the blame). In 1922 the agents reported assisting with the construction of nine dipping vats and the dipping of 2,500 cattle.

Fighting Diseases

Along about 1922 there was increased interest in poultry production. With more chickens came more disease problems. One of the most severe showing up in North Carolina was bacillary white diarrhea or pullorum disease. Studies by Poultry Researchers B. F. Kaupp, R. S. Dearstyne, and others revealed that adult birds would often perform normally but the disease was transmitted to the chicks with a high rate of mortality. They found the disease throughout the state.

A second study evaluated a controversial macroscopic agglutination test being administered to hatching egg flocks by the North Carolina Department of Agriculture. The researchers concluded that although there were some limitations to the test, it was the best method advanced to date for the detection of carrier birds. From the

blood-tested flocks, the chick loss was only 4.8 percent from this disease, compared with 41.5 percent from the untested flocks.[11] (Progress was hindered when thieves decimated two pens of hens in the study.)

On the crops side, which still dominated North Carolina agriculture, wildfire showed up in tobacco beds. First discovered in the state in 1917, the disease by 1922 had been found in 26 counties. Plant Pathologist F. A. Wolf said it was "of the type of disease which appears to come suddenly and may cause the crop to be practically worthless."[12] For control of the disease, Wolf recommended sanitation in and around the plant bed: Use of (1) disease-free seed or seed that had been disinfected, (2) new plant bed cloths or sterilized old ones, and (3) new plant beds or thoroughly fired old ones.

A disease of cotton commonly called anthracnose or boll rot, like the boll weevil, had spread over the entire cotton-growing area by the mid-1920s and was causing an annual loss of 1 to 3 percent of the crop. It was established that the fungus which caused anthracnose was carried over from one season to the next both on the surface and within the tissues of the seed. A number of chemicals were available that would take care of the organisms on the outside of the seed, but what about those on the inside? None could be found that would kill the disease organism within the seed without injury to the embryo. However, North Carolina researchers discovered that the cotton anthracnose organism could be killed by a dry heat at a temperature low enough that it would not kill the cotton embryo.

Dewberry anthracnose had also become a problem. From a few small fields around Cameron about 1905, the Sandhills dewberry industry had expanded to about 350 growers who were shipping some 300 carloads of dewberries each year by 1925. One of the difficulties the growers had encountered was premature death of the canes and drying up of the berries. After study of the disease, the solution turned out to be rather simple: very satisfactory control could be obtained if all the old canes were removed immediately after harvest and if the crop was sprayed at appropriate times.

Mr. Zook's Report

Despite adverse economic conditions in some sectors, growth of the college continued. By 1922 the total college teaching faculty had reached 95, compared with 63 in 1916. Student enrollment continued a steady increase, reaching 1,200 in the fall of 1922.

President Riddick believed that the administrative organization of the college was inadequate and that a reorganization was essential.[13] It was decided that a survey of the institution should be made by an impartial expert and that the expert's recommendations should serve as a basis for future changes. Dr. George F. Zook, specialist in higher education of the U.S. Bureau of Education, was selected to make the survey. He visited the college during March, 1923, held many conferences, and later submitted his report. It recommended, among other things:

> 1. That at the earliest possible time the board of trustees undertake such negotiations and adopt such measures as may be necessary to secure the complete transfer of all control over the activities of the agricultural experiment station and the agricultural extension service to the board of trustees at the college, and that thereafter these two services be administered through the college in complete cooperation with the work of resident teaching.
>
> 2. That the resident teaching work of the college be organized into four main divisions: agriculture, engineering, general sciences, and social sciences and business administration, with a dean in direct charge of each division.

Zook came down hard on the organization of the agricultural functions of the college. Five pages of the typewritten report dealt with what he titled "The Relation of Resident Teaching, Research, and Extension Work."

He called the separation of research and extension from the teaching function detrimental to all but particularly so to the teachers who should have been dispensing the latest research information to their students and also been in touch with the needs and problems of the farmers.

Relationships between the college and the state Department of Agriculture appeared to have been satisfactory for some five or six years after the research and extension work was placed under the joint committee in 1912.[14] World War I engulfed the United States, and the attention of all was turned to the foreign enemy. Family quarrels were largely forgotten or postponed. With the ending of the war, however, pressures began to build within and outside the state.

In 1917 a committee representing the National Association of Commissioners of Agriculture and the land-grant colleges developed a memorandum regarding the functions of the two institutions. It was agreed that the primary function of the colleges was research and education and that of state departments of agriculture was control

and regulation of the sale of seed, feed, and fertilizer. These recommendations, however, were not binding on the several states and no change was made in North Carolina.

In January, 1919, Secretary D. F. Houston of the U.S. Department of Agriculture made an address to the National Association of Commissioners of Agriculture in which he stated:

> A great gain would result if the states adopted the policy in general of confining the agricultural colleges to investigational and educational work, both in the colleges and in the field, and the commissioners or board of agriculture to administrative and regulatory matters, heading up under such commissioners or boards the proper administrative and regulatory activities affecting agriculture, thus providing in each state two great, strong central agencies for the betterment of agriculture and rural life.

In February, 1923, Henry Wallace, then secretary of agriculture, sent a letter to all state governors which set out rather specifically the policy that the U.S. Department of Agriculture observed in cooperative relations with the state public agencies with regard to (1) regulatory and law enforcement and (2) research and extension work:

> In all regulatory work and matters of law enforcement, we cooperate with the State Department of Agriculture, or such law enforcement agencies as the state may have created.
>
> Our research work, if done in co-operation with the states, is carried on with experiments of the Land-Grant College.
>
> Our extension work in agriculture and home economics is carried on with the extension divisions of the Land-Grant Colleges. This cooperation is made mandatory in the Federal Smith-Lever Law itself, the provisions of which have been accepted by the State Legislatures.

While this pressure from Washington was building up, conditions within the state were not entirely harmonious. The agreement between the college and the state Department of Agriculture specifically provided that the director's office would be at the college, but for some reason the office remained in the state department. The matter was discussed, at least in one meeting with the joint committee, and Kilgore suggested that he have a part-time office at the college, but apparently this arrangement was not consumated. President Eugene C. Brooks, discussing relationships between the college and department in 1924, mentioned that the director's office remained in the department in violation of the agreement:

> From the beginning of the co-operative agreement, the Joint Committee saw the necessity of basing instruction on research and investiga-

> tion, and it continued to locate the research men and nearly all extension workers at the College, but their headquarters really were at the Department of Agriculture, where the executive officer resided. Their physical location was at the College, yet they were under no College regulations; they occupied offices and laboratories sometimes adjoining the offices or laboratories of the College workers, yet in many instances they grew farther and farther apart, and in some instances they were as widely apart psychologically as if they lived in different parts of the city. As a result, the program that was begun for the purpose of promoting harmony was gradually promoting discord. . .[15]

While research funds remained practically constant during the administration of Kilgore, the extension budget increased each year, beginning in 1914, from both federal and state sources under the provisions of the Smith-Lever Act, and federal funds were further increased from emergency funds when the U.S. became an active participant in the war. In his reports, Kilgore made little distinction between the station and extension. The break came about more from extension activities rather than research, but the final result was the moving of both activities to the college.

The New Ag School

With Zook and the U.S. Department of Agriculture suggesting a more complete separation of agricultural functions between the college and the state Department of Agriculture, and the agitation for action at home, change came rapidly. On April 10, 1923, Zook reported his findings to the executive committee of the Board of Trustees. Before the summer was out reorganization was well on the way.

The trustees did not accept in full Zook's recommendations for school organization. Instead, they created four schools—Agriculture, Engineering, General Science, and the Graduate School. President Riddick immediately stepped down as college president to become dean of the School of Engineering. E. C. Brooks was named the college's fifth president. On July 1, 1923, B. W. Kilgore was named dean of the School of Agriculture. C. B. Williams again relinquished the top position (or was removed from it) in favor of Kilgore.

Dean Kilgore also held the position of director of research until 1925, when Agronomist R. Y. Winters was named to that position. This came despite the recommendation in the June 19, 1923, meeting of the executive committee of the Board of Trustees that "when the Dean of Agriculture assumes his duties at the College, it will be

I. O. Schaub

R. Y. Winters

Z. P. Metcalf

advisable for him and the President to name C. B. Williams as Director of the Experiment Station. But, it is understood that the Dean of Agriculture is the Executive Head of the Experiment Station, and that C. B. Williams will be under the direction of the Dean of Agriculture." After relinquishing the position of dean of agriculture in 1923, Williams served in the two positions he had held in 1912-1917—vice director of the station and head of the Department of Agronomy.

In line with the Zook recommendations, within two years there were separate directors for the three divisions of the School of Agriculture. Entomologist Z. P. Metcalf was named director of resident instruction in 1924. I. O. Schaub, after assignments with the Frisco Railroad and the U.S. Department of Agriculture, returned to the college as director of the Agricultural Extension Service on July 1, 1924. R. Y. Winters completed the arrangement when he became station director in 1925. All were located at the college.

Kilgore's term as dean was short. On some policies President Brooks and Dean Kilgore did not agree. The record does not provide details, but they clashed on the administration of the teaching program in the School of Agriculture. Also, Kilgore complained to Brooks that the director of instruction was bypassing him and going directly to the president on some matters.[16]

Kilgore's resignation was effective July 30, 1925. Thus ended an association with the college and the experiment station that began when he was appointed assistant chemist with the station in 1889. For a quarter of a century he was the leading professional personality in agriculture in North Carolina.[17]

I. O. Schaub continued to serve as director of the extension service, but on April 9, 1926, was given the additional assignment of acting dean of the School of Agriculture. He was named permanently to the position of dean a few months later.

In a report to the college Board of Trustees on February 27, 1924, President Brooks detailed the functions of the four schools. He described the School of Agriculture as follows:

> The purpose of the School of Agriculture is threefold: (1) To secure through scientific research, experimentation or demonstration, accurate and reliable information relating to soils, plants and animals, and to secure from every available source reliable statistical, technical and scientific data relating to every phase of agriculture that might be of advantage to our State; (2) to provide instruction in college for young men who desire to enter the field of general agriculture, or who wish to become professionals in agricultural education, or specialists in any field of science related to agriculture; and (3) to disseminate reliable information through publications and through extension agents, and through a wise use of this information, to give instruction to the agricultural workers of the state in the scientific, experimental and practical progress in the various lines of agriculture.
>
> All effective instruction in agriculture is based on research and investigation and the curriculum is organized so that not only the subject matter for classroom instruction and extension work may be drawn from research, experimentation and demonstrations, but that students themselves will have the opportunity during their college careers to work under the direction of research specialists.

Students electing to become teachers of agriculture would find their basic work in the School of Agriculture, but their professional guidance would be determined by the Department of Vocational Education in the School of General Science.

The School of General Science (in 1925 the name was changed to School of Science and Business) included several areas that before or since have been a part of the School of Agriculture—biological sciences, agricultural economics, rural sociology, and vocational education.[18] Named dean of the School of General Science was B. F. Brown, head of the Department of Markets and Rural Organization.

G. W. Forster was named head of the agricultural economics program. In 1927 this program, with farm management and marketing responsibilities, was combined with the Department of Agricultural Administration, renamed Agricultural Economics and moved to the School of Agriculture with Forster as the head.

In recommending these changes, President Brooks said there was need for greater emphasis on the business side of farming and on farm

organization and marketing. He believed it would be more effective if the agricultural administration and business courses were closer to the production courses in the School of Agriculture.

Personnel Changes

Shortly after becoming president, Brooks spelled out his policy for bringing together the teaching, research, and extension functions in the several departments.[19] The department head or chairman was assigned the responsibility for bringing about "a unity and working harmony of the related groups in the same department."

As to departmental leadership, following the departure of Dan Gray in 1921, R. S. Curtis served briefly as head of the Animal Industry Department, followed by R. H. Ruffner.

The poultry work, a part of the Department of Animal Industry since 1912, was made a separate department in 1924, with B. F. Kaupp as the head. Kaupp left in 1930 and was succeeded as department head by R. S. Dearstyne, who had joined the faculty in 1922.[20]

In 1924, when consolidation of horticultural research and extension at the college took place, C. D. Matthews replaced J. P. Pillsbury, who was then named coordinator of the instructional program in the department. In 1928 Matthews was replaced by J. H. Beaumont as department head.

Frank H. Jeter returned to publications work at the college in 1922. R. W. Green, who had left this department to work with the tobacco cooperative association, returned to the college as a professor of agricultural economics when the cooperative failed in 1926.

Other department heads during the last half of the 1920s were G. W. Forster, Agricultural Economics; B. W. Wells, Botany; and Z. P. Metcalf, Zoology and Entomology. W. H. Darst was head of farm crops in the Agronomy Department.[21]

In extension, L. R. Harrill was brought into the state office from his Buncombe County agent position to consolidate and direct all youth activities. The home demonstration personnel reluctantly surrendered responsibility for the 4-H work with girls, which had been the beginning of the extension home economics program.[22]

In another consolidation move, in 1924 State Agent C. R. Hudson was placed in charge of Negro extension work. Assistant Director and State Agent James M. Gray assumed responsibility for the farm demonstration (county) program. He left in 1928, and some of his

A group photograph of participants at the 50th anniversary celebration of the Agricultural Experiment Station:

Bottom row, left to right: S. C. Clapp, Supt. Swannanoa Test Farm; H. C. Evans, Auditor, Extension Service; Charles Dearing, Supt., Willard Test Farm; Fred Miller, Asst. Director, Test Farms; W. A. Graham, Commissioner of Agriculture; H. B. Battle, Director, 1887-1897; R. Y. Winters, Director, 1925-1937; I. O. Schaub, Dean of Agriculture; Clarence Poe, Editor, Progressive Farmer; C. W. Dabney, Jr., Director, 1880-1887; B. W. Kilgore, Director, 1901-1907 and 1912-1924; C. B. Williams, Director, 1907-1912.

Second row: E. H. Hostetler, Animal Husbandry; F. W. Sherwood, Chemist, Nutrition; Robert Schmidt, Horticulture; R. E. Currin, Supt., Edgecombe Test Farm; S. G. Lehman, Plant Pathology; Frank Meacham, Supt., Statesville Test Farm; M. E. Gardner, Horticulture; C. F. Williams, Horticulture; A. F. Bowen, Treasurer; R. F. Poole, Plant Pathology; Z. P. Metcalf, Entomology; B. W. Wells, Botany; E. G. Moss, Supt., Oxford Test Farm; B. F. Kaupp, Poultry.

Third row: T. B. Mitchell, Entomology; J. L. Rea, Supt., Blackland Test Farm; F. H. Smith, Animal Nutrition; Jerre Moore, Plant Breeding; G. W. Forster, Agricultural Economics; W. A. Anderson, Rural Sociology; unknown (head facing right); Carl Taylor, Rural Sociology.

Fourth row: W. F. Pate, Soil Fertility; Frank Jeter, Publications; R. J. Saville, Agricultural Economics; A. S. Cline, Agronomy; Roy Dearstyne, Poultry; Herman Wilfong, Poultry; S. J. Jackson, Agronomy.

Top row: G. W. Randall, Horticulture; C. D. Matthews, Horticulture; J. O. Halverson, Animal Nutrition; and L. G. Willis, Agronomy.

duties were assumed by C. A. Sheffield, named assistant to the director.

Maude Wallace served as assistant state home demonstration agent and S. J. Kirby was assistant state agent.[23]

Test Farm Developments

A 1925 memorandum of understanding between President Brooks and Commissioner of Agriculture W. A. Graham stated the following arrangement for the test farms or branch research stations:

> The test farms owned and supported by the Department of Agriculture are used by the College for conducting experiments or research in such manner and to such an extent as the President of the College and the Commissioner of Agriculture may determine; and the Director of Research of the College is given full authority to plan and supervise any research work on the test farms without referring the same to the President or to the Commissioner, provided the total expense of conducting the same in one year does not exceed the total expense of the preceding year.
>
> The Department of Agriculture maintains a Supervisor of the test farms and the Department agrees to keep its force and provide service for the use of the College. The test farms, therefore, are under the supervision of the Director of the Experiment Station and the Supervisor of the test farms. They, working jointly, can carry out any program that may be mutually agreed upon.
>
> But in a case of disagreement, the matter may be settled by the President of the College and the Commissioner of Agriculture, and if they are unable to agree, the matter may be referred by either to a joint committee composed of the Governor and equal representatives from the Board of Agriculture and the Board of Trustees of the College.[24]

F. E. Miller was named assistant director for the branch stations in 1920.[25]

Director Kilgore, in his 1924 station annual report, stated that one of the interesting developments relating to the research program that year had been the increased popularity of the branch stations among the people of the section adjoining the farms:

> These farms are rapidly becoming community centers which people may visit to study the investigations being made and at which they may gather for picnics and field days. County agents, too, have brought small groups of interested farmers on visits of inspection to look into the results being secured with certain crops or with livestock. Approximately 15,000 people gathered at the six branch stations for annual meetings last year and this number does not include those who made visits alone or in small groups.

Farmers' institutes had pretty well gone by the board by the 1920s, but coming on the scene were the branch station field days. Held annually at each station, these events attracted in some instances as many as 4,000 to 5,000 people. They were all-day affairs designed for educational purposes but more often featuring political speeches and the social aspects of a large gathering. They did, however, perform a useful public relations function for the stations, and over the years a great amount of new farming information was undoubtedly imparted.[26]

Also in 1924, Kilgore noted that the stations had been improved in physical equipment so that they were more nearly than ever before in a position to render the kind of service needed. Some 176 research projects were being carried out at the six outlying farms and at the central station (at the college).

Polk Hall

Despite limited operating funds, money was available for capital improvements. Polk Hall was included in a 1923 appropriation of $1,350,000 from the General Assembly for campus construction. The Board of Trustees was authorized to spend the money as it saw fit. From this and other appropriations in the 1920s came, in addition to Polk Hall, the college's first library building and the first gymnasium, along with three dormitories, new electrical and civil engineering buildings, the new power plant, the stadium, the president's home, a warehouse, a barn, three greenhouses for horticulture, and a new poultry plant.

Polk Hall was dedicated on July 29, 1928. Even before construction had started the decision had been made to name the building in honor of L. L. Polk, usually accorded the role of primary instigator of the establishment of the college.

The opening of Polk Hall made possible a new area of work—meat and meat products. The basement of the building contained a meats laboratory consisting of: (1) a judging pavilion, where meat animals were judged before slaughtering and large meat demonstrations were given; (2) a killing laboratory, where all animals were slaughtered and inspected; (3) a cutting laboratory, where carcasses were cut up and small meat demonstrations were given; (4) a lard laboratory, where lard and soaps were made; (5) a sausage laboratory, where products such as sausage, souse, scraple, and hamburger were

processed; (6) coolers, where carcasses were chilled before cutting, processing and sale, and where curing was done; (7) a smoke house, and (8) a retail market for disposing of the meat.

The Department of Horticulture was moved to the third floor of Polk Hall. The three greenhouses were constructed nearby.

The poultry plant was moved to the area south of Western Boulevard near Avent Ferry Road, entirely or in part on a 22-acre tract acquired in 1923 joining the south edge of the Belvin tract acquired in 1899. The move was necessary because the station's original 10 acres acquired in 1885 were sold for real estate development.[27]

Swine research was located on a farm about three miles south of the campus. There was some complaint from the animal science researchers that the distance from campus created inefficiency in their work, but overall the researchers seem to have accepted the amount of time required in going to and from their experiments there as well as on the branch stations.

The college dairy herd provided milk for the college cafeteria (in Leazar Hall).[28]

At about this time the property owned by the North Carolina Agricultural Society and used as the location of the State Fair was up for sale. At a meeting of the Board of Trustees in May, 1924, a basis of agreement for transferring the state fairgrounds to the college was approved. The college would pay a portion of the value of the prop-

A mid-1920s aerial view of the campus, looking southwest, with Polk Hall under construction in upper right corner.

erty, and both the college and the society would use the property. The arrangement was never consummated and the property was sold for commercial real estate development. A portion of it became the site of the Raleigh Little Theatre and rose garden.

The construction of Polk Hall gave the School of Agriculture four sizable buildings dominating "Ag Hill." When the Department of Animal Industry moved from the Animal Industry Building to Polk, the name of the former building was changed to the Zoology Building. The School of Agriculture administrators were housed in Ricks Hall, along with publications, home economics, 4-H, forestry, other extension specialists and support personnel, and perhaps others.

Patterson Hall, 25 years old, was in need of renovation and repair. As funds became available, some work was done on it during the last half of the 1920s. It housed the departments of Agronomy and Botany. In May, 1930, the farm committee of the Board of Trustees described it as being in sad shape, with fertilizer and farm machinery stored in the basement—"a building apparently of excellent construction, is, in fact, only a shell, its interior an extravagant waste of space."

Instructional Opportunities

The baccalaureate program at the beginning of the 1920s, according to the catalog, included the course in general agriculture and specialized courses in agricultural engineering, animal husbandry, biology, farm crops, horticulture, poultry science, rural life, soils, vocational education, veterinary medicine, and agricultural chemistry.

After the rearrangement of schools and courses in 1923-24, the number of instructional areas in the new School of Agriculture was reduced to six: Agronomy (including agricultural engineering); Animal Industry (including dairy manufacturing); Botany (including bacteriology, plant physiology, and plant diseases); Horticulture (including forestry); Poultry Science; and Zoology (including genetics, entomology, and animal physiology).

Catalogs for the period from 1925 to 1930 indicate that botany and zoology were primarily in the School of Agriculture, but these programs were also discussed under the School of General Science or Science and Business. A program in biology was described under the latter school. The *Agromeck* placed botany and zoology in the School

of General Science in 1924, but afterward they were listed in the School of Agriculture.

In addition to the veterinary program, there was apparently some activity in the human medicine area. The 1926-27 catalog advised: "Any student contemplating a medical career should consult the Department of Zoology in regard to the subject matter and arrangement of courses." The 1929-30 catalog reiterated this opportunity when it said: "The pre-medical student will find in the Biology curriculum the biological courses necessary for his entrance into a standard medical college."

The short course program continued to fluctuate. At the beginning of the decade there was a two-year course and a six-week winter course in agriculture. The winter course was soon discontinued. From 1926 until 1930 there were two-year curricula in agronomy and in animal husbandry and one-year curricula in horticulture and in poultry. In each program the students would schedule a full course load of approximately 21 hours per quarter. The one-year program was described as being "for men actually engaged in farming." Completion of 60 hours of course work entitled the participant to a certificate.

In the early 1920s a special rehabilitation program for disabled World War I veterans was offered, with federal funding, in several departments. In 1923-24 there were 178 students in the agricultural rehabilitation program.

In addition there were the short-short courses. The two-week course in cotton grading was especially popular in the early years of the decade. Other short courses offered from January 8 to 19, 1923, as listed in a farm magazine advertisement, were for cotton, tobacco and small grain farmers; for fruit and vegetable growers; in farm dairying; in poultry raising; and in cotton grading.

One listing showed enrollment in several courses during 1926-27 as follows: beekeeping, 35; poultry, 75; soils and fertilizers, 6; tobacco grading, 51; and hay grading, 11. That same year some 2,519 students were enrolled in correspondence courses in agriculture.

There was little change in the number of graduate students. The first doctorate, however, was awarded in 1926, to Jesse Benton Mowry. Primarily a sociology major, his dissertation was titled "The Natural Resources and Their Conservation as a College Course of Study." Two other Ph.D.'s were awarded in 1928, both in chemistry. (No other such terminal degrees would be awarded by the college until 1948.)

As an extracurricular activity during these years, judging teams were big—and successful. In 1923 the crops judging team, under the guidance of W. H. Darst and J. B. Cotner, took first place at the International Collegiate Crops Judging Contest in Chicago. Team members were W. H. Rankin, W. W. White, C. L. Hall, and C. R. Dillard. The crops judging team also took first place in the international contest in 1925, 1927, 1928, and 1931. In 1926 crops judging team member W. L. Adams made the highest score (up to that time) ever made by an individual in the history of this contest.

In 1927 the poultry judging team, under the direction of B. F. Kaupp and W. F. Armstrong, placed first in the national poultry judging contest held in New York City's Madison Square Garden. Team members were J. L. Fort, R. W. Shoffner, J. J. Barnhardt, and W. M. Ginn. Through the years these and other judging teams consistently scored high in regional and national competition, and judging teams remained an important part of college life for a limited number of students.

In 1923 a new agricultural student publication was born—the first such publication since the demise of the *North Carolina Student Farmer* about 1910. It was the *N. C. State Agriculturist.* An objective of the new magazine, from the student point of view, was to promote and foster the exchange of agricultural ideas. It was also to be used as

4-H club members at an early state 4-H short course, assembled in the Thompson Gymnasium.

"a training school in agricultural journalism." (There was a journalism program in the college from about 1923 until consolidation.) Faculty contributed some articles, but most were student written.

With increasing enrollment and gradual program revisions, how well was the college doing in performing its instructional function? Director of Instruction Z. P. Metcalf gave his assessment in President Brooks's 1927 annual report to the trustees:

> With a few individual exceptions, the scholarship of the students in the School of Agriculture has been satisfactory. There is a grave danger, however, especially in technical schools, where so much of the student's time is devoted to laboratory or demonstration work, that the mental processes of the student may become purely mechanical and perfunctory, and that the student will not develop those habits of deep and reflective thinking that make a college education really worth while. Then, too, social activities are so many, so varied, and so attractive that real scholarship is often hard to maintain. Therefore, it seems wise to point out to students and teachers alike the advisability of maintaining a sane balance between two very desirable elements. Teachers of technical subjects and laboratory courses especially need to check up on their methods to determine whether or not such courses are developing the initiative of their students, or whether or not they have become so stereotyped that they destroy the native and dormant ability that the student possesses.[29]

Once the young men were trained, where did they go? A 1927 study showed that out of 540 men who had graduated in the agricultural courses at the college from 1893 through 1926, 173 of them (32 percent) called themselves farmers. In addition, 41 were in some agricultural business, 27 were college teachers and professors, 49 were in extension work, 29 were in agricultural research, 18 were veterinarians, and 89 were vocational teachers in high schools. This made a total of 79 percent of the graduates who had gone into some form of agricultural work or farming. Of the remainder, 10 were taking further studies at other colleges, 70 had gone into private businesses, 3 were in the Army, and 31 could not be located.[30]

In the 1920s the horticultural farm stretched from Polk and Patterson Halls westward to Dan Allen Drive, from Hillsboro Street south to the railroad. It served as the location for horticultural research and as a demonstration farm for varieties and for cultural practices.

It also served as a source of irritation, particularly to the members of the Horticulture Department staff. Students and others considered raiding the orchard a favorite sport.

As darkness descended on the evening of October 3, 1928, three students ventured into the orchard. The boom of a shotgun rang out. One student fell to the ground with some 70 shotgun pellets in his body, including two or more in his right lung, one that grazed his eyeball, and possibly one in the brain.

For 10 days, as the student hovered close to death, the Board of Trustees, President Brooks, and Governor A. W. McLean investigated and denounced the incident. The farm worker who fired the shot said that his supervisor had instructed him to shoot students entering the orchard. Members of the horticulture faculty blamed each other for issuing instructions or making statements that led to the incident. Subsequently the college declared it a "shipping offence" for a student to be caught in the orchard.

Forestry Comes South

In 1892 Professor Massey reported that he was offering some instruction in forestry. By 1900 forestry instruction had developed into a two-hour course taught by Massey and required of juniors majoring in agriculture. The catalog described the course as lectures on forest influences and methods of forest management, timbers, and forest products. By 1927 four forestry courses were being offered in the Department of Horticulture. In extension J. S. Holmes served for one year as the first farm forestry specialist (1917-18). He was succeeded by Harry B. Krausz. In his 1918-19 annual report Krausz indicated that creating greater interest in proper management and utilization among forestry owners was the big challenge. He said that through surveys of farm woodlands, owners had been supplied with information about management of their properties, protection against insects and diseases, fire, and damage from grazing. In addition, owners had received assistance in marketing their timber through estimates, price information, and, in some cases, by actual supervision of logging, sawing, and handling their timber.

Krausz left in 1922 and was replaced by H. M. Curran the following year. Curran, in his 1923 annual report, estimated that the farms of North Carolina contained about 10 million acres of forest, from which about $32 million worth of forest products were obtained each year (including $14 million worth of wood products used at home). Instead of $3.00 per acre, Curran believed that with good management farmers could expect at least $10.00 income per acre of forest land each year.

Curran expressed interest in getting county agents active in a forestry program, including setting up demonstrations on farms in their county. One who heeded his advice was R. W. Graeber, who had become the agent in Iredell County in 1921. Although trained at North Carolina State College in dairying, Graeber had on his own initiative started timber thinning demonstrations in each township in the county.

In 1925, when extension was being divorced from the state Department of Agriculture, Curran stayed with the Department of Agriculture and Graeber moved to the college as farm forestry specialist. The federal Clark-McNary Act provided funds to put the position on permanent funding, starting July 1, 1925. Graeber concentrated on thinning and management of timberlands.

Slowly there was increased attention to the state's forest resources:

> The North Carolina Forest Service (then known as the Division of Forestry, Department of Conservation and Development) assigned most of its personnel to fire protection. Extension Forester R. W. Graeber spread the gospel of forest management, but one man could not reach a quarter of a million forest land owners. This stimulated a small group of people, members of the North Carolina Forestry Association, to do something about the situation. Their efforts bore fruit in 1928 when the authorities of North Carolina State College approved a four-year curriculum in forestry leading to the bachelor of science degree.
>
> The man selected to head up this program was Dr. Julius V. Hofmann, then Associate Director of the Pennsylvania State Forestry School at Mont Alto. He had earned the first Ph.D. degree in forestry in the United States at the University of Minnesota in 1914, and had engaged in silvical and fire weather research with the United States Forest Service in the Pacific Northwest for fourteen years preceding his appointment at Mont Alto in 1924. He held the firm belief that forestry should be a business enterprise, paying its own way.
>
> Dr. Hofmann reported on February 1, 1929, for duty as Director of the Department of Forestry in the School of Agriculture. It was planned to register students in September, and the first forestry graduating class was not expected until 1933. In April, however, Dr. Hofmann received a call at his office in Polk Hall from Professor W. H. Horning, a former colleague at Mont Alto, and six Mont Alto students. Because of the merger of the two forestry schools in Pennsylvania, the Mont Alto school had been abolished. Professor Horning proposed that North Carolina State College expand its forestry program to accommodate the Mont Alto student body in September. The persistence of the visitors overcame all objections and the proposal finally was approved. Governor O. Max Gardner took emergency action to provide funds for additional faculty, classroom, and laboratories.

The Department of Forestry opened on September 19 with 24 freshmen, 13 sophomores, 17 juniors, 17 seniors, and one graduate student. The faculty included Dr. Hofmann, Professor R. W. Hayes, and D. Y. Lenhart, a teaching fellow. Supporting courses were offered by the Departments of Botany, Civil Engineering, Soils, and Zoology. "Temporary" quarters were provided in the north half of the third floor of Ricks Hall. The Northern and Southern students discovered each other with agreeable surprise. Seventeen forestry diplomas were granted in 1930, and the new forestry department was an undeniable reality.[31]

Rural Sociology

Both agricultural research and agricultural instruction from their beginnings focused on production agriculture. But as early as 1906, when North Carolina became the first state in the South to hold institutes for women, there was a recognition of the importance of the home in farm living.

By 1920 there were calls for action in a third area—rural leadership or the development of leaders in the communities.

Sociology work at the college started in the fall of 1920 with the arrival on the campus of Carl C. Taylor, professor of economics and sociology, and graduate student Carl C. Zimmerman.[32]

The program Taylor developed was called sociology with a rural sociology specialty. The catalog listed nine courses which would be offered, all taught by Taylor: citizenship (required of all freshmen at the college), general economics, general sociology, agricultural economics, marketing of farm products, rural sociology, shop organization and management, personnel administration and industrial problems, and a special economic and social problem seminar.

In 1921, Taylor, then head of the Department of Social Science, proposed the establishment of a School of Agricultural Commerce and Manufacturing for the purpose of "training our graduates, farmers, manufacturers, and engineers in the business aspects of their respective specialities." He suggested that one-half of the program should cover agricultural commerce and marketing and the other half should be concerned with manufacturing and engineering commerce. The program was apparently endorsed by the trustees, but little activity took place before the schools were reorganized.

The Bureau of Economic and Social Research, founded by Taylor about 1924, received some funding, and several research projects were carried out under this framework. Most of this funding came when the Congress in 1925 passed the Purnell Act. This legislation

gave the station an additional appropriation of $20,000 for 1925-26. This was increased annually by $10,000 until the total reached $60,000—an increase of 200 percent from federal sources.

These funds were available for "experiments bearing directly on the production, manufacture, preparation, use, distribution, and marketing of agricultural products and including such economic and sociological investigations as have for their purpose the improvement of the rural home and rural life, and for printing and disseminating the results of said researches."

The first research by Taylor and Zimmerman was a study of primary groups in Wake County completed in 1922. The bulletin published following the study "has long been recognized as a classic piece of literature by all serious students of rural sociology."[33]

At about this same time, Taylor, B. R. Brown, E. C. Bronson at Chapel Hill, and E. C. Lindeman at Greensboro, teamed up to produce a study of the level of living of farmers, especially tenant farmers. This is the first known effort at interinstitution cooperation.[34]

Zimmerman received the master of science degree in agriculture in 1921 and remained for several years as an instructor. Other early professors in what came to be known as Rural Sociology were Fred R. Yoder and W. A. Anderson.

Extension Sheep Specialist George Evans used this "traveling sheep school" to carry eight purebred sheep; shearing, wool tying, docking, and castrating equipment; blankets; models of barns; and other necessities of the sheep business. This truck visited 17 fairs and meetings in 1922.

For Better Seed

To escape the most severe boll weevil damage, farmers were advised to plant early and select certain cotton varieties that grew off rapidly and fruited heavily early in the season. Reason was that the number of boll weevils increased as the season progressed, reaching maximum numbers in late summer and fall. By the time the boll weevil arrived on North Carolina farms, there had been enough study on cotton varieties to make some definite varietial recommendations.

The techniques used by agronomists in developing or upgrading varieties are not entirely clear. Apparently the procedure was to take an existing variety and, through field selection of seed, hope to upgrade the variety. For open pollinated crops such as corn, cross-breeding, which was tried by Professor Massey before the turn of the century, could be used.

Division of Agronomy personnel began improving cottonseed about 1912.[35] The objective was to locate or upgrade varieties adapted to North Carolina conditions, with emphasis on high yield, earliness, and uniform staple. There were six recommended cotton varieties in 1921: Wannamaker Cleveland Big Boll; Mexican Big Boll Nos. 6, 14, and 18; Edgecombe Cook No. 38; and Lone Star. Mexican Big Boll Nos. 14 and 18 originated in Edgecombe County. Number 14 was selected in cooperation with the Edgecombe Seed Breeders' Association and No. 18 on the Edgecombe Branch Station. By 1925 the cotton researchers were concentrating on the Mexican Big Boll. Based on studies of the cotton requirements of cotton mills in the state, this one variety had been bred to furnish a uniform staple of 1 to 1 1/16 inch.

Farmers were also advised and instructed on selecting seed from their own fields, and in 1922 field agents assisted farmers in the selection and purchase of 227,885 bushels of "improved seed for farm crops."

Despite the upgrading of seed stocks by station personnel and the selection of seed by county agents, farmers could not always be assured that they were receiving what they bargained for. Once station agronomists had isolated a particular strain or had labeled a variety, it was difficult to maintain purity because farmers and seedsmen produced seed for sale to others under a variety of conditions or lack of control. Also, the existing laws were not strong enough to prohibit or control intentional mislabeling of seed. And there was a proliferation of variety names. A similar variety could appear on the

market under a large number of names, but there was not much the farmer could do to compare the different varieties accurately.

The International Crop Improvement Association was formed in 1919. The purpose was to encourage minimum standards for seed production and labeling through (1) a method for increasing seed of improved varieties by plant breeding, (2) means of maintaining seed purity, and (3) means of discouraging unscrupulous individual seed growers from renaming established varieties.[36]

The idea for a state seed association came from Professor of Farm Crops W. H. Darst. As coach of the award-winning crops judging team, Darst had learned of seed certification programs in other states from contacts made at collegiate judging contests held each fall in Chicago. Here is how Middleton and McLaughlin tell the story:

> In the fall of 1928, O. Max Gardner was running for Governor, and on several occasions he expressed interest in sponsoring programs to aid agriculture. This gave Darst the idea of working through him to get a bill to authorize the formation of a crop improvement association for North Carolina passed in the next State legislature which would convene in the spring of 1929.
>
> Darst approached I. O. Schaub, dean of the School of Agriculture, North Carolina State College; R. Y. Winters, director of the North Carolina Agricultural Experiment Station; and E. C. Brooks, president of North Carolina State College, with his idea. Gardner was elected, and Schaub and Brooks agreed to accompany Darst to a conference with the new Governor.
>
> Governor Gardner gave his support to the formation of an association for the purpose of certifying seed. The Governor's Agricultural Advisory Board met on January 28, 1929, to consider plans to aid North Carolina farmers. One of the three major recommendations of this board was to ask that a statewide seed improvement organization be formed.
>
> After much study, Darst presented a proposed organization and plan of procedure for developing and disseminating purebred seed of approved varieties. This proposal was endorsed by the Governor's board.
>
> With the support of Gov. O. Max Gardner and the Agricultural Advisory Board, on March 19, 1929, the General Assembly of North Carolina enacted a law entitled "An Act to Foster the Development and Production of Pure Bred Crop Seed in North Carolina." This law provided for the formation of the North Carolina Crop Improvement Association.[37]

G. K. Middleton was selected as the first extension seed specialist with the responsibility for initiating the improved seed program.

Master Farmers and Homemakers

A special recognition program for farmers was initiated in 1923 when on August 1 of that year the executive committee of the Board of Trustees requested that the president and agricultural faculty "develop plans for having the College award each year some form of certificates of distinction to two farmers in the State who have rendered distinguished service to North Carolina agriculture along the lines heretofore worked out by the University of Wisconsin, Clemson College, etc."

The first such award, called a Certificate of Merit, was awarded to three farmers—R. W. Scott of Alamance County, R. L. Shuford of Catawba County, and B. F. Shelton of Edgecombe County—during commencement exercises in 1925. The Robert W. Scott family had become synonymous with not only good farming but with service to the college and the state Department of Agriculture. R. L. Shuford was one of the nation's outstanding breeders of Jersey cattle, owning the top-rated Jersey cow in the country in 1925 (named "Red Lady") and owner of the first "gold medal bull" south of the Mason-Dixon Line. B. F. Shelton was a member of the state Board of Agriculture and one of the few eastern North Carolina farmers with an outstanding livestock program on his farm.

In 1926 the award went to S. A. Latham of Union County; 1927 recipients were W. D. Graham of Rowan County and E. A. Stevens of Wayne County.

In 1926 the *Progressive Farmer* followed the action of several other farm magazines in teaming up with the state extension services to select "master farmers" in each state. The idea was presented to the North Carolina Extension Service while administrators, specialists, and agents were attending their annual conference in Raleigh in December, 1926, and "enthusiastically approved," according to the magazine.

The first public announcement was made in the December 25, 1926, issue of the magazine:

> We are going to try to find in each county in North Carolina, South Carolina and Virginia one "Master Farmer"—a farmer who is an outstanding example of sound farming practice and achievement. Having located one such farmer in each county we shall next try to select 10, 12 or 15 foremost "Master Farmers" in the state and award to each of these men a gold medal as a certificate of distinction, these medals to be awarded at a banquet to be given at the state capital with eminent state and national leaders participating in the ceremonies.

The first public announcement of the winners was made in the December 10, 1927, issue of the *Progressive Farmer*. Twenty-four had been selected—several more than had been anticipated when the program was announced. The magazine was careful to point out that they would not claim that these were the 24 best farmers in the state, but a group of distinguished North Carolina citizens they were. Included in the list were the six farmers previously selected as Certificate of Merit recipients.[38]

Pedigreed Leap's Prolific wheat developed at the Iredell and Mountain stations, 1926.

All but two of the awardees attended the big celebration in Raleigh on December 16. Some 12 to 15 of the men brought along their wives. The event was set to coincide with the annual conference of county agents ending on Friday, December 16, at the college. The lineup of speakers and program participants at the banquet that night in the Hotel Sir Walter was an impressive one. It included Governor A. W. McLean, gubernatorial candidate O. Max Gardner, several other well-known figures, and representatives of the college and the magazine. Including the county agents, more than 300 attended.

Several traits characterized all of these farmers. They had been good stewards of the land. Most of them had started with poor, rundown farms and had built them up. Soil erosion had been controlled.

All of the master farmers were practicing "balanced farming," meaning that they had a wide variety of crops along with livestock. Several were dairymen. Available mechanization was used.

All were producing an abundant supply of homegrown feed for their livestock and food for their families. A reasonable amount of the money earned on the farm was put into better family living, considering the home conveniences available at the time. Each house was comfortable and painted. In most cases a portable electric power generating system provided electricity for the home. The family was one of the first in the community to have a radio, refrigerator, and washing machine.

They were all what rural sociologists would come to call innovators—those who are first to adopt new farming practices and move out ahead of the crowd. As far as is known, none of them were agricultural college graduates, but the evidences of research results and extension recommendations were clearly evident.[39]

Starting in 1928, the home demonstration division of the extension service cooperated with the *Farmer's Wife*, a magazine printed in Minnesota, in the selection of master farm homemakers. Five women were selected and presented their award at the meeting of the State Federation of Home Demonstration Clubs during the annual farm and home week (before 1928 called the farmer's and farm women's convention). Selected for the honor the first year were Mrs. W. D. Graham of Mount Ulla, Mrs. W. B. Lamb of Garland, Mrs. J. E. Corriher, Jr. of China Grove, Mrs. A. R. Poyner of Moyock, and Mrs. W. T. Whitsett of Whitsett.

Long-Range Planning

Boll weevils and hard times probably stimulated agricultural workers and others to think more about comprehensive farming and farm family living plans.

Farmers were brought in to help with the planning in 1925. In 20 western counties, county boards of agriculture were formed. The boards were composed of two leading farmers from each township and sometimes included a member of the board of county commissioners and a representative of the county seat chamber of commerce. A cooperative plan of action for each county was worked out between the county board and the county agent. The board would then meet with the agent every two to three months to see what progress had been made and to analyze any problems that might have developed.

On December 17, 1925, a "big sectional meeting" was held in Asheville. Present were representatives from 14 counties, county agents, specialists from the college, President E. C. Brooks, and Extension Director I. O. Schaub. A number of committees, including three to look at homemaking aspects of farm living, met for about one-half day. The meeting ended with reports from the committees and the selection of D. M. Buck of Yancey County as head for the coming year of the "Carolina Highlands Agricultural Association." A second meeting was planned for December, 1926.

An extension publication in 1928 outlined a plan whereby agents in each county would involve their citizens in planning. The agents would call community meetings and give those attending a chance to discuss their individual farm and family and community needs. From these meetings the agents were expected to develop a comprehensive county program.[40]

On the station side, Director Winters, in his 1928-29 annual report, said the station staff had made a careful examination of the research program during the past year, dropping a number of projects and strengthening the attack upon a few problems important to the state and region by supplying better support and arranging cooperative efforts between one or more departments of the station and with the U.S. Department of Agriculture.

On the instigation of Gov. O. Max Gardner, a conference was called in January, 1929, "to discuss ways and means of improving farming conditions and rural life in North Carolina." From this conference came the decision to issue a longtime agricultural program for the state. "The agricultural staff of the North Carolina State College was asked to prepare this program and to secure the assistance

A home demonstration class teaching the skills of grading eggs and dressing poultry.

and suggestions of a committee of the state's most successful farmers."

On invitation of the governor, 158 farmers from 68 counties met in Raleigh and were assigned to work on departmental programs. They were joined by representatives of banks, fertilizer companies, farm machinery manufacturers, and other business interests.[41]

Ideas for improving the lot of the southern farmer were plentiful. Andrew M. Soule, president of the Georgia College of Agriculture, argued that the South must upgrade its education if farming was to become profitable:

> With proper education, Soule believed, "a new generation of farmers" would "restore the agriculture of the South to the prestige it once enjoyed and again make it a profitable and inspiring business."[42]

However, despite all the dreaming, the planning, and the exhortations, neither farm families nor members of the agricultural establishment were prepared to meet the trials and tribulations of the coming decade.

NOTES TO CHAPTER 9

1. Farmers had advocated government-sponsored or subsidized warehouses for storage of their crops at least as early as the 1890s when the Farmers Alliance promoted the "subtreasury plan." See Helen G. Edmonds, *The Negro and Fusion Politics in North Carolina 1894-1901.* Chapel Hill:

The University of North Carolina Press, 1951, pp. 24-25; and Alan B. Bromberg, "'The Worst Muddle Ever Seen in N.C. Politics': The Farmers' Alliance, the Subtreasury, and Zeb Vance," *North Carolina Historical Review*, January, 1979, pp. 19-40.

2. Mann, Julian Edward. "An Economic Appraisal of the North Carolina Cotton Growers' Cooperative Association." M.S. Thesis, N.C. State College, 1930, 119 pp.
3. *Ibid.*, pp. 11-12.
4. Green, R. W. "Some Economic and Social Aspects of Cooperative Marketing of Tobacco in Virginia, North and South Carolina." Typewritten report, 1925, 29 pp. N.C. State University Archives.
5. Schaub, I. O. *North Carolina Agricultural Experiment Station: The First 60 Years 1877-1937.* N.C. Agricultural Experiment Station, Bulletin No. 390, 1955. p. 104.
6. Clarence Poe headed the committee. Representing the college were I. O. Schaub, Carl C. Taylor, Jane McKimmon, and T. E. Browne. Others on the committee were D. W. Bagley of Moyock, Charles F. Cates of Mebane, D. J. Lybrook of Advance, and Mrs. Sarah Gray McCormick of McDonald. The committee concluded that the Grange seemed "best suited to the needs of the farmers of North Carolina" and ought to be revived in the state.
7. "Live at home" referred to the farmers' production of all or most of the food consumed by the family and feed needed for his livestock. There were nutritional benefits from home food production, but the purpose of these campaigns was to improve farm income by reducing the amount that would go for the purchase of food and feed.
8. Curtis, Robert S. *The History of Livestock in North Carolina.* N.C. Agricultural Experiment Station, Bulletin No. 401, 1956, pp. 36-37.
9. Fountain, Alvin M. "Rebellion at the Dipping Vat," *The State.* Vol. 47, No. 1 (June 1979), pp. 16, 30.
10. Curtis, *op. cit.*, p. 37.
11. Morris, Tom. *Poultry Can Crow at NCSU.* Published by the author, 1980, pp. 29-30.
12. Wolf, F. A. *Wildfire of Tobacco.* N.C. Agricultural Experiment Station, Bulletin No. 246, 1922, 28 pp.
13. Lockmiller, David A. *History of the North Carolina State College.* N.C. State College, 1939, pp. 148-149.
14. Schaub, *op. cit.*, pp. 105-109.
15. "The Relationship of North Carolina State College to the State Department of Agriculture," *State College Record.* October, 1924, 36 pp. It is hard to assess the impact of the confused organizational structure on individual faculty members. Agricultural Editor Frank Jeter, in a statement prepared some 20 years later, indicated that it was largely the organizational structure existing at the time and the problems it presented that caused him to resign at the end of 1919. In describing the organizational situation—part in the Department of Agriculture downtown and part on the college campus—Jeter said "he had to walk a tight rope to please both sides and had to give credit where credit was due but at

the same time had to help preserve the existing organization because he worked for that organization."

16. Letter from Kilgore to Brooks, May 29, 1925. See also statement by Kilgore released to the press and June 9, 1925, letter from Kilgore to secretary of the Board of Trustees, all in N.C. State University Archives. Also, Willard B. Gatewood, Jr., *Eugene Clyde Brooks; Educator and Public Servant*. Durham: Duke University Press, 1960, pp. 234-235.

17. Kilgore's health became impaired at about this time, but he directed the activities of the Pine State Creamery, served as an editor of the *Progressive Farmer* from 1928 to 1930, and served as president of the North Carolina Cotton Growers Cooperative Association until 1933. At the time of his death in 1943, he was serving as state chemist with the North Carolina Department of Agriculture. In 1918 Davidson College conferred on Benjamin Wesley Kilgore the honorary degree of Doctor of Science; in 1943 North Carolina State College conferred on him a similar degree. Kilgore Hall was named for him.

18. In 1927 Vocational Education was established as a separate school with T. E. Browne as director of instruction and L. E. Cook as department head. Browne was named dean of the School of Education in 1937. In 1931 the Department of Rural Sociology was moved to the School of Agriculture, leaving the School of General Science with only the basic studies supporting the other degree programs after consolidation of the universities in 1931. In 1937 the name was changed to Division of Basic Studies. Consolidation of the state's higher education system took away from the college the business administration programs. Also in 1931, as an economy measure, rural sociology and agricultural economics were merged into a single department.

19. Minutes, meeting of board of trustees, August 1, 1923, in N.C. State University Archives.

20. Tom Morris, in his history of the Poultry Department, credited Kaupp with the authorship of seven books on poultry. There is some evidence that the school and/or college administration had become displeased with Kaupp because he had "become too commercial" in his activities. However, Morris credited Kaupp's 15 years as head of poultry work with building "the Poultry Department into the finest one in the South."

21. Other personnel additions at the state level during the 1920s included: F. H. Smith, W. L. Clevenger, A. C. Kimrey, R. E. Nance, and J. E. Foster in Animal Industry; J. B. Cotner, E. F. Goldston, D. S. Weaver, W. H. Rankin, E. Y. Floyd, L. G. Willis, and H. B. Mann in Agronomy; C. F. Williams, H. R. Niswonger, Glenn O. Randall, Robert Schmidt, M. E. Gardner, and E. B. Morrow in Horticulture; L. A. Whitford and D. B. Anderson in Botany; R. F. Poole in Plant Pathology; C. D. Grinnells in Veterinary Science; B. B. Fulton in Entomology; and J. K. Coggins and L. O. Armstrong in Vocational Education.

    M. E. Sherwin of the Agronomy Department died suddenly on January 5, 1924. Replacing him in soils teaching was R. B. Etheridge.

    Following the sudden death of A. G. Oliver in 1928, C. F. Parrish was placed in charge of the poultry extension program.

22. Clark, James W., Jr. *Clover All Over*. Office of 4-H and Youth, N.C. State University, 1984. p. 110.

23. Extension agents beginning their careers in the 1920s included W. O. Davis, E. O. McMahan, J. G. Morrison, T. B. Brandon, E. H. Garrison, E. P. Gulledge, Don Matheson, R. W. Galphin, J. E. Dodson, R. L. Sloan, H. K. Sanders, E. S. Millsaps, Jr., C. B. Baird, B. E. Grant, J. C. Hubbard, L. B. Altman, J. I. Wagoner, E. C. Lackey, Mck. McNeil, J. T. Monroe, Fred Sloan, I. O. L. Torrence, Samuel T. Brooks, J. W. Crawford, J. W. Sanders, R. H. Bright, L. F. Brumfield, R. W. Shoffner, W. B. Collins, and J. W. Artz. County home demonstration agents beginning long terms included Effie Vines Gordon, Mrs. Irma Wallace, Mrs. Lillie Hester, Mrs. Elizabeth Tuttle, Viola Addie Houston, Marjorie Holmes, Maude McInnis, Mrs. Bertha Mae Edwards, Rose Elwood Bryan, Flora McDonald, Mrs. Lillie M. Debnam, and Ruth Current.

    Helen Estabrook became the first home economics specialist when she was appointed in 1925 to cover the areas of clothing and household furnishings. She was followed by Nutrition Specialist Mary E. Thomas in 1926. Willie Hunter took over the clothing duties in 1928; Miss Estabrook continued as house furnishings specialist.

    Home demonstration district agents included Pauline Smith and Martha Creighton. New farm demonstration district agents in the 1920s included John W. Goodman, E. W. Gaither and B. Troy Ferguson.

24. Schaub, *op. cit.*, p. 110.

25. Throughout the 1920s the number of branch stations remained at six but the names were changed. F. T. Meacham continued as assistant director in charge of the Piedmont Test Farm (formerly Iredell Branch Station); E. G. Moss continued at the Tobacco Test Farm (Granville); and S. C. Clapp continued at the Mountain Test Farm (Buncombe). New assistant directors were R. E. Currin, Jr. at the Upper Coastal Plain Test Farm (Edgecombe); Charles Dearing at the Coastal Plain Test Farm (Pender); and J. L. Rea, Jr. at the Blackland Test Farm.

26. As an example of a field day program, the men's department program for the field day at the Piedmont Station on July 10, 1924, began with string band music at 10 a.m., followed by an invocation by a local minister. At 10:30, Station Superintendent F. T. Meacham welcomed the group and County Agent R. W. Graeber gave the announcements. There was a recitation by Miss Louise Taylor. Hon. O. Max Gardner was the principal speaker, scheduled from 11 a.m. until noon. Dinner at 12:30 was by families and groups. The afternoon program for the men consisted of a discussion of cooperative marketing from 2 to 4 p.m. The women's department program featured an address by Mrs. T. W. Bickett of Raleigh and an afternoon address on farm poultry by Extension Specialist A. G. Oliver but was more entertainment than the program for the men. The closing event for all was a string band concert at 4 p.m.

27. However, some of the purchasers were unable to complete payments for the lots they bought, and in 1984 North Carolina State University owned a section of this tract and used it for a parking lot. The only remainder of the original research use of this land was the house, built in 1886, which was still used as a dwelling, at 2714 Vanderbilt Avenue.

28. Fred Haig, at his retirement in 1961, recalled that milk was hauled from the barn to the cafeteria in a one-horse wagon pulled by "Old Zeb." "Old Zeb," Haig explained, "was a big, 1,800-pound white Percheron whose only jobs were to pull the milk wagon once a day and stand up pretty for the students when he was used as a model in teaching horse judging."

29. Statement by Z. P. Metcalf in President Brooks' annual report to the Board of Trustees, Trustees minutes, June 6, 1927.

30. "College Graduates Return to Farms," *Extension Farm-News*, July, 1927, p. 3.

31. Miller, William D. *A History School of Forest Resources 1929-1979*. N.C. State University, 1979, p. 2.

32. In 1965 Zimmerman prepared an autobiographical statement in which he described some parts of the trip to Raleigh: "Those were times before any decent roads, much less good ones. In August, we left Columbia, Missouri, in a 1919 Chevrolet and headed for Raleigh. This was an historic trip, which took 12 days, one new clutch, one new transmission, and the replacement of six rear springs." (Taken from publication listed in Note 33.)

33. "Rural Sociology: Some Beginnings at N.C.S.U." No author or date given, but this mimeographed statement was prepared by Selz C. Mayo. 5 pp. in N.C. State University Archives. The study was published as Station Bulletin No. 245, *Rural Organization, A Study of Primary Groups in Wake County, N.C.*, 1922.

34. Taylor, Carl C., and Carle C. Zimmerman. *Economic and Social Conditions of North Carolina Farms*. (Publisher and date not indicated), 87 pp.

35. *Long and Short Staple Cottons Compared*. N.C. Agricultural Extension Service, Circular No. 120, 1921, 4 pp.

36. Middleton, Gordon K., and Foil W. McLaughlin. *Seeds of Time: A History of the North Carolina Crop Improvement Association 1929-1977*. N.C. Crop Improvement Association, N.C. Agricultural Experiment Station, N.C. State University, 1978, p. 6.

37. *Ibid.* pp. 7-8.

38. The other 18 master farmers were Leland H. Kitchin, Halifax County; Charles F. Cates, Alamance; F. P. Latham, Beaufort; B. N. Sykes, Hertford; G. W. Trask, New Hanover; J. L. Beall, Davidson; J. C. Causey, Guilford; O. J. Holler, Rutherford; Charles E. Fuller, Vance; S. L. Carpenter, Gaston; W. B. Harris, Iredell; B. S. Lawrence, Randolph; T. E. Osborne, Henderson; Blaney Sumrell, Pitt; C. W. Teague, Macon; C. B. Wells, Buncombe; John W. Winstead, Person; and L. O. Mosley, Lenoir County.

39. For a detailed account of the master farmer program, how it was conducted, and stories on the farmers selected, see various issues of the *Progressive Farmer* from December, 1926, through 1928. The program was later relabeled "Master Farm Families" and continued in North Carolina through 1965. A total of 74 farmers or families were selected. For some details throughout the life of this program, see Master Farm Family file in N.C. State University Archives.

40. *Building a Program of Agricultural Extension*. N.C. Agricultural Extension Service, Circular No. 169, 1928, 36 pp.

41. *Agricultural Program for North Carolina*. N.C. Agricultural Extension Service, Circular No. 175, 1929, 136 pp.

42. Fite, Gilbert C. *Cotton Fields No More, Southern Agriculture 1865-1980*. Lexington, Ky.: The University Press of Kentucky, 1984, pp. 118-119.

10

Depression and New Programs

The Triple A. Tobacco campaigns. A search for better farm living. Saving the soil. REA and TVA. Station accountability. New and improved varieties. Crop diseases. Consolidation. School changes name and programs. Withers Hall. More land for research. Radio to reach the farmers. Changes at the top.

As the new decade of the thirties began, agriculture was still in a very depressed condition, and the worst was yet to come. In 1931 tobacco prices dropped to 8 cents per pound, and cotton farmers had to settle for less than 6 cents.

Governments at all levels were hard pressed for revenue. On July 1, 1932, state employees in North Carolina suffered a reduction in pay, and paid annual leave was eliminated. The various operating budgets were reduced by 30 percent.

In the counties, there was much discussion on the merits of the extension program. Petitions of the people saved positions in some counties, but in a few extension work was discontinued. However, soon to come on the scene were federal programs that would lead to expanded extension programs in the counties.

The Triple A

Within a few days after the inauguration of Franklin D. Roosevelt as president of the United States in March, 1933, the machinery was put into place to create what would be called the federal farm programs. The Agricultural Adjustment Administration (AAA) was the first.

In his 1933 extension annual report, Director I. O. Schaub said the AAA programs set in motion revolutionary changes in farming and agricultural work in North Carolina. During the latter half of that year members of the extension service, including the county and home demonstration agents, turned practically their entire attention to crop reduction programs and work incidental to those programs.

Making Triple A agents out of extension personnel was somewhat of a natural occurrence. Extension was the only organization with the necessary field staff available for immediate action throughout the rural areas. With over one million cotton farmers nationally to be reached and persuaded to sign individual contracts within a matter of weeks, Secretary of Agriculture Henry A. Wallace's decision to use the extension service seemed an obvious one.[1]

The role envisioned by Wallace for these agents was, however, a new one. State extension directors in the north and east feared that their role as impartial educators might be compromised by the tasks of enforcement and regulation that would be involved in the implementation of the new farm program and were reluctant to cooperate with the AAA. There was no reluctance on the part of most southern directors. Schaub welcomed the new assignment and saw the AAA as an agency that could strengthen his own organization. He believed that the need for direction of the cotton and tobacco programs would head off county efforts to eliminate extension programs. Also, in fulfilling their AAA duties agents would see more farmers than they had ever seen before and would have an opportunity to convey to them the traditional extension messages.[2]

Schaub was right on both accounts. The emergency agents, funded by the AAA to run programs in 1933 in counties where there were no agents, were soon funded by the counties themselves. The programs that developed affected all producers of the selected commodities, and under the drastically changed operating rules, farmers seemed more anxious than normal to receive extension's advice.

As a major cotton-producing state at the time, North Carolina was one of the first to become fully engaged in crop control activities—the cotton plow-up program in the summer of 1933. "The entire organization of the Agricultural Extension Service in this State was drafted Sunday, June 18, by the administrators of the Farm Adjustment Act to conduct a cotton reduction campaign during the week of June 26," *Extension Farm-News* reported. "There were some amusing incidents, especially those concerned with the overnight

transformation of dairy, poultry, and fruit specialists into cotton experts; but the men did a good job under the circumstances."

Effective they were. Some 51,022 North Carolina growers signed agreements to plow up 229,487 acres and reduce the 1933 crop by over 125,000 bales. The success of the cotton plow-up campaign paved the way for the wheat, corn-hog, and cotton contract sign-up campaigns which were to follow. At least 98 percent of the eligible growers signed the 1934-35 cotton reduction contracts. The wheat program was not big in the state, but 1,102 growers did sign contracts in 1933. Putting across the tobacco campaign was not as easy.

Tobacco Campaigns

After a hectic 1933 marketing season, which included a marketing holiday declared by Governor J. C. B. Ehringhaus, extension in December launched a sign-up campaign in the flue-cured tobacco areas. The procedure or pattern of the sign-up for tobacco was the same as that used in the cotton program—"the use of emergency agents, the full mobilization of all extension personnel, the community programs to explain the government's offer to the farmers, and the propaganda barrage from the press, businessmen, farm leaders, and politicians exhorting the farmers to accept the offer."[3]

More than 60,000 growers signed agreements to reduce their crop 30 percent.

Two factors were mainly responsible for the almost 100 percent sign-up. First was the need for sweeping reforms in tobacco farming to control production and marketing. The excess of production over consumption had undermined the industry, and the growers were anxiously awaiting opportunity to participate in some form of control. Second was the liberal benefit payments offered to contract signers—among the most liberal offered in the AAA crop programs.[4]

However, this high initial sign-up did not mean that the tobacco program would run smoothly. At particular issue were questions of the program's effect on tenants and sharecroppers, allotments for small farmers, the base on which allotments were determined, the use of acreage versus poundage as the control measurement, representation on the farmer advisory boards or commissions, the role of government in individual farmers' decision-making, and the role of government agencies and personnel in promoting and conducting the referendums and sign-up campaigns.

As to the government role in promoting the programs, the "educational" campaign by the extension service and the AAA was called a thinly veiled propaganda drive:

> AAA administrator Howard Tolley might remind every farmer that he was not recommending to anyone how they should mark their ballot, and Dean Schaub might protest that the campaign meetings were only designed to inform, but the actions and speeches of their agents belied this. No farmer could have been left in any doubt as to the result the AAA and the Extension Service wanted. As one small example, one county agent mailed every farmer notice of the ballot; the same notice featured a cartoon with a figure labeled "prices" bent double under a weight labeled "carry-over." The Extension Service interpreted the favorable vote as a tribute to its own campaign. Frank Jeter's *Extension Farm News* positively gloated that, as a result of the vote, "some of those who have had harsh things to say about the leaders of the Extension Service will begin to think that perhaps these leaders are not so impotent after all . . . the Extension Service has proved that it has the power to organize, conduct and conclude any reasonable effort with a maximum of results."[5]

It is hard to assess the net impact of these activities on the extension service, the School of Agriculture, and the college. There is some evidence that there was criticism of or harm to the organization from its role in these crop control programs. The extension agent in Sampson County, where growers consistently voted against the program, reported in 1935 that there was a "lot of antagonism" toward the program.

Jeter's statement above implies criticism of the extension service, and what criticism there was at times became extremely bitter. Badger found some of it.

> The Greensboro Daily News complained about the "politicians and paid administrators from the highest to the lowest who have taken to the farm hustings to urge the program's approval, to stress the agricultural salvation which it alone offers, and to say little or nothing about the dangers and impositions involved."
>
> A Wilson leaf dealer and prominent member of the United States Tobacco Association ascribed the victory of control to the "Hitler tactics" of the people in Raleigh who had "jammed this program down the farmers throats." Senator (Josiah W.) Bailey was also contemptuous of this effort in mass democracy, which he described as "a perfect model of fascism." The people in Raleigh, however, did not see their own behavior in this light. On the contrary, Frank Jeter, the extension editor, told a visitor from Washington that he had been privileged to witness "democracy in action."[6]

Information is not available by which to assess the impact of

these activities on the individual members of the extension service. Some agents and specialists must have viewed these activities as a unique opportunity and challenge, and most of the extension personnel involved likely saw these programs as necessary for prosperity on the farm. In any case, those who went through it never forgot the long hours and the trauma often arising from assigning production allotments to the individual farms. They were glad when the task could be handed over to someone else.

The "triple A" was only one of the many federal agencies created in the 1930s. Others included the Soil Conservation Service (SCS), Farmers Home Administration (FHA), Production Credit Administration (PCA), Rural Electrification Administration (REA), and Farm Security Administration (FSA). Alphabet agencies, they were sometimes called.

As the federal AAA organization employed its own staff, extension personnel gradually withdrew from direct operation of the program, although Tobacco Specialist E. Y. Floyd gradually moved into the position of full-time administrator of the state AAA office after it was established as an agency separate from the college. Also, in the process of administering the AAA program and working with other federal agencies, extension received another important assignment—that of informing the public about these new agricultural agencies and their activities. Extension came to be called "the educational arm of the U.S. Department of Agriculture."

Extension personnel were also called on to set up the organizational structure for several of the agencies. The extension service assisted the Farm Credit Administration in organizing production credit associations. Thirty-one such associations were organized in 1934.

The extension programs expanded as a result of these activities. In 1937, 33 years after Seaman Knapp's first demonstration and 23 years after passage of the Smith-Lever Act, there was for the first time a county agent in every North Carolina county.

A Search for Better Farm Living

Through the administration of O. Max Gardner as governor, there was considerable interest in live-at-home programs. "Farm to make a living" was the extension theme in 1931.

There was ample opportunity for more food and feed crops. In 1930, North Carolinians imported 1 of every 4 ears of corn they used, 2

of 3 biscuits, 1 of 4 bales of hay, 1 of 10 Irish potatoes, 1 of 4 sweet potatoes, 1 of 3 pounds of beef, 2 of 5 pigs, 2 of 3 quarts of milk, and 1 of every 2 chickens and eggs used in the state.

State government was deeply involved in emergency programs, mostly under the guise of help for those suffering the most from the depression. Through the governor's Emergency Relief Office, home agents were added to work from four to six months during the summer, mostly in counties without regular extension personnel. The number of these emergency agents reached 46 in 1934.

Extension home economics personnel concentrated on relief gardens, curb markets, food conservation, and clothing construction. A total of 140,000 relief gardens were reported in 1933. In that same year some 11½ million cans or jars of food were canned under extension's direction. Some 30 curb markets under extension supervision were accounting for about $300,000 annually in sales. Much of the clothing work taught housewives how to patch up or remodel old garments to extend their life.

Membership in the home demonstration clubs steadily increased, stimulated in part by additional counties joining the program. By 1939 there were 1,520 home demonstration clubs in 89 counties with a membership of 38,011.

In December, 1933, Governor J. C. B. Ehringhaus announced his own agricultural program. He called for a continuation of the live-at-

An expanded 4-H camping program brought needed social contacts and recreation to rural youngsters.

home program, better woodland management, discovering new uses and markets for farm products, reducing fertilizer costs, and greater cooperation among farmers. Called the "Plan and Prosper Campaign," there were four points:

> First, a complete and cheerful cooperation with the federal acreage reduction plans, particularly in the basic crops;
>
> Second, individual farm production planning with particular reference to our retired and waste acres and in harmony with our home and farm necessities;
>
> Third, a real "home marketing" activity designed to make easily available to home markets our home products, and
>
> Fourth, a real effort toward reduction of our fertilizer costs (a) through an intensive study of our fertilizer necessities and the ways of lessening production costs; and more especially, (b) through an active stimulation of livestock production in our state.[7]

Governor Ehringhaus later became very active in the crop production control programs, particularly the tobacco program.

The youth programs suffered from extension's attention to the federal farm programs. Enrollment in 1933 was the lowest since 1925, and the annual short course on the campus was cancelled that year. But the picture improved throughout the 1930s, reaching a membership high of 49,060 in 1939. As shown in the table below, 4-H was a popular activity with both races but more so with girls than with boys.

North Carolina 4-H Club Membership in 1939

	White	Negro
Boys	12,686	5,154
Girls	23,320	7,906

Saving the Soil

Federal soil conservation programs called attention to the huge soil erosion losses being suffered, particularly on piedmont and mountain farms. The extension service was given the responsibility for establishing soil conservation districts through which the soil conservation program would be administered. The four new districts organized in 1939 brought to 10 the number of organized districts, which covered some 10 million acres in 31 counties. Extension specialists and agents teamed up with Soil Conservation Service techni-

cians to develop a broad program of erosion control and better land use.

Starting in 1935, terracing programs were also established by the two agencies. Using either county or federal funds, the county extension office operated a terracing unit composed of a 40-horsepower crawler tractor and a two-wheeled terracer. An SCS technician surveyed the terraces to be built. The farmer paid only the operating cost of the machinery. By the end of 1939, 48 units were operating in 41 counties and some 10,000 miles of Mangum or broadbased type terraces on 200,000 acres had been built. The number of counties in the program eventually reached 65.

Subsoilers and heavy disks were owned by some of the associations, and as the demand for terracing eased off, some of the units provided land clearing, pond construction, and other services for farmers.

Terracing reclaimed some abandoned farmland. So did filling in ditches and gullies, building waterways and water control structures and planting kudzu. Ground covers designed to control water movement off the land became popular.

Much of the information came from the new research facility near Statesville, the Southeastern Regional Erosion Experiment Farm, established in 1930. Participants were the experiment station, the state Department of Agriculture, and the Bureau of Chemistry and Soils of the U.S. Department of Agriculture. The 270-acre farm was located on Highway 10 some 11 miles west of Statesville. By 1934, 16 projects were under way on terrace design and construction, water runoff and control, farm machinery design for working over terraces, economics of soil conservation, gully-stopping structures and methods, cover crops, and rotations.

By January, 1939, the extension service assumed the administration of the Land Use Planning Program sponsored by the U.S. Department of Agriculture through its planning agency, the Bureau of Agricultural Economics. As defined in the 1939 extension annual report, land use planning was "systematically studying present land use areas within a state, county or township, and then by utilizing the knowledge and best judgment of farmers in the area, setting forth plans and possibilities for the maintenance and improvement of such areas." The purpose of the program was "to correlate thinking on the part of farm people and encourage them to make use of facilities that are available from the Land Grant Colleges and from the U.S. Department of Agriculture; to assist farm people in supplying factual

materials that should be used as a basis for community and county land use planning for the benefit of agriculture; and to develop state and county programs looking to more effective land use." By the end of the first year mapping, classification, and recommendations were carried out in five counties.

REA and TVA

Also starting in 1935, the extension service entered into a cooperative agreement with the Tennessee Valley Authority (TVA) to carry on a land use and conservation program in the 15 North Carolina counties in the TVA watershed. Assistant county agents were placed in each county, funded by TVA, which also supplied fertilizer and other demonstration materials. Cleveland County Farm Agent R. W. Shoffner was selected to direct the program, which emphasized erosion control, improved fertility, selective land use, and improved farm management and marketing. By 1939 there were 2,800 demonstration farms in the 15 TVA counties and 826 demonstration farms in other counties in the state funded under the TVA program.

The program that would have the most impact on the greatest number of people was the one designed to light up rural America—the REA.

Following the creation of the Rural Electric Administration in Washington, each state would appoint a state authority to develop rural electrification programs. D. E. Jones, appointed rural electrification specialist in 1935, gave much of the credit for interest in rural

A county terracing unit in operation.

electrification to David S. Weaver and Senator Dudley Bagley of Currituck County:

> These two men ever guided by a clear vision of the blessings which electricity could bring to the rural people of the State, have labored unceasingly to attain their goal. Obstacles, seemingly insurmountable, have been overcome through their persistent effort and the twenty five thousand farm families in whose homes electricity dispels the darkness of the night give willing testimony as to the worth-whileness of the movement. These homes and the thousands yet to be served will stand as living monuments to these two men.[8]

Weaver would later be called "the father of rural electrification in North Carolina."

On May 31, 1934, Governor Ehringhaus appointed the state rural electrification committee. Clarence Poe was the committee chairman. Representing the college were Jane McKimmon, T. E. Browne, and C. A. Sheffield. On June 1, the committee met and selected Weaver to direct a statewide survey to determine the location of existing distribution lines serving rural customers, the desire of farm families for electric service, and the location of areas where the construction of rural lines would be economically feasible.

This survey of about 700 rural communities proved the people's interest and gave a green light for the development of local electric membership cooperatives in the state. On September 15, 1935, the "rural electrification branch" of the extension service was set up to assist communities in organizing cooperatives and making the best use of electricity once it was available in their homes and on their farms. In 1934 only 11,558 North Carolina farm homes had electric current; by the end of 1939, 28.4 percent of the farms in the state had been electrified.

Electricity brought other labor savers to the farm. State Home Agent Ruth Current reported that in 1938 some 1,885 home water systems were installed with extension's help in 78 counties.

Interest in cooperatives was strong during the 1930s. Capitalizing on this interest, extension worked with a number of other state groups to start organizing the Farmers Cooperative Exchange (FCX) in October, 1933. The 1934 extension annual report stated: "The FCX was formed of a number of farm cooperatives over the State with a view to building a bigger and stronger organization to help the farms with their marketing problems and to secure a good grade of fertilizer to distribute at a moderate price to member farmers." Operations started in June, 1934. Educational meetings were held across the state

to assist in the organizing of local FCX branches. Goods carried in the beginning included seeds, feeds, fertilizer, spray material, tobacco cloth, packing material, containers, paint, salt, and flour.

Station Accountability

During the early 1930s the experiment station annually received a total of $90,000 from the federal government—$15,000 from the Hatch fund, $15,000 from the Adams fund, and $60,000 from the Purnell fund. This amount was constant from year to year and could be counted on. Other funding was not as reliable, and as the depression deepened, it decreased. The state fund derived from the fertilizer tax through the state Department of Agriculture dropped from $60,000 in 1924 to $41,500 during the 1932 fiscal year and to $30,000 the following year. Also in 1931-32, the station received $11,132 from farm sales and $3,439 from special endowments, industrial fellowships, and miscellaneous sources.

It was probably this declining revenue that prompted Director Winters to use the first three pages of his 1932 annual report to cite the achievements of the organization during its first half century in operation. He said the Agricultural Experiment Station had had an essential part in the social and economic progress of the state. "While its services were established for the benefit of agriculture, the results of its research have contributed to the welfare of those who produce, those who market and transport, those who process or manufacture, and to those who consume agricultural products."[9]

Winters singled out the promotion of agricultural organizations and cooperatives; development of control measures for plant and animal diseases and insects; soil research; introduction of new crops and improved varieties; forage crop management and nutrition studies; cotton research; drainage and erosion control studies; and studies in farm management, farm credit, and standards of living among farm owners and tenants. He said the station had contributed to the industrial development of the state through technical advice to manufacturers of chemicals, feeds, fertilizers, implements, and other materials used by farmers.

Winters further said that changes in financial support on short notice had required the discontinuation of projects before completion, and other projects had been placed on the inactive list until funds were available or more important work completed.

Location of agricultural research sites in North Carolina, 1930.

He said the research program was directed toward the study of a few of the larger problems and was organized so as to promote cooperative research. He listed three groupings or categories of research.

1. Research which has for its purpose extending and preserving the usefulness of land.
2. Studies of farm enterprises which will give a better understanding of their relationship to the farm business as a whole, and to efficient operation.
3. Studies of human factors in agriculture which will contribute to the improvement of the social and physical environment.

By the end of the decade the station budget was approximately $300,000 annually, with about two-thirds from federal sources and one-third from state appropriations, the state Department of Agriculture, farm sales, and miscellaneous sources. The 1935 Bankhead-Jones Act provided funds for the establishment of regional USDA research laboratories and cooperative research among the states in a region. A second major purpose of the legislation was to shore up research into "basic laws and principles relating to agriculture." An example given in the instructions to the state directors from Secretary of Agriculture Henry A. Wallace dealt with pastures—an important area if North Carolina was to become a livestock state. Wallace stated that Bankhead-Jones funds could be used to study "fundamental problems of plant breeding and genetics, soil fertility, animal nutrition, economics, and the like. . ."

The 1930s brought a new service—soil testing. Operated by the Department of Agronomy, the service handled 4,000 soil samples from farmers in 1937 and 5,400 in 1938. The 1938 station annual

report said the examination and appraisal of the samples received had consisted in the main of establishing the soil types, their physical condition, the character of drainage, their topography, their approximate organic matter content, and their pH. Agronomists C. B. Williams and W. H. Rankin believed that the information from the sample examinations, coupled with results from their field experiments, enabled the department to give reasonably accurate recommendations. They were finding that many North Carolina soils were suffering from acute plant-food deficiencies and pH values that were too high or too low.

On July 15, 1939, soil testing work was taken over by the newly created Soil Testing Division of the North Carolina Department of Agriculture. I. E. Miles moved from the college to the department to direct this work.

New and Improved Varieties

Plant breeding was moving from field selection of the best plants or varieties to crosses and hybridization. Farmers were asking for improved seed stock.

The sandhills dewberry growers, for example, needed a new variety. Lucretia had been the old standby since dewberries became popular at the turn of the century, mainly because it was a good shipper. But the quality was "not too good," and it was subject to most of the leaf, cane, and root diseases.[10] Later, the Young variety was tried. The fruit was high in quality and the plant was vigorous and resistant to many of the diseases, but the berry was too soft to be shipped to distant markets.

In the early 1930s a cooperative bramble and strawberry breeding program was launched in cooperation with the U.S. Department of Agriculture. C. F. Williams in the Department of Horticulture was the State College contact for the brambles breeding program. In 1936 he said the objective in the dewberry breeding program was for vigor and productivity with disease resistance and freedom of thorns in the plant, and high quality fruit with the ability to hold up under shipment and storage. This ideal fruit did not come about, but by 1936 the "Cameron" variety, named after the Moore County town by the same name, was ready for release. Cameron represented a considerable improvement over older varieties.

The advent of the North Carolina Crop Improvement Associa-

tion in 1929 focused attention on improved seed, including variety purity. In 1930, 70,000 bushels of seed from an estimated 4,785 acres were certified by the association.[11]

Cotton was the most popular crop for certification in 1930. The two varieties certified were Mexican Big Boll, developed by the N.C. Agricultural Experiment Station, and the Cleveland Big Boll, developed by the Coker's Pedigreed Seed Company in Hartsville, South Carolina. During the 1930s the station released several improved strains of Mexican Big Boll, and Coker came out with improved Cleveland Big Boll varieties, Clevewilt, Farm Relief, Foster, and Coker 100.

The first oat varieties certified were Lee, from the breeding program of the USDA, and Coker's Fulgrain and Norton. Wheat varieties popular with farmers in the 1930s were Purplestraw, Redhart, Leaps Prolific, and Fulcaster.

Tobacco varieties grown for certification in the 1930s included Bonanza, Cash Strain 1, Gold Dollar, Virginia Bright Leaf, and White Stem Orinoco.

Corn varieties were all developed by farmers and all were open pollinated.

Crop Diseases

For tobacco farmers, 1931 was a very bad year.

Blue mold (downy mildew) had been present in the western part of the United States for many years as a minor disease on wild species of tobacco. In 1921 it showed up in the eastern part of the country but then disappeared for 10 years. In 1931 blue mold reappeared in the Florida-Georgia area and later in the year spread into North Carolina for the first time. Researchers predicted that, while variations in severity would occur from year to year, growers should expect it to reappear consistently. They said it would be primarily a plant bed disease but would occasionally be found on plants in the field.[12] Experimental work seeking a control method was started in 1932. By 1938 station scientists were recommending fumigation with para-dichlorobenzene or spraying with a copper-oxide-oil spray.

Black shank, too, had damaged tobacco for some time—since about 1910, according to Forsyth County growers. But not until 1930, when it showed up in a number of Forsyth and Stokes County fields, did the disease become a serious threat.

First experiments indicated that the damage from the disease

could be reduced by applying chemicals to lower soil pH. But extensive testing in 1931 indicated that such an approach would not be effective. In 1937 black shank was discovered in Pitt County, 250 miles from the original infestation, and over the next 10 years would spread over much of the area in North Carolina where flue-cured tobacco was grown.

In an effort to control the increasingly troublesome Granville Wilt, plant pathologists turned to heavy doses of chemicals. They applied as much as 1,500 pounds of sulfur per acre, along with manganese sulphate, copper sulfate, naphthalene, potassium sulfate, magnesium sulphate, ferrous sulphate, and hydroxymercurichlorophenol. There was some control of the disease, but at high application rates tobacco plants were injured, and heavy liming was required to bring soil acidity back to a proper level. This method of control was judged not very practical.

The researchers continued to experiment with crop rotation. They found the practice of planting tobacco after tobacco to be a complete failure. Rotations with corn, soybeans, redtop, cotton, small grains, and lespedeza helped to reduce infestation with two-and three-year rotations, but five-year rotations were best.

Black shank, a destructive tobacco disease, came on the scene in the 1930s.

Across much of Wake and Granville counties farmers were going out of tobacco production or moving to new territories. Destruction of 80 percent of the plants in some fields was not uncommon, and the disease was "rapidly establishing itself throughout the eastern part of the state."[13]

The pathologists were more successful in finding a seed treatment for cotton. As little as one-half ounce of a 5 percent ethyl mercury phosphate dust per bushel of seed gave significant reductions in losses from soil-borne diseases. The two commercial products most effective were Ceresan and New Improved Ceresan. In 1938 some 450,000 acres were planted with treated seed.

Peanut farmers got help too. Three years of testing showed that copper-sulfur dusts, ranging from 5 to 20 parts per million of copper, 80 to 95 ppm of sulfur, and certain copper sprays including bordeaux mixture and cupruous oxide spray consistently gave practical control of peanut leafspot diseases. Such treatments produced increases in yields averaging about 500 pounds of peanuts and 800 pounds of peanut hay per acre at a cost of about $5.00 per acre, including both materials and labor. And experiments in 1940 showed that a mixture of 30 percent pyrethrum diluted with 70 percent sulfur gave excellent control of the peanut leafhopper, the most serious insect pest of peanuts in the state.

Consolidation

North Carolina State College and North Carolina A & M College alumni expressed objection when Governor O. Max Gardner began talking about consolidating the three top institutions of higher learning into a single university. But the occupants of the west side of the campus—in the Ricks, Patterson, Zoology, and Polk buildings—as they looked out across the farm and orchards, must surely have felt they had nothing to fear. Imagine their shock and surprise when an out-of-state study commission recommended that the School of Agriculture be moved to Chapel Hill and that the State College in Raleigh and the Woman's College at Greensboro be downgraded to junior colleges. The facility at Chapel Hill should be used for the two upper classes and graduate work. This would, of course, entail moving all degree programs to Chapel Hill.

The recommendations may have been sound from the standpoint of efficient education. The report pointed out that agriculture

could benefit from the superior basic science program at Chapel Hill. A number of the study commission's recommendations were accepted, but the 12-member commission appointed to guide consolidation quickly rejected any thoughts of changes that would not uphold the legislative mandate "to preserve the integrity of the institutions at Chapel Hill, Raleigh, and Greensboro." The consolidation act, ratified March 27, 1931, provided:

> Section 2. That the North Carolina State College of Agriculture and Engineering shall be operated as part of the University of North Carolina. It shall be located at Raleigh and shall be known as the North Carolina State College of Agriculture and Engineering of the University of North Carolina.

Frank P. Graham, appointed president of the Consolidated University of North Carolina by the new Board of Trustees in 1932, spelled out three courses that could be followed, in a report to the trustees on June 11, 1935:

> (1) Outright physical consolidation of two or all three institutions on one campus, for example, at the historic seat of the University at Chapel Hill.
>
> (2) The stopping of consolidation where it is, with duplication continuing in the upper years in the engineering school, science curricula, and departments of education.
>
> (3) Preservation of the locality, institutional integrity, historic traditions, values, and loyalties around the basic purposes of each institution, but with no duplication of schools or curricula in the upper and graduate years.

The third alternative is the one essentially followed. There is no evidence that there was local sentiment (within the state) to move the School of Agriculture. The program in business administration was moved to Chapel Hill and the School of Education at State College was dismantled. Only vocational agriculture and industrial education programs remained at State College, but the coordination of the vocational agricultural program between agriculture and education remained essentially the same as it had been for several years. These moves had some impact on agricultural students and programs, but for the agriculturalists life during consolidation was easy compared to the engineers on campus, who had to wait five years before the decision was finally made that there would be only one school of engineering and that it would be located in Raleigh.[14]

School Changes Name and Programs

Forestry, with its built-in student body from Mont Alto, Pennsylvania, started faster than most subject-matter areas. It was soon one of the largest and fastest growing departments of the college. As early as October 23, 1931, only 2½ years after the forestry program was offered, there was a suggestion, apparently favorably received by the trustees but not put into effect, that a separate school of forestry should be established.

The Department of Forestry became the Division of Forestry in 1931. On May 14, 1932, the trustees changed the name of the School of Agriculture to the School of Agriculture and Forestry. J. V. Hoffman continued as head of the Division of Forestry.

A direct outcome of consolidation was a revised curriculum for the School of Agriculture and Forestry in 1935. As a portion of an extensive plan "to keep the separate schools on a plane with the modern trend of education," the graduation requirements of each department were increased "in order that its students may be better equipped to meet the changing social and economic order into which they will step."[15]

The number of credit hours required for graduation in the school was increased from 216 to between 228 and 250, varying with the separate departments. Practically all the new additions were in the humanities, the stated objective being to give the student a broader and more general education rather than narrow, highly specialized training.

To take care of the increasing demand for men with training in engineering coupled with a background of agriculture, a new course in agricultural engineering was instituted. Freshmen and sophomores in the new course would take some of their work in the School of Engineering.

The landscape design and architecture area developed in the 1930s. Established by Horticultural Professor J. P. Pillsbury in 1928, the four-year undergraduate course was first called Landscape Gardening. The name was changed to Landscape Architecture in 1930.[16]

A faculty committee recommended that the course in vocational agriculture be transferred to the School of Agriculture and Forestry. The committee also recommended that the vocational agriculture curriculum be expanded to five years, with the extra year devoted to technical training in agriculture; or if kept at four years, that three summers of instruction be added in technical agricultural subjects. Neither of these recommendations were put into effect.

Enrollment in agriculture slowly increased; with the addition of the forestry students, undergraduate enrollment reached 300 in the early 1930s. With a total college enrollment of around 2,000, the schools of Engineering and Science and Business had larger enrollments; the schools of Education and Textiles had fewer students than the School of Agriculture.

The 1929-30 undergraduate enrollment in agriculture was as follows:

Agricultural Economics	35
Agronomy	109
Animal Husbandry	33
Forestry	75
Horticulture	16
Poultry	12
Special	3

Enrollment for the 1938-39 winter term, totaling 402, was as follows:

Agricultural Economics	27
Agricultural Chemistry	12
Animal Production	38
Dairy Manufacturing	6
Entomology	4
Field Crops and Plant Breeding	37
Horticulture	5
Plant Pathology	4
Poultry Science	6
Soils	11
Agricultural Engineering	27
Forestry	107
Landscape Architecture	7
Wildlife Conservation and Management	11
Agriculture and Special	100

Major changes in the graduate program came in 1931. At a meeting of the executive committee of the Board of Trustees on June 8, President Brooks announced the abolishment of graduate fellowships and assistantships along with abolishment of the office of dean of the Graduate School. The administration of the Graduate School

would be placed in the hands of a committee.

The Graduate School was one of four created in the 1923 reorganization (Agriculture, Engineering, and General Science were the other three). Carl C. Taylor had held the position of dean of the Graduate School since that time. At the beginning of their association, Brooks and Taylor had been very close. As time passed, their affection for each other gradually eroded and developed into apparent antagonism by 1931. Brooks's action raised the question of whether the move was an effort to improve the graduate program or to get rid of Taylor.

Students protested the action; the Board of Trustees was divided on the issue; the newspapers of the state gave the rift wide publicity; the American Association of University Professors (AAUP) investigated. The AAUP investigator concluded:

> . . . the tension which had developed between two able men differing widely in aims and temperament, and both concerned, one as president, one as dean, with the executive management of the college. Dr. Taylor was intense, outspoken, and impetuous—perhaps not always prudent—popular with the students, and winning the plaudits of the press and the great body of the people by his power on the platform; Dr. Brooks is rather austere, with a keen sense of authority, burdened with the care of office, and growing, perhaps somewhat more conservative and increasingly positive with the passing years and continued ill-health.[17]

In presenting his Graduate School proposals, Brooks said the school needed to find its distinctive place in a school of graduate instruction. He believed the program should be redirected so that it might become more a graduate school of technology with concentra-

Livestock barns photographed in 1931 just before being removed to make room for the William Neal Reynolds Coliseum.

tion in agriculture, engineering, textile manufacturing, and the sciences related to them.

As envisioned by Brooks, a committee on graduate instruction directed the work of the Graduate School. Plant Pathologist R. F. Poole chaired this committee from 1931 until he resigned in 1940 to assume the presidency of Clemson College.

The influence of agriculture on the committee would remain strong. In 1936-37, when there were eight members of the committee, four were from agriculture—Poole, G. W. Forster, Z. P. Metcalf, and R. Y. Winters. G. K. Middleton replaced Winters on the committee in 1937, but the committee gradually expanded to 14 members in 1940, somewhat lessening agriculture's influence.[18]

The short courses were not doing what they were supposed to do. President Brooks speculated that good work by vocational agriculture programs in the high schools and effective work of the extension classes and demonstrations could be reasons for their decline. In an effort to rejuvenate this area of the instruction program, on October 1, 1937, the College Extension Division inaugurated a series of practical short courses in agriculture. This program, including poultry production, dairying, field crops, and swine production, was directed by Dan Paul, formerly extension agent in Granville County. He was joint director of the agricultural short courses and executive secretary of the Alumni Association until 1942.

Summertime activities of the agricultural faculty included presenting short courses for teachers of vocational agriculture and for Civilian Conservation Corps (CCC) camp advisers.

In his June, 1930, report to the trustees, President Brooks praised the judging teams and the departmental clubs for their contribution to the academic life of the students. These and other departmental activities should have promoted friendly competition between the representatives of the several departments. But according to *N.C. State Agriculturist* Associate Editor C. D. Thomas, in his February, 1934, editorial competition wasn't always friendly. He put much of the blame on the professors:

> "There goes a bunch of those 'Field-Croppers' over to pick around in my fence corners." Such was the sarcastic comment of a professor on Ag Hill to a group of boys when he saw another class going across the campus on a field trip.
>
> This attitude is very prevalent between the different departments in the Agricultural School. In fact, a knowledge of this jealousy has spread to the campuses of many other schools. Very often, a person who is connected with State College is asked about the strained relations

between the departments in our Ag School. This comes as an embarrassing question to those who like to boost our institution wherever they go.

But even a casual observation will reveal the fact that such reports are only too true. On Ag Hill, we find that each department feels it is a "godsend" to a blighted agriculture. Its work and no other is of any value to mankind.

Editor Thomas felt that the problem was instructors who were narrowed down to the four walls of their department and not broad-minded enough to see the value of all phases of agriculture in the scheme of things.

Thomas received both praise and criticism for his comments. Whatever the situation might have been, there was evidence that in the 1930s provincialism hindered the efforts of the school to move ahead.

Withers Hall

Few new buildings were constructed during the depression years. Near the end of the 1930s, Withers Hall and the Nelson Textile Building were completed with the help of the federal Public Works Administration (PWA). Both were opened in 1939 and dedicated on March 5, 1940.

Withers Hall, named for Chemist W. A. Withers, was considered a part of the School of Agriculture and Forestry. In the dedication ceremonies, Dr. Paul Gross, professor of chemistry at Duke University, saw the $393,000 building as "a long step toward alleviating the South's need for more fundamental research on agricultural problems."

Dr. Ralph W. Bost, head of the Department of Chemistry at the University of North Carolina at Chapel Hill, gave the dedicatory address. Here are some of his comments, as reported in the March 6 issue of the Raleigh *News and Observer*:

"Chemistry has revitalized agriculture during the last decade," stated Dr. Bost. "It has provided new weapons to fight plant diseases and insects; furnished new and better plant foods; identified and synthesized plant hormones which will open up intriguing research problems in horticulture. In our own Southland at this very moment, the sweet potato is being converted into starch and alcohol, thus giving the hard-pressed farmer a new market for his produce. In other sections of our country the lowly soybean has responded to the magic touch of the research chemist and has been converted into many useful products for modern society."

Withers Hall was placed in the middle of the campus; the textile building extended the campus westward across orchard and farm to Dan Allen Drive.

The Raleigh city fathers had decreed that dairy farming within the city was not proper. Following the destruction of one of the barns by fire in 1930, the college dairy farm was relocated from just south of the railroad tracks to the area north of Western Boulevard and east of Gorman Street, across Western Boulevard from where the television studios would be built 15 years later. (After the barns were moved near the end of the decade, two dormitories went into the space vacated, and plans for a sports arena were made.)

Out in the counties, as well as on the campus, the effects of federal funding were being felt. In many counties the Works Progress Administration (WPA) assisted in the construction of office buildings which would house county extension workers. During the peak year of 1936, 34 such buildings were constructed.

The WPA also came to the assistance of the home demonstration clubs. Community club houses in which meetings and other activities could be held were needed by the clubs. The 1935 extension annual report noted that the WPA had solved the problem by sponsoring the erection of 140 club houses in rural communities, of which 63 were built in 1935. The buildings were generally of log construction with rough rock chimneys, an auditorium measuring 50 by 30 feet, a fireplace at one or both ends, and a kitchen. Inside toilets were installed where running water was available; otherwise, sanitary

A home demonstration club meeting inside one of the new log club houses.

outside toilets were constructed. Some or all of the buildings were also used for community activities other than those conducted by the home demonstration clubs.

More Land for Research

Good research land was not always easy to come by. Early in his administration as station director, R. Y. Winters complained that "less than 10 acres of the 150 acres of the Station Farm are suitable for field plat experiments because of the irregular soil and contour."

Additional land was acquired in the 1930s. The January, 1934, *Extension Farm-News* announced that consolidation of experimental work with sheep, swine, and beef cattle was contemplated in a project soon to start on part of the Camp Polk State Prison farm near Raleigh. The State Highway and Public Works Commission had granted the college use of a 400-acre tract on the Camp Polk farm, and the federal Civil Works Administration (CWA) had allotted funds to erect barns and provide equipment.

In the announcement, Earl H. Hostetler, in charge of research on the three types of livestock, stated that three barns, one each for sheep, beef cattle, and swine, a feed storage barn, several sheds, a herdsman's house, and necessary terracing and fencing would be constructed. In addition to traditional livestock research, there were plans to conduct experiments in building up run-down land and to test "the growing of feed and other phases of livestock raising as encountered by the farmers themselves." For the first time the station would have enough acreage on which to maintain a herd of beef cattle.

Apparently this announcement was premature. Records available indicate that negotiations went on between the college and the highway commission for several years. A general agreement was reached, some livestock was put on the land, prison labor was used on the farm, and the highway commission was reimbursed for the prison labor by receiving livestock products to feed the prisoners when milk and meat were disposed of. Committees were appointed by both parties and jointly in an effort to develop a workable arrangement. By 1937 the negotiations concerned long-term leases (10 to 25 years) with permanent buildings to be constructed.

The land came into possession of the college but by purchase. In 1939 the college paid the highway commission $75,000 for 1,225 acres, $30,800 for 616 acres in 1944, and $27,500 for 87 acres in 1946. The 1939 tract became an animal husbandry facility; the 1944 purchase

included the land north of Reedy Creek Road that went for beef cattle research; the third tract was located between Meredith College and the college dairy farm.[19]

In 1936, while negotiations were under way with the highway commission, some 81 acres were purchased from Berry O'Kelly on the south side of the railroad and adjoining the western boundary of the campus. That tract became the Method Horticultural Farm.

Additional cropland was acquired with the purchase of land for the McCullers Station in 1935. This 200-acre tract, some 10 miles south of the campus, perhaps provided the area for plat work that Winters had earlier said was needed. Joe Rand was the first superintendent of that station.

In addition to the Erosion Control Station, three other activities were added in the Statesville area. In 1934 money to buy 131 acres of land adjoining the Piedmont Research Farm and to erect laboratories, greenhouses, a cotton gin, and other buildings was provided by the federal government. One purpose was to establish a cotton improvement program that would concentrate on the development of cotton varieties with a high yield and strong resistance to diseases, cold, drought, and other adverse conditions. The Agricultural Experiment Station and the state Department of Agriculture were cooperators in the project.

On the same tract, an erosion control nursery was established to test plants that might be suitable for preventing soil erosion. All plants found desirable would be propagated there and distributed to eroded areas for demonstration plantings.

The 1939 North Carolina General Assembly appropriated funds for the location of a dairy research station in northwestern North Carolina. After looking at land in several counties, a 130-acre tract was purchased about four miles southeast of Statesville on the old Amity Road. A herd was located there and investigations made to determine the best types of feed for livestock raised under piedmont conditions.

The 1937 General Assembly provided funds for the establishment of "an experiment farm for the study of peanut growing." Some 248 acres adjoining the Upper Coastal Plain Station was purchased in November, 1937. Also, three or more tracts were leased in Northampton, Halifax, and Perquimans counties. Lime and fertilizer requirements, breeding, rotations, and disease control work on peanuts was expanded.

Enlargements and improvements were made at some of the other

stations. For example, during 1933 and 1934, Civil Works Administration (CWA) labor was used for repairing and painting buildings and for renovating the drainage system on the Blackland Farm. But Superintendent Jim Rae was not satisfied. Biennial reports from the superintendents during the early thirties contained a stock phrase, "A good surfaced road to Wenona is the most urgent need of the Farm at this time." Jim Rae got his wish in 1937 when the Pike Road, beginning at state highway no. 97 and running to the Blackland Station in Washington County, a distance of nine miles, was paved. A year later telephone service was provided for the farm. Good roads were important to the stations. Also in 1937, roads were paved to or near the Coastal Plain, Upper Coastal Plain, and Piedmont stations.

William C. Allsbrook, who was foreman at the Upper Coastal Plains Station at the time, recalled that researchers coming to the station from the college would get off the train at Kingsboro, a little siding about three miles from the farm. "Sometimes the roads were so bad we'd send the mules and wagon tc pick them up at the railroad track, and I've seen the time we couldn't get all the way there."[20]

Once the researchers got to the research station they often stayed several days. The residences of station superintendents were referred to as "on-the-farm hotels." Superintendents' wives (or at the Pender Station, bachelor Charles Dearing's cook, Mamie) established reputations as cooks and housekeepers.[21]

During the 1930s the Blackland Station was expanded from 200 to 362 acres; the Coastal Plains Station from 273 to 445 acres; the Oxford Station from 246 to 325 acres; and the Mountain Station from 305 to 316 acres.[22]

Radio to Reach the Farmers

WLAC, a radio broadcasting station of the Department of Electrical Engineering, went on the air in 1922. An announcement in the October, 1922, *Extension Farm-News* said the new station would broadcast news items about extension and college work, market and weather reports, agricultural statistics, and other information of value to farmers.

When the trustees allocated $1,500 to launch this station, there was a commitment that agriculture would make extensive use of the facility. Just what happened, or didn't happen, to it is not clear. The station, largely student operated with help from the faculty, was licensed and operated as a project of the college, but the license was permitted to lapse. This station, some say, is what eventually devel-

oped into radio station WPTF in Raleigh.

In 1927 several agents and specialists located in the Asheville area were appearing regularly on station WWNC in Asheville. In 1928 B. F. Kaupp (poultry), W. H. Darst (field crops), and W. W. Shay (animal husbandry) were broadcasting a series of lectures over station WPTF in Raleigh. The lectures were intended primarily for students in the vocational high schools, but it was suggested that "county agents might also get their co-operating groups to tune in on Friday between eleven and twelve and hear these interesting discussions."[23]

By 1930 some material was being mailed from the college to radio stations in the state, but the audience was small. The U.S. Census of Population for 1930 indicated that 23 percent of the urban families in the state had a radio set, but only 3 percent of the farm families possessed one.

The school's first big move into radio came in 1935 when Eugene S. Knight was hired as the first radio editor and "Carolina Farm Features" went on the air September 16. The heart of the program was a 6- to 8-minute talk prepared by specialists and others at the college. The individual presented the talk in person on WPTF in Raleigh; the talk was mimeographed and mailed to the other six stations using the service, to be read by a station announcer.

In 1936 representatives of extension, mostly agents from Mecklenburg and surrounding counties, teamed up with the Soil Conservation Service to present a daily program on WBT in Charlotte. Starting in 1938, a daily radio script service was prepared at the college and mailed to all stations in the state. A special 4-H program was started by WPTF in 1937, followed by a special home economics program on the same station in 1938. Both were broadcast weekly.[24]

Remote broadcasting from the college during special agricultural events, such as Farm and Home Week and the 4-H short course, originated in 1938. The equipment was set up on the porch of the old campus YMCA building. The broadcasts consisted mostly of interviews with the participants at the events.

A special treat, and a big job, was developing a special one-hour program for the NBC radio network broadcast on April 21, 1937—one of the regular land-grant college programs featured monthly on the National Farm and Home Hour. The temporary studio was set up in Raleigh's Memorial Auditorium.

Radio usage increased rapidly in farm homes after electricity became available. A number of county agents found an effective way to reach farm families through time provided by local radio stations.[25]

Changes at the Top

Director Winters resigned in 1937 to accept an appointment in the Office of Experiment Stations at the U.S. Department of Agriculture in Washington. In writing about his term as director, I. O. Schaub said that "in spite of lack of financial support and indifference or lack of interest on the part of some officials whom he would naturally expect to give him his strongest backing, Dr. Winters during his 12 years as Director organized the Station on a sound scientific basis and laid the foundation for the large expansion in financial support, personnel, and scope of work that was to take place during the next decade."[26]

Schaub did not identify the officials whom he thought should have given Winters more support. During Winters's tenure as director, there was a marked change in the type of many research projects. With the additional funds coming from the Purnell Act in 1925 and the Bankhead-Jones Act of 1935, new lines of work were initiated and in nearly all departments new and better-trained workers were added to the staffs. Research was placed on a more scientific basis than ever before.

Upon Winters's departure, Schaub was named acting director of the station, a position he held for three years in addition to his duties as dean of the school and director of extension.

In extension, Mrs. Jane S. McKimmon stepped down as head of the home economics program in 1937 and was succeeded as state home economics agent by Ruth Current, promoted from her district home agent position.[27] John W. Goodman was promoted from district agent to assistant director following the resignation of C. A. Sheffield. Named to district agent positions in the 1930s were L. B. Altman, Anamerle Arant, C. M. Brickhouse, Anna C. Rowe, Mrs. Estelle T. Smith, and Mrs. Esther G. Willis.

In departmental leadership changes, J. H. Beaumont resigned as head of the Department of Horticulture in 1933 and was succeeded by M. E. Gardner. Rural sociology was a part of the Department of Agricultural Economics and Rural Sociology from 1931 to 1940, when the departments of Agricultural Economics and Rural Sociology were created. G. W. Forster was the head of the combined departments. Agricultural engineering was gradually separated out from the Agronomy Department, becoming a full-fledged department in 1939-40 with D. S. Weaver as the head.

Added to the faculty roster, particularly during the latter half of

the 1930s, were the names of a number of people who would help provide a base for the rapid and significant development to come.[28]

NOTES TO CHAPTER 10

1. Badger, Anthony J. *Prosperity Road, the New Deal, Tobacco, and North Carolina.* Chapel Hill, N.C.: The University of North Carolina Press, 1980, pp. 42-44.
2. The irony of this situation has often been pointed out. Much of extension's effort in its earlier years had been to help farmers increase their production. In this new role the assignment was to get crop production reduced. During the next 50 years of crop allotments and acreage control, it would often be pointed out that extension as one government agency was helping (and even urging) farmers on their individual farms to increase their yields while the AAA (and its successor agencies) was a sister government agency trying to hold production down.
3. Badger, *op. cit.*, p. 44.
4. *Annual Report of Agricultural Extension Work in North Carolina 1933*, pp. 3-8.
5. Badger, *op. cit.*, p. 59.
6. *Ibid*, pp. 159, 227.
7. *Plan and Prosper Campaign.* N.C. Agricultural Extension Service, Special Circular, January, 1934, 8 pp.
8. Jones, D. E. "Making History in Thirty Months," *N.C. State Agriculturist*, January, 1937, pp. 3-4, 10.
9. *Fifty-Fifth Annual Report of the North Carolina Agricultural Experiment Station*, 1932, pp. 9-11.
10. Williams, C. F. *Culture of the Cameron Dewberry.* N.C. Agricultural Extension Service, Circular No. 226, 8 pp.
11. Middleton, Gordon K. and Foil W. McLaughlin. *Seeds of Time: A History of the North Carolina Crop Improvement Association. 1929-1977.* N.C. Crop Improvement Association, N.C. Agricultural Experiment Station, N.C. State University, 1978, pp. 13-17.
12. Smith, T. E., K. J. Shaw, and E. G. Moss. *Control of Tobacco Blue Mold.* N.C. Agricultural Extension Service, Circular No. 229, 1938, 16 pp. Blue mold continuously infected North Carolina tobacco plant beds but was not a problem in the field until 1979 when a combination of weather conditions resulted in severe blue mold throughout the state. Flue-cured production was down 22 percent from the previous year and burley production was off 52 percent.
13. *Sixty-First Annual Report of the North Carolina Agricultural Experiment Station*, 1938, pp. 24-25.
14. For detailed proposals made for consolidation, the Consolidated University's reactions, and some results of consolidation, see minutes of the meetings of the Board of Trustees, President Frank Graham's annual report to the trustees, and Louis R. Wilson, *The University of North*

Carolina Under Consolidation, 1931-1963, History and Appraisal, Chapel Hill, N.C.: University of North Carolina Press, 483 pp.

15. Matthews, C. M. "Revised Agricultural Curriculum," *North Carolina State Agriculturist,* October, 1935, p. 4.

16. Glenn Randall and J. G. Weaver assisted Pillsbury with this program. In 1946, when Pillsbury retired at the age of 72 and after 35 years with the college, the program was folded into the newly formed School of Architecture and Landscape Design (changed to School of Design in 1948).

17. For details on this incident, see minutes of the Board of Trustees; the Raleigh *News and Observer* during the period; "Report on the Dismissal of Dean Carl C. Taylor," *AAUP Bulletin,* March, 1932, pp. 224-232; and Willard B. Gatewood, Jr., *Eugene Clyde Brooks: Educator and Public Servant,* Durham, N.C.: Duke University Press, 1960, pp. 248-249. There seems no question that Rural Sociologist Taylor was regarded, as AAUP investigator Holland Thompson found in his investigation, as "the most distinguished member of the faculty." He continued to live in Raleigh for several years, writing one of his several books. Future jobs included head of the Rural Population Division of the USDA and foreign assignments. In 1959 N.C. State College awarded him an honorary doctorate.

18. After Poole left, Metcalf was named chairman of the committee with the title of director of graduate studies. From 1944 to 1950 his title was associate dean of the graduate school. (The dean, for the consolidated university, was located in Chapel Hill.) D. B. Anderson was associate dean of the graduate school from 1950 to 1956, and then served for one year with the title of dean. Walter J. Peterson was acting dean for one year and then dean until his retirement in 1974.

19. The 1939 tract in 1984 included the animal husbandry facilities and the forage-livestock facility along Trinity Road north of the Medfield Estates development, Carter-Finley Stadium and parking area, the Carl Alvin Schenck Memorial Forest, and the School of Veterinary Medicine. The 1944 tract included the land north of Reedy Creek Road occupied by beef cattle research, and the area containing the Genetics Garden south of this road. The third tract was located between Meredith College and the Dairy farm. The acquisition of this last tract brought the total college land holdings to 2,617 acres. Through the last years of the 1940s and into the 1950s, the western end of Tract 1 contained the "Old Animal Husbandry Farm," and Tract 2 was the location of the "New Beef Cattle Farm." Eventually the highway commission, later the Department of Transportation, got much of the land back. Interstate 40 crossed the western end of the two tracts, and the Wade Avenue-Interstate 40 connector split it right through the middle.

20. William C. Allsbrook interview, December 17, 1981.

21. Superintendents Currin, Dearing, Moss, and Rae continued as station superintendents throughout the decade. In 1931, on the death of F. T. Meacham, Catawba County Agent Wade Hendricks was named superintendent of the Piedmont Station. In 1938 D. W. Colvard succeeded S. C. Clapp at the Mountain Station.

22. Acquisition of the Apple Research Laboratory (financed by the first direct state appropriation for research in 1937) and the McCullers Station

represented a change from the traditional ownership pattern where the branch research locations were owned by the state Department of Agriculture. However, the apple research facility was only a building on a lot, and the McCullers Station might be considered an extension of the campus-based Central Station. The new acreage at the Mountain Station (discontinued during World War II) was to become the location of Owen School.

23. For detailed accounts of early radio usage, see William L. Carpenter, *Let The People Know*, N.C. Agricultural Extension Service, N.C. Agricultural Experiment Station, 1978, pp. 27-28, 36, 40-42, 61-62.

24. The home economics program did not last very long, but the 4-H program continued until L. R. Harrill retired in 1963 and in a revised form for several years after that.

25. Response to those early radio programs was good. Many publications were offered on the programs. Mrs. Pauline Taylor, Mecklenburg County home demonstration agent, received 1,500 requests for a recipe offered on the WBT program in the summer of 1936.

26. Schaub, I. O. *North Carolina Agricultural Experiment Station: the First Sixty Years 1877-1937*, N.C. Agricultural Experiment Station, Bulletin No. 390, 1955, pp. 110-116. Following his retirement from the U.S. Department of Agriculture, Winters returned to Raleigh to live and in the 1960s wrote four pamphlets chronicling early station activity.

27. Mrs. McKimmon retained the position of assistant director of the extension service until her complete retirement in 1946 at the age of 79. She received an honorary doctorate from the University of North Carolina and the Distinguished Service Award of the U.S. Department of Agriculture. She was the tenth recipient and the first woman to receive the Distinguished Service Ruby from Epsilon Sigma Phi, national extension fraternity. First Married Student Housing, and then, since 1976, the university's continuing education center has carried her name.

28. Faculty additions in the 1930s included: Forestry—George K. Slocum, Lenthall Wyman, William D. Miller; Economics-Sociology—R. E. L. Greene, C. Horace Hamilton, H. B. James, W. W. McPherson, Selz C. Mayo, Henry Pierce, Cecil D. Thomas; Horticulture—John H. Harris, E. B. Morrow, and in what would become the food processing area, Biochemist Ivan D. Jones and Assistant Bacteriologist T. A. Bell and John L. Etchells; Animal Husbandry—L. I. Case, J. L. Moore, F. W. Sherwood, H. W. Taylor; Agronomy—E. R. Collins, T. L. Copley, L. A. Forrest, Paul H. Harvey, Thomas Kerr, R. L. Lovvorn, J. F. Lutz, Adolph Mehlich, G. K. Middleton, J. R. Piland, Jack A. Rigney, H. F. Robinson, J. A. Shanklin, B. W. Smith, A. D. Stuart, L. T. Weeks, W. W. Woodhouse, Jr.; Agricultural Engineering—H. M. Ellis, J. C. Ferguson, G. Wallace Giles, D. E. Jones; Botany—Pathologists Don E. Ellis, H. R. Garriss, S. G. Lehman, Luther Shaw; Entomology and Zoology—C. H. Bostian, T. B. Mitchell, Tom Quay, Reinard Harkema, Clyde F. Smith; Poultry Science—T. T. Brown, F. W. Cook, L. W. Herrick, C. J. Maupin; other extension specialists not attached to subject matter departments included Pauline Gordon, Julia McIver, Cornelia C. Morris, Maude Schaub, Mamie Whisnant, and Rose Elwood Bryan; Frances McGregor joined the 4-H staff.

11

Winning World War II on the Farm

Special programs. Making mattresses. Youth to the rescue.
The army moves in. Dehydrated cabbage. Research and farming.
More food and fiber. Science scores.

WARTIME ACTIVITIES STARTED considerably ahead of the Japanese invasion of United States territory in December, 1941. In the United States a military draft went into effect in October, 1940. Young men were called up for a one-year period of military service. "I'll be back in a year little darling," was a popular song that fall.

Special Programs

"Farm folk of North Carolina," stated the extension annual report, "answered the rumblings of war in 1940 with a preparedness program which included: Livestock expansion to counteract loss of world markets for other commodities; cooperation in agricultural adjustment; conservation and planning programs; canning for home security; and mattress-making for comfort and for physical and mental strength."

In 1941 agents in eight southeastern counties near Fort Bragg became involved in army maneuvers. Their assignment was to contact farmers, explain the situation, and help secure maneuver rights on their farms. Some 18,217 landowners granted rights on 2,556,000 acres of land. That fall 400,000 troops trained across the fields and among the longleaf pines.

To conduct a program of "Citizenship Training for Democracy"

was another assignment handed to the extension service in 1941. This assignment was carried out through 952 discussion groups; at 570 patriotic programs, pageants, and ceremonies; and at 8,927 meetings of farmers, home demonstration and 4-H clubs, local leaders, and discussion groups.

In April, 1941, came word on a state food and feed production drive, with extension assigned a key role. It was called the "Food and Feed for Family Living" campaign.

Despite previous efforts to encourage food production, the 1940 Census of Population revealed that of the 278,000 farms in the state, 31,000 had no garden, 86,000 were without hogs, 33,000 were without a chicken of any kind, and no cows were being milked on 98,000 farms.

In October came a national campaign, with the announcement that an old campaigner, dressed in a natty new outfit, was making his rounds of every North Carolina farm home.

> Often turned away, when he was known as "Live-at-Home," his rejuvenated appearance together with more power and political and economic crisis at hand, will gain him entrance into practically every home.
>
> Now labeled "Food-for-Freedom," a campaign has been launched which will enlist the aid of farm families the country over in meeting the increasing needs of both people of the United States and Great Britain.[1]

The government was asking for increased production of milk, eggs, beef and veal, lamb and mutton, corn, oats, barley, rye, hay, soybeans, peanuts for oil, and vegetables. State and county goals were established and "Extension agents led AAA committeemen in a house-to-house canvass of every farm, and the result was that every goal, with the exception of that for peanut-production-for-oil, was overpledged."

The nation's farmers were called on to produce the greatest amount of food, feed, fibers, and other vital farm materials ever taken from the land. They were called on to feed the nation and, to some extent, the people of its allies.

"As the nation slips rapidly into high gear in its all-out production effort, a clear plan is slowly coming to the front for farm people's part in the war," declared the editor of *Extension Farm-News* in January, 1942. "Food, fats, feed, and fiber" were the extension goals for 1942. The weather was good and acreage and yields were up. All livestock showed an increase over the year before, with milk production 21 percent greater than in 1941.

Director I. O. Schaub designated February 9 to 14, 1942, as "Victory Garden Week" in North Carolina. Throughout the war, gardens sprang up on farms, along roadsides, on vacant city lots, and in front yards. For 1944 the value of home gardens in the state was estimated at $68 million.

A drive to collect iron and steel scrap came along just after the Japanese attack on Pearl Harbor and was renewed several times during the war. By the end of the war, extension-led scrap drives had contributed millions of pounds of scrap metal, rubber, paper, and fats and grease to the war effort.

In 1943 the extension service was assigned operation of the farm labor program. Fred Sloan, promoted from district agent to state program leader in 1941, headed up this activity. It consisted of urging farmers to cooperate with each other and share their labor and machinery, recruiting migrants, and putting prisoners of war to work on the farms. In 1943, 1,500 Italian prisoners harvested peanuts on 541 farms in eight North Carolina counties.

To make the labor more efficient, farmers were urged to keep their machinery in good repair, and special machinery clinics were held.

At a five-state regional conference on May 8, 1942, in Asheville, extension was given the assignment of acquainting rural people with

Victory gardens sprang up along city streets as well as out on the farm.

President Roosevelt's seven-point program to control the cost of living, to be completed by June 7.

> Extension's job will be to see that every rural citizen fully understands the philosophy of the program and the dangers of inflation. We will be expected to explain to farm people the situation with respect to rising prices; how the control of living costs affects them personally and limits the cost of the war; and the ways that the cost of living may be stabilized through bond-buying, taxes, price regulation, rationing, and by other measures.[2]

District conferences of county farm and home agents were held between May 13 and 22. The next two weeks were allotted for the completion of the educational setup in the counties and neighborhoods.

A new concept—neighborhood leaders—was put to use.[3] Development of the concept started in September, 1941. By the end of the war, a total of 55,000 volunteer leaders had served in the state. The idea was to have one leader for every 10 farm families, or a leader within walking distance of every farm in the state. Two percent of the leaders were appointed, 55 percent were selected by farm people at county and community meetings, and 43 percent were actually elected. They were credited with leadership in the scrap metal, garden, farm machinery repair, and 4-H enrollment campaigns.

The experiment station also went "all out" in an effort to find the facts and design the specifications that would make the maximum contribution to food production in the war effort. Ninety percent of the projects were revised to answer some wartime problem. L. D. Baver, station director from 1941 to 1947 (Chapter 12), likened the farmer to the soldier and the experiment station to the designers of guns and other weapons of war. "The job of farming in war time, like the job of war itself, consists in making the most effective use of all available means—labor, machinery, fertilizer, facts."[4]

Making Mattresses

A service program, in contrast to the traditional educational role of extension, came with the cotton mattress program that began in March, 1940, and ran for two years.[5] This program was a combination surplus disposal and antipoverty or low-income program. Farm families made application at their county AAA office. If accepted, the family was put on a waiting list and notified when to come to the county mattress center. Working together, under the direction of a

county agent or program aide, a mattress was made that day for each family represented.

County extension agents located a suitable factory for the operation, which included storage space for the bales of cotton donated by the federal government. Each mattress contained 50 pounds of cotton and 10 yards of 32-inch ticking. Specialists Pauline Gordon, Mamie Whisnant, Willie Hunter, and Eugene Starnes provided the training for the county personnel. By May, 1940, the program was under way, with 4,600 bales of cotton allotted to North Carolina for the program. When the activity ended in 1942, more than 220,000 mattresses had been made.

Added to the program in 1941 was the making of comforters. When this phase ended, also in 1942, some 100,000 comforters had been made.

For most of the families that participated, it was the first mattress they had ever owned. The mattresses were not only more comfortable than the traditional bed tick filled with wheat straw or other home-grown material but were also more convenient, better looking, and a definite source of pride.

Lorna Langley, home economics agent in Sampson County, recalled visiting a home that had mattresses to see what they were doing with them.

> We went into this lady's home and she had three mattresses, one on top of the other piled on a bedstead. The children were sleeping on the floor. Of course, we raised the question why these three were stacked up and the children were sleeping on the floor. She said, "Well, I will tell you, me and my old man slept on one one night and it felt so good that we decided we would put all of them on here. We are going to take it apart after a while and let the children sleep on them."[6]

In addition to the purely service aspect of conducting the mattress program, specialists and agents figured out ways to incorporate educational messages on sewing, bedding, and other house furnishing ideas.

In 1941 the home demonstration agents were given the assignment of encouraging participation in the cotton stamp program. For reducing cotton acreage, in lieu of monetary payments the farm families were given stamps with which they could purchase cotton goods.

Farm and nonfarm women were called on for a major contribution to the war effort. "Rosie the Riveter" was eulogized in story and song. But no less important was the work of the women on the farm.

Farm families making cotton mattresses in a county mattress-making center.

Many tended the victory gardens and looked after the livestock. They cropped the tobacco and hoed the corn. They learned to drive the tractor.

Surplus fats and grease from the kitchen were collected by homemakers and turned in—156,000 pounds in 1944. Extension-sponsored curb markets helped to insure complete distribution of all food produced and increased farm income. Food was preserved in great quantity. In 1944, the peak year, families assisted by extension canned 27,023,217 containers of fruit, vegetables, and meats. That same year families stored some one-half million pounds of food products in the frozen locker plants that were springing up in the state.

Clothing and kitchen improvement (possibly stimulated by the advent of electricity and electric appliances) were popular topics during this period. A new department of Family Life Relations was created in 1945.

Enrollment in the home demonstration club program continued to grow, with 55,185 members in 2,175 clubs in 1945.

Youth to the Rescue

The smoke had hardly cleared from Pearl Harbor before a special wartime contest for North Carolina youngsters was announced. A "Food for Victory" contest, sponsored by the Chilean Nitrate Educational Bureau, offered North Carolina farm boys and girls an opportunity to win $820 in defense bonds and stamps in 1942. Awards, ranging from $250 to $1, were made to boys and girls under 19 based on the part their farms played in the food-for-freedom program. This was one of many special contests and activities carried out under the auspices of the 4-H clubs during the war.[7]

April 5 through 11, 1942, was declared National 4-H Mobilization Week. "4-H Mobilization for Victory" was the theme. Health and clothing had been the most popular 4-H projects in 1941. The following year production and conservation projects and citizenship training were emphasized.

4-H members participated in the first nationwide scrap drive and in 1942 rounded up 6,454,034 pounds of scrap metal; 1,007,442 pounds of scrap paper; and 856,632 pounds of scrap rubber. They purchased $267,419 worth of war bonds and stamps; and 1,788 acted as air raid wardens. In 1943 they bought $751,846 and sold $1,032,198 worth of war bonds and stamps. The organization became the sponsoring agency for the 1943 "Victory Scrap Drive," held from October 1 to November 15, 1943. Some 6½ million pounds of scrap were gathered in by the youngsters.

Also in 1943, largely through the collection and sale of old phonograph records, North Carolina 4-H club members raised more than $1,700 for the purchase and presentation of an ambulance to members of the armed services.

The "Feed a Fighter" campaign was conducted in 1943 and 1944. It was judged that any of the following activities would produce the equivalent of the food needed to feed one man in the armed forces for a year:

Feed 2 baby beef animals
Feed 6 pigs
Feed 16 lambs
Grow 300 broilers
Care for 50 hens
Feed and handle one milk cow
Grow 113 bushels of corn
Grow 110 bushels of tomatoes

Grow 135 bushels of sweet potatoes
Grow 135 bushels of Irish potatoes
Produce 270 gallons of cane syrup
Grow one acre of mixed vegetables
Can 500 quarts of vegetables

More than 91,000 club members participated in the activity, also held as a contest. The state winner was Sullivan Fisher of the Red Oak Club in Nash County. He produced enough food to feed 34 service men for a whole year. The winning club was the Cleveland 4-H Club in Johnston County, and Johnston also won the county award.

North Carolina 4-H club members produced enough food in the "Feed a Fighter" program to be given the honor of naming two ships of the U.S. fleet. One of these was the USS Tyrrell, an AKA-type vessel, named for Tyrrell County. It was built by the North Carolina Shipbuilding Company and launched on July 10, 1944, at Wilmington. Juanita Ennis Ogburn of the winning Cleveland Club in Johnston County was accorded the honor of being named sponsor of the ship and breaking the champagne bottle on the hull. A number of 4-H members and others from Johnston, New Hanover, and Tyrrell counties attended the ceremony.

The following spring this attack cargo ship was in the middle of the action:

> At dawn on 1 April 1945, the Southern Attack Force, to which Tyrrell was attached, arrived off Hagushi, Okinawa. At 0550, as battleships, cruisers, and destroyers commenced bombardment of Japanese defenses—Tyrrell began lowering her boats. By 0644, the last of her landing craft was in the water and headed for the beach.
>
> For the next nine days, Tyrrell remained off Okinawa, supporting the conquest of that island stronghold. On 2 April, a twin-engined Japanese bomber attempted to crash the ship, diving through a storm of antiaircraft fire. In an attempt to ram the bridge, the plane sheared off the ship's main radio antenna, hit the lower yardarm support on the starboard side of the mainmast, and continued on to sideswipe the starboard 5-ton cargo boom at the number 5 hatch. As the plane splashed alongside, it blew up and showered the cargo ship's decks with pieces of wreckage.[8]

Decommissioned as a naval vessel in 1946, the Tyrrell, several times renamed, served for years as a freight carrier.

The other ship was christened the USS Cassius Hudson. It honored C. R. Hudson who had been sent by Seaman A. Knapp to North Carolina to start the farm demonstration work in the state in 1907. Until 1922 Hudson was the state agent in charge of the county

operations. That year he was placed in charge of the Negro extension work in the state. He remained in that position until his sudden death from a heart attack on March 3, 1940, at the age of 67.

The USS Cassius Hudson was built at the Brunswick, Georgia, shipyard by the J. A. Jones Construction Company of Charlotte. Attending christening ceremonies on August 31, 1944, were Hudson's widow, Josephine Scott Hudson, their daughter, Frances, and Mrs. Hudson's brother, W. Kerr Scott, then commissioner of agriculture.[9] The life of this liberty ship was short, however. It was sunk by enemy action on its first voyage to the Asian theatre.

In response to the wartime programs, 4-H enrollment shot up rapidly from 54,000 in 1941 to 63,000 in 1942 and to 91,000 in 1943. The number of clubs also increased from 1,586 in 1941 to 1,747 in 1943.

The Army Moves In

Events can occur rapidly in wartime.

On February 26, 1942, less than three months after the attack on Pearl Harbor, two War Department engineers called at the home of the superintendent of the Mountain Branch Station at Swannanoa about six o'clock in the evening. They asked to see a map of the station.

Superintendent D. W. Colvard was not at home. The two engineers informed Mrs. Colvard that they were interested in locating an army casualty hospital in the area. When Colvard returned home later that evening, he contacted Malcolm Ainsworth, manager of the Asheville Chamber of Commerce, and learned that an investigating party of engineers was looking for a site suitable to build a 1,500-bed casualty hospital.[10] Ainsworth agreed to meet the next day with Colvard and F. E. Miller from Raleigh, director of the branch stations, who was scheduled to be at the station at that time.

Ainsworth informed Colvard and Miller that the government officials, after viewing several sites including Roanoke, Virginia, and Bluefield, West Virginia, had tentatively selected the research station property as the hospital location if the site could be made available.

On March 4 a number of engineers arrived at the station in three taxis over a snow-covered road from Asheville. On that same afternoon Colvard took the train to Raleigh to discuss the matter with Department of Agriculture officials and the Board of Agriculture, which would be in session on March 5.

On the train Colvard ran into Don Elias, president of the Asheville Chamber of Commerce, who was also connected with the *Asheville Citizen-Times* and Radio Station WWNC. Elias told Colvard that the Asheville Chamber of Commerce had been endeavoring to secure war industries for western North Carolina. Failing that, they had approached Marvin McIntyre, secretary to President Roosevelt, who was formerly employed by the *Asheville Citizen-Times*, concerning moving federal agencies to western North Carolina. It was Elias's opinion that this proposed location for the hospital grew out of McIntyre's support for constructing a hospital in this area. Elias also stated that the Chamber of Commerce was disappointed that the army had selected the Swannanoa spot but that they had told the army officials that if no other spot was acceptable, an effort would be made to secure the test farm site for the hospital. Elias was on his way to Raleigh to promote the idea with Department of Agriculture officials.

Pleased to be able to make a contribution to the war effort, realizing the contribution the facility could make to the economy of the Asheville area, and believing the money received would be sufficient to establish a station in another location, then commissioner of agriculture W. Kerr Scott was amenable to the request that the state give up the land.

As rumors and premature publicity spread across the western part of the state and as government officials tramped about over the farm, the farm workers wondered whether they should start their gardens. On March 31 word was received that the hospital would be built on the site. By April 20, a temporary office had been set up; by May 18, a spur railroad was under construction; and actual construction of Moore General Hospital got under way around June 20.

There were some minor hitches. Federal officials argued that the law required the price of the property to be set at market value; Commissioner Scott argued for the higher replacement value. The employees were uprooted from their houses, and the dairy superintendent barely got his belongings out of his house before it was moved away. Most of the crops growing on the land were salvaged.

This hospital, Moore General, received some of the first casualties from the fighting in Europe.

The decision was made to establish two branch stations in the western part of the state. On February 1, 1944, the state Board of Agriculture and the Council of State approved the purchase of 425 acres from W. M. Transou at Laurel Springs. On June 1 it was

announced that the state was buying the Grover Clark farm—300 acres adjoining the city limits of Waynesville—for a farm to serve the lower mountain area.

Colvard served as superintendent of both locations until after the end of World War II, buying building materials wherever and in whatever amounts they could be found. After Colvard's resignation, Jim Graham became the superintendent of the Upper Mountain Branch Station at Laurel Springs and Howard Clapp was named to head the Mountain Branch Station at Waynesville.

The Blackland Branch Station was relocated in 1943; but fire, not the War Department, was the reason. The peat soils would catch on fire, and the fires would burn or smoulder until the water table rose high enough to put them out. Water applied on top of the ground was not effective. The problem became so great that it affected the operation of the farm, particularly the efficiency of personnel.

The Board of Agriculture agreed that the farm should be relocated, and in 1943 a tract of 494 acres on Highway 64 five miles east of Plymouth was purchased. Shortly thereafter, an additional tract of 1,064 undeveloped acres was added to the farm. The new station was called the Tidewater Branch Station.

What later became the Sandhills Branch Station was established in 1940 on a 100-acre tract at Eagle Springs in Moore County.

Iredell barley originated in Iredell County as a head selection from a field of Tennessee Beardless No. 6 on the farm of W. B. Crawford (left), shown here with D. T. Redfern, assistant county agent.

The station field days ended in the 1940s, but the stations still provided a local and area influence. Many farmers and others continued to visit the stations, individually and in groups. And local farmers looked over the fence to see what those folks from Raleigh were doing. Jim Graham, superintendent at the Upper Mountain Station from 1945 to 1952, recalled that the mountain farmers traditionally cut their "meadow" or native hay crops only once a year—late in the fall after the plants had practically cured standing in the field. After experiments were put out on early cutting of hay, Graham said the natives thought it was a crazy idea but "they watched and as soon as we started cutting our hay I could hear their mowing machines start up."[11]

Back on campus, there were no new buildings but considerable moving around. The Federal Farm Security Administration (later the Farmers Home Administration) desired to locate its southeastern legal division headquarters in Raleigh. Adequate commercial space was not available, and in 1940 the college was approached about leasing space on the campus for this purpose. Patterson Hall became the focus, and a one-year lease was drawn up. The FSA occupied Patterson Hall from 1940 to 1945.

This necessitated the deployment of the persons and groups formerly occupying Patterson Hall. However, by this time student enrollment had dropped to the point that not all of the dormitory space was needed, and the 1911 Building was permanently converted from dormitory to office space. Occupying this building during the war years were personnel from Engineering Mechanics, Extension Home Demonstration, Industrial Engineering, Rural Sociology, Agronomy, and the campus office of the Veterans Administration.

Dehydrated Cabbage

In the early days of World War II there was a feeling, both within and outside the state, that North Carolina should be in a position to help supply the army with dehydrated vegetables. The War Department sent a representative who met with personnel from the state Department of Agriculture and the college. The decision was made after rather prolonged conferences, Ivan Jones recalled, that North Carolina should provide dehydrated cabbage for the army.[12]

A dehydrator was constructed at a kraut factory near Mt. Airy in Surry County. The dehydrating equipment was built by Broddus

Wilson, who constructed equipment for washing and skin-drying potatoes for the fresh market.

Some $3,000 of experiment station funds were made available for the project. Plans for the dehydrator were supplied by the U.S. Department of Agriculture, which was very active at that time in the promotion of food dehydration throughout the nation.

There was not a pilot plant nor were there experimental processing facilities at the North Carolina Agricultural Experiment Station at that time, so Wilson constructed a small, steam-heated tunnel dehydrator fitted with three one-foot-square trays. The source of heat for this pilot plant dehydrator was a furnace made for residential use, operating at five pounds steam pressure. The commercial dehydrator at Mt. Airy held 5,000 pounds of freshly shredded cabbage when loaded.

Cabbage dehydration tests were made and the product was acceptable to the army. Commercial dehydration of cabbage never took place in North Carolina, however, because the price the government would pay for the produce was not sufficiently attractive to the makers of the product.

Since equipment, machinery, and all types of materials for plant construction were scarce, it was necessary to adapt facilities that might already be present in the state. One possibility was the use of tobacco redriers. At that time in North Carolina all tobacco was redried before it was packed into hogsheads for storage. The use of the redriers for dehydration of vegetables was investigated, and a number of vegetables were successfully dried in these facilities. A study was made of the use of the tobacco redriers for both Irish and sweet potatoes to be used for livestock feed.

Later the decision was made to enlarge the crop dehydration program, and a larger experimental dehydrator was built in the basement of Polk Hall. When the war ended, the demand for dehydrated food no longer existed, dehydration research throughout the nation was discontinued, and the dehydrator was dismantled.

Research and Farming

Editor Frank Jeter described the neighborhood leader movement as a great aid in reaching farm families effectively and quickly with emergency war programs, "but it hasn't put the information mill out of business, because new bulletins, pamphlets and mimeographed material must be prepared concisely and briefly, almost daily, to give

the neighborhood leaders something to work with." Despite shortages of paper, ink, and metal for engraving plates, the flow of information was continued.[13]

To meet the special demands for wartime information, the extension service released 34 publications in a special war series bulletin category between May, 1942, and February, 1945.

Beginning in 1940 the experiment station annual report carried the title *Research and Farming*. Thus the name was not new but the concept of a research periodical was new when the first issue of a quarterly experiment station "magazine" by that name came off the presses in 1943. Edited by Phyllis Yates, the first full-time experiment station editor, each issue contained 12 pages. The articles were written by station scientists and could best be described as progress reports on research under way or completed. The writing style ranged from "popular" to "semipopular" as contrasted to the technical language used in many station reports. From 1943 through 1949, the fourth quarterly issue each year was the experiment station annual report.

Radio became more important as a farm news medium as most farm families acquired receivers, and visual aids came to the forefront during World War II. New slide sets were added to the young slide library, and in 1942 the first 16-mm sound motion picture projector was purchased. A library of 16-mm sound and silent motion pictures was developed with eight films owned by the extension service and 30 others available to extension personnel on a loan basis. The school's first feature film, "Our Garden," was produced by photographer Lewis Watson in 1943. The following year Watson produced a film on poultry.

In March, 1943, State College Chancellor John W. Harrelson announced that through the newly organized State College Foundation, Inc., Richard J. Reynolds of Winston-Salem was filming and presenting a series of educational motion pictures to the college. The seven films produced were contributed by Reynolds to "help promote the production of food and feed during the emergency."[14] During 1944 these films were shown to a total of 34,765 persons. Other films in the visual aids library were shown to a reported 41,842 persons.

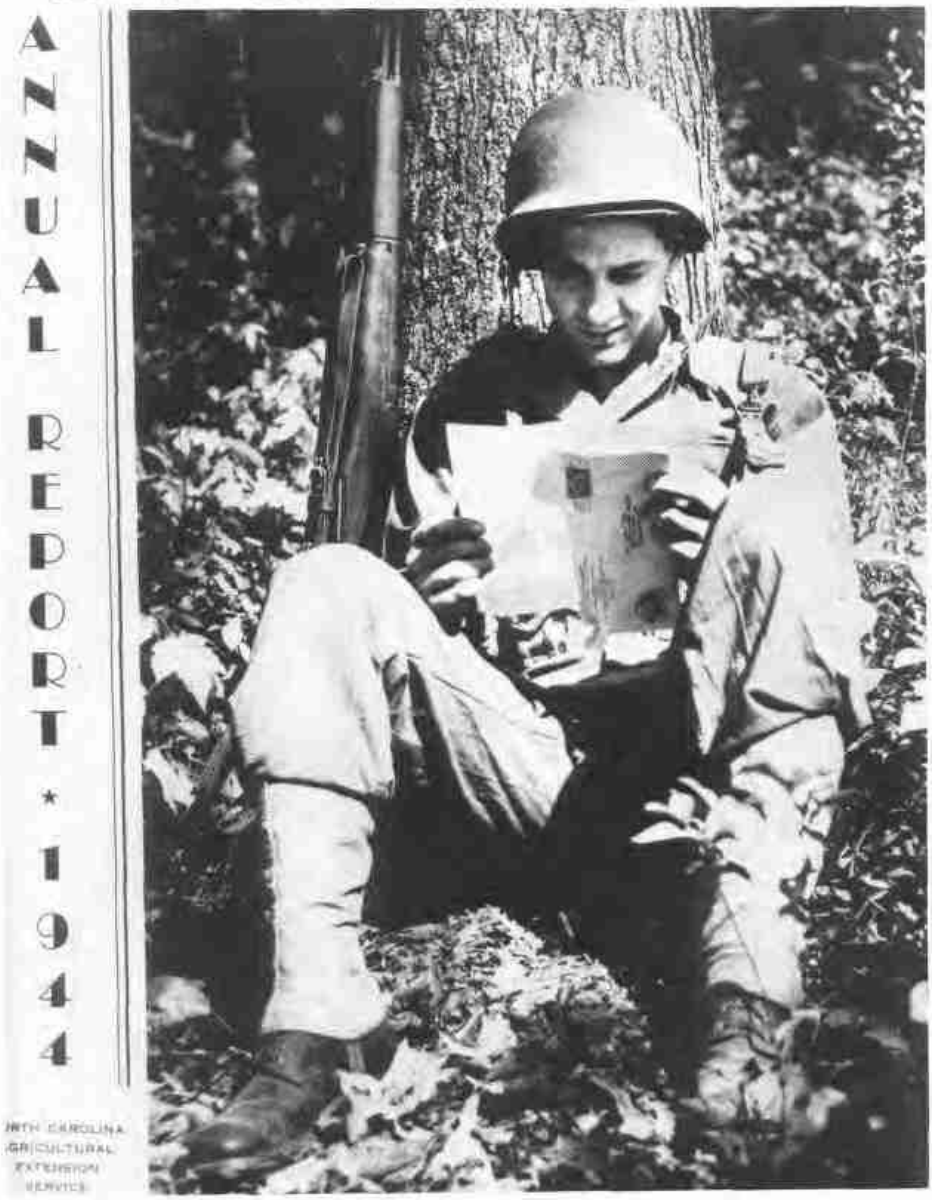
Considerable effort was needed to explain the many details of the wartime programs and to squelch rumors when they appeared. An article in the December, 1942, *Extension Farm-News* illustrated the work of the rumor mill and the details needed.

> Reports that farm people will need a permit costing from $3 to more than $5 before they can butcher their hogs or other meat animals have

been labeled as false by Dr. I. O. Schaub, Extension director, who says that such erroneous reports should be corrected. No permit is needed.

Another report making the rounds infers that farmers will have to have their hogs weighed before killing them. This also is false, Dr. Schaub said.

The only restriction on farm slaughter of hogs, calves, sheep, and lambs is where a farmer has been butchering and delivering animals for others. In such a case, the farmer is restricted to no more than the same amount of each kind of meat he slaughtered and delivered to others as custom work in the corresponding quarter of 1941.



Publications exhibited the closeness of the college's efforts to the wartime activities. The 1944 extension annual report was designed as a letter to the men at the front.

> Concerning the Share-The-Meat program, Dr. Schaub said farm people will be expected to eat more than 2½ pounds of meat per week per person at hog-killing time, but they should even up their consumption on a year-round basis to cooperate in this voluntary effort.

The war effort was a total commitment. The profit angle was not overlooked, but the need for food and fiber was extensively used by agents and specialists as an appeal around which a story could be told. This approach was used in the March, 1943, *Research and Farming* by Animal Scientist J. E. Foster:

> Under present war conditions, when feed is scarce and high priced and when optimum production is so vital, it is the duty of every farmer to feed and manage his flocks in such a way that nothing will be wasted.
>
> Why feed parasites when our animals need feed, and our people need meat?

In an article titled "Control Sheep Parasites and Increase Meat, Wool and Medical Supplies for the War," Foster pointed out that internal worms would cause gritty masses or nodules to form on the walls of the intestines, making them unfit for use either as sutures or sausage casings—both in short supply. Particularly needed were suitable absorbable sutures for sewing up certain types of wounds. Also, there was a large need for first-class shearling pelts (produced from parasite-free lambs) to make clothing worn by airplane crews flying at high elevations.

More Food and Fiber

"A Year to Remember" was the title of the 1945 extension annual report. It was a year in which the crops were planted in war and harvested in peace.

Record-breaking crops were produced in North Carolina in spite of shortages of equipment, fertilizer, and labor, the report stated.

> Everyone pitched in and helped to get the crops planted. First it seemed that a portion of the early truck crops and then the fruit would be lost because of a lack of labor. Many feared that much of the bumper tobacco crop could never be harvested. There was a heavy demand for extra labor in the peanut and cotton fields. And yet, in spite of these difficulties, all crops were finally harvested and housed.

On the livestock side, cattle numbers steadily increased during the war. Beef cattle numbers increased from 116,000 to 180,000 between 1940 and 1945. Dairy cattle numbers during the same period went from 479,000 to 571,000.

Laying hens and pullets increased from 8,121,000 to 11,059,000 from 1940 to 1945. And, in a way, it was during the war that the commercial broiler business was born, with production going from 4,400,000 in 1940 to 17,940,000 in 1945.

Hog numbers fluctuated considerably, ranging from a low of 1,133,000 in 1941 to a high of 1,512,000 in 1944.

Dairying was one of the most dynamic farm enterprises during the first half of the 1940s. One reason was the expanding market for milk. By the end of 1941 there were 124 dairy product plants in the state. These plants purchased some $2 million worth of non-Grade A or manufacturing milk from the state's farmers—milk produced "without the necessity of expensive barns and other equipment." By the end of 1942 there were 210 routes collecting milk from 9,982 producers, and two years later the number of plants was up to 246. As military installations opened in the state, the demand for milk increased.

A second reason for increased dairy activity was that it was profitable. Associate Agricultural Economist R. H. Rogers made a detailed study of the records of 32 dairy farms in 1932.[15] He found that these farms averaged 36.2 cows producing 6,637 pounds of milk. There were 305 acres per dairy farm with an average of 170 acres in crops. The average total investment was $38,447 per farm. Even at the bottom of the depression, these dairy farms earned an average 4.22 percent on their investment.

A decade later a study showed that dairy farming was still profitable but expensive.[16] On 89 farms studied in 1941, the average gross receipts were $6,850. Of this amount, dairying contributed $4,863, or 71 percent. The average operating expenses were $5,138; the average return over operating expense was $1,720. The interest earned was 4.4 percent on the total investment.

Most of the growth in dairying was occurring on cotton and tobacco farms. To obtain the cows to build the new herds, extension agents and specialists assisted farmers in bringing in some 5,000 high-grade heifers and cows each year, many of them from Wisconsin.

Increased livestock numbers demanded increased feed production. From 1940 to 1945 the acreage in forage crops mowed for hay increased from 1,111,000 to 1,374,000 acres. The peak in hay acreage in the state was reached in 1945.

Corn was still the largest crop, in terms of acreage, with yields increasing from 20 to 25 bushels per acre from 1940 to 1945.

In 1939 lespedeza replaced cotton as the second largest crop in the state, with 911,000 acres planted. In 1940 the lespedeza acreage crossed the one-million-acre mark. Extension Agronomist E. C. Blair predicted it was here to stay.

> Lespedeza is so easy to grow (being sown on small grain without special seed bed preparation), produces such heavy yields of hay, affords such abundant summer grazing, is such a good soil builder when turned under, and makes such good yields of easily harvested seed, that it will probably always hold its present place in agriculture.[17]

However, disease problems developed, and as farmers increased their use of fertilizer on small grain, the grain choked out the lespedeza, and the acreage gradually declined.

In the Tidewater region, where cattle were coming back after the eradication of the Texas fever tick, studies showed that large areas of native reeds, could, under proper management, be converted into palatable and wholesome beef.

Feeding trials with sweet potato silage, containing both vines and potatoes, were carried out in 1942. They showed that, as a feed for dairy cattle, sweet potato silage compared very favorably with corn silage. Other studies showed that hogs could be grown and fattened on wheat as well as corn under certain price conditions.

Science Scores

That was the heading on an article in the 1945 extension annual report.

> Since approximately one-third of the cropland of the state is devoted to this crop and since corn is a basic feed commodity in the building of a greater livestock and poultry industry, a five-point corn program was developed in every county in the state.
>
> The acreage devoted to hybrid corn was doubled and the average state yield was increased under favorable weather conditions to 25 bushels per acre, an all-time record. The demand for adapted hybrid seed was so great that the supply was exhausted early in the season and plans were immediately made for the production of more hybrid seed, the number of growers being more than doubled.

The statewide average yield of 25 bushels per acre broke the record. Yet average yield in farmer demonstrations in all 100 counties, using the five-point plan developed at the college, was 45.7 bushels. On one farm a yield of 121.4 bushels was obtained. And the corn breeders were continuing their research for more suitable hybrids.

Farm mechanization, although simple by later standards, nevertheless enabled farmers to produce record crops with a limited farm labor force.

Science was paying off.

The boys (and girls) were coming home. With the aid of their "G.I. Benefits," many of the more than 100 military veterans of the School of Agriculture and Forestry faculty would return to school for further education. Undergraduates would come in massive and record numbers.

With an expanded vision of the world, the veterans would have new ideas. Haywood County Agent Wayne Corpening applied some military ways of viewing organization and leadership to organize Haywood County communities—part of a movement that would become a statewide community development program.

Some felt that a surplus of agricultural know-how had been accumulated, but most disagreed, and additional bright young scholars were added to the campus and field faculty.

So researchers, teachers, specialists, and agents—as well as farm families—prepared to return to normal. There was no way they could have known that there would never again be a return to "normal" out on the farm. As they had lived through the halcyon days of 1940, for the last time they were seeing America as it used to be.

NOTES TO CHAPTER 11

1. "Food for Freedom Campaign," *Extension Farm-News*, November, 1941, p. 1. For other stories detailing extension responsibilities and activities, see *Extension Farm-News* from November 1941 through the war years, and the extension annual reports for 1941-1945.
2. "Extension Given Big War-Time Job," *Extension Farm-News*, May 1941, p. 1.
3. "Study of Two Counties Reveals Effectiveness of Neighborhood Plan," *Extension Farm-News*, June, 1942, p. 1; and "Final Tabulation Shows 27,281 Good Neighbors," *Extension Farm-News*, August, 1942, p. 1.
4. "Your Experiment Station Goes To War," *Research and Farming*, N.C. Agricultural Experiment Station annual report, 1942, pp. 11-13. See also "Agriculture and the War," 1943 annual report, pp. 9-11.
5. The mattress program was more a depression-type than a wartime program, designed to reduce the large surplus of cotton in government warehouses and to enhance the level of living of farm families. It is included in this chapter because it came during the period of war and prewar activities.
6. Lorna Langley interview, January 8, 1980.
7. Clark, James W., Jr. *Clover All Over*. Office of 4-H and Youth, 1984, pp. 204-213.
8. Mooney, James L. (Editor). *Dictionary of American Naval Fighting Ships*. Vol. VII. Washington: Naval Historical Center, Department of the Navy, 1981, p. 378.
9. Mrs. C. R. Hudson, whom many remembered from the boarding house she operated on Hillsboro Street across from Ricks Hall, died in 1978 at the age of 94.
10. Colvard, Dean W. "Negotiations for locating Government Hospital on property of Mountain Experiment Station." April 1, 1942, mimeographed, 28 pages, in Colvard personal papers, N.C. State University Archives.
11. James A. Graham interview, July 19, 1979.
12. Ivan Jones interview, March 13, 1979.
13. For a detailed account of wartime information activities, see William L. Carpenter, *Let the People Know*, N.C. Agricultural Extension Service, N.C. Agricultural Experiment Station, 1978, pp. 52-64.
14. The seven films contributed by Reynolds were titled "Carolina Cows," "Can All You Can" on vegetables and fruits, "Raise 'Em Right" on hog growing, "Repair It Now" on farm machinery, "Our Garden," "Home Drying" for fruits and vegetables, and "The Family Poultry Flock."
15. Rogers, R. H. *A Study of North Carolina Dairies*. N.C. Agricultural Experiment Station, Bulletin No. 288, 1933, 36 pp.
16. "Dairy Farming Pays in North Carolina," *Research and Farming*, N.C. Agricultural Experiment Station annual report, 1942, p. 60.
17. Blair, E. C., his 1941 annual narrative report, on microfilm in N.C. State University Archives.

III

DYNAMIC DEVELOPMENT

"THE KEY FOR A SUCCESSFUL INSTITUTION is the quality of the personnel that it has and the training of that personnel," L. D. Baver stated in a 1978 interview. More than any other individual, L. D. Baver is credited with stimulating and pushing this school of agriculture into a new era of scientific discoveries and their application to farming.

However, as pointed out in chapter 12, the arrival of Baver and R. M. Salter in 1940 was just one of several events between 1940 and 1948 credited with establishing the base for tremendous development in the state's agriculture and in the School of Agriculture during the next several decades. Increased funding, wartime needs, better-trained personnel, and improved supporting departments all contributed to a bursting forth of research knowledge on which the expansion of agriculture could be based.

The school has been fortunate to have been led throughout its history by effective administrators. Those who served between 1950 and 1983 and the growth in funds and facilities in that period are indicated in chapter 13.

The increased funding came by several routes—legislative appropriations, foundations created by the university, outside foundations and funding agencies, grants, and contracts (chapter 14). In some instances funds were appropriated or otherwise allocated in response

to perceived problems or needs of those outside the educational system. More often it was a case of the faculty and administrators recognizing needs and then seeking funds necessary to address and/or solve the problems identified. During the 30-year period a number of new programs were developed and old programs were significantly changed.

Following the influx of veterans at the end of World War II, enrollment declined through the 1950s. New instructional programs and an increased general interest in activities related to agriculture brought record numbers of students through the mid-1970s, followed by some decline (chapter 15). Instructional programs changed to reflect changing interests and needs.

The biggest changes came on the farm. Old problems remained or were only partially solved. Environmental and other societal concerns brought an array of new research and education topics to the school's agenda (chapter 16). Mechanization reduced the need for human energy. Larger and more efficient farms became the norm; the number of farms decreased; yields went up; livestock production increased and became more efficient; some marketing problems were solved while others remained; food processing developed.

The human side of farm families was not forgotten. Programs for the housewife and the children responded to the changing needs of the times. Little research went into these areas, but in North Carolina as throughout the nation, a sizeable share of the extension budget went to home economics and 4-H youth activities (chapter 17).

From the earliest days of extension work there was concern for reaching all the rural citizens of the state. In North Carolina these citizens included many Negroes and Indians. The program for Negroes (who made up a sizeable portion of the farm population) was large and effective, but not without concern that it might not be serving everyone equally. Special programs for Indian farmers were developed. From the mid-1960s into the early 1980s, questions of equal opportunity, affirmative action, and integration became the number 1 administrative concern in the school, North Carolina State University, and the University of North Carolina system. Some of these concerns, efforts made to correct them, and legislative and judicial remedies are included in chapter 18.

12

Blossoming Out with New Leadership

State funds at last. Enter Salter and Baver. Rejuvenating animal industry. Frank Graham's contribution. The Missouri-Ohio State-Cornell connection. Experimental statistics. More farm power. New tobacco varieties. Carolina corn's the best. Horticultural breeding. The Willard Red. Teaching upgraded. Baver says goodbye.

BY THE LATE 1930s THE STAGE WAS SET for rapid development. It started with a recognition of the need and increased funding. Then came aggressive leadership with a decision and commitment to bring in the best personnel available in a particular field.

Not only did the 1935 Bankhead-Jones Act provide additional funds directly from Washington—matching state funds were required, which encouraged the allocation of additional state funds for agricultural research. Total Agricultural Experiment Station funding increased from $145,000 in 1935 to $300,000 in 1940 and $455,000 in 1945. The direct state appropriation increased from $5,000 in 1938 to $178,000 in 1945. The allocation from the service fees through the state Department of Agriculture ended in 1941.

State Funds at Last

In 1910 C. B. Williams, then director of the station, expressed displeasure and concern that the state of North Carolina was not making any direct appropriation for agricultural research while many other states were making such appropriations. It was not until 1937 that Williams's complaints were acted upon—as a result of activity at the grass-roots level.

In early 1936, members of the Brushy Mountain Fruit Growers Association sent to Raleigh a resolution asking that there be established in the area "a station for experimentation and scientific research." At that time the Brushy Mountain area was the leading apple-growing section of the state, with more than 500,000 trees, mostly of the Limbertwig, Red Delicious, Golden Delicious, Bonum, Red Winesap, and Stayman varieties. In a July 6, 1936, letter to M. E. Gardner, members of the association spelled out what they thought needed researching:

> . . . all agreed that insect and disease control came first in importance, especially insect emergence dates so that sprays may be timed to catch the new broods. This service, we understand, is given by a number of other states from test stations. Following this in importance to us, is the testing of new spray materials and schedules as they are developed, soil management, pruning and grafting, causes and remedies for alternate year bearing.

In 1937 the North Carolina General Assembly responded with an annual appropriation of $5,000 for the 1937-39 biennium. Apple grower E. P. Lowe deeded to the college a tract of land along Highway 16 on the crest of the ridge that separates Wilkes and Alexander counties. Soon a laboratory and garage had been constructed there and before the year was out Carl E. Van Deman was on the job seeking to find the solution to the various problems confronting apple growers in the Brushy Mountain area.

Director Winters surely approved of this form of citizen input. Writing in the 1937 station annual report, his last, he said:

> There exists at times a feeling of impatience among growers and others toward the slow process of fact finding and the lack of proven information. The danger lies not so much in the existence of impatience but in its stimulation of superficial tests and practices which are misleading. Expressions of impatience are useful in directing the attention of research workers toward needed information. Expressions of impatience would be doubly useful if they were also directed toward support for research personnel and facilities.

Encouraged by this first direct state appropriation for research from the state, the experiment station requested support for other needs. When the legislators came to Raleigh in 1939, they were asked for an additional $82,735 yearly "to study a variety of agricultural problems not now receiving adequate attention because of limited funds and facilities." Requested were funds to increase research with apples, peaches, peanuts, bulbs and flowers, beef cattle, and sheep, and to increase soil testing work.[1]

The direct appropriation from the state's general fund increased rapidly during the war years. During the 1944-45 fiscal year, the state appropriation was $178,000—approaching the federal appropriation of $196,000 for agricultural research in North Carolina for that same year. The increased funds could be effectively used because during the late 1930s a number of young men had been added to the staff who were destined to make outstanding contributions to the school's programs.

Enter Salter and Baver

After the departure of Winters as station director in 1937, three years elapsed before a permanent director was named. A newspaper reporter writing in July, 1940, attributed the problems of finding a new director to animosity between college officials and the North Carolina Department of Agriculture.[2]

It is not possible to assess the seriousness of these charges. At the March 25, 1938, meeting of the executive committee of the university Board of Trustees, President Graham asked that a committee of three from the executive committee be appointed to confer with a committee from the board of agriculture on the relationship of the work of the state Department of Agriculture and the State College. Clarence Poe, I. B. Tucker, and J. S. Hill were named to this committee. Faculty members who were with the station at the time were aware of disharmony between the college and the Department of Agriculture, but they also agreed that rejection by persons considered for the position was more likely because of inadequate funding for research.

The committee seeking the director was made up of John W. Harrelson, head of State College, with the title of dean of administration; Dean I. O. Schaub; and Z. P. Metcalf, director of instruction in the School of Agriculture and Forestry. Whether because of inaction or disagreement by the committee, or a reluctance on the part of university President Frank Graham to permit them to act, there is no evidence that any candidate was proposed until Graham assumed the leadership role.[3]

At any rate, Graham was in the company of several officials of the U.S. Department of Agriculture (USDA). He asked them for a list of top soil scientists in the country. When he received their list he rejected it with the complaint that they had not given him the names of people with the stature he was seeking. The USDA officials

R. M. Salter (right) and L. D. Baver provided outstanding leadership in the School of Agriculture and Forestry from 1940 through 1947.

responded that they had given him a listing of the people who might be enticed to move to North Carolina—the top people would not. Graham asked them to give him another list and to let him worry about the people's availability.[4] The new list included the names of some men who ranked very high in their professions. Among them were Dr. Robert M. Salter, Ohio State University; Dr. Richard Bradfield, Cornell University; Dr. Frank Parker and Dr. Ira Baldwin, University of Wisconsin; and Dr. J. W. Tidmore, Auburn University. There is no evidence that anyone then on the State College staff was considered for the position.

Since North Carolina was a crop state with tremendous problems in soil fertility and management, Graham had concluded that a soils expert was needed for the directorship. His advisors in Washington had recommended that he discuss the matter with soils professor J. Fulton Lutz. According to Lutz, when he learned that Bradfield, Salter, and Parker had rejected offers to become director, he urged Graham to contact Bradfield and Salter again.[5] After the second interview, Bradfield declined but Salter expressed an interest in the position on the condition that he could bring with him Dr. Leonard Baver, an agronomist at Ohio State University, to become head of the

Agronomy Department, replacing C. B. Williams, who was retiring. Dr. Lutz also recommended Baver to President Graham.

As Lutz recalled the story, he received a telephone call from Graham informing him that Baver was in Chapel Hill on his way to Raleigh. (Lutz was Baver's first doctoral student when Baver was on the faculty at the University of Missouri.) Graham asked Lutz to accompany Dr. and Mrs. Baver to lunch and then to take Baver to the office of Clarence Poe, editor of the *Progressive Farmer*, a university trustee and chairman of the board's agricultural committee. Graham met the group in Poe's office. After some discussion, Graham asked Lutz to take Baver to Harrelson's office on the campus.

According to Lutz, "When we got to Harrelson's office, Metcalf, Schaub, and Harrelson were there. Dr. Graham followed us. It was obvious that Chancellor Harrelson, Dr. Metcalf, and Dean Schaub didn't know that Baver was coming until Dr. Graham called them from Dr. Poe's office. When we got there the atmosphere was a bit chilly. But after some discussion, it got a little better," A week or two later, Baver and Salter were hired—Salter as director of the experiment station and Baver as head of the Agronomy Department.

Salter had begun his undergraduate studies at Ohio State University in engineering but became interested in agriculture and changed his major. He obtained his master's degree at West Virginia University. Baver, who grew up on a tenant farm in southern Ohio, received his bachelor's and master's degrees from Ohio State University and the doctorate from the University of Missouri.

Clarence Poe, always close to the scene, in a September, 1940, editorial in the *Progressive Farmer*, noted that many people had felt impatient because of President Frank Graham's long delay in approving a successor to R. Y. Winters as station director. Poe felt, however, that Graham was determined to get a man whose work had already won national distinction. He believed that Graham had succeeded with Salter and Baver. The extra funds needed had become available on July 1. Louis R. Wilson told how the funds came about:

> After consultation with the local officers and faculties at State College, representatives of the United States Department of Agriculture, and the officers of the General Education Board, the conclusion was reached that North Carolina and the South had failed generally to apply the most scientific tools of research to the study of the wide spectrum of problems everywhere present in the region. President Graham found that the General Education Board had long maintained an interest in all that pertained to the South's educational development

and was sympathetic to the idea and willing to aid in underwriting it, provided that other funds could be found to match its contribution. It offered $50,000 to be used over a ten-year period to supplement salaries of key faculty members of the School of Agriculture and the Agricultural Experiment Station.

This proposal, according to tradition, set in motion a diverting chain reaction. Upon arriving at 8:30 a.m. at his office the morning after he received word that the General Education Board would aid in the undertaking, provided its contribution would be matched, President Graham put through a telephone call for Richard J. Reynolds, Jr., an alumnus of State College and a Trustee of the Consolidated University, who was then somewhere in California or Honolulu on a yacht race. Roused out of sleep at four or five o'clock, Reynolds asked what was so urgent that he should be called at such an unearthly hour. Graham assured him, with apologies, that it was urgent, that he wanted $50,000 to match the General Education Board's offer. Reynolds replied, "Go ahead, I'll match it, but next time wait 'till I have had breakfast before you call me." The next time, not long after, he gave $125,000 as an endowment for strengthening the agricultural program. The Trustees also transferred $50,000 from the Escheat Fund for the same purpose, and Graham then set about securing top-flight personnel for the positions mentioned.[6]

Salter stayed only one year, leaving to take a position in the U.S. Department of Agriculture. Newspaper stories claimed that rather than moving to a more attractive job he was fleeing from a distasteful situation in Raleigh that included relationship problems with various administration officials. Salter vigorously denied that any problems in the university system had caused him to move on.[7]

Baver was immediately elevated to the directorship of the experiment station with the prediction that he would carry on the policies and programs initiated by Salter, which included greatly improved relations with the North Carolina Department of Agriculture.[8]

Baver was succeeded as head of the Department of Agronomy by Ralph Cummings, who until then had been on the faculty at Cornell. A North Carolina native, Cummings had received his B.S. degree from North Carolina State College and had held a temporary job on the agronomy faculty in 1937. In 1942 Cummings was only 29—undoubtedly one of the youngest to ever assume an administrative post at the institution.

Before World War II agronomy had made a great deal of progress—more than most departments—in adding new and younger scientists to their staffs. Cummings continued to build up the agronomy staff. He said he was looking for "young people with good minds

and real promise who were reasonably free of preconceived notions . . . deliberately at times we chose people who did not have a background in that particular commodity at the time they were brought in but who had good scientific minds, vision, imagination, and who we felt could address a problem."[9] But it was time to give attention to the other departments.

Rejuvenating Animal Industry

It has been reported that one of the conditions Salter stipulated before accepting the directorship of the station was that he be permitted to rejuvenate the Department of Animal Industry. It is not known what steps were taken in this direction before Salter left in October, 1941, but A. O. Shaw, an associate professor at Kansas State College, visited Raleigh in December to consider the position of department head.

Shaw recalled later that during his interview Baver told him that he would like to improve cooperative efforts so they could do better research at the outlying stations and that he wanted to bring some young people into the Department of Animal Industry.[10]

Shaw joined the school as head of the Department of Animal Industry on March 1, 1942. On his arrival Shaw found conflict between certain members of the departmental staff and bitterness at his being brought in. He did not think Dean Shaub "was ever enthusiastic about what we were doing." Nevertheless, Shaw obtained results in a hurry. Before 1943 was out, he had brought in four young men who would make considerable contributions in the school and elsewhere.[11]

Shaw also worked hard to improve relations with the state Department of Agriculture. His efforts included visiting (accompanied by Mrs. Shaw) "about one evening a month out at the Kerr Scott residence with Kerr and his wife and that kind of relationship always makes it possible to get things done that you couldn't do otherwise." Shaw participated in the search for new stations that were eventually located at Plymouth, Laurel Springs, and Waynesville. He thought working with the Department of Agriculture in these searches also gave an opportunity to improve relations with that department.

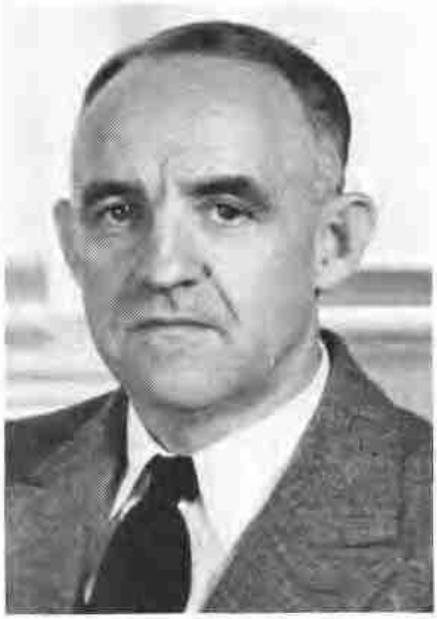
Shaw's tenure was short. He left on July 1, 1944, to become general superintendent of Coble Dairy Farms in Davidson County. He was succeeded as head of the Department of Animal Industry by James H. Hilton.

New facilities on the north side of Hillsboro Road and east of the state fairgrounds helped lay the groundwork for improved livestock research.

Frank Graham's Contribution

Consolidated University President Frank Graham's contribution to the development of the School of Agriculture and Forestry has gone largely unrecognized. Members of the university community a generation later seemed surprised when told that the president of the university became involved in the affairs of a single school within one of the three branches of the university in his domain. But members of the faculty from the 1930s and 1940s, when quizzed about the matter, without exception name Graham as the person primarily responsible for the growth and development of the school during this period.

Jack Rigney perceived Graham as a man with a great vision of what the university could mean to the state of North Carolina, and one who recognized that agriculture had to be a much more influential part of the whole system than it was.[12] But he did not operate alone. Dudley Bagley of Currituck County has been identified as one of the agricultural leaders of the time who was close to Graham and served as an adviser to him.



Frank P. Graham

Ralph Cummings said he had been aware for some time, when he joined the faculty, that Graham was looking for a means of putting

the school into a position of leadership and service to the nation. He could recall hearing Graham say that quality was all important and that if a person was not sufficiently good for the best institutions he was not good enough for North Carolina.[13]

W. E. Colwell, recalling his first contact with Graham, provides an illustration of the detailed attention Graham gave to the selection of new personnel in the school:

> When I was on interview in North Carolina in March of '42, deciding whether with my new Ph.D. I was going to N.C. State with Ralph Cummings, Baver and company or whether I was going to another place, Ralph took me over to Chapel Hill, which I presume was customary of all candidates in those days. I don't suppose we spent more than 30 minutes with President Graham, but he made you feel like you really wanted to come to N.C. State. I am sure that a part of my decision was based upon his very strong personality.[14]

University President William C. Friday saw Graham as an individual with a keen conception of basic and sophisticated research but one who could also relate agricultural programs to the practical use of the people.[15]

Some recognition for Graham's contribution to the school came when the *Progressive Farmer* selected him as the 1940 "Man of the Year" in service to North Carolina agriculture.[16] The January, 1941, issue of *Extension Farm-News* reported his selection as follows:

> In announcing the selection for 1940, Dr. Clarence Poe, editor of The Progressive Farmer, wrote: "By being made head of the Consolidated University of North Carolina . . . President Frank P. Graham had an opportunity either to greatly discourage and diminish or to greatly encourage and enlarge our own North Carolina agricultural college. Because he was big enough of brain and heart to choose the latter course, we honor him as 1940 'Man of the Year' in service to North Carolina agriculture."
>
> The honor to Dr. Graham is being widely acclaimed on the State College campus. Dr. Graham secured funds in 1940 for greatly enlarging the agricultural research program of State College and for beginning the virtual equivalent of a "Kenan Fund" for getting and keeping the foremost leaders in agricultural research, teaching and Extension.

The Missouri-Ohio State-Cornell Connection

From time to time, interesting and unplanned linkages among institutions of higher learning develop. But probably few linkages with greater impact have ever developed than the one involving North Carolina State College, the University of Missouri, Ohio State Uni-

versity, and Cornell University. Competent and influential people in soil science at three eastern and midwestern institutions had a major impact on soil science, agronomy, and North Carolina State's School of Agriculture as a whole. This linkage is of special interest because it developed at a time when it was to have a major influence on strengthening North Carolina State's School of Agriculture.

The beginning of that relationship appears to have been the arrival of Franklin Davis from the University of Missouri at North Carolina State College in 1929 to assist in the teaching of soils. Professor M. F. Miller, head of the soils department at the University of Missouri, wrote to Professor Davis inquiring if he had a student to recommend for a graduate fellowship. Professor Davis rcommended Fulton Lutz, one of his best students at North Carolina State College, from Catawba County. Lutz received his master's degree in 1930 and his Ph.D. degree in 1934 as the first doctoral student under the tutelage of Leonard Baver, who was then at the University of Missouri. He also had taken courses under another soils professor, Richard Bradfield, who moved later from Missouri to Ohio State and from there to Cornell.

Lutz returned to North Carolina State College as professor of soil science and recommended a brilliant student he was teaching and advising, Ralph Cummings, for graduate studies under Bradfield (then at Ohio State University). Cummings studied under Bradfield and R. M. Salter, another soil scientist at Ohio State, as well as under Leonard Baver, who had gone from Missouri to Ohio. When Bradfield moved from Ohio State to Cornell University he invited Cummings to join him there as a member of his faculty.

When Frank Graham was picking the names of prominent soil scientists to consider for leadership roles at North Carolina State College, Bradfield and Salter were among those proposed. It appears that Bradfield and Salter had discussed the North Carolina situation between themselves. They seemed to have agreed that whoever accepted the leadership role at North Carolina State's School of Agriculture would be well advised to simultaneously bring in two additional strong leaders—one in agronomy and one in animal science.

When Salter became director of the experiment station and Baver head of agronomy, no immediate move was made to recruit a new head of animal science. When Baver succeeded Salter as director, he immediately employed Ralph Cummings, then at Cornell, as head of agronomy. Had Bradfield accepted the top position earlier, it is

possible that he would have brought Cummings with him. Baver also proceeded to recruit a leader in animal science. For this responsibility, he turned to A. O. Shaw at Kansas State University, who was a cousin of Bryon Shaw, a soil scientist with the USDA. Byron Shaw had been a graduate student under Baver at Ohio State University. When Baver left North Carolina State College, Cummings succeeded him as director of research.

But the Missouri-Ohio-Cornell saga does not end here. When Cummings became director of research he was succeeded as agronomy head by W. E. Colwell who had studied under Cummings and Bradfield at Cornell. When Colwell was asked to assume the responsibility as assistant director in charge of tobacco research, he was succeeded as head of agronomy by E. T. York, who had gone from Auburn University to Cornell to work under Bradfield. R. L. Lovvorn, who later succeeded Cummings as director of research, knew Baver as professor at Auburn and the University of Missouri. Lovvorn was originally recruited by C. B. Williams, head of agronomy at North Carolina State College, based on the recommendation of Fulton Lutz, who had been in graduate school with Lovvorn at the University of Missouri before returning to the soils faculty at North Carolina State College. Lutz also endorsed the employment of Wallace Giles, who was a graduate student in agricultural engineering and also in the same graduate fraternity house with Lovvorn. Giles later became head of agricultural engineering.

David Mason was offered a research assistantship at Ohio State University in 1939 primarily because he wanted to work with Baver in some soil physical problems in the production of sugar beets in northwest Ohio. He was shocked to learn in the fall semester of 1940 that Baver, along with Salter, had accepted positions at North Carolina State College. In February, 1941, Baver invited Mason to come to State College. In addition to his work in agronomy, Mason had expertise in statistics and became head of the Department of Experimental Statistics at State College.

Among other soils or agronomy scholars who went to Cornell for graduate work or were recruited from Cornell were W. W. Woodhouse, C. D. McAuliffe, A. C. McClung, Thurston Mann, F. B. McCaleb, and Willie Woltz. Mann served as professor of crop science, head of the genetics faculty, and assistant director of research for tobacco.

Frank Graham did indeed open doors that brought top scholarship and leadership to the School of Agriculture. Because of North

Carolina's history as a row-crop state and widespread concern for soil conservation, it should not be surprising that Graham sought leaders from this discipline. Others who came from leading institutions in different disciplines have been equally competent. The impact of these great universities, through the scholars and leaders they produced, has been beyond measure in the emergence of the North Carolina State University School of Agriculture as a first-rate institution in the United States. It also serves to illustrate how high levels of competence may be developed and identified. While there is no evidence that similar networks developed in other disciplines, competent faculty members have been recruited from all major graduate schools in agriculture. In later years, increasing numbers of scholars and leaders have received their graduate training in North Carolina State's School of Agriculture and Life Sciences.

Experimental Statistics

Early in 1940, while riding on a train, Frank Graham quite by chance met W. F. Callander, head of the Agricultural Marketing Service of the U.S. Department of Agriculture. During their conversation Callander expressed the desire to help establish another statistical laboratory or statistical computing center similar to the one then in existence at Iowa State University where federal statisticians were trained and cooperative research with federal agencies was carried out.

Graham told him, "We will do it at North Carolina State College."[17]

Callander, C. F. Sarle, Bureau of Agricultural Economics, USDA, A. E. Brandt, Soil Conservation Service, USDA, and others were contacted regarding the type of program to establish and persons to lead it. On the local scene, Frank Parker, state statistician in the Federal-State Crop Reporting Service in the North Carolina Department of Agriculture, was especially supportive of the idea.

G. W. Forster, head of the Department of Agricultural Economics, was named to head the search committee. Forster wrote to a number of people soliciting nominations for the job, including G. W. Snedecor, who headed the statistical laboratory at Iowa State. After writing his letter recommending individuals at Iowa State, Colorado State University, and the University of Wisconsin, Snedecor showed the letter to one of his colleagues.

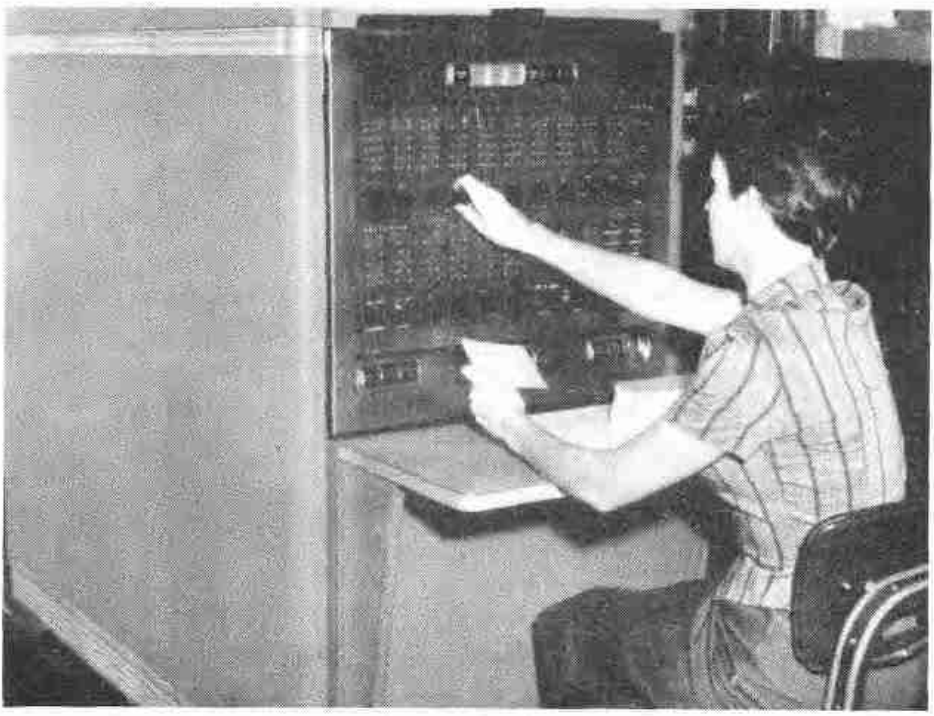
"Can you think of anybody else whose name I ought to put down in response to this?" he asked.

"I don't see my name on there," was the reply.

Snedecor said, "That is an oversight, isn't it?" He put a postscript on the letter which read: "If you are interested in a woman, there is a woman on my staff who is eminently qualified to fill the position that you described and her name is Gertrude Cox."

An offer dated September 24, 1940, was received by Miss Cox, and she reported for work November 1, 1940, the first woman professor on the faculty of North Carolina State College.[18] The Department of Experimental Statistics was formally approved by the board of trustees on January 22, 1941, with Miss Cox as head of the department, a position she held until 1949.

The major objectives of the Department of Experimental Statistics were to provide statistical consulting, computing assistance, and service courses for the research staff. However, according to Robert J. Monroe, one of the first recruits for the new program, Frank Parker and the USDA representatives who endorsed the program and assisted in its formation were thinking primarily in terms of accumulating data rather than complicated analyses.[19] Their main goal was to achieve a more precise estimate of the crop acreage and crop and livestock production through samples constituting less than a total



The school's first computer was installed in Patterson Hall in 1956, under the direction of the Department of Experimental Statistics.

census. Monroe said he believed that the strong support for the program in North Carolina came because this state had the most diverse agricultural production of all the southern states. It would seem that if sampling for statistical reporting purposes would work in North Carolina it would work anywhere.

In the teaching area, a number of new courses were developed, and two courses, one in agronomy and one in agricultural economics, were moved to the new department. During the first summer, in 1941, a special summer course attracted 83 students. Also during the early years, three one-week conferences attracted 243 researchers from the southern states, and the young department was well on the way to becoming a regional institution.[20]

With financial support from the U.S. Department of Agriculture and the Rockefeller Foundation, the department grew rapidly. In September, 1944, the university Board of Trustees approved establishment of the Institute of Statistics and appointed Miss Cox as director. In 1946 the Department of Mathematical Statistics was created at Chapel Hill and the Institute of Statistics was given an all-university status. In 1949 a third department was added to the institute—the Department of Biostatistics in the School of Public Health at Chapel Hill. Jack Rigney was named head of the Department of Experimental Statistics at State College, permitting Miss Cox to give full time to her leadership of the Institute of Statistics.[21]

The department was heavily involved in statistical consulting and advisory activities from its formation in 1941. The first consulting was with research personnel of the experiment station. Complete service was provided, from planning and design of experiments and surveys to collection and analysis of data and review of manuscripts.

Once the demand for statistical services had been established, the salaries were budgeted so that several statisticians were joint employees of the Department of Statistics and other departments such as agronomy, animal industry, horticulture, and agricultural economics.

How well did the faculty take to the new service when it was provided in 1941? Research in the experiment station at that time was in a rather rudimentary state, according to Ralph Cummings. "The idea of establishing procedures with confidence limits such as those that the modern trend in statistics would bring in was not well accepted."[22]

Jack Rigney, however, remembered that there were already on the faculty "people who were bright and very able and who were

anxious to get research programs off the ground and really going, and the initial impact was tremendous."[23]

Cummings believed that bringing in statisticians who were trained or experienced in subject matter fields, such as R. E. Comstock in animal science; Jack Rigney, Paul Harvey, and Harold Robinson in agronomy; and R. L. Anderson in the social sciences made the program more acceptable in the various departments.

Certainly one stimulus that led to use of the statisticians in the design and analysis of research was Baver's allocation of a certain percentage of the funds for each project to the statistics department. (Recollections on the amount range from 2 to 5 percent.) This practice was later found to be in violation of budgeting regulations, but it had been effective. Many researchers figured that "if we're paying for the service we may as well use it."

What was the overall impact on the research program? Rigney said, "It was a most opportune historical moment that statistics was added at that time because it was capable of adding a genuine dimension to the whole thrust in the research program."

Horticulturist Fred Cochran judged that the Institute of Statistics helped to guide a great deal of the research in the School of Agriculture in the early years, particularly by offering the services of analysis and proper design of the experiments. "I think it was quite evident at science meetings all over the country that reports from this institution were probably recognized as some of the best organized and most scientifically conducted because of this type of cooperation between the commodity groups and Experimental Statistics Department here on the campus, which was a part of the Institute."[24]

When Robert Monroe attended the 1951 annual meeting of the American Society of Agronomy, he found other agronomists intrigued by what was going on at North Carolina State College. The agricultural research program, he believed, had achieved a significant national stature.

However, by the mid-1940s the word of the up-and-coming program had not reached everybody. D. B. Anderson was interviewed for the head of the Botany Department at Michigan State University in 1945. After discussions with Frank Graham, J. W. Harrelson, and L. D. Baver, Anderson informed the dean of the School of Science and Arts at Michigan State that he had decided to remain at North Carolina State College. That dean wrote back to Anderson that, "I feel you have bet on the wrong horse."[25]

More Farm Power

Power farming was coming to North Carolina. Many farmers had used tractors for the main land preparation jobs, to pull grain binders, and as stationary engines to power ensilage cutters, threshing machines, cotton gins, and sawmills. But farm machinery had been put on rubber. Smaller tractors had been developed for the farms of the South. In the late 1930s tractor-pulled combines swept over the state, and a few farmers had switched from mule to tractor power for planting and cultivating.

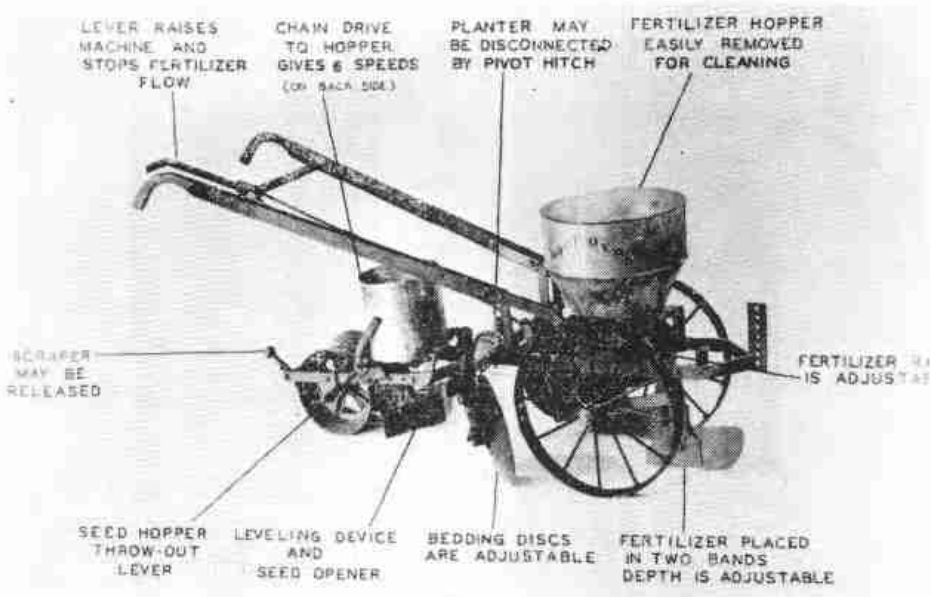
Yet up to 1937 little or no college research money had been allocated to agricultural engineering. During the summer of 1937, G. W. Giles, on his own time, with his own money, and with scraps from the junk yards, built a prototype lespedeza harvester. Giles recalled that the harvester never amounted to very much, but one day Director Winters told Giles that if he was that dedicated and firm in his belief in the need for improved equipment he (Winters) would allocate Giles a few hundred dollars out of his contingency fund.[26]

It was not until L. D. Baver arrived in 1940, however, that a serious commitment was made to agricultural engineering research. One result was the Onceover—a combination fertilizer distributor-planter developed by engineer Wallace Giles with assistance from agronomist Emerson R. Collins and mechanical engineer F. B. Wheeler.

The machine, pulled with one horse, was credited with doing the work that was being done with six horses and six men. The six steps that the onceover machine replaced were opening the row, placing fertilizer and mixing it in the row, bedding one side of the row, bedding the other side of the row, leveling off the seedbed or ridge, and planting the seed. The machine would be especially helpful to small tobacco and cotton farmers and also useful in getting ready for ridge-planted tobacco or sweet potatoes by putting down two bands of fertilizer and bedding.[27]

In 1942 Giles teamed up with bacteriologist John Etchells, biochemist Ivan Jones, and J. H. Hilton of the Department of Animal Industry to study sweet potato vine harvesting. When sweet potatoes are harvested the vines are still fairly succulent and are a real nuisance in the harvesting operation. Tests indicated that the potato vines would make good silage for livestock feed if a practical way to harvest them could be devised.

The result was the development of a "finger wheel" rake. The harvesting of vines for silage failed for several reasons, but out of the



The Onceover fertilizer distributor and planter.

research came the patent for a wheel-type hay rake—the kind being used in 1984 on the majority of the world's farms.[28]

New Tobacco Varieties

When Ralph Cummings returned to the campus in 1942 he must have observed some new projects under way, but a number of the projects paying the greatest dividends were some that were under way when he had been there before as worker and student. In fact, his 1937 temporary assignment was as an associate soil chemist to investigate the causes (if there were causes inherent in the soil) for Granville wilt, a disease of tobacco. The long search for a control method for these and other disastrous diseases came to fruition during World War II in the form of resistant tobacco varieties developed at the extensive USDA and state research facilities (test farm) at Oxford.

Ready for farmer planting in 1941 were flue-cured varieties Nos. 400 and 401. Both exhibited resistance to black root rot. No. 400 was recommended for the piedmont area; No. 401 was suggested for use anywhere in the flue-cured area. Station researchers predicted that 401, when compared to a number of the other varieties, would add $40 to $50 per acre to the value of a farmer's crop.[29]

Resistance to black shank disease came with Oxford varieties 1, 2, 3, and 4. Approximately 3,000 acres of these strains were grown in 1943.

The long-awaited cure for Granville wilt came with Oxford 26 after many years and the screening of 1,034 different varieties from all over the world. The new variety was released to farmers in 1945, and in that first year some 40,000 acres of it were planted. The new variety met both the disease resistance and quality tests.

But neither farmers nor researchers were completely satisfied with the new varieties because they were not 100 percent resistant. In a few cases, where tobacco was grown under conditions favoring exceptionally severe disease development, as many as 20 percent of the plants could be lost. This loss was associated with the growing of seedlings on blackshank-contaminated beds or on fields where tobacco was badly diseased the previous year.[30]

So—although the search for better varieties had to be continued—farmers at last had tobaccos that could be grown on fields infected with both Granville wilt and black shank—fields where tobacco could not have been grown before.

Carolina Corn's the Best

All new crop varieties came with an area of adaptation attached to them. But nowhere was the area of adaptation more critical than with corn hybrids.

Corn production was given a boost when Paul Harvey arrived in 1938 to work with G. K. Middleton, who two years earlier had started developing corn hybrids adapted to the state. By 1940, 756 different experimental corn hybrids had been tested by station researchers at five branch stations and with two cooperating farmers. Of these 756 entries, 45.5 percent outyielded the best local variety, some by as much as 30 percent. The ones that outperformed the old-line varieties were those based on germ plasm of North Carolina breeding stock.

Out-of-state hybrids did not do well under North Carolina conditions. Early maturity; soft, poor quality grain; and susceptibility to weevils, earworms, and birds made their value questionable for farming in North Carolina, the researchers concluded.[31] Exceptions were several Kentucky and Tennessee hybrids that proved consistently good in the piedmont and mountain areas.

The help of North Carolina farmers was needed to produce seed once good hybrid stock had been selected. County agents picked farmers who would try crossing small quantities of seed in what were called apprentice plots. In 1941, 18 North Carolina farmers produced an estimated 100 bushels of hybrid seed. Each cooperator crossed five

strains of single-cross corn with his local variety. The parent single-cross seed, originated at neighboring or Corn Belt state experiment stations, were distributed by the North Carolina Crop Improvement Association, as directed by the Agricultural Experiment Station. Both yellow- and white-seeded strains were produced.[32]

By 1945, approximately 15,000 bushels of North Carolina certified hybrid seed corn were grown in the state. That same year in the coastal plains, North Carolina hybrids T-28, T-31, 1111, and 1114 outyielded Jarvis Golden Prolific by 31 percent. In the mountains, U.S. 282 increased grain yield 44 percent over the Jarvis variety. In the piedmont, two new yellow hybrids, N.C. 26 and N.C. 27, showed an average grain increase of 40 percent above the check variety grown with them.

The small grain breeding program had begun in 1936 when G. K. Middleton moved from the Crop Improvement Association to the station. The first wheat release from this program was Carala in 1940—a white-strawed variety selected from Alabama Bluestraw.

The first barley varieties released by the station were Davidson and Randolph in 1938 and Iredell in 1940, followed by Hooded 26 and Sunrise in 1942.

Oat varieties released were Letoria and Lelina in 1941, followed by Lemont in 1945.

Horticultural Breeding

The first new varieties from the cooperative strawberry breeding program were released in 1938.[33]

During the 11 previous years, some 60,000 seedling strawberries of known parentage, produced as a result of breeding work by the U.S. Department of Agriculture, had been grown at the Coastal Plain Test Farm. The best of these had been selected and tested in eastern North Carolina. By 1938 three varieties were judged ready for release.

The "Fairmore" variety originated as a cross between Blakemore and Fairfax. Noted for firmness and shipping quality and vigorous plant growth, it was recommended to commercial growers in eastern North Carolina.

"Daybreak" originated as a cross between Missionary and Fairfax. It was suggested as a home garden variety in eastern North Carolina.

"Eleanor Roosevelt" originated as a cross between Bellmar and Fairfax. The fruit was unusually large, and this variety was suggested

for commercial use throughout North Carolina and in states north and westward.

The event at which the naming of this strawberry was first announced was an auspicious one. On June 12, 1937, Mrs. Roosevelt attended the third annual strawberry festival at Wallace, toured the Resettlement Administration facility at Penderlea, and visited the Lower Coastal Plain Test Farm at Willard. Arriving on an early morning train, Mrs. Roosevelt was taken to the test farm for breakfast, attended by more than 200 people. It was at this event that Superintendent Charles Dearing announced that the new strawberry variety would be named in honor of Mrs. Roosevelt.

NC-27 was one of the most popular yellow hybrids developed by station personnel.

Highway 117 had been paved out to the farm the week before, and the seven miles from the farm to Penderlea were sprinkled with water to hold down the dust, but clouds of dust nonetheless surrounded the motorcade as Mrs. Roosevelt (at her insistence) visited all sections of the resettlement farm, where some 600 landless people had been relocated on farms of their own. The special guest held up well through the hot, dusty day, according to news reports. The resettlement activity was one of her favorite projects.

At the close of the day she boarded the train to return to Washington. Dignitaries attending the activities included Gov. Clyde R. Hoey, Senator Robert R. Reynolds, and Congressman Graham Barden. An estimated 10,000 people came out to see and hear the nation's First Lady.[34]

From the same strawberry breeding program came "Massey," a variety released in 1940 and named to honor Prof. W. F. Massey. It originated as a cross between USDA No. 634 and Blakemore. It was described as more vigorous than most varieties, with high dessert quality, beauty, and large size. It was noted for holding its high aroma after being shipped to distant markets.

Until the new varieties arrived, Blakemore was the most popular variety with North Carolina growers. After 1940, the Massey was the primary commercial variety until Albritton was introduced in 1950. Horticulturist E. B. Morrow was the local cooperator on these strawberry breeding experiments.

A new Irish potato, the Sequoia, was available for western North Carolina farmers in 1940—the result of 10 years work by M. E. Gardner and Robert Schmidt. In 1930 a cross was made from Green Mountain, an old variety, with, Katahdin, a newer one. True seed from the cross was planted and the best seedlings kept for further testing. The new variety outyielded older varieties and contained resistance to leaf hoppers, flea beetles, and late blight.

In other horticultural breeding research, a red carnation especially adapted to southern conditions was released to florists in 1940. The new variety resulted from a cross made in 1935 by horticulturalists Glenn Randall and J. G. Weaver. And the Cape Fear pecan, selected from approximately 1,000 seedlings planted at Willard in 1912, was introduced in 1941.

The Willard Red

Carey H. Bostian arrived on the campus in 1930 to fill the zoologist position in the Department of Entomology and Zoology. As a student he had majored in genetics with a minor in zoology. For five years, as the only zoologist on the staff, he taught zoology, anatomy, embryology, and physiology as well as genetics. The addition of Reinard Harkema to the zoology staff permitted Bostian to give more attention to the teaching of genetics.

One of Bostian's genetics students was Roy Dearstyne, head of the Poultry Department, who audited the class one quarter. While in the class, Dearstyne became obsessed with the idea that the hope of the poultry industry lay almost entirely in breeding. Bostian argued with Dearstyne that he was expecting too much, that genetics was not an overnight thing and that it would take a good many years to do what Dearstyne wanted to do. Bostian recalled:

> I remember one interesting conference we had when he convinced Dr. Winters that the Poultry Department should undertake some breeding work and that they might use me on a part-time basis. I wasn't enthusiastic about it. I told Dr. Winters and Dr. Dearstyne that I didn't know anything about chickens, that I was a geneticist. Dr. Winters said, "Well, if I had a choice between a geneticist who didn't know

anything about chickens and a poultryman who didn't know anything about genetics, I would take the geneticist for this kind of job."[35]

Emphasis was placed on the identification of high-producing individuals. In 1935 one White Leghorn pullet in the college poultry flock laid 313 eggs and another laid 303. The average North Carolina chicken at this time was laying around 100 eggs per year. During the 1942-43 laying year, a Rhode Island Red hen laid 333 eggs and a White Leghorn 334 eggs in 365 days. A Broad-Breasted Bronze turkey hen laid 430 eggs in four laying years. Breeding studies of crossbred chicks for broilers and layers showed that crossbred pullets and layers might be superior to purebreds.

The Willard Red was released to the North Carolina poultry industry in 1945-46 (about 20,000 chicks a year from 1946 to 1955). This strain had a flock average of around 230 to 240 eggs per hen per year and good resistance to leukosis. Breeding of this strain of Rhode Island Reds was started at the Coastal Plain Station at Willard in 1920. The origin of the initial stock is not known, but it probably came from exhibition birds used at the central plant in Raleigh. The size of the flock was approximately 200 to 400 hens from 1922 to 1946. When the poultry plant at Willard was expanded in 1947, about 1,000 layers were kept each year.[36]

During 1946 and 1947 the researchers developed inbred lines of Reds, Rocks, and Leghorns for producing hybrids of superior egg production. Also, they developed inbred lines of three strains of Barred Plymouth Rocks and New Hampshires for superior broiler producers. By 1949, 10 lines of poultry had been intensively inbred (for three to five years) to produce hybrid chickens. Eight promising lines were developed from the 10 lines of White Leghorns, New Hampshires, Barred Plymouth Rocks, and Rhode Island Reds. This breeding work showed that "Hybrid Chickens are on the way."

Teaching Upgraded

On January 31, 1944, the university Board of Trustees named Baver associate dean of the School of agriculture and director of undergraduate instruction in the school. Z. P. Metcalf, longtime director of undergraduate instruction, was named associate dean of the graduate school.

Instruction had not been overlooked in the program of upgrading research. Just two weeks earlier, on January 15, 1944, the execu-

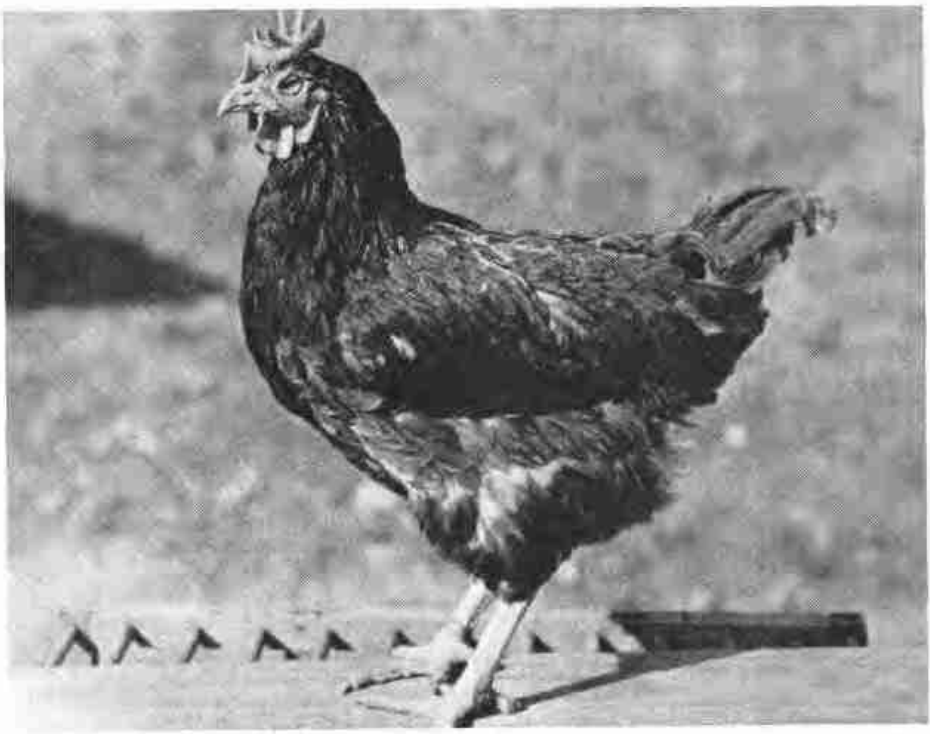
tive committee of the board had instructed the president and controller of the university "to secure information as to size, number of teachers, salaries, facilities, etc., from the leading engineering and agricultural schools in America for the purpose of comparing them with the agricultural and engineering schools at State College, the aim being the ultimate development of these schools to rank among the leading engineering and agricultural schools in the country."[37]

A 1941 report by Z. P. Metcalf, director of instruction in the school, showed that of the 62 faculty members in the school, 25 (40 percent) held the doctorate, 31 had obtained a master's degree, and 6 had earned only the bachelor's degree. (Across the South, the percentage of faculty with doctorates ranged from 27 to 52.) These 62 men had received their first college training from 31 institutions; those holding the doctorate had received this degree from 15 different institutions.[38]

In 1946 Baver revised the four-year program and rejuvenated the short course offerings (see Chapter 15).

During the 1940s and 1950s a significant activity in the School of Agriculture was the development and expansion of graduate studies. Prior to this, doctoral programs in most disciplines relating to agriculture were almost nonexistent in southeastern universities. Agricultural graduates from this region found it necessary to apply to midwestern and eastern universities to pursue advanced level studies. Some of the early Ph.D. degrees were actually granted at Chapel Hill after the candidates, supervised by a committee composed of representatives from both campuses, had completed their programs. There was a rapid increase in graduate work in many departments in the School of Agriculture beginning with David Mason in statistics and agronomy and Tom Quay in zoology in 1948. The first doctoral degrees in animal sciences were awarded to G. Matrone and A. E. A. Hudson in 1950 and 1951, respectively. Robert Redfern was awarded the first Ph.D. in dairy manufacturing in the south in 1952. These programs resulted in many southern schools of agriculture sending their graduate students to North Carolina State College instead of midwestern or eastern universities. For several years, the School of Agriculture was a pacesetter in graduate work in the Southeast.

Before Baver could give much direct attention to the teaching program, another important event occurred. In 1945 I. O. Schaub expressed the desire to relinquish one of his jobs—dean of the School of Agriculture and Forestry. On May 25, 1945, Baver was appointed to



This Rhode Island Red hen in the station breeding program laid 333 eggs in 365 days during the 1942-43 laying year.

the deanship, retaining his position as director of the experiment station. Schaub continued as director of the Agricultural Extension Service.

Baver Says Goodbye

Baver's tenure as dean was also short. He resigned January 1, 1948, to accept a position with the Hawaii Sugarcane Growers Association. In his seven years with the school he made a significant impact. In fact, the place would never again be the same. What kind of a man was he?

"A hustler," the June, 1943, *Extension Farm-News* called him.

"As dynamic an individual as ever lived," is how he appeared to Robert Monroe.[39]

Aggressive, impatient, abrasive, and abrupt are other terms that have been used to describe him. Also brash. In his letter to Dean J. W. Harrelson acepting the appointment as director of the experiment station, Baver suggested that he should be named dean of the school when I. O. Schaub retired.[40]

A state of ferment developed during Baver's period as dean. He created that state by shifts in personnel, by realignment of responsi-

bilities, and by presenting to the faculty a plethora of new ideas. Carey Bostian rose from instructor to chancellor and observed a large number of administrators during his years with the institution. According to Bostian, when Baver arrived he was aghast at the lack of planning for most of the research that was going on. A result was the rapid development of the statistics program. Bostian said that in choosing faculty members Baver had very high standards and found a way to supplement their salaries so they could be enticed to come from other universities. He replaced some department heads and scared others. He didn't seem to mind if a department head became unhappy because he was called on the carpet for not doing his job properly.

Bostian thought Baver had not cultivated the agricultural leadership of the state, as was done by administrators in more recent years, and when he announced that he was leaving, the people of the state—as well as the members of the faculty—did not express much regret. In some ways, Bostian believed, "it was probably fortunate that Baver didn't stay longer because there had been built up a good deal of resentment on the part of some faculty members."[41]

Apparently undeterred by adverse reactions, Baver went about his job with great enthusiasm. James H. Jensen was interviewed in late 1944 for the position of head of the plant pathology section of the Department of Botany and Plant Pathology. How did Baver present the possibilities of North Carolina to him?

> In his own inimitable, enthusiastic, jumping-up-and-down way. He was a very enthusiastic man. His general comment was that the School of Agriculture at North Carolina State was on the move. The Department of Agronomy had been fairly well established. A number of very excellent people were already on hand and he was interested in having a good Department of Plant Pathology to go hand-in-hand.[42]

Interviews could take place anywhere. E. W. Glazener, on the faculty of the University of Maryland, was interviewed in a Washington, D.C. hotel. R. J. Preston, on the Colorado State University faculty, came down from a summer camp high in the mountains to meet Baver in the train station at Laramie, Wyoming.

In addition to his enthusiasm for the potential of the agricultural school and North Carolina agriculture, Baver apparently promised a lot. When W. M. Roberts came to the campus for a recruitment visit in 1942, he found that the dairy manufacturing program consisted of Extension Specialist W. L. Clevenger, who had achieved a high degree of success in establishing dairy and cheese plants and assisting

milk processors, and the following equipment: a small hand bottling machine, a surface cooler, a 150-gallon vat processor, a 40-gallon batch freezer, and a small beat-up ice cream homogenizer—none of it being used.[43]

With Baver's promise of adequate personnel and equipment, Roberts joined the staff on August 1, 1943, to head up the dairy manufacturing work. Within a few years he had a staff consisting of himself, another dairy product man (W. S. Arbuckle), a microbiologist (Marvin Speck), and a biochemist (Leonard Aurand). A few years later the section was processing milk and ice cream and had a properly equipped research laboratory.

"Those were momentous times," Jack Rigney recalled. "Baver was one of the most dynamic leaders we have had here and under his overall leadership the School of Agriculture just blossomed and took off."[44]

On his departure Baver's positions were parceled out to several people. James H. Hilton, head of the Department of Animal Industry, was promoted to dean. He was succeeded as department head by D. W. Colvard. Ralph W. Cummings, head of the Department of Agronomy, was placed in charge of the research program with the title of associate director of the experiment station. He was succeeded as department head by agronomist W. E. Colwell. Named to direct the undergraduate teaching program was Carey H. Bostian, with the title of associate director of instruction. Going into the new position of assistant director of extension was David S. Weaver, head of the Department of Agricultural Engineering. He was succeeded as department head by Wallace Giles.

"Hardly any agricultural college in America has as able leaders as the men who have recently come into key positions in North Carolina's agricultural program." So commented Baver as he left for Hawaii.[45]

But he also left a legacy. Salter and Baver were men of vision. Once their program was started, the momentum never stopped.

NOTES TO CHAPTER 12

1. *Extension Farm-News*, October, 1938, p. 1.
2. In a story printed in the *Henderson Daily Dispatch* under the date of July 15 and credited to their Raleigh bureau, the paper said: "The perennial feud between State College and the North Carolina Department of Agriculture is blocking the appointment of a research head for the college." The story further charged that the feud was "thereby blocking establishment of any real plan for agricultural experimentation and greatly handicapping the efforts of those who are steadfastly seeking to jolt the state out of the 'cash-crop' rut."
3. Thomas Kearney, who made a detailed study of the university, believed that Graham was dissatisfied with the leadership of the three schools at State College—agriculture, engineering, and textiles. The resignation of Winters offered him his first opportunity to make changes or to become involved.
4. D. B. Anderson interview, May 2, 1979; confirmed by several other interviewees.
5. J. Fulton Lutz interview, May 3, 1979.
6. Wilson, Louis R. *The University of North Carolina Under Consolidation, 1931-1963, History and Appraisal.* Chapel Hill, N.C.: University of North Carolina Press, 1963, p. 163.
7. Henry Averill, in a story distributed to the afternoon newspapers of the state, dated August 6, 1941, said the full story of Salter's resignation did not appear in the bare statement that he quit in order to take the USDA job. Averill admitted that the offer was attractive, but claimed that the offer had been before Salter for some time, "which makes it appear that the Salter position here could not have been quite as pleasant and free from irritating incidents as appeared on the surface." Averill said there was ample evidence that under the Salter regime relations between State College and the State Department of Agriculture became more harmonious and cooperative than in decades. "Everywhere it was proclaimed that Dr. Salter was primarily responsible for the improved relations," Averill continued. However, the news story stated that Salter had experienced difficulty with Assistant Budget Director Bob Deyton, particularly in a case concerning the purchase of additional land for the McCullers station. Also, Averill stated that Salter had run into difficulties with Dean Schaub, and through secondary sources quoted Salter as saying in effect that "the dean is still the czar." In a letter to Schaub dated August 8, 1941, Salter vigorously denied the allegations in the story and told Schaub that he wished to assure him that he had "only the deepest gratitude for the kindness you have shown me, for the valuable help you have given me whenever I called on you, and for the uniformly cooperative attitude you have shown in all matters pertaining to my work." In his July 12 letter of resignation to President Graham, Salter had stated: "I sincerely hope that my decision to relinquish my position here will not be interpreted as indicating any dissatisfaction with the treatment or support I have received from yourself or others in authority. In fact, everyone has been so fine to me and so sympathetic with the policies and program I have tried to inaugurate that I shall leave with a feeling of profound regret that I shall not have the opportunity to demonstrate my gratitude."

8. In the news release mentioned above (note 7), Averill stated that everyone agreed that Baver would carry on Salter's program. He said the appointment of Baver "indicates that there has been no weakening of the determination of Dr. Graham, backed by Dean (J. W.) Harrelson and the special committee headed by Dr. Clarence Poe, to bring about a complete rejuvenation and rehabilitation of State College's agricultural school." Averill believed Baver would continue to work for improved relations with the state Department of Agriculture and for continued progress of the College. "It appears certain that there is no chance of the college falling back into the same agricultural rut from which the Salter-Baver combine has done so much to remove it," Averill declared.
9. As department head, Cummings brought in W. E. Colwell, W. C. Gregory, W. L. Nelson, and N. C. Brady in 1942; B. A. Krantz and R. P. Moore in 1943; and D. S. Chamblee in 1944. R. W. Cummings interview, June 15, 1979.
10. A. O. Shaw interview, September 14, 1981.
11. Brought in were Walter J. Peterson in animal nutrition (later head of the Chemistry Department and then dean of the graduate school), D. E. Brady in meats processing with an assignment of working with the emerging freezer locker business, William M. Roberts in dairy manufacturing (later head of the Department of Food Science), and Ralph Comstock in animal genetics.
12. Jack Rigney interview, May 3, 1979.
13. Ralph Cummings interview, June 15, 1979.
14. W. E. Colwell interview, October 29, 1979.
15. William C. Friday interview, June 21, 1979.
16. It was the fourth year for this annual award. Previously recognized had been W. Kerr Scott, I. O. Schaub, and Harry B. Caldwell (master of the North Carolina State Grange).
17. Nourse, E. Shepley, et al., "Statistical Training and Research: The University of North Carolina System," *International Statistical Review*, Vol. 46 (1978), pp. 171-207.
18. H. F. Robinson stated in a July 18, 1980, interview that it was his understanding that Miss Cox left Iowa State because, as a woman, she had been refused faculty status and an appropriate salary adjustment there.
19. R. J. Monroe interview, November 13, 1980.
20. Early faculty in the department, either full or part-time, were Jack Rigney, R. L. Anderson, Jay Wakeley, Ralph E. Comstock, and A. L. Finkner.
21. In 1958 a portion of the quantitative genetics program was separated from the Department of Experimental Statistics to form the nucleus of a new Department of Genetics with Harold F. Robinson as the head. Robinson had been on the experimental statistics faculty since 1946. In 1960 the School of Physical Sciences and Applied Mathematics was created, taking from the School of Agriculture the departments of Experimental Statistics and Chemistry, and from the School of Engineering the departments of Applied Mathematics and Physics. Although administration of statistics teaching and associated academic activities were shifted to the new school, a Department of Experimental Statistics remained with the School of Agriculture because of research projects directly associated with that school's research program. By 1960 the department had awarded a total of 52 Ph.D. degrees and 51 M.S. degrees, and the faculty had grown to

19 members. In addition, the department contributed to student programs in most other graduate-degree-granting departments. Gertrude Cox also played a significant role in the development of the Research Triangle Institute (see D. D. Mason interview, February 13, 1980).

22. Ralph Cummings interview, June 15, 1979.
23. Jack Rigney interview, May 3, 1979.
24. Fred Cochran interview, January 9, 1980.
25. D. B. Anderson correspondence with D. W. Colvard, January, 1983.
26. G. W. Giles interview, November 14, 1980, and correspondence from Giles to W. L. Carpenter, October, 1983.
27. The *Progressive Farmer,* November, 1942.
28. Letter from G. W. Giles to W. L. Carpenter, November 27, 1984. Research was described in North Carolina Agricultural Experiment Station Special Circular No. 3, *Sweet Potato Vine Silage,* October, 1944; and Special Bulletin (no number) *An Invitation to Manufacture the Vine-Row Harvester,* July, 1946.
29. *Research and Farming 1941.* North Carolina Agricultural Experiment Station (annual report), p. 36.
30. *Research and Farming 1943.* North Carolina Agricultural Experiment Station (annual report), pp. 58-60.
31. *Agricultural Research in North Carolina 1939-1940.* North Carolina Agricultural Experiment Station (annual report), p. 11.
32. Several commercial seed firms originated with these early hybrid corn activities with farmers. The Watson Seed Farm is one example.
33. Darrow, Geo. M. and E. B. Morrow. *Breeding New Strawberry Varieties.* N.C. Agricultural Experiment Station Bulletin No. 320, 1939, 12 pp.
34. July 13, 1937, Raleigh *News and Observer* and interviews with W. C. Allsbrook, who attended the ceremonies, and Jesse Sumner, who succeeded Charles Dearing as superintendent of the Lower Coastal Plain Test Farm. Some think the decision to name the strawberry for Mrs. Roosevelt was a spur-of-the moment decision by Superintendent Dearing. At the least, he was chastised by his superiors for his hasty action.
35. C. H. Bostian interview, January 19, 1979.
36. Morris, Tom. *Poultry Can Crow at NCSU.* Published by the author, 1980, pp. 32-34.
37. Minutes, executive committee, Board of Trustees, January 15, 1944.
38. Letter from Z. P. Metcalf to J. W. Harrelson, December 9, 1941.
39. R. J. Monroe interview, November 13, 1980.
40. Letter from L. D. Baver to J. W. Harrelson, July 28, 1941.
41. C. H. Bostian interview, January 19, 1979.
42. J. H. Jensen interview, May 22, 1980.
43. W. M. Roberts interview, February 1, 1979.
44. J. A. Rigney interview, May 3, 1979.
45. Following retirement from the Hawaii Sugar Growers Association, Baver returned to Ohio State University for a while, where he did some teaching and writing. He wrote a book on soil physics. He was awarded honorary doctorates from the University of Hawaii and North Carolina State University.

13

Organization and Leadership for a Dynamic Age

Merger completed in 1950. Hilton the peacemaker. Colvard provides 1950s leadership. James and the growth period. Legates at the helm. Name changes for the school. Biology to the forefront. Changing departments. The training ground. In search of new ideas. Studies and surveys. Four big buildings. Other facilities. Research stations. Peace in the family.

THE 1923 ZOOK REPORT recommended that the Agricultural Experiment Station and the Agricultural Extension Service "be administered through the college in complete cooperation with the work of resident teaching." Also, agriculture would be one of the main divisions of the college with a dean in charge of each division.

This seems not to have been carried out at all times. Following Kilgore's brief tenure as dean (reportedly because of his inability to gain control over the teaching program), I. O. Schaub served as dean and director of extension from 1925 to 1945 and as acting director of research from 1937 to 1940. L. D. Baver was dean, director of research, and director of instruction from 1945 to 1948. J. H. Hilton filled the same positions from 1948 to 1950.

There appeared to be good cooperation, but during Baver's administration and Hilton's first two years, extension was not generally regarded to be among their responsibilities as deans.

Merger Completed in 1950

A major step in the consolidation of activities under the dean of agriculture occurred in late 1950 following the retirement of I. O. Schaub.[1] J. H. Hilton, dean of the school and director of the experiment station since January, 1948, continued as dean under the reorganization. R. W. Cummings, associate director of the experiment station since 1948, received the new title of director of research. C. H. Bostian, associate director of instruction during the same period, also received a new title—director of instruction.

David S. Weaver, assistant director of extension, succeeded Schaub as director of extension.[2] R. W. Shoffner was named assistant director of extension to succeed Weaver.

This move clearly designated the dean as the top official charged with the coordination of all phases of the school—teaching, research, extension. Also, Weaver and Cummings were authorized to perform as directors of their two agencies for purposes of executing documents relating to the U.S. Department of Agriculture. One clear indicator of a more consolidated program was the beginning in 1950-51 of a published annual report covering all three divisions of the school.

Hilton the Peacemaker

When Hilton succeeded Baver as dean in 1948, he brought to the deanship a distinctly different leadership style. Their personalities were different. Baver moved quickly and sometimes abruptly. Hilton was more suave and better oriented toward people. Hilton would have had difficulty doing some of the things that Baver did in discharging people and changing their duties.[3]

On the other hand, 35 years later the feeling of those who had been in the system at the time was that Hilton's following Baver provided a very effective sequence of administrations. Hilton, while calming the waters, was able to capitalize on the changes that Baver had made. He was able to advance the program without being blamed for stirring up personnel as Baver had done.

R. W. Shoffner thought Hilton's greatest asset was his public relations ability. He said Hilton could go into any group and get attention. "He could meet with any group and they respected him."[4] On the transition from Baver to Hilton, Shoffner said Hilton "picked up more or less the thoughts and programs that Baver had stirred up.

Hilton began to pick up the pieces and to put them into a program. He gained the support, very strong support, of all the leadership in the state."

Hilton's leadership surely contributed to the smoothness with which the 1950 reorganization proceeded. As new buildings became available in 1952 and 1953, extension specialists were housed with their research and teaching counterparts, and they began to report to their department heads instead of directly to the extension administration.

J. H. Hilton

The plethora of government agricultural agencies that had sprung up in the 1930s was cause for some concern, particularly with the older agencies. As a way to smooth working relationships among agencies with often competing assignments in North Carolina, the State USDA council was formed. (The name was later changed to North Carolina Board of Farm Organizations and Agricultural Agencies.) Eleven organizations and agencies jointly developed statewide agricultural programs in 1948, 1952, and 1961. Hilton was a leader in this movement.[5]

Hilton presided over the beginnings of the great change in North Carolina agriculture. The 1950 Census of Population did not yet reveal the dramatic changes taking place, showing roughly a 1-1-1 division of the North Carolina population among urban, rural farm, and rural nonfarm residency. The man on the street, and even the

R. W. Cummings

C. H. Bostian

D. S. Weaver

man on the farm, did not yet know or understand the changes under way. Hilton prepared the faculty and many of the state's leaders for the change that was to come.

He saw sizable budget increases in all areas and appropriations for facilities that would more than double the space then available for the School of Agriculture.

The new space, the increased budgets, expanded numbers of personnel, and the confidence for the school expressed by the farm people of the state when they approved the first "Nickels for Know-How" referendum in 1951 all led to high spirits and a feeling of optimism throughout the school. (See pages 352-3 for discussion of "Nickels for Know-How.")

Hilton possessed an important distinction as an administrator. He was the first nonagronomist to head the agricultural program. All of his training, research, and administration had been in animal sciences. It was expected that he would push animal agriculture, which he did. But here again he was able to capitalize on the work of Baver, who had put into practice a dynamic program of livestock feed production, including alfalfa and ladino-grass pastures. Hilton saw significant progress in livestock development in the state before he resigned in 1953 to become the president of Iowa State University.[6] He was succeeded by D. W. Colvard, head of the Department of Animal Industry.

Colvard Provides 1950s Leadership

The year 1953 was one of major change. In addition to the deanship change, Chancellor John W. Harrelson, who had headed State College for 19 years, retired. Named to succeed him was Carey H. Bostian, director of instruction in the School of Agriculture. He was succeeded as director of instruction by former State College agronomist Roy L. Lovvorn, who returned to the campus after three years as head of the U.S. Department of Agriculture's Weed Investigations Division at Beltsville, Maryland.

Colvard's successor as head of the Department of Animal Industry was J. W. (Joe) Pou.

Also in 1953, W. E. Colwell, head of the Department of Agronomy, was named to the new position of assistant director in charge of tobacco research. He was succeeded as department head by E. T. York, Jr.

During Colvard's seven years (1953 — 1960), massive changes came to the farm. Cotton production declined; livestock production increased. During the 1950s North Carolina began its move to become one of the nation's top poultry-producing states. Capital replaced human labor in farm production. Questions were raised and answers sought concerning marketing farm products and the role of the college in marketing.

D. W. Colvard

Colvard presided over an expanding research program, with increased funding—from $1,979,050 in 1952-53 to $4,379,433 in 1959-60. Projects ranged from the most basic to the most practical. Outside funding was becoming an important part of the budget. Examples were the development project in Peru and the Agricultural Policy Institute.

Following the big facilities expansion program of the early 1950s, the next major building activity came when the General Assembly allocated funds to enlarge Polk Hall in 1959.

Colvard also presided over a declining student enrollment in agriculture, but several late-1950s activities laid the base for dramatic increases in enrollment during the coming decade. An "open house" first held by the School of Agriculture in 1959 later became a university-wide function and was still an important student recruitment activity in 1984.

A two-day symposium in December, 1957, entitled "Planning for the Future in the School of Agriculture" focused on the enrollment problem. Participants included visiting deans of agriculture, agribusiness leaders, educators, and members of the faculty. In this meeting consensus began to develop concerning a proposal that had been under discussion among the administrative staff regarding a revision of the curriculum. H. B. James, director of instruction, and J. W. Pou, head of Animal Industry, presented and led the discussion on the proposal that the curriculum be divided into three major sections emphasizing agricultural science, agricultural business, and agricultural technology.

As an important addition to the teaching program, the 1959

General Assembly approved a request to establish a two-year program in agriculture.

Colvard helped develop the "agribusiness" concept, giving agriculture a broad definition. He organized advisory committees to help direct the school's programs. In a search for new ideas, trips were made to other states and speakers were brought to the campus.

From the federal government came funding for new extension programs. But in North Carolina the governor and private citizens asked questions about the need for extension and its efficiency. Colvard was able to allay criticism through a study committee that recommended major changes in structure and programs.

Colvard was also the overseer of the college's first major international activity—a foreign assistance program in Peru. Research Director R. W. Cummings was selected to head that program in 1955. During his two-year absence, Director of Instruction R. L. Lovvorn was moved into the position of acting director of research. The vacant resident instruction position was filled on an acting basis, first by Botanist H. T. Scofield and then by Victor A. Rice, a 1916 State College graduate who had retired as the dean of the School of Agriculture at the University of Massachusetts.

Another change in 1955 was the creation of a new position of assistant director of research, filled by H. A. Stewart, head of the animal husbandry section in the Department of Animal Industry.

The school administrative team in 1959. Seated, left to right: H. C. Folks, asst. director of instruction; R. W. Shoffner, asst. director of extension; Ruth Current, asst. director of extension; D. S. Weaver, director of extension; H. B. James, director of instruction; D. W. Colvard, dean; R. L. Lovvorn, director of research; K. R. Keller, asst. director of research. Standing left to right: C. W. Williams, administrative officer; H. A. Stewart, asst. director of research. Not pictured: C. B. Ratchford, asst. director of extension.

Also in research, W. E. Colwell resigned in 1957 to return to the family farm in Nebraska. He was succeeded by Kenneth R. Keller as assistant director in charge of tobacco research.

Cummings did not return to the college following his two years in charge of the agricultural mission to Peru, opting instead to join the Rockefeller Foundation in India.[7] In 1957 Lovvorn was promoted from acting director to director of research, and H. B. James, head of the Department of Agricultural Economics, was named director of instruction. James was succeeded as department head by C. E. Bishop.

In other administrative changes in the 1950s, Homer C. Folks filled the new position of assistant director of instruction in 1959, with the primary responsibility of developing and administering the new two-year program, and C. Brice Ratchford succeeded retiring John W. Goodman as assistant director of extension in 1954. Ratchford resigned in 1959 to become extension director in Missouri and was succeeded by George W. Smith in 1960. Also in extension, state home demonstration agent Ruth Current's title was changed to assistant director of extension in 1958.

Colvard resigned in 1960 to accept the presidency of Mississippi State University.[8] He was succeeded by H. B. James.

James and the Growth Period

The college and university administrations again looked inward in selecting James, a school leader, to replace Colvard as dean. As director of instruction, H. Brooks James had been the chief architect in the design of a new instruction program in 1958, and it became his responsibility to develop and administer the new two-year agricultural program. During the 10-year period from 1960 to 1970, James and E. W. Glazener, who succeeded him as director of instruction, saw the number of students in on-campus agricultural programs grow from 907 to 2,155.

Student enrollment was only one of the growth areas during James's tenure. The experiment station budget increased from $4,379,433 in 1959-60 to $11,624,226 in 1969-70. During the same decade, the extension budget increased from $5,286,530 to $10,149,967. A major building program was carried out. The number of faculty members in the school increased from some 480 in 1960 to approximately 750 in 1970.

The James administration participated in further integration of extension specialists into the departmental programs. A number of specialists were given tenure and faculty rank in 1962. In 1963 a new program to provide graduate instruction for extension personnel was launched.

International activity was greatly expanded, with some 30 full-time positions in Peru during the height of the Peruvian program. The school joined four other universities in an international soils program.

H. B. James

Environmental concerns received attention. Agriculture was recognized as a polluter of the environment and also as a victim of the effects of pollution. The school entered into marine sciences and water resource programs.

Planning became a top priority. An agricultural program was developed for Governor Terry Sanford in 1961. Long-range plans were developed by the school and a series of five-year extension long-range plans was implemented.

There was a great expansion in the biological sciences area. Two new departments were created—Biochemistry and Microbiology.

Marketing and food processing moved to the forefront. In 1961 a new department was created to give emphasis to food processing. That same year a new position, entitled assistant director for marketing and jointly funded by research and extension was established. J. C. Williamson, an agricultural economist, filled this position until 1968, when he was appointed assistant director of research upon the retirement of H. Arlo Stewart. Following the 1970 resignation of Research Director Roy L. Lovvorn to become the administrator of the Cooperative State Research Service of the U.S. Department of Agriculture. Williamson moved into the top research post in the school. He was succeeded as assistant director by Ralph McCracken.

Other station administrative changes in the 1960s included the appointment of H. F. Robinson as assistant director and head of the newly created Institute of Biological Sciences. After Robinson was promoted to university dean for research, this position was filled by

Nash Winstead from 1965 to 1967 and by Lawrence Apple from 1967 until the institute was discontinued in 1971.

James oversaw considerable shuffling of the extension administration. On his retirement in 1961, Director D. S. Weaver was given a two-year appointment as special assistant to the dean. At the same time, Assistant Director R. W. Shoffner was appointed director for a two-year period. Also, George Hyatt, Jr., head of the Department of Animal Science, was given the position of associate director, to become director in 1963. At that time Shoffner, who was not fully in agreement with these changes, would succeed Weaver in the position of assistant to the dean. Shoffner filled that position for only one year, opting to finish out his long association with the college as the director of foundations. The position of assistant to the dean was discontinued.

On Hyatt's elevation to director in 1963, Assistant Director George Smith was moved into the associate director position, which he held until his accidental death in 1970.

J. E. Foil served as assistant director for county operations from 1963 until 1975. In 1968 the position of assistant director for marketing (one-half extension), held by J. C. Williamson, was made a full-time extension position for marketing and special programs, to which George Capel was appointed.

In the position of assistant director for home economics, Ruth Current retired in 1961 and was succeeded by Eloise Cofer the following year.

Another retiring veteran was L. R. Harrill, assistant director for 4-H programs, in 1963. Carlton Blalock was named to succeed him in 1964.

A new position, that of assistant director for training, was created in 1963. It was filled by E. J. Boone, who would also serve as head of

R. L. Lovvorn

E. W. Glazener

R. W. Shoffner

the emerging Department of Adult Education.

In 1965, the position of Negro state agent, filled by R. E. Jones, was changed to assistant director.

In resident instruction, E. W. Glazener, head of the Department of Poultry Science, was named to succeed Brooks James as director of instruction in 1960. Serving as assistant director in this division were Homer Folks (1959-1963), J. N. Young (1963-65), Darrell Miller (1965-67), and H. B. Craig (1967).

James resigned in 1970 to become vice-president for research and public service of the Consolidated University of North Carolina.[9] E. W. Glazener served as acting dean until J. E. Legates was named dean in 1971.

Legates at the Helm

J. Edward Legates joined the faculty of the School of Agriculture as a specialist in animal breeding in 1949. In 1958 he was appointed head of a new section for animal breeding in the Department of Animal Industry. From there he moved to the deanship in 1971.

The growth experienced in the 1960s continued through the early 1970s before leveling off as both state and federal budgets came under pressure from lawmakers and taxpayers.

The budgets did increase from 1970 to 1982. The station budget increased from $12,371,906 in 1970-71 to $35,777,001 in 1981-82. The Extension budget went from $11,198,143 to $29,178,005 during the same 13-year period. However, inflation rose to 13.3 percent in 1979 and at both state and federal levels the percentage of the budgets allocated to the agricultural schools of the land-grant colleges and universities gradually declined.

New outside funds were generated. Through the four supporting foundations (see Chapter 14), upwards of $1 million was generated each year. Also, two tobacco companies each contributed more than $1 million to the school's programs.

More sophisticated hardware for research, extension, and classroom teaching gave more production and greater results. But with some 80 percent of operating funds allocated for salaries and with salary increase the first priority at each budget session, support budgets were strained to maintain and upgrade the operation. Capital improvement funds were especially hard to obtain during the 1970s and early 1980s.

J. E. Legates

Legates made especially effective use of the commodity promotion associations that were organized for almost all major crop and livestock farmers in the state. Their leaders helped formulate the budget requests and present the institution's case to the state legislators. The same people provided input into research and extension programs through commodity reviews that began in 1975. Representatives of a commodity association spent one day on the campus every three years, hearing reports of research and extension activities under way and then making recommendations to school administrators.

Throughout the 1970s there were continuing predictions of reduced college enrollments because of the declining birth rate during the 1950s. But each year a larger percentage of the high school graduates went to college, helping to hold enrollments up. Also, new programs attracted additional students, particularly those in the premedical, predental, and preveterinary areas, and subjects related to the environment caught the fancy of many people during the decade. Young women became attracted to the natural sciences and enrolled in increasing numbers.

Total enrollment for the school peaked in 1975 with 3,965 students and ranged from 3,511 to 3,754 through 1982. Undergraduate enrollment also peaked in 1975, with a total of 2,900 students seeking the baccalaureate degree, and ranged from 2,389 to 2,668 through 1982. The number of students in the two-year Agricultural Institute peaked at 418 in 1980 and had dropped to 376 in 1982.

Legates, who had established an international reputation as an animal geneticist, led the school into an expanded international program. During his tenure, the school was involved in a soil testing program in Latin America and Asia. In 1975 an international root-knot nematode project was established in Latin America and Africa. The school became involved in a small ruminant research project in South America and Africa in 1978. In 1981 the school was selected to

administer a five-year, $16,600,000 tropical soils management research and training program.

The Peruvian contract ended in 1973 after 17 years of activity in that country. Government upheavals there undid much of the progress that had been made, but in 1982 the School of Agriculture and Life Sciences was again invited back to assist with the development of agricultural research and extension in Peru.

The school underwent a number of extensive planning projects during the 1970s, including a university-wide self-study in 1971 and a statewide university system evaluation in 1974. A series of departmental reviews was instituted with assistance of the Cooperative State Research Service of the U.S. Department of Agriculture.

Responding to national concerns was particularly noticeable at the school during the 1970s. There were new programs on land and in the sea. To monitor and evaluate pesticide residues, a special laboratory was set up. Animal waste disposal and nutrient runoff from farmlands was critically analyzed.

New programs were developed in cooperation with the Sea Grant, Water Resources Research Institute, and Wildlife and Fisheries programs. Also begging for attention were energy conservation, genetic engineering, and biotechnology.

The Department of Veterinary Science was established in 1974 with the nucleus (personnel and courses) coming from the animal disease work in the Department of Animal Science. When the School of Veterinary Medicine was established, this department and other veterinary research and extension work were merged with the new school.

In research there was a name change. In 1977, on the 100th anniversary of the experiment station's founding, the name was changed from Agricultural Experiment Station to Agricultural

George Hyatt

J. C. Williamson

K. R. Keller

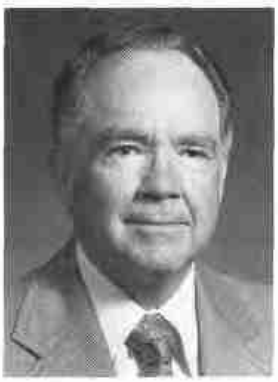
Research Service. The new name reflected the fact that the unit represented an activity more than a location or physical entity.

J. C. Williamson served as director of research until 1976 when he was replaced by Assistant Director K. R. Keller. Keller retired in 1979 and was succeeded by Durward Bateman, a North Carolina native whose most recent position had been as chairman of the Department of Plant Pathology at Cornell University. Thurston Mann succeeded Keller as assistant director for tobacco research until his retirement in 1983. Mann was succeeded by W. H. Johnson. On the resignation of Ralph McCracken from another of the assistant director positions in 1973, George Kriz was named to this post and later promoted to associate director.

In recognition of the cooperative work with other schools, Richard J. Preston, dean of the School of Forestry, was named assistant director of research in 1968. Eric Ellwood held this position from 1971 to 1978, and the position was filled by Ellis Cowling after 1978. In 1982 C. E. Stevens, associate dean and director of research for the School of Veterinary Medicine, was named assistant director of the Agricultural Research Service.

In extension, Carlton Blalock was named director on the retirement of George Hyatt in 1978. Blalock likewise retired in 1981 and was succeeded by Chester Black. Blalock had served as assistant director for 4-H from 1964 to 1970 and as associate director from 1970 to 1978. Black had followed a similar path, serving as assistant director for 4-H from 1970 to 1976, as assistant director for county operations (succeeding Ed Foil) from 1976 to 1978, and as associate director during Blalock's tenure as director.

Robert C. (Bob) Wells succeeded Black as associate director of Extension. Paul Dew was named director for county operations in 1979, and Donald L. Stormer succeeded Black as assistant director for



T. C. Blalock

Chester Black

Durward Bateman

4-H in 1976. D. G. Harwood, Jr. was named assistant director for agriculture and special programs following the death of George Capel in 1975. In home economics, Martha Johnson succeeded Eloise Cofer on her retirement in 1980. In a new position, Joseph A. Phillips became assistant director for community and rural development in 1982. E. J. Boone continued as assistant director for training.

J. E. Legates retired from the deanship on January 31, 1986. He was succeeded by Durward Bateman, promoted from his research director position. Also in 1986, E. W. Glazener announced his intention to retire as director of instruction effective December 31, after 26 years and five months in this position. This term accorded to Glazener the longest tenure of anyone in a top administrative post in the history of the school, eclipsing the extension directorship tenure of I. O. Schaub (July 1, 1924-October 1, 1950) by five months. Also, Legates's period as dean (1971-1986) gave him the longest tenure in this position of anyone except Schaub, who served as dean of the school from 1926 until 1945.

Name Changes for the School

On July 1, 1950, the Division of Forestry became the School of Forestry—a goal long sought by the forestry faculty. To accommodate the move, the School of Agriculture became just that, dropping the reference to forestry in its name.

The ties were not severed, however. The School of Forestry remained in its Rick Hall locations until Kilgore Hall was completed in 1952. There forestry shared a building with Horticulture until buildings for forestry were constructed along the north side of Western Boulevard. In programs the two schools continued to have close working arrangements—forestry specialists of the Agricultural Extension Service housed with the forestry school, and a large share of that school's research budget coming from the Agricultural Research Service.[10]

A far more significant name change for the agricultural school came in 1963. The account of the change in the 1963 school annual report began with a quote from the head of another land-grant school:

It has been said that the second half of the 20th century belongs to the biological or life sciences. University of California Chancellor Clark Kerr has said:

"The fastest growing intellectual field today is biology . . . The 'code of life' can now be read; soon it will be understood . . . It is an intellectual discovery of unique and staggering proportions. Secrets of the atom may hold no greater significance . . . than the secrets still hidden in the genetic code.

"If the first half of the 20th century may be said to have belonged to the physical sciences, the second half may well belong to the biological. Resources within the university will be poured into the new biology, and into the resulting new medicine and agriculture, well supported as they already are."[11]

On February 1, 1964, the School of Agriculture became the School of Agriculture and Life Sciences.

Biology to the Forefront

Basic sciences, as well as the production departments, had been on the move. Botany and zoology continued to undergird the plant and animal programs. With the advent of newer agricultural chemicals for pest control, entomology and plant pathology increased in importance.

In 1950 the personnel in these four areas were designated as faculties and placed in the Division of Biological Sciences, headed by D. B. Anderson. Faculties, the four areas were called. Heading them up were H. T. Scofield in botany, C. F. Smith in entomology, J. H. Jensen in plant pathology, and F. S. Barkalow in zoology. A familiar name missing from the administrative ranks was that of Zeno P. Metcalf, who remained on the faculty until his 1955 retirement brought to an end the illustrious North Carolina career that began with the N. C. Department of Agriculture in 1908. Metcalf dormitory on the campus was named for him.

The genetics faculty was added to the Division of Biological Sciences in 1951. Genetic research had grown up in close connection with the plant and animal breeding work in five departments—Agronomy, Animal Industry, Horticulture, Poultry, and Experimental Statistics. A unique feature of the genetics faculty, however, was that it was not to function by itself but rather as a coordinating nucleus. There would be four staff members in genetics, headed by S. G. Stephens, who would work closely with about 20 other geneticists in other departments who would be considered associate members of the genetics faculty. Gradually, over the years, genetics personnel were pulled into

the Genetics Department, beginning with the addition of a quantitative genetics program, which was administered in the Institute of Statistics, when Genetics was designated a department in 1958.

The departmental designation for the five faculties in the Division of Biological Sciences came in 1958 when the division was disbanded and the five faculties were returned to or granted departmental status. Continuing as heads of the departments were H. T. Scofield in Botany and Bacteriology (the name had been changed from Botany), C. F. Smith in Entomology, and F. S. Barkalow in Zoology. Heading the Department of Plant Pathology was D. E. Ellis, who had succeeded J. H. Jensen on his resignation in 1954; heading the Department of Genetics was H. F. Robinson, who succeeded S. G. Stephens in 1958.

As the biological sciences continued to develop, the Institute of Biological Sciences was created in 1962, with H. F. Robinson as director. The new position filled by Robinson also carried the title of assistant director of the Agricultural Experiment Station. Robinson's replacement as head of the Genetics Department was Thurston Mann. Also in 1962, Fred Barkalow was succeeded by B. S. Martof.

Two additional changes came in 1964. G. R. Noggle succeeded H. T. Scofield as head of Botany and Bacteriology and E. H. Smith succeeded Clyde F. Smith as head of Entomology. Other department headship changes also occurred in the biological sciences. In Botany, Noggle was succeeded by Jerome Miksche in 1977. In Entomology, Ed H. Smith was replaced by Kenneth J. Knight in 1967, who was then succeeded by Ronald J. Kuhr in 1981. In Genetics, Thurston Mann was succeeded by John Scandalios in 1975. In Plant Pathology, Don E. Ellis was succeeded by Robert Aycock in 1973. The Department of Zoology was headed by David E. Davis from 1967 to 1976, followed by John Vandenbergh.

Changing Departments

On January 1, 1956, the Department of Agronomy was divided into the Department of Field Crops and the Department of Soils. J. W. Fitts, a member of the faculty since 1952, was named to head the Department of Soils. Paul H. Harvey, who joined the State College faculty in 1938, was named to head the Department of Field Crops. The division came upon the resignation of E. T. York as department head.

Fitts served as head of the Soils Department until 1963, when he was succeeded by Ralph McCracken. Following McCracken's promotion to assistant director in 1971, Charles McCants was named as his replacement. McCants held the position until 1981, when he was succeeded by Robert H. Miller. Harvey served as head of the Field Crops Department until 1974. He was succeeded by Billy E. Caldwell the following year. Both departments underwent a name change in 1962. The Field Crops Department became the Department of Crop Science; the Soils Department became the Department of Soil Science.

The Department of Food Science and Processing was created in 1961. Personnel were pulled from several departments to put together the new department—meats and dairy manufacturing from Animal Industry, fruit and vegetable processing from Horticulture, and poultry products from Poultry Science. Veteran dairy manufacturing expert William M. Roberts was named to head the department, a position he held until his retirement in 1980. He was succeeded by David M. Lineback. In 1962 the name of the department was changed to Food Science.

Administrators and department heads in 1950. Seated, left to right: R. W. Cummings, director of research; J. W. Goodman, asst. director of extension; D. S. Weaver, director of extension; I. O. Schaub, retired; J. H. Hilton, dean; C. H. Bostian, director of instruction; J. W. Harrelson, chancellor. Standing, left to right: Jack Rigney, Statistics; B. W. Wells, Botany; C. H. Hamilton, Rural Sociology; D. B. Anderson, Botany; Z. P. Metcalf, Zoology; R. J. Preston, Forestry: W. E. Colwell, Agronomy; Gertrude Cox, Statistics; W. J. Peterson, Chemistry; R. S. Dearstyne, Poultry Science; D. W. Colvard, Animal Industry; G. W. Forster, Agricultural Economics; M. E. Gardner, Horticulture; G. W. Giles, Agricultural Engineering.

Two new departments were spawned from the five constituting the Division of Biological Sciences and the Institute of Biological Sciences. Both Biochemistry and Microbiology became departments in 1965. Named head of Biochemistry was Gennard Matrone; named head of Microbiology was James B. Evans. S. B. Tove succeeded Matrone as head of Biochemistry following Matrone's death in 1975. Biochemistry was jointly administered by the School of Physical and Mathematical Sciences.

A Department of Extension Personnel Development, headed by E. J. Boone, was created in 1963. Later the department name was changed to the Department of Adult Education, and again in 1970 to the Department of Adult and Community College Education. Beginning in 1965 the department was jointly administered by the School of Education.

The Department of Veterinary Science was established in 1974 to provide research and extension services to the state's expanding livestock industry. Making up the department initially were Department Head Terrence M. Curtin and four veterinarians from the departments of Animal Science and Poultry Science. The department existed until its activities were merged into the new School of Veterinary Medicine in 1979.

In addition to Adult Education and Biochemistry, four other departments developed across-school ties. Jointly administered by the School of Agriculture and Life Sciences and other schools were the departments of Biological and Agricultural Engineering (School of Engineering), Economics and Business (School of Humanities and Social Sciences), Sociology and Anthropology (School of Humanities and Social Sciences), and Statistics (School of Physical and Mathematical Sciences).

The Department of Biological and Agricultural Engineering (changed from Agricultural Engineering in 1965) was headed by F. J. Hassler, who succeeded Wallace Giles on his retirement in 1961.

The Department of Agricultural Economics, located in the School of Agriculture and Life Sciences, and the Department of Economics, located in the School of Liberal Arts (later the School of Humanities and Social Sciences) were merged into one department—the Department of Economics—in 1965. C. E. Bishop, formerly head of Agricultural Economics, was named head of the combined departments. The department was renamed the Department of Economics and Business in 1974. Bishop resigned in 1966 and was succeeded as department head by William D. Toussaint. Toussaint held

the position until 1982, when Dale Hoover took over the departmental reins.

The Department of Sociology and Anthropology also resulted from the merging in 1966 of two departments in different schools—the Department of Sociology and Anthropology in the School of Liberal Arts and the Department of Rural Sociology in the School of Agriculture and Life Sciences. Selz C. Mayo, who had succeeded C. Horace Hamilton as head of the Department of Rural Sociology in 1959, also headed the department in the School of Liberal Arts and continued as head of the new combined department of Sociology and Anthropology. Mayo was succeeded by Ronald C. Wimberley on his retirement in 1982.

David Mason headed the Department of Statistics (formerly Experimental Statistics) from 1962 until his retirement in 1981. He was succeeded by Daniel L. Solomon.

Two other departments underwent name changes in 1962—Animal Science from Animal Industry and Horticultural Science from Horticulture.

George Hyatt succeeded J. W. Pou as head of the Department of Animal Industry in 1958. On Hyatt's elevation to the associate directorship of extension, he was succeeded by I. D. Porterfield in 1962. Porterfield was succeeded by Charles A. Lassiter in 1976.

In Horticulture, Fred Cochran succeeded retiring M. E. Gardner in 1956. Clive Donoho served as head of this department from 1967 to 1973, followed by James Strobel from 1974 to 1976 and A. A. DeHertogh in 1978.

What was initially the Division of Publications underwent several name changes—to the Department of Publications in 1950, to the Department of Agricultural Information in 1953, to the Division of Agricultural Information in 1954, to the Department of Agricultural Information in 1962, and to the Department of Agricultural Communications in 1981. Veteran Editor Frank Jeter headed this department until his death in 1955. O. B. Copeland served as head from 1956 to 1959, followed by William L. Carpenter from 1959 to 1980 and David M. Jenkins in 1980.

In Poultry Science, the only department that did not undergo at least a name change between World War II and 1984, veteran administrator Roy S. Dearstyne retired in 1955. E. W. Glazener served as department head until being promoted to director of resident instruction in 1960. Henry Garren served as department head from 1960 to 1968, followed by Robert Cook.

In 1960 the Department of Chemistry was moved from the School of Agriculture to become one of the departments making up the new School of Applied Mathematics and Physical Sciences (later changed to Physical and Mathematical Sciences). Other departments comprising this new school were Statistics (still jointly administered by Agriculture), Physics, and Mathematics.

The Training Ground

Quality personnel—one of the ingredients necessary for success in an academic institution—has been liberally credited with the growth, development, and achievement of the School of Agriculture and Life Sciences at North Carolina State University. L. D. Baver, in a 1978 interview, said, "The key for a successful institution is the quality of the personnel—and the training of that personnel."[12]

But quality in personnel is expensive to acquire and difficult to keep. The bringing in of "bright young men" was a phrase often heard when the authors talked with people who had association with the institution. Some of these bright young men stayed for long and distinguished careers, but a large number moved on, achieving higher positions in the academic world. Perhaps the outward and upward advance of personnel documents the wisdom of bringing in these "bright young men."

Charles W. Dabney, the second director of the Agricultural Experiment Station (1880-87) resigned to accept the presidency of the University of Tennessee. In later life he served as an assistant secretary of agriculture and president of the University of Cincinnati.

Deans J. H. Hilton and D. W. Colvard moved directly from the deanship to the presidency of major land-grant universities—Hilton to Iowa State and Colvard to Mississippi State.

Station Agriculturist Milton Whitney (1886-87) later headed a division of soils in the U.S. Department of Agriculture, and Charles W. Burkett, a professor of agriculture from 1901 until 1906, resigned to become director of the Kansas Agricultural Experiment Station.

Between his two tenures in extension (1909 to 1913 and 1924 to 1950), I. O. Schaub was director of the USDA's southern extension region. County and district agent J. W. Mitchell also served as a regional director in the USDA.

In the biological sciences area, L. H. Snyder, an early professor of genetics who resigned in 1930, became president of the University of

Hawaii. Plant Pathologist Frank Poole was named to the presidency of Clemson College in 1940. Plant Pathology head J. H. Jensen resigned in 1953 to become provost at Iowa State University. Later he was president of Oregon State University. H. F. Robinson became vice chancellor of the University of Georgia System. Later he was provost at Purdue before returning to his native state as chancellor of Western Carolina University.

From Horticultural Science, Clive Donoho went to Ohio as assistant director and then director of research and James Strobel moved to Mississippi as president of the Mississippi University for Women.

Agronomy Department Head E. T. York served as federal extension director, director of extension in Alabama, vice president for agriculture at the University of Florida, and head of the Florida System of Higher Education. Assistant Director Homer C. Folks became associate dean of agriculture at the University of Missouri and the first coordinator of teaching of agriculture in land-grant institutions at the federal level. Henry W. Garren, head of the Department of Poultry Science, became dean of agriculture at the University of Georgia.

From his extension administrative position, C. B. Ratchford moved to Missouri as director of extension and later served as president of the university system in Missouri. Entomology Department Head E. H. Smith was director of extension in New York, and district leader H. M. McNeil became director of extension in New Hampshire. In Animal Industry, J. W. Pou became director of extension in Arizona and M. B. Wise became an extension administrator in Virginia. John Gray, in charge of forestry extension, went on to head forestry work at the University of Florida. In farm management and marketing, John Curtis became director of extension in Maryland, and Moyle Williams became associate director of extension in Illinois.

Station directors R. Y. Winters, R. M. Salter, and R. L. Lovvorn moved into administrative positions in the USDA.

Three North Carolina State University faculty members held the post of vice president for research and public affairs in the University of North Carolina system between 1966 and 1984—C. E. Bishop, H. B. James, and Walton Jones. Bishop later served as president of the universities of Maryland, Arkansas, and Houston. D. B. Anderson also served as vice president of the university system.

Carey Bostian, R. W. Cummings, Nash Winstead, Lawrence Apple, Jack Rigney, and W. L. Turner moved to campuswide administrative posts at North Carolina State University.

In Search of New Ideas

The land-grant college system has long been touted for its closeness to the people. A facet of this closeness is the feedback mechanism it provides from the client to the college headquarters.

When a county agent works with an individual, a family, an industry, or a community organization, the contact between agent and client has been made primarily because of some problem that needs solving or some technical information desired. If the information needed to take care of the situation is not available to the agent, the request for information is passed from agent to extension specialist. If the specialist does not have the information needed, the word is passed to the appropriate researcher who presumably will supply the information or develop research activity to seek the answer.

In some instances the specialist, researcher, and administrator may have direct clientele contact. Researchers regularly appear at research station field days, commodity association meetings, and commodity reviews. The statement is often made that many farmers go directly to the specialist or researcher—bypassing the county agent system.

Administrators have devised several specific mechanisms for bringing about direct contact with clientele.

In the 1950s a school advisory council was appointed by the dean. This group met twice yearly to analyze and critique school programs and to suggest new activity. Members of the council solicited support from the members of the General Assembly. In 1959, as the Agricultural Institute was being developed, an advisory committee for this program was established. The extension advisory system was strengthened in 1979, with revised systems in the counties and the appointment of the first statewide advisory council.

In 1970 a series of 21 meetings for county directors of the Agricultural Foundation (1 for each county) and the public were held across the state. In these meetings administrators discussed aspects of the school's program and invited comment. Similar meetings were held every other year.

The extension service led the effort to get commodity associations established—one for almost every crop and livestock group in the state—and worked closely with them. A general characteristic of these associations was an annual meeting on the campus, in Raleigh, or elsewhere, usually in the winter, with many of them also holding a summer meeting. School personnel regularly appeared on their programs and the members of the board of directors of the affected commodity association were expected to attend the commodity reviews. Also, commodity association officers often invited school administrators to meet with them, and most (or all) of the associations funded projects (research and extension) of special interest to them.

Beginning in 1969 school administrators, including department heads, made a number of bus tours to various parts of the state as a means of keeping abreast of the state's changing argiculture.

The search for new ideas was taken to the highways and the skyways. In October, 1956, Dean Colvard led members of the school advisory committee on a flying tour of agricultural programs at Purdue, Iowa State, Wisconsin, and Michigan State. Twenty-one agricultural leaders made the trip in a chartered airplane. Donated funds were used to make the trip. In addition to teaching, research, and extension programs in general, the group specifically looked at basic research and two-year instruction programs at the host institutions.

A similar trip occurred in 1961, when the topic was food science and processing. As part of establishing a new department in food

In 1956 the school's advisory committee visited four midwestern universities in a search for new ideas.

science, Dean James led a party of 10 on a week-long tour of colleges and facilities in California, Oregon, and Washington. The vast scope of the food processing industry on the West Coast and the role of food processing in the total agribusiness picture was clearly evident to those making the trip.

Starting in 1955 and running through 1965, an annual Agribusiness Caravan was planned by Wayne Corpening, agricultural official with Wachovia Bank and Trust Company. The School of Agriculture, the N. C. Department of Agriculture, and Wachovia jointly sponsored the tours, which ranged up to two weeks in length for the one to the European Common Market. They were open to anyone who wished to attend. Participants paid their own way.

Studies and Surveys

Numerous surveys have been conducted, particularly in relation to extension programs. Two major problems showed up in program projection meetings held in 98 of the state's 100 counties in the mid-1950s. Low net income was the major problem listed in every county. A second major problem identified was the inadequate training, skill, and general education of many rural people. Program projection was an extension activity whereby a committee of farm, home, business, and civic leaders—with the help of extension agents—studied the county situation. More than 5,000 people participated.[13]

In 1975, some 8,882 household heads, representing a cross section of the state's population, took part in an extension-sponsored survey designed to determine attitudes toward such issues as health, jobs, agriculture, recreation, housing, land use, environment, law enforcement, education, transportation, citizen involvement, and community satisfaction. It was believed the survey would be useful to extension as well as to a number of agencies in the area of public policy and planning.[14]

Some 112,000 North Carolinians returned questionnaires as part of the North Carolina 2000 plan, carried out in 1981 and 1982. This governor's commission found that agriculture would remain a prominent feature of the state's life and economy at the end of the century. But it would encompass more than just crop and livestock marketing and production. Agriculture would be access to capital, inheritance taxes, exports, air and water pollution, hazardous waste disposal, soil

erosion, energy conservation, land use regulations, information networks, and computers.[15]

Two special study-advisory committees gave attention to the extension organization and its activities. The first was in 1956-57. It came about because of concern over the governor's lack of appreciation for the work of the organization.

The school of agriculture administration was convinced that Governor Luther Hodges's statements critical of extension and his lack of understanding of the organization were beginning to show themselves in the reluctance of the General Assembly to appropriate salary increases and other funds for extension. It appeared that the time had come to have some kind of a reaffirmation by the public to "handle something we might not be able to handle ourselves with the Governor."[16]

On August 16, 1956, Dean Colvard addressed a letter to C. H. Bostian, North Carolina State College chancellor, and William Friday, acting president of the University of North Carolina. In this letter he requested a study by a citizen committee that would look at the programs, organization, and operating policies and procedures of extension and its relationship to other organizations. With the concurrence of Governor Hodges, President Friday appointed a nine-member committee. The committee elected Archie K. Davis, chairman of the board of Wachovia Bank and Trust Company as the chairman.

The committee's report, made public in June, 1957, contained some far-reaching and controversial recommendations, including the proposed consolidation of county programs under the supervision of a county chairman. The committee called for some reorganization at the state level, some changes in relationships to county governments, more detailed job descriptions, and attention to salary schedules.

A similar citizens' committee, studying the same agency, came into being in 1978, instituted and appointed by North Carolina State University Chancellor Joab Thomas. Paul Leagans, retired professor from Cornell University and one-time North Carolina extension agent and specialist, chaired the 10-member committee.

In its 1979 report, the committee said extension would need better-trained and better-compensated workers in the future. Each worker would have to reach more people and reach them faster and more effectively through sound teaching methods and communications technology. Extension should also continue its strong thrust in agri-

culture, put more emphasis on forestry, expand the clientele for its home economics and 4-H programs, and phase out or revamp its community resource development program.[17]

In 1961 the extension service embarked on developing a series of long-range program plans, usually once every five years. The first one was titled "1.6 in '66," reflecting an income goal of $1.6 billion for the farmers of the state by 1966. Other programs in the series were "Target 2" in 1966, "Impact '76" in 1972, "4-Sight" in 1977, and "People's Plan 87" in 1983.[18] Between 9,000 and 10,000 citizens of the state were involved in planning some of the earlier extension programs. In 1983 about twice this number of people were involved.

The experiment station went through detailed planning processes in the 1960s and 1970s. In 1962, 13 internal committees looked at programs and relationships with other groups and agencies.[19] In the mid-1970s, internal committees, with assistance from representatives of the Cooperative State Research Service in the U.S. Department of Agriculture, analyzed research needs.

The school had a prominent part in the development of agricultural programs by what came to be known as the North Carolina Board of Farm Organizations and Agricultural Agencies. On November 6, 1947, a meeting was held in the office of Governor R. Gregg Cherry to promote crop diversification and particularly to give attention to use of land expected to be made available by reductions in tobacco and peanut acreage. Some possibilities discussed at the meeting included increases in livestock and poultry, corn, cotton, soybeans, small grain, and pastures.

From this meeting a committee was developed, chaired by J. H. Hilton, which produced a program unveiled to the public in 1948. It promoted increases in the above-mentioned activities as well as improved production practices.[20]

Taking a broader look at rural problems was the Challenge program, unveiled in January, 1952. It called for an increased per capita income, greater security, improved educational opportunities, finer spiritual values, stronger community life, and more dignity and contentment in country living.[21] Under the umbrella of this program a team of extension specialists helped county groups develop county Challenge programs.

At the request of Governor Terry Sanford, the board in 1961 developed the Agricultural Opportunities Program.[22] Its objectives were to increase farm income, to develop marketing and processing

facilities and services, and to promote education for family and community development.

It was hoped that each agency or organization would develop its own program under the Agricultural Opportunities umbrella. The extension "1.6 in '66" program and the 1962 experiment station long-range plan were a part of this effort.

Four Big Buildings

Postwar capital improvements came as a big chunk, thanks in large measure to W. Kerr Scott—alumnus, county agent, extension specialist, state Grange master, commissioner of agriculture, governor from 1949 to 1953, and later U.S. senator.

A surplus had built up in the state treasury during the war years, while the building program at state institutions had languished. At the institutions of higher learning an army of veterans were arriving to catch up on their schooling and take advantage of the G.I. Bill.

Governor Scott; his longtime colleague D. S. Coltrane, director of the budget in the Scott administration; and the members of the General Assembly looked with special favor on the School of Agriculture and Forestry at State College. Funds were made available for four new buildings to be placed where veteran student housing had stood. They would more than double the space available for the school.[23]

Scott Hall was the first one finished. Members of the Poultry Department moved into the building in July, 1952. Cost of the 30,600 square foot building and its equipment was around $420,000. It contained offices, laboratories, and classrooms. It was named for W.Kerr Scott's father, Robert W. Scott, longtime member of the state Board of Agriculture, who was given the principal credit for the legislative appropriation to construct Patterson Hall when he was a member of the General Assembly in 1903.

Williams Hall was completed in August, 1952. Built and equipped at a cost of $1,003,054, it was named in honor of C. B. Williams, head of the Department of Agronomy, director of the Agricultural Experiment Station, and first dean of the School of Agriculture. The four floors contained approximately 81,000 square feet of space. Seven teaching spaces and 83 offices occupied most of the area. A headhouse and four greenhouses were built nearby.

Gardner Hall, completed at almost the same time as Williams

Hall, was the largest of the four. Its four floors contained some 90,000 square feet of space plus six greenhouses. Cost was $1,050,387. The building housed the five units of the recently formed Division of Biological Sciences and was named for State College graduate and governor O. Max Gardner.

Kilgore Hall was completed in 1953. The 51,000 square feet of floor space was equally divided between the Department of Horticulture and the recently formed School of Forestry. It was built at a cost of $850,000. Honored with the name was Benjamin W. Kilgore, director of both the research station and the extension service and dean of the school. In the same package the horticulturists received a headhouse, a propagating house, and two greenhouses.

Four agricultural buildings, under construction in 1951, are shown in this aerial photograph of the campus looking east: (1) Kilgore Hall (Horticulture and Forestry), (2) Scott Hall (Poultry Science), (3) Gardner Hall (Biological Science), (4) Williams Hall (Agronomy). Note area cleared for construction of the first student union building and D. H. Hill library in upper left corner.

Other Facilities

It would be another 10 years before a sizable building project would come about for agriculture.[24] Completed in 1962 was the Reproductive Physiology Research Laboratory. In 1963 came an addition to Polk Hall that essentially doubled the space in this 1926 building.

An addition to Gardner Hall was completed in 1967. With almost $2 million in appropriations from the General Assembly and from outside funding sources, the addition almost doubled the space available for the expanding biological sciences. A second addition was completed in 1979. This section was named Bostian Hall, in honor of the longtime agricultural teacher, school administrator, and chancellor.

The first $2-million building for the School of Agriculture and Life Sciences was the food science building completed in 1967. An additional $1,500,000 went into equipping this first home for the relatively new Food Science Department. The name of the building honored longtime administrator I. O. Schaub.

Also in 1967, construction got under way on the $2,500,000 North Carolina State University unit of the Southeastern Plant Environment Laboratory. The North Carolina State unit, which came to be known as the Phytotron, served as a companion unit to a similar research facility built at Duke University at the same time.

The third unit of the Weaver Laboratories was completed in 1970. Construction on the complex to house the Department of Biological and Agricultural Engineering started in 1960. The 95,000 square foot complex was named in honor of David S. Weaver who established the department in 1940 and later served as director of the Agricultural Extension Service.

The third and final unit of the Roy S. Dearstyne Avian Health Center, named for the longtime head of the Poultry Science Department, was completed in 1969. The Grinnells Animal Health Laboratory, honoring dairy researcher and veterinarian C. D. Grinnells, was completed in 1972. Additions were made to Scott Hall in 1969 and Ricks Hall in 1974. The 1983 General Assembly appropriated funds for an addition to Williams Hall.

Private funds were used to develop the M. E. Gardner Arboretum on the campus just south of Patterson Hall (1972), while another arboretum was developed on the Method Road Horticultural Farm in the late 1970s and early 1980s.

To the school's farm acreage was added the 1,000-acre Finley

farm south of Raleigh in the early 1960s and the 422-acre Randleigh farm in 1967. In the 1980s the forage-animal metabolism complex was being constructed in stages on the "old animal husbandry" farm west of Interstate 40, and new dairy facilities were constructed on the Finley farm to replace those turned over to the new School of Veterinary Medicine near the State Fairgrounds. Also on the Finley farm, the poultry research complex was completed in 1981. During the late 1970s and early 1980s, greenhouses and other facilities were constructed near the Raleigh beltline in what was known as the Method Road complex.

Outside the school, leaders were honored by place-names. In 1968 the swine building at the North Carolina State Fair was named the Kelley Building, honoring Jack Kelley who served extension from 1939 to 1964.

In 1970 the nine-story chemistry building was named Dabney Hall for Charles W. Dabney, second director of the Agricultural Experiment Station and author of the bill establishing North Carolina State University. That same year the six-story general laboratories building, headquarters of the School of Physical and Mathematical Sciences, was named Cox Hall in honor of Gertrude Cox, who led the university to international distinction in statistics.

The name of Jane S. McKimmon, first attached to married student housing, was placed on the continuing education center in 1976. Clarence Poe, longtime trustee and chairman of the agricultural committee of the board of trustees, was memorialized in 1970 when his name was given to the new School of Education building.

Research Stations

An expanding research program needed more land. It came in abundance—all across the state—especially between 1947 and 1954.[25]

The Horticultural Crops Research Station at Castle Hayne was started on 49 acres purchased in 1947. Later 10 acres were added and some additional land was rented.

Many of the operations that developed into research stations started on rented land.

The Upper Piedmont Research Station was started on 60 acres of leased land near Rural Hall in 1948. In 1962 the station was moved to Chinqua-Penn Plantation on part of a large tract of land given to the university by the Penn family.

The Lower Coastal Plain Tobacco Research Station was established on rented land near Greenville in 1948. It was moved to a site near Kinston in 1965.

The Border Belt Tobacco Research Station was also first operated on rented land, beginning with the 1949 crop year. In 1957 the station was relocated on a permanent site near Whiteville.

The Mountain Horticultural Crops Research Station likewise started on leased land in 1949. It was moved to a permanent site near Fletcher in 1959 amid some controversy. Extension employees claimed the station had been purchased with federal funds that had been appropriated for their salary increases. There was some truth to the charge. Some $200,000 of new federal money for salary increases had been allotted to the extension service in North Carolina. Governor Luther H. Hodges, a great promoter of industrial expansion, had become very much interested in food processing and the expansion of that industry in the state. The Gerber Baby Food Company was considering several sites, among them Henderson County. Governor Hodges pledged to the Gerber executives that if they would locate in North Carolina he would see to it that a horticultural research station would be built nearby.

Not being enthusiastic about increasing the total appropriation for agriculture, Governor Hodges obtained the money to establish the research station by having the state budget division switch funds. Some of extension's state money was used to build the station, and the new federal money replaced in the state budget the extension funds that were used to establish the research station.

Harley Blackwell, who became superintendent at the station four years later (1963), recalled in 1979 that he was "still getting vibrations" on Governor Hodges's use of extension funds to establish the station.[26]

The Coastal Plain Vegetable Research Station was established near Faison in 1949. In 1970 the Horticultural Crops Research Station at Clinton was established, closing out and consolidating the work at Faison and the Coastal Plain Research Station established near Willard in 1905.

The Sandhills Research Station, established in 1940, was relocated near Jackson Springs in 1951, primarily to permit an expansion of the peach breeding program.

A special farm for peanut research had been established adjacent to the Upper Coastal Plain Research Station at Rocky Mount in 1937.

In 1952 the Peanut Belt Research Station was established near Lewiston.

The Central Crops Research Station, 12 miles east of Raleigh on Highway 70 near Clayton, was established in 1953, and the McCullers Station was closed out at that time. Much of the livestock, poultry, and forage research was done on the several tracts of university farms around Raleigh, and the Central Crops Research Station served a similar function by providing research land for field crops near the campus.

Another of the older stations was closed out in 1954—the Piedmont Test Farm near Statesville. The work there was moved to the new Piedmont Research Station near Salisbury. This station, with 1,061 acres, became the largest in the system.

Called test farms at first, from the 1920s on several titles were applied to the outlying research locations. The 1954 School of Agriculture annual report listed six separate designations for the 16 locations—test farm, research farm, experiment station, station, sub-

In 1955 the outlying research facilities were officially named research stations. In this 1975 photograph are (left to right) James A. Graham, commissioner of agriculture; J. C. Williamson, director, N. C. Agricultural Experiment Station; Pat Kelley, director of research stations, NCDA; and John Smith, superintendent of the Tidewater Research Station.

station, and laboratory. In 1955 the units were officially named research stations, and in the North Carolina Department of Agriculture the Division of Test Farms became known as the Division of Research Stations.

Peace in the Family

There is probably no other state in which the activities of the agricultural college and the state department of agriculture are more closely entwined than in North Carolina.

In fact, the North Carolina Department of Agriculture has been a constant partner with the School of Agriculture from the beginning of both organizations. L. L. Polk was a crusader for the establishment of North Carolina State College and served as the first commissioner of agriculture beginning with the creation of the North Carolina Department of Agriculture in 1877. Although some political stresses have arisen,especially in the early years, despite conflicting laws governing the two organizations, and surely despite some conflicts in personalities, a workable division of responsibilities has emerged.

There is considerable evidence that Dean Schaub and Agricultural Commissioner Kerr Scott had difficulties over the administration and operation of the outlying stations in the late 1930s and perhaps into the early 1940s. There is evidence of sensitivity based primarily on the fact that a few of the researchers felt that they could not get the superintendents to exercise sufficient care in carrying out the research projects.

A. O. Shaw, head of the Department of Animal Industry from 1942 to 1944, recalled a problem he had during a field day at the station at Willard. "We started quite a well designed experiment on grazing and I went down to the field day, and they had staked it all off and taken our cattle off it and were using it for a parking lot."[27]

There was cause for concern in the 1950s when marketing work was expanding and both the college and department were attempting to carve out for themselves a role in this area. Also, there was considerable concern within the leadership of the extension service when funds were allocated to the state Department of Agriculture to employ regional agronomists in 1979. These new positions were viewed as essentially extension-type activities.

I. O. Schaub, who had witnessesd much of the 75-year history of

the organizations, placed the blame squarely on the laws regulating them:

> . . . by law the Board of Agriculture was charged with the duty of carrying on certain types of research. Unfortunately the College was also by law charged with similar responsibility and in the same field. These conflicting and duplicating laws are still on the books (1953) and human nature being what it is, the old wars will be resumed at some future date unless some subsequent Legislature repeals some of the old acts and more clearly defines the functions of the two agencies.
>
> Many people and the press in the past have been extremely critical of the conflicts and jealousies between the staff members of the two agencies and to place the whole blame on the people trying to administer the programs. The writer holds no brief for or against those who have been participants in previous controversies, but he does submit that the primary cause of previous conflicts rests squarely on the Legislatures that passed the acts governing the two agencies.[28]

Much credit for the success of the joint venture must go to the comissioners of agriculture and their long tenure. During the era of most dramatic changes in farming, which began about 1940, only three commissioners of agriculture have been in office—W. Kerr Scott, from 1937 to 1949; L. Y. Ballentine, from 1949 to 1964; and James A. Graham from 1964.

Credit must also go to Cecil Thomas, who served as director of research stations in the Department of Agriculture from 1953 to 1972 and to Pat Kelley, director after 1972.

With responsibilities for enforcement of state laws related to agriculture, the North Carolina Department of Agriculture has relied upon the Agricultural Research Service of the School of Agriculture for many of its standards for inspection and enforcement and for the other services it renders. The Department of Agriculture has collected "Nickels for Know-How" funds for the Agricultural Foundation at the university without charge.

A unique feature of the total operation is the ownership and management of the research stations across the state. In 1983 nine of the stations were owned by the State Department of Agriculture and six of them (in addition to the university farms) were owned by North Carolina State University. Owned by the Department of Agriculture were those at Whiteville, Clinton, Waynesville, Oxford, Lewiston, Salisbury, Plymouth, Rocky Mount, and Laurel Springs. University-owned stations were at Clayton, Castle Hayne, Kinston, Fletcher, Jackson Springs, and Reidsville.

The superintendent and other employees of each station (regardless of ownership) were employees of the state Department of Agriculture and under the supervision of the director of the Division of Research Stations. Allocation of land and facilities on the station was made jointly by research administrators at the university and the station superintendents. Research and extension personnel were located at several of the stations. Experiment station personnel provided technical leadership for all projects on all stations.

One indication of the successful cooperation of these two agricultural agencies was revealed in interviews with research station superintendents. They consistently asserted that ownership of the station created no problems in executing research projects.

A history cannot overlook the weaknesses, the failures, the frailty of people. It must report the good and also the bad. Judgments must be made. In this case, the leadership must be saluted for making an imperfect arrangement work to the benefit of those the arrangement was designed to serve.

NOTES TO CHAPTER 13

1. "Ag Activities Merged Under One Dean," *Agriculture Astride the Century*. 1950-51 Annual Report, School of Agriculture, p. 6. Accounts of personnel and facilities in this chapter taken primarily from annual reports for the period covered and interviews.
2. In semiretirement Schaub handled the foreign visitor program for two years, serving as programmer and host to the growing number of representatives of foreign countries coming to North Carolina to study the school's program. He wrote short histories of both the extension service (published in 1953) and the experiment station (published in 1955). Following these activities, "Dean Schaub," as he was so affectionately known, remained a familiar figure on the campus, collecting materials and organizing them into what became the North Carolina State University Archives. "Era Ends for State," an *Extension News* headline proclaimed on his death in 1971—71 years after his graduation from the A & M College in 1900 at the age of 19.
3. C. H. Bostian interview, January 19, 1979.
4. R. W. Shoffner interview, March 17, 1979.
5. For detailed accounts of new programs and activities mentioned in this chapter, along with budgets and funding sources, see chapter 14.
6. Hilton served as president of Iowa State University, his alma mater, until his retirement in 1965. He then returned to North Carolina as executive director of the Smith-Reynolds Foundation in Winston-Salem for five years.
7. Later Cummings returned to the university and served as the university-wide dean for research.

8. In 1966 Colvard returned to his native state as the first chancellor of the University of North Carolina at Charlotte. Three important projects following his retirement in 1978 were writing the story of racial integration in the universities in Mississippi (*Mixed Emotions*, Danville, Ill.: The Interstate Printers and Publishers, Inc., 1985); serving as the first chairman of the board of directors of the North Carolina School of Science and Mathematics; and conducting 64 oral interviews that constituted a major portion of the research for this book.
9. James served as vice-president for the university system until his death in 1973.
10. To better describe the broadening programs of the forestry school, the name of the School of Forestry was changed in 1968 to the School of Forest Resources.
11. "Name Changed to Meet Challenge of Future," 1963 Annual Report. School of Agriculture and Life Sciences, p. 2.
12. L. D. Baver interview, November 23, 1978.
13. "Program Projection Covers the State," *1956 Annual Report*. School of Agriculture, p. 26.
14. This 1975 study was one of several in the mid-1970s conducted by sociologist James R. Christensen, Department of Sociology and Anthropology, North Carolina State University.
15. "Agriculture Gets Attention in North Carolina 2000 Report," *1982 Annual Report*. School of Agriculture and Life Sciences, pp. 2-3.
16. Extension Service Advisory Committee. *A Report on the Programs, Organization, Management of the Agricultural Extension Service*, N.C. Agricultural Extension Service, 1957, 142 pp.
17. Chancellor's Commitee on Role Projection and the Response by the Extension Service. *Change, Technology and Accountability: A Blueprint for the Future of the North Carolina Agricultural Extension Service*. N.C. Agricultural Extension Service, 1980, 104 pp.
18. *1.6 in '66, A Working Document*, 1963, 200 pp.; *Target 2, A Working Document*, 1966, 288 pp.; *Impact '76, A Working Document*, 1972, 344 pp.; *4-Sight, A Working Document*, 1977, 236 pp.; *People's Plan 87, A Working Document*, 1983, 224 pp. All published by N.C. Agricultural Extension Service.
19. *A Ten-Year Projection for Agricultural Research in North Carolina*. N.C. Agricultural Experiment Station, Bulletin No. 422, 1963, 114 pp.
20. *A Farm Program for North Carolina*. N.C. Agricultural Extension Service, 1948, (no number), 44 pp. Faculty and farm leaders participating in the program included J. H. Hilton, I. O. Schaub, L. D. Baver, Roy Dearstyne, D. W. Colvard, John Arey, R. W. Cummings, Clarence Poe, Harry Caldwell, Thomas J. Pearsall, A. C. Edwards, W. Kerr Scott, E. B. Garrett, A. L. Teachey, J. Milton Mangum, M. G. Mann, W. P. Hedrick, J. H. Vaughn, C. W. Tilson, E. Y. Floyd, L. L. Ray, A. G. Lytle, J. B. Slack, R. Flake Shaw, W. W. Eagles, Paul Kelly, W. C. Guthrie, Willard L. Dowell, Fred W. Greene, Warren Johnson, and Judson H. Bount.
21. The North Carolina Board of Farm Organizations and Agricultural Agencies. *North Carolina Accepts The Challenge Through A United Agricultural Program*, 1952, 76 pp.
22. The North Carolina Board of Farm Organizations and Agricultural Agencies. *Expanding and Developing Agricultural Opportunities in North Carolina*, 1962, 16 pp.

23. "New Ag Campus Nears Completion," *North Carolina Astride the Century*. 1950-51 annual report, School of Agriculture, p. 5; "Our New Buildings," *Forward Together*. 1951-54 annual report, School of Agriculture, p. 39; For photographic reports of the four buildings, see *Research and Farming*—autumn, 1952, Scott Hall; winter and spring, 1953, Williams Hall; summer and autumn, 1953, Gardner Hall; winter and spring, 1954, Kilgore Hall; all pp. 8-9.
24. For buildings completed between 1963 and 1983, see introductory sections of the school annual report for the specific years.
25. Historical sketches of each research station are found in individual leaflets on the station, available from the Division of Research Stations, N.C. Department of Agriculture.
26. Harley Blackwell interview, October 30, 1979. In addition to Blackwell, other long-tenured superintendents and their locations in 1970 included: Wallace Dickens, Border Belt Tobacco, Whiteville; W. C. Allsbrook, Central Crops, Clayton; Jesse Sumner, Coastal Plain, Willard; F. E. Cumbo, Coastal Plain Vegetable, Faison; J. M. Jenkins, Jr., Horticultural Crops, Castle Hayne; Sanford Barnes, Lower Coastal Plain Tobacco, Kinston; J. R. Edwards, Mountain, Waynesville; Billy Ayscue, Oxford Tobacco, Oxford; Wallace Baker, Peanut Belt, Lewiston; Clyde McSwain, Piedmont, Salisbury; Clarence Black, Sandhills, Jackson Springs; John Smith, Tidewater, Plymouth; Dana Tugman, Upper Mountain, Laurel Springs; Howell Gentry, Upper Piedmont, Reidsville.
27. A. O. Shaw interview, September 14, 1981.
28. Schaub, I. O. *North Carolina Agricultural Experiment Station, The First 60 Years*, N.C. Agricultural Experiment Station, Bulletin No. 390, 1955, pp. 108-09.

14

Branching Out with New Funds And New Programs

Early contributions. The Dairy Foundation. The Agricultural Foundation. Reynolds professors. Changing sources of funds. Long-range plans. Protecting the land and people. From the land to the sea. Extension development programs. Conserving energy. The Agricultural Policy Institute. Mission to Peru. Other international programs. Computers and new media.

THE FRESHMAN ARRIVING ON CAMPUS in the fall of 1900 was in for an eye-opener—that is, if he had never seen a pulverizing harrow, a corn planter with a check rower, a corn shredder, or a baby chick incubator. These items were among the assorted array of farming implements—presumably the latest available—to be used to supplement classroom instruction and to introduce the young student to the scientific world of agriculture.

It may or may not have been significant to the student—although it was to his teachers—that the equipment had been donated to the college by commercial concerns.

Early Contributions

From the early days of the college limited amounts of equipment, seeds, plants, and other materials had been contributed for use in agricultural work. Early reports of youth work indicated that by World War I bankers and merchants were contributing some funds for contest prizes and other activities in their local areas.

In the mid-1920s extension forester R. W. Graeber suggested that donations of forest land should be solicited for use in forestry instruction. The Board of Trustees apparently liked his suggestion. On July 16, 1926, the report of the committee appointed to make recommendations in regard to the college's accepting forest land was adopted. The report, submitted by the chairman Clarence Poe, was as follows:

> The Committee recommends that the College accept donations of forest lands for experimental and demonstration purposes. It appears that there are patriotic citizens who would make such donations, if proper credit is given to the donors and assurance given that the donations will be used for these purposes.

Not willing to rely solely on the generosity of forest landowners, just 2½ months after the arrival of Dr. J. V. Hoffman to head the new forestry program, the North Carolina Forestry Foundation was incorporated on April 15, 1929, as an agency for purchasing land for research and demonstration purposes. Almost immediately the foundation, with funds provided by the Jefferson Standard Life Insurance Company, purchased a 75-acre tract near Raleigh known as Poole Woods.[1]

In 1930 George Watts Hill gave the college title to 378 acres of his Quail Roost Farm north of Durham for use as a forestry camp. He also worked with the school in purchasing additional acres until the Hill Forest reached a total of 1,500 acres.

In 1932 a tract of 1,564 acres in Hyde County was purchased by the foundation from Senator Angus D. McLean.[2] On August 20, 1934, the deed for the purchased 70,000-acre Hoffman Forest in Jones and Onslow counties was recorded in the name of the Forestry Foundation.

Hoffman believed extensive acreages of a variety of forest land were needed to provide the necessary field experiences for the forestry students.

In 1931 the Game Bird Foundation, a New York-based corporation organized for promoting the protection and conservation of game birds, provided funds with which the Poultry Science Department set up a division of research and instruction in game bird

protection, conservation, and management. After two years the funds were withdrawn and the program discontinued.

When the college observed its 50th anniversary in 1939, not much money had been given to the institution, but a precedent for receiving contributed funds had been set. Manufacturers and suppliers, banks, foundations, and wealthy citizens would all play a part in financing the institution as it began its second half-century. But the most important contributions to the agricultural program would come from ordinary farmers. Two foundations set up in the 1940s would make these contributions possible.

The Dairy Foundation

"The equipment you have there is a disgrace to the dairy industry." Those are the approximate words George Coble used in 1944 to document the need for improved research and teaching in the dairy manufacturing area.

As recalled in interviews with W. M. Roberts and others, several people were responsible for advancing the idea of foundations as a supplementary financing source for programs in the School of Agriculture and Forestry.

In an editorial in the *Progressive Farmer,* editor Clarence Poe called for the establishment of a major endowment, like the Kenan Fund at Chapel Hill, for the benefit of the college. He praised the R. J. Reynolds Tobacco Company when it made sizable grants to support faculty salaries and to produce educational films in the early 1940s.

Charlotte businessman David Clark, a graduate in textiles but with an interest in all phases of the college, gave encouragement for an agricultural foundation to receive public funds for the agricultural school.

By 1944, W. D. Carmichael in the consolidated university office was beginning to talk about raising money and establishing foundations. As Roberts recalled, Carmichael and President Frank Graham approached George Coble of Coble Dairies at Lexington. Following this meeting, word reached Roberts that he and W. L. Clevenger should make up a list of dairy manufacturing equipment needed—in the amount of $25,000 to $30,000.

Roberts, Clevenger, and Lex Ray, then executive vice-president of the North Carolina Dairy Products Association, carried the list to Coble. Roberts recalled the meeting in a 1979 interview.

> We showed George Coble the list of equipment that we were requesting. George sat there and screwed up his mouth and uttered a word or two that I would just as soon not repeat here and tore up the list. He said, "Hell, this is a damn insult to talk about $28,000. You can't do anything with that today." He said that we are going to get $100,000 or we are not going to get anything. Lex Ray, Professor Clevenger, and I kind of gasped a little bit at that but nevertheless that's what it was. George said, "Let's go see Governor Broughton."
>
> . . . George got an appointment with Governor Broughton . . . . Governor Broughton said, "Well, George, $100,000 doesn't seem unreasonable to me." He said, "I think we can manage that in some way but let me suggest this. Why don't you, Professor Clevenger, and Roberts visit some other universities and then come back and make a report to me."
>
> As a result, George Coble, Lex Ray, Mose Kiser, professor Clevenger, and I took off on a tour. We visited Ohio State University and Purdue. . . .
>
> When we came back and made our report to Governor Broughton, we asked him for $125,000—$100,000 for the dairy plant and to fix up our teaching and research laboratories and $25,000 for the bull barn. The Governor said, "Fine. You can have it—we've got it." We remodeled the dairy plant and laboratories in Polk Hall and purchased some modern equipment. Also, an arrangement was made to begin processing dairy products to supply the College dining facilities. These facilities really gave us a base for recruiting personnel and getting our dairy products program going.[3]

This event might be looked upon as the beginning of the Dairy Foundation. As Roberts further recalled, Coble also said to Governor Broughton: "Governor, if you will see that this state money is allotted to support the dairy products and a dairy program at North Carolina State College, then we in industry will go out and raise a half million dollars in foundation funds to help support salaries."

In 1944 the Dairy Foundation was organized with George Coble as the first president. Suppliers, producers, and processors all participated. The primary source of funds in the earlier days was the annual June Dairy Month checkoff program when dairy farmers contributed five cents for each 100 pounds of milk sold that month. The farmer contribution was matched by the milk plants. Contributions were solicited from firms supplying the dairy industry.

It took 15 years for the foundation to reach Coble's half-million-dollar goal of income and contributions. But by 1982 income for the foundation had reached a total of more than $3.5 million, with income bolstered by royalties from the Acidophilus Milk Marketing Program. In 1975, through an agent in Cincinnati, this milk devel-

Dairy Foundation funds helped develop equipment such as this, made available to the dairy industry in 1948, which removed objectionable off-flavors from milk.

oped in the Department of Food Science was offered under a marketing agreement to processing plants throughout the United States. A year later 82 dairies were marketing the product in 36 states.

As Coble envisioned, the funds generated were used to enhance the programs in dairy production and dairy manufacturing, with about equal amounts going into each area.

The Agricultural Foundation

H. W. (Pop) Taylor, longtime director of the Alumni Association following a career as a county agent and swine specialist, once recalled: "Chancellor Harrelson said to me that if somebody gives us a sow and pigs we have no way for administering the gift."[4] At the same

time Coble was talking up support for the dairy program, a group of distinguished North Carolinians and farm leaders were talking about a similar program for the total support of the agricultural school. The Agricultural Foundation was incorporated in December, 1944. Selected from the 45 organizers to lead the organization through its formative years was Thomas J. Pearsall of Rocky Mount, its first president.[5]

At a meeting of the Publicity and Money Raising Committee on March 13, 1945, it was proposed that the goal for the foundation be set at $2 million, of which $1 million would be sought in small donations and $1 million through large donations. The committee projected plans that individuals donating $10 or more and mercantile establishments and corporations or firms donating $25 or more be designated as "life members." The $2 million mark was reached in 1960, but rather than from cash donations of $10 or $25, most of the dollars had come from nickel contributions.

By 1951 a plan was in place whereby the purchasers of feed and fertilizers would contribute a nickel for each ton of either of these products they bought. The enabling legislation was presented and passed during the 1951 session of the General Assembly. By aggreement with L. Y. Ballentine, then serving as commissioner of agriculture in North Carolina, the Department of Agriculture would collect the funds along with collections being made for other purposes. This meant that there was no cost to the Agricultural Foundation for collections.

In a statewide referendum held on November 3, 1951, following an extensive promotional campaign, 68,063 votes were cast. A total of 61,004 votes were cast in favor of the program, far in excess of the two-thirds majority needed for passage.

Similar 90 percent favorable votes were cast as the program came up for renewal, first at three-year intervals and then at six-year intervals after 1975. E. Y. Floyd served as state campaign chairman for several of the earlier referendums.

Feed and fertilizer manufacturers were not as friendly toward the program as were the farmers. In the early days of the program, a major feed company doing business in the state announced that it would not participate in the program. When Commissioner of Agriculture L. Y. Ballentine put a stop order to prohibit the sale of the company's products in the state, the company soon relented.

It was during the 1951 campaign that the name "Nickels for Know-How" was suggested by Assistant Editor William C. Haas. In

1982, when the assessment was doubled to 10 cents per ton, the name was changed to "2 Nickels for Know-How." Through 1982 more than $13 million had been received by the foundation, with some $5.5 million coming from the Nickels for Know-How program.

Every department and every major program of the school benefitted from Agricultural Foundation funds. Many new positions were started over the years, along with salary supplements to retain top faculty, support for graduate assistantships, and special projects as the need arose. For example, foundation funds made it possible to begin research immediately when in 1970 Cylindrocladium black rot suddenly showed up in farmers' peanut fields.

More recently, two additional foundations appeared on the agricultural scene. The North Carolina 4-H Development Fund, started in 1960, had received a total of $2,448,507 in income through 1982. The North Carolina Tobacco Foundation, chartered in 1976, had received a total of $2,202,935 through 1982.[6]

Reynolds Professors

The name of Winston-Salem tobacco executive William Neal Reynolds became best known where basketball was played. The William Neal Reynolds Coliseum was the largest such facility in the South when it was opened in December, 1949. Reynolds' niece, the late Mrs. Charles Babcock of Winston-Salem, donated the initial fund toward the erection of the building.

Reynolds wanted to be associated with the academic side of the college also, and within a year after the completion of the Coliseum he contributed 10,000 shares of stock in the R. J. Reynolds Tobacco Company to the college to establish special professorships in the School of Agriculture.

The stock, worth an estimated $343,000 in 1950, along with accumulated earnings, had increased in value to more than $5 million 30 years later. Income from the fund was used to supplement the salaries of those designated William Neal Reynolds Distinguished Professors.

First to be designated Reynolds professors were J. H. Jensen, S. G. Stephens, and G. H. Wise. Through 1983, 31 Reynolds Professors had been selected.[7]

When the contribution was made, Dean Hilton, who had played a major role in negotiating the grant, described it as "probably the

greatest single program to come to State College's School of Agriculture since its founding." He said the endowment would enable the college to retain and attract eminent teachers and scientists for work in the school.[8]

Appointment as a Reynolds Professor was recognized as the highest honor open to faculty members in the School of Agriculture and Life Sciences.

The school also had the benefit of the M. G. Mann Professorship, held by R. A. King from its inception. Other professorships included extension professorships provided by the Philip Morris Company.

The importance of private funds when the School of Agriculture was being revitalized is seen from the way the earlier grants were used. The first grants for salary supplementation were requested of the agricultural and dairy foundations for the purposes of returning to the school some outstanding young men who had been there before, of obtaining additional training for some, and of recruiting outstanding people in areas that needed to be strengthened.

At the first meeting of the Agricultural Foundation, L. D. Baver requested $1,000 annually to help bring W. E. Colwell back to North

Fifteen Reynolds Professors were available on February 24, 1975, following a luncheon and the addition of two of the group. They are (left to right): Dr. C. Horace Hamilton, sociology and anthropology professor emeritus; Dr. Henry L. Lucas Jr., statistics; Dean J. E. Legates, animal science and genetics; Dr. Charles H. Hill, poultry science; Dr. Stanley G. Stephens, genetics professor emeritus; Dr. Samuel B. Tove, biochemistry; Dr. C. Clark Cockerham, statistics and genetics; Dr. George H. Wise, animal science professor emeritus; Dr. Francis J. Hassler, biological and agricultural engineering; Dr. Gennard Matrone, biochemistry; Dr. Walter J. Peterson, chemistry professor and graduate school dean emeritus; Dr. Joseph A. Weybrew, crop science; Dr. William A. Jackson, soil science; Dr. Dan U. Gerstel, crop science and genetics; and Dr. Marvin L. Speck, food science and microbiology.

Carolina. Colwell joined the Agronomy Department in 1942 and had gone with the Rockefeller Foundation for work in Mexico in 1944. He returned and provided leadership as the head of the Agronomy Department and as assistant director in charge of tobacco research.

Baver also requested a supplement of $500 annually for R. W. Cummings in the Agronomy Department whose later leadership involved becoming director of research and heading the first agricultural mission to Peru.

A third request of $1,800 was to be used to assure E. W. Glazener of support up to that amount to pursue his doctoral degree. Baver had approached Glazener, an honor poultry science graduate of North Carolina State College, about relinquishing his position at the University of Mayland and joining the staff at N. C. State. Glazener wanted to remain at the University of Maryland where he could pursue his doctorate. The assurance that he could continue to study for his doctorate if he came to State was all that was required to get him to return. Glazener served the institution as head of the Poultry Department and as the associate dean for instruction for a period of about 40 years before he retired.

Supplements for new recruits requested by Baver included support for a leader of vegetable and truck crop research, which was filled by Fred Cochran, who later became head of horticulture and remained in the school throughout his career. Also requested was a supplement to James H. Jensen as head of the plant pathology faculty. Jensen served in that capacity with distinction before leaving to become provost at Iowa State University and later president at Oregon State University.

When Baver and Hilton approached D. W. Colvard in 1945, then a test farm superintendent, about returning to graduate school and coming to N.C. State as head of the dairy husbandry section, they requested and obtained, with the help of Dr. Frank Graham, a fellowship from the General Education Board. By the time Colvard reported for duty in 1947, Guilford Dairy Cooperative had established a professorship in the Dairy Foundation and Colvard was the first Guilford Dairy Professor. He served later as head of the Department of Animal Industry and as dean of agriculture.

Hilton insisted that the appointments to the William Neal Reynolds Distinguished Professorships be made to persons who were primarily involved in teaching and research and not to those regarded as administrators at the time of appointment. After foundation funds had accumlated to make possible other expenditures, they supported

a variety of activities including graduate research assistantships used to strengthen the research and graduate training.

Funds from foundations and private individuals have played a major role, not only in revitalizing the School of Agriculture and Life Sciences in the beginning, but in maintaining a high level of excellence over a long period of years. Most of those holding William Neal Reynolds Distinguished Professorships have remained with the institution. J. E. Legates was a Reynolds Professor before he became dean. He was regarded as one of the outstanding animal geneticists in the country and could have gone to almost any institution he might have chosen. He elected to devote his entire career to the School of Agriculure and Life Sciences.

Changing Sources of Funds

Not only did the total amount of funds available increase year by year, but the sources of funds likewise changed over the years. The table below shows changes in the agricultural research budget. State appropriations increased rapidly after 1960, while federal funds increased more slowly. Funds from foundations, gifts, grants, and contracts increased manyfold.

A pattern in federal research funding was to move away from the allocation of funds by formula to an allocation of funds by grants, whereby each state research service competed with the other states for the fixed amount of funds. In extension, a trend was away from the allocation of funds by formula to earmarked funding for special projects, such as marketing, the Expanded Food and Nutrition Education Program, farm safety, and civil defense.

Support of the Research Program in the School of Agriculture by Sources of Funding

Year	Direct federal appropriation	State appropriation	Foundations, gifts, grants, contracts	Miscellaneous receipts	Total funds
1950	$ 403,545	$ 1,049,003	$ 64,245	$ 97,581	$ 1,614,374
1955	583,068	1,411,887	160,422	148,818	2,304,195
1960	1,148,584	1,984,967	1,071,215	174,667	4,379,433
1965	1,738,366	3,096,241	2,641,732	334,280	7,810,619
1970	2,193,153	6,259,405	2,785,061	386,607	11,624,226
1975	3,088,847	10,383,635	3,858,803	683,771	18,015,056
1980	4,777,103	16,109,864	7,026,562	995,722	28,909,251

Long-Range Plans

North Carolina Accepts the Challenge Through a United Agricultural Program was the title of the 74-page booklet that announced the comprehensive long-range plan prepared by the North Carolina Board of Farm Organizations and Agricultural Agencies in 1952.[9]

The groups represented by the board were the North Carolina Department of Agriculture, North Carolina Department of Conservation and Development, North Carolina Farm Bureau Federation, Farmers Home Administration, Production and Marketing Administration, Division of Vocational Teaching of the North Carolina Department of Public Instruction, North Carolina Rural Electrification Authority, Soil Conservation Service, North Carolina State Grange, and the Agricultural Experiment Station and Agricultural Extension Service at North Carolina State College.

Representatives, usually the chief administrators, of these organizations and agencies came together once each month for a dinner meeting. Out in the counties, groups representing the agricultural interests were likewise formed into organizations that met regularly. These state and county organizations were given considerable credit for bringing together the representatives of a large number of groups charged with serving agriculture in the state. The purpose was to enable these organizations and government agencies to carry out programs that were complementary rather than competitive.

The Challenge was "An Agricultural Program Dedicated To: Increased per capita income, Greater security, Improved educational opportunities, Finer spiritual values, Stronger community life, and More dignity and contentment in country living."

The program spelled out ways that farming could be enhanced by improved crops, livestock and poultry; conservation of resources; and increased income. The program for better family living advocated improvement in the home and in the community.

Framers of the program suggested that "every county in the State should make a study of its situation and map a program to increase and make better use of farm income." Every farm family was admonished to "set up goals and objectives, and choose the farming pattern most likely to achieve these goals."

Special extension specialists were hired to work under the supervision of John Crawford, who gave direction to the county efforts. A number of counties surveyed their situation and published booklets outlining county situations and goals. Another feature of

the program was to get communities organized. From a base of 29 such communities in 1950, the number had grown to 917 by the end of 1961.

The next major planning effort by the Board of Farm Organizations and Agricultural Agencies came in 1961, at the behest of governor Terry Sanford.[10] At his request, the board developed the Agricultural Opportunities program. There were three goals: (1) to increase farm income; (2) to develop marketing and processing facilities and services; and (3) to promote education for family and community development.

By 1961 the concept of agriculture and agribusiness (rather than just farming) had been developed. Three groups—farmers, those who provide farmers with necessary supplies, and those who handled farm products from the farm gate to the consumer's table—were included. By 1961 the value of farm supplies purchased by farmers had reached $1/3 billion, farm production was valued at $1 billion, and processing and marketing was a $2.5-billion operation. The Agricultural Opportunities program described agriculture as a $3.5-billion business in North Carolina but pointed out that there was much room for improvement and capitalizing on the many opportunities available.

The Challenge program was unveiled to the public in 1952. It was developed by a number of agricultural organizations and agencies.

It was hoped that each of the several groups making up the board would each develop its own agricultural opportunities program. Only two of the groups—research and extension at North Carolina State College—went so far as to develop formal programs.

On February 20, 1962, Experiment Station Director Roy L. Lovvorn asked 13 committees he had appointed to develop a 10-year projection for agricultural research in North Carolina. Six of the committees were interdisciplinary and dealt with (1) livestock, poultry, feed grains, forage crops, and protein sources; (2) field crops; (3) horticultural crops; (4) forestry; (5) home economics; and (6) human resources and human behavior. The other seven dealt with relationships of the experiment station to adjacent state experiment stations, the U.S. Department of Agriculture, outside granting agencies, the outlying research stations, the extension service, private breeding agencies, and the state seed and fertilizer laws.[11]

During 1962 much time was devoted to this analysis. The printed reports gave a 10-year projection for agricultural research in the state.

In September, 1961, Extension Director R. W. Shoffner appointed a committee and asked it to develop a five-year program for that agency. W. L. Turner was chairman of this steering committee. Subcommittees were asked to analyze horticulture; field crops; livestock, poultry, feed grains, forage grains, and protein sources; forestry; marketing; home economics; youth programs; information; and community.[12]

In the counties, each extension staff was asked, after consultation with local lay leaders, to provide the state committees with situational data; a listing of major problems that must be overcome; goals in farm income, family living, and youth and community work that might be reached within five years; and the educational approaches that were needed to reach the goals.

As a featured part of the program, specific income goals were set for the agricultural phases of the program. When these goals were totaled up they came to a 24 percent increase during the five-year span of the program, or a goal for 1966 of $1,574,636,783. From this figure came the name of the program—"1.6 in '66."

Five years later this program was judged a success by the adminstration. It was followed by a second five-year program, and still others as the years went by. Inflation, however, soon began to make specific dollar figures meaningless and other names were developed—"Target 2" in 1966, "Impact '76" in 1972, "4-Sight" in 1977, and "People's Plan '87" in 1983.[13]

Protecting the Land and People

Rachel Carson's 1962 book, *Silent Spring*, not only caught the attention of agricultural researchers and specialists—it moved them to center stage in the long struggle against pollution and damage to the environment.

First, some rose up to defend their activities in what by that time had become a case of chemical warfare against the pests of flora and fauna with which farmers had to contend. Others came to the recognition and admission that there could indeed be danger from chemical pesticides in the environment, that mass infusions of pesticides alone would not totally eliminate the pests, and as various species became resistant to pesticides the process might even become self-defeating.

Regardless of the positions of individuals or groups, there was a clear need for action. In the early 1950s, the Pesticide Residue Research Laboratory had been established, mainly because of concern for possible health problems and complaints about pesticide residues on tobacco.[14]

In projecting its program of research for a 10-year period, the Agricultural Experiment Station outlined a three-fold program in 1967 that included efforts to improve the quality of the environment. The Agricultural Extension Service, developing a five-year program to begin in 1972, added a new dimension to its projected goals—protect and improve quality of the environment.

In the instructional area, a degree program in conservation, jointly administered between the School of Agriculture and Life Sciences and the School of Forest Resources, was established in 1967, and a graduate degree program in ecology was established in the early 1970s.

In 1968 the Agricultural Chemicals Advisory Committee was formed. Its functions were to advise the administration and faculty on policy matters related to agricultural chemicals. Two years later the Animal Waste Management Committee was formed to give attention to the ever-increasing problem of animal waste disposal.

Whenever a public need was perceived, funds were made available through special grants in addition to funds from the traditional sources of support for agriculture.[15]

Attention of those concerned with pollution of the environment was focused on agriculture because it was in the triple role of culprit, victim, and a part of the remedy. Agricultural production and

processing were recognized as contributors to pollution and other environmental problems through their usage of pesticides and chemical fertilizers, animal wastes and processing plant residues. On the other hand, estimates indicated that agricultural production was being reduced by 15 percent as a result of air pollution. Farmland was also seen, however, as a part of the solution to the pollution problem; it could serve as a huge filter to which waste water can be applied. Also, agricultural technology could be applied to reduce the adverse effects of pollution through erosion control, integrated pest management programs, livestock and food processing waste control systems, and perhaps in other ways.

From the Land to the Sea

As national concern mounted for both immediate and long-range water problems, much attention was devoted to the streams and the oceans. "Water quality" became a popular term.

The Water Resources Research Institute was created with federal and state funds in 1965. Located on the North Carolina State University campus, the program initially drew support from the Raleigh and Chapel Hill campuses, but over time other branches of the university became involved. Projects initiated for 1965-66 included studies of rainfall runoff and stream flow in North Carolina, salt marsh productivity, water pollution laws, solubility of soil elements, groundwater yields near Raleigh, water quality, and water recreation facilities.[16] F. J. Hassler served as acting director of the program for one year until David H. Howells was named the first permanent director.

A Coastal Studies program for North Carolina was created in 1966, with Arthur W. Cooper as the director. This program, which also involved several schools at North Carolina State University and several branches of the University of North Carolina, was chartered to work on the restoration, protection, and development of the Tar Heel coastline.[17]

Sea Grant support for the University of North Carolina began in 1970 under the coordination of the School of Public Health at the University of North Carolina at Chapel Hill. In 1973 B. J. Copeland became the program's director, and Sea Grant's administrative offices moved from Chapel Hill to North Carolina State University.

In 1976 the U.S. Department of Agriculture and the U.S.

Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) designated the university as a Sea Grant College. The 1982 budget of $1,852,000 came two-thirds from NOAA and one-third from the North Carolina Department of Administration. In 1983, 20 research and extension personnel from the School of Agriculture and Life Sciences participated in the program.[18]

In a related area, the school's Water Conservation and Utilization Task Force, appointed in 1982, assessed the state's water resources, conservation methods needed, and the school's role in dealing with this important natural resource.[19]

Special attention was also given to the area of phosphate mining in Beaufort County and to the ailing Chowan River, where both fertilizer manufacturing and farm runoff were believed to be contributing to the pollution of that important stream.[20]

Extension Development Programs

"Development" became a magic word for extension programmers. As an outgrowth of the Challenge program, area development associations were organized across the state. The first two were the Western North Carolina Development Association, comprised of 18 westernmost counties with activities centered in Asheville in 1949, and the Northwest Area Development Association, comprised of 11 counties centered in Winston-Salem in 1954.[21]

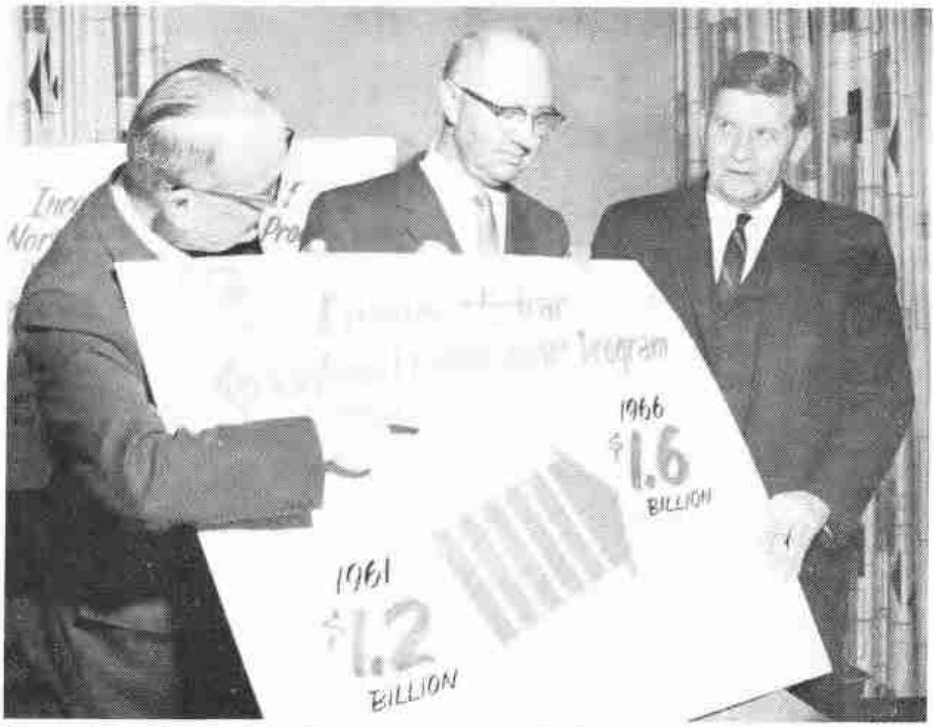
A key feature of these associations was a group of counties around a trade or metropolitan center. There were four areas of activity—agriculture, community development, industrial development, and tourism.

Extension personnel worked closely with the agricultural and community development activities, providing some assistance to the other two as well. The agriculture committee in each association sponsored livestock sales and other activities and promoted agricultural development and better farming. The community development function was best known by the contests to select the top communities in each association area. Generally the best in each county were selected to compete with the other counties. Competition was by size or characteristic of the communities, such as farm, rural-nonfarm or village, and town or city. The area awards were made at an annual banquet.

By 1962, 13 associations were active, with all but two of the state's counties involved in an association. In 1961 the extension service realigned its administrative districts to conform to area association lines as much as possible. By the mid-1960s some 1,200 communities were organized. Then decline began, and by 1983 there were only about 600 organized communities and five active associations; two of which happened to be the two first ones organized—in the west and northwest.

Supported by federal funds, the Farm and Home Development program came along in the mid-1950s. North Carolina received $620,000 of the $12 million appropriated by Congress for this purpose. Farm and Home Development was described as a "really new approach to carrying out the mission of the Agricultural Extension Service. It is a personalized unit approach to the problems of farm people. It involves a different way of approaching people and problems."[22]

The resources of the individual farm—such as land, labor, capital, and marketing—would be studied with a view to helping the farm family make practical decisions in planning their enterprises so as to



Extension Director R. W. Shoffner, Dean H. Brooks James, and Governor Terry Sanford (left to right) at the kickoff of the first of several extension long-range plans in 1962.

produce the maximum net income. The families would be given information on marketing and public policy as well as regular production information.

In North Carolina the new funds were used to employ additional farm and home agents and specialists. Those employed included a specialist in public affairs, 3 marketing specialists, 2 area marketing specialists, 92 assistant farm and home agents, 23 secretaries and clerks, and 10 farm and home development work specialists.

This approach had been tried with some success in a few states. Particularly noted was the Balanced Farming Program in Missouri. It was anticipated that a large number of small farmers not taking advantage of the information extension had to offer would benefit from this redirected extension program.

North Carolina was one of four states where a detailed and systematic evaluation of the new approach was carried out.[23] The one substantial accomplishment found as a result of the activity was a significant increase in the size of the farm business, due primarily to a rapid growth in livestock and poultry enterprises. In spite of intensive assistance, Farm and Home Development families expanded crop production no faster than did families in a matched control group. Likewise, crop production practices did not change and yields did not increase, leading the researchers to conclude that the new approach had little or no impact on crop culture during the study period.

The study also found that home economics phases of the program were not successful and that the level of family living for the families in the program did not increase any faster than for the families in the control group.

Extension was given the major role in the Rural Development Program, starting in 1955.[24] All government farm agencies and many farm and civic organizations participated. A state committee with membership from all interested state and federal agencies and other interested groups was organized, with the director of extension serving as chairman. The program was directed toward helping low-income rural families through improving agriculture and through nonfarm employment. Special county agents were located in Bertie, Anson, and Watauga counties.

By 1962 this activity had been expanded into a statewide operation called the Rural Areas Development Program, with 12 USDA agencies combined into a single effort to provide new jobs and increase incomes in rural areas. Emphasis was on total economic development with the cooperation of public and private groups.

A Center for Rural Resource Development was established on the campus in 1973 to provide information and technical assistance to small towns and rural communities to help them solve environmental problems, improve community services, stimulate employment, and enhance human development. Research and extension personnel in the School of Agriculture and Life Sciences and the School of Forest Resources were to provide the main inputs for the center, but it was also to draw upon the resources of other segments of the university. The center assisted in the administration of funds received under Title V of the federal Rural Development Act of 1972, which were used for a variety of research and educational projects. Paul Stone was selected as the first coordinator of the center.[25]

The most successful of the several special programs developed by the federal government for implementation by the state extension services was the Expanded Food and Nutrition Education Program (EFNEP). Beginning in 1970, the program was still under way in 1983. Some 60,000 low-income rural and urban families had participated in this program, designed to help families make more efficient use of their food dollars.[26]

Conserving Energy

In 1960, when farming was increasingly being viewed as a part of the total agribusiness structure, it was pointed out with some pride that agriculture was buying more petroleum than any other industry in America. North Carolina farmers spent $41,875,000 for petroleum products in 1956.[27] Within 15 years this fact would rise up to haunt the agricultural establishment. During the winter of 1973-74, the so-called Arab oil embargo was in effect, and automobiles were lined up at the gas pumps. An energy shortage was upon the land. A 1973 item highlighted the attention this shortage received by personnel in the school:

> An Extension survey which revealed that Tar Heel tobacco growers could lose up to $27 million because of the fuel shortage prompted a flurry of activities by energy companies and public agencies. Sufficient fuel was secured as a result to cure the record 1973 tobacco crop. Educational programs in energy conservation were incorporated into all phases of Extension work, and especially into agricultural engineering and home management programs.[28]

By 1975 a solar-heated tobacco curing barn had been developed by agricultural engineers and was under test, along with a new

"cross-flow" curing system that promised to increase the efficiency of handling and curing tobacco. That same year, 16 extension workshops gave participants insights into home repair and maintenance for energy conservation.

By 1977 specialists and researchers had prepared some two dozen leaflets on energy conservation in the home, along with a wide range of other instructional materials. Researchers were investigating the saving of energy in broiler houses, hog houses, and greenhouses, and in a wide range of farm operations. As fuel prices continued to climb, attention was given to a return to wood as a fuel for home heating and as a potential fuel for commercial and public buildings.

A joint Energy Task Force of the School of Agriculture and Life Sciences and the School of Forest Resources looked at the opportunities and responsibilities related to energy and North Carolina agriculture in 1979. The task force inventoried energy-related research and extension projects under way in the two schools, identified high priority areas for energy research, and identified appropriate extension and public service programs.[29] The task force found that about 15 percent of the research projects were energy related, 63 of them dealing with conservation and 14 with the production and use of alternate fuels. Extension activities included 21 projects related to conservation and five to the production and use of alternate fuels.

Other activities that were federally funded and designed to meet the concerns of a particular time included civil defense in the early 1960s and farm safety from time to time.

The Agricultural Policy Institute

Rural poverty made the headlines in the 1950s and 1960s, and with good reason. In 1960 some 46 percent of the nation's farm families lived in the South. Yet, southern farmers were selling only 27 percent of the nation's farm products, and net income per farm family was only two-thirds that of farm families living in the rest of the nation.

There was a belief—in the school and in the offices of the W. K. Kellogg Foundation—that policies made in the political arena did not always relate realistically to the economic and social problems prevailing in the farming community. In 1960 this foundation granted $759,800 to the school to conduct a southwide program to focus attention on policy formation for the southeast. The program was organized as the Agricultural Policy Institute. It was the largest

foundation grant received by North Carolina State College up to that time.

This program in agricultural adjustment and public policy called for a three-pronged attack on the region's agricultural problems:

> (1) A concerted effort to bring southern agricultural, political, and educational leaders together in seminars and workshops to exchange views of the South's farm problems and opportunities.
> (2) Developing series of educational programs at N. C. State College to train agricultural workers in problems of farm adjustments and policies, including short courses for county agricultural workers, a one-year program of study for state and regional agricultural workers, and graduate study in agricultural adjustment and policy.
> (3) An expanded economic research activity to supplement the two educational phases of the program.[30]

This program for the South followed a similar Kellogg-sponsored one conducted at Iowa State University. It came about after Dean D. W. Colvard, a member of the Kellogg Foundation Agricultural Advisory Committee, perceived a chance for such a program for the South and encouraged his colleagues in agricultural economics to submit a proposal.

Institute Director C. E. Bishop and Associate Director James G. Mattox often pointed out that the institute program was an educational program, not a policy-making one. However, it was known that there was concern among Kellogg Foundation board members that many of the people in Washington and elsewhere who were responsible for making agricultural policy were guided more by political considerations than by sound economics and an understanding of agriculture. There was hope that an educational program involving leaders throughout the Southeast might influence those who had the responsibility for policy making.

In 1964, a second grant, this time for $1,208,712, extended the program for five more years. In addition to expansion of the three areas initially outlined, an added thrust was a major effort in lifting "bypassed people and chronically depressed areas into the mainstream of economic progress."

The Federal Vocational Education Act of 1963 provided funds for the establishment of the Center for Occupational Education in the School of Agriculture and Life Sciences and the School of Education in 1965. With a budget of $600,000 for the first two years, the center was chartered to seek answers to "one of the most perplexing prob-

lems of modern economic development—the affluence and abundance that are evident on one hand and the unskilled people, low incomes and economic backwaters that are evident on the other."[31] Selz Mayo was acting director of the center until John Coster was named permanent director.

Mission to Peru

From early in the history of the college, interest had been expressed in the world beyond the borders of North Carolina. The big push, however, awaited the post-World War II programs of the nation. While making a speech on world affairs, President Harry Truman emphasized that the United States should be prepared to share its technical know-how with countries around the world in the interest of helping to accelerate their economic and social development. This was the fourth point in his speech, and from it came the popular phrase "Point Four Program."

Soon the federal government had established the Foreign Operations Administration (renamed International Cooperation Administration and later Agency for International Development) to handle the program. The land-grant colleges were early recognized as having a considerable reservoir of talent that could be applied to this task, and the U.S. government began working out contracts with various universities.

Several individual staff members from the School of Agriculture had taken leaves of absence or had arranged to consult in a number of foreign countries concerning the technologies related to agriculture. The administrative staff had concluded that the school was in a position to respond to this international need in a more formal way if the right situation should develop. The dean of agriculture, the director of research, and certain faculty members had received overtures concerning possible involvement.[32]

In 1953 two representatives of the U.S. State Department located in Peru came to the United States to explore the possibility of finding a school of agriculture willing to enter into a contract with them. They invited the North Carolina State College School of Agriculture to explore the possibility of working out a contract to provide technical assistance in cooperation with the Peruvian Ministry of Agriculture and one of the Peruvian colleges. R. W. Cummings, director of research, was asked to go to Peru and explore this possibility in the

spring of 1954. As a result of his visit, the School of Agriculture agreed to send a mission to Peru to assist with their national agricultural research program.[33]

The $526,000 contract was for three years. It involved the assignment of a small staff of scientists to work in cooperation with the Ministry of Agriculture and the National Agricultural College in Peru with the goal of improving agricultural research in that country. The United States and Peruvian governments provided the full costs plus overhead funds for costs incurred on the North Carolina State College campus. The dean of the School of Agriculture served as liaison between the International Cooperation Administration Office in Washington, the Peruvian government, and the campus of North Carolina State College.

The program began in January, 1955, when R. W. Cummings took a leave of absence from his duties as director of research and became chief of party in Peru. A six-member team on long-term assignment was supplemented by up to four short-term technical assistance specialists each year. As the first contract approached termination or renewal, Cummings resigned his position as director of research to accept a position with the Rockefeller Foundation, and

North Carolina State University faculty member and agricultural technician George Ellis (left) discusses livestock production with his Peruvian counterpart. Each NCSU technician was assigned to a Peruvian and the two operated as a team.

Jack Rigney succeeded him as chief of party. In his capacity as liaison officer, Dean D. W. Colvard, visited the project from time to time until his resignation on July 1, 1960. His successor, H. B. James, assumed this responsibility. Both Cummings and Rigney developed excellent working relationships with officials in the Peruvian government and the project was looked upon as one of the most effective land-grant college technical assistance contracts dealing with agriculture.

The effort resulted in the formation of a National Agricultural Research Agency which was officially adopted and financed by the Peruvian government in 1957. Then came research programs, projects, and personnel mainly oriented to improvements in production of basic food and feeds in seven commodity programs.

The project was renewed after the initial three-year period was completed, and major expansion came in 1962. The U.S. Agency for International Development at that time asked the college to assume responsibility for the technical backstopping of all the agricultural services in Peru with a budget of approximately $1,111,000 per year and a staff of 25 technicians. In addition, the Rockefeller and Ford Foundations added another $450,000 over a three-year period to strengthen the agricultural economics and rural sociology aspects of the program.

There were ups and downs for the program. By 1965 the 10-year old program could note research initiated on many subjects, a viable extension program, construction of a new agricultural university moving ahead, and 55 Peruvians studying for advanced degrees in the United States.

However, strained diplomatic relations between the United States and Peru sharply curtailed the mission, and the North Carolina contingent in Peru dropped to half the normal 25. Those returning to the United States were not replaced, and the short-term advisory service part of the program was inactive for several months.

The crisis had developed in U.S.—Peruvian relations when the Peruvian government seized U.S. fishing boats and American-owned land. The professional relationship between the remaining members of the mission and their Peruvian counterparts continued to be cordial and productive, and by the end of 1965 the program was returned to normal operation. The governments, too, got over their quarrel, and in 1970 North Carolina State University and the Peruvian Ministry of Agriculture jointly established the International Potato Center

in Lima. The center was financed by both the U.S. and Peruvian governments and private foundations.

The mission to Peru ended in 1973, after 81 faculty members had worked there for two years or longer, and some 200 Peruvians had been trained in the United States—about half in graduate programs. Farm production had risen enough that annual increases were outstripping the population gains on a percentage basis. The picture looked bright. But when the military took over the government in 1968 the decision was made that Peru could not continue support for research and extension efforts. Budgets for universities were cut severely, and an enormous tax and land reform program adversely affected farmers. The result was a dramatic decline in agricultural productivity and Peru became dependent on imported foods.

In 1980 the military leadership authorized a return to a democratic system, and the newly elected congressional government placed a high priority on developing the country's agricultural capacity. In January, 1982, North Carolina State University was selected over about 10 other American universities to receive a $2 million grant for a three-year project to carry out the plans developed during the baseline study of the situation. By the end of 1982, School of Agriculture and Life Sciences pesonnel were back in Peru.

Other International Programs

As the project in Peru was heading toward its peak in size and importance, the university signed a contract in 1963 with the U.S. Agency for International Development (USAID) to direct a soil fertility study for Latin America.[34] Called the International Soil Testing Program, it eventually included most of Latin America and several Asian countries. This project, directed by J. Walter Fitts, ran until 1975 and was the first of several important projects in the soils area.

In 1970 the university entered into a compact with four other universities and USAID in an effort to develop greater competence in tropical soil science.[35] The other institutions were Cornell University, the University of Hawaii, Prairie View A & M College, and the University of Puerto Rico. The project, which ran for five years, was designed to expand and strengthen the universities' existing competencies for increasing food and fiber production on tropical soils. The North Carolina phase of the project, with funding of $500,000, related plant nutrition to the physical and chemical properties of humid tropical soils.

In 1981 North Carolina State University was selected by USAID to administer a five-year, $16,600,000 tropical soils management research and training program.[36] In this project, NCSU, Texas A & M University, Cornell University, and the University of Hawaii agreed to conduct studies in Peru, Indonesia, Niger, Upper Volta, and Brazil. Charles B. McCants was selected to direct this project.

In other areas, the university signed a contract with the Ford Foundation in 1964 to help the Indian government strengthen its postgraduate studies and research in agricultural engineering at the India Institute of Technology at Kharagpur. F. J. Hassler directed this activity.[37]

The objective of the project was to help develop a strong, viable department of agricultural engineering in education and research at the Ph.D. level. The project successfully incorporated several innovative aspects that were later used in a number of similar projects by other universities. Short-termers from the NCSU Department of Biological and Agricultural Engineering staffed the program, the Indian University fully administered the program, and the research carried out was directly applicable to the problems of India.

In 1975 the university received the largest grant ever made for nematode research.[38] The money was to be used in a search for better methods of controlling root-knot nematodes—a serious problem in North Carolina as well as in many places around the globe. The initial funding was for three years, but it was extended for two years in 1978 and for an additional three years in 1980. Total funds committed to the project were $2,895,322. J. N. Sasser directed the project, which involved some 60 countries in eight geographical regions from Latin America through southeast Asia. Research was carried out in Raleigh and in regional research centers in Costa Rica, Nigeria, Kenya, Columbia, and the Philippines.

In 1978 the university joined 12 other U.S. universities to study the use of crop residues as feed for small ruminants.[39] W. L. Johnson was selected as director of the NCSU portion of the project. Sheep and goats are important domestic animals in South America and Africa, the areas to which the project was directed.

After the initial funding for international activity in the early 1950s, additional funding came in 1965 and again in the mid-1970s. In response to the increased opportunities that these new funds brought in, Jack Rigney was appointed to a new university post of dean for international affairs in 1968. Rigney had directed the mission to Peru and had obtained additional experience in India and

elsewhere. In his new position he directed the international activities, coordinated on-campus instruction, and oversaw the foreign visitor programs.

Upon Rigney's retirement in 1981, J. Lawrence Apple, named coordinator for the school's international efforts in 1976, became coordinator of the university's international programs.

Foreigners, many high up in government, came to the campus for instruction and to study the research and extension programs of the School of Agriculture and Life Sciences. In 1960, on the tenth anniversary of the foreign visitor program, Fred Sloan, who had succeeded I. O. Schaub as the director of this activity, noted that the one-thousandth foreign visitor to be received by the School of Agriculture came to the campus in April of that year.

In 1972, Sloan and the program were singled out for recognition by the U.S. Secretary of Agriculture.[40] In the 17 years Sloan had directed this activity (1953-1971), he had helped to plan visits to North Carolina for over 2,800 men and women from 120 countries.

Following Sloan in this part-time position were J. E. Foil (1976-1981) and G. B. Lucas (1981). Through 1983 more than 4,000 foreign visitors received training in the School of Agriculture and Life Sciences.

Computers and New Media

"The research activities of an expanding university produce large quantities of numerical data that must be analyzed to be of use to the research man and the public. In some cases, these analyses require burdensome computations and data processing."

So started a 1956 article that announced the procurement of the school's first computer.[41] The IBM 650 magnetic drum processing machine had been installed in Patterson Hall that year as a campus-wide facility, operated by the Department of Experimental Statistics.

Most computations could be performed with one pass of a deck of cards through the machine. The program was stored on the cards. But the machine, primitive as it was by later computer standards, contained a magnetic drum that revolved at 12,500 rpm, allowing access to the 2,000 ten-digit words on the drum in about 2.4 thousandths of a second. The machine was capable of performing 78,000 additions or subtractions per minute, 5,000 multiplications per minute, or 3,700 divisions per minute—all with 10-digit numbers. (The computer

would become an important research tool. William Splinter in Biological and Agricultural Engineering was one of the first researchers to develop research models on a computer in the course of his tobacco research.)

This first computer followed by just a couple of years the school's extensive involvement in commercial and public television. Beginning in 1952, school personnel began to appear on the several commercial television stations being operated in the state, and a full-time radio-television position was established to work with school personnel and the stations in developing agricultural programs.

Meanwhile, University of North Carolina officials, led by W. D. (Billy) Carmichael, had raised the necessary funds to construct a television station.[42] In January, 1955, WUNC-TV went on the air, with broadcast studios on each of the three university campuses (Chapel Hill, Raleigh, and Greensboro) and with a single transmitting tower in western Chatham County.

At the request of university officials, the extension service agreed to provide the station with five 30-minute farm shows each week, three 30-minute homemaker shows, and a weekly garden show. This programming represented half of the time allotted to North Carolina State College for programs broadcast over WUNC-TV. Radio-TV Editor Ted Hyman served as a member and later chairman of the

Television activities covered the whole range of school activity. Consumer marketing programs with extension specialist Ruby Uzzle, here on the "Aspect" set with television specialist Hal Reynolds, were always popular.

North Carolina State Television Advisory Committee. These activities gave the school a strong voice in the college's television operation.

The early garden and homemaking shows did not survive, but regular programming by the school continued over the university system's television facilities: Today on the Farm (1955-1960), Aspect (1960-1970), NOW (1970-1976), Backyard Gardener (1967-1980), and Almanac (1980). The system was used for a wide variety of instructional programs, and, for a period of time, the extension administration used the system to communicate with county offices.

Radio continued to be an effective communication medium. With increased emphasis on county agent use of radio in the 1950s, the number of broadcasts made by county personnel each year rose from 8,000 in 1953 to 14,000 in 1957.

On the campus, Frank Jeter began a daily, noon-hour broadcast on WPTF in 1945. In 1951, his radio work on the station was expanded with three early-morning shows. These programs continued until 1954. Later a faculty member in the School of Agriculture served as a guest each Monday during the noontime farm program.

Also in the 1940s, Horticultural Specialist John Harris began a Saturday gardening show on WPTF, in which he responded to questions sent in by listeners.

"The Tarheel Farm Hour" went on the air March 1, 1954. As far as is known, this was the first live radio show originating from a land-grant college campus that was broadcast on a network of commercial stations. Thirty-three stations carried the program at the beginning; by the end of the year, 43 of the 115 stations in the state carried the program. The 15-minute program was broadcast five days a week at 11:30 a.m. A 14-station FM network carried the program to the broadcast stations, which could transmit the program live or record it for later broadcast. This program was established in cooperation with the North Carolina Association of Broadcasters.

A battery-operated, portable tape recorder purchased in 1956 made it possible to tape features out in the field for inclusion in the program.

After the demise of The Tarheel Farm Hour in 1958, the stations in the state were provided, on tape, a daily 3-to-4 minute feature from the school, along with a number of specialized taped programs from time to time, and radio continued to be an important communications channel in the counties.

In 1972 North Carolina became the first state to establish a statewide videotape system for extension agent training and to use with clientele. Production facilities were established on the campus, and a playback unit and monitor were installed in each county extension office.

In 1975, in cooperation with the Wake County extension staff, a telephone answering service was located on the campus. The system ran for about 10 weeks during that summer. Featured were 40 recorded messages on canning and freezing. The system was later tried in other counties, and in 1978 Teletip, a statewide telephone recorded message system, was installed on the campus. Within a couple of years the number of messages available had exceeded 1,000, and by the end of 1983 the system had received 771,000 calls since it began.

From the installation of the first computer in 1956, school personnel kept pace with the computer revolution, using computers in their regular work and preparing programs for use by farmers and homemakers. The computers that were added and the skills that were developed in their operation made it possible for the dairy herd improvement production records to be recorded, and the dairy program was soon set up to serve the entire southeastern United States. Likewise, computer programs were designed to calculate farm income and expenses and to compute the ingredients in feed mixes.

The older educational techniques did not vanish. The demonstration—dating back to Seaman Knapp in 1904—remained an effective tool. Meetings of farmers—originating in the Farmers Institute days of the past century—were regularly used. But new technology in the educational area came on strong, necessitating that school personnel adapt to and use the new media as they became available.

NOTES TO CHAPTER 14

1. This tract was held by the Forestry Foundation until it was sold in 1941.
2. This tract was held until it was sold in 1942.
3. W. M. Roberts interview, February 1, 1979. George Coble was a Lexington, North Carolina, businessman who got into the milk business in a big way during World War II by merging small milk plants so he could sell milk to the military establishments in the state. His company faced financial problems when the war ended and his large military markets were no longer available. As a state highway commissioner, he introduced tall fescue planting along the state's highways.
4. H. W. Taylor interview, February 1, 1979.

5. In addition to his extensive farming operations in the Nash-Edgecombe county area, Pearsall served as a state legislator and in other government activities. He chaired a committee that developed the state's approach to integration of the public schools, known as the Pearsall Plan. Incorporators of the foundation were Pearsall, C. W. Tilson, S. T. Proctor, Clarence Poe, John W. Clark, J. W. Umstead, George Watts Hill, J. Melville Broughton, J. S. Ficklen, Edwin Pate, L. Y. Ballentine, W. Kerr Scott, Harry B. Caldwell, Mose Kiser, W. W. Andrews, Pearl Thompson, Fred P. Johnson, T. W. Ferguson, J. W. Jimeson, D. J. Lybrook, Julian Price, T. B. Upchurch, Jr., W. G. Clark, Jr., Clarence Stone, J. Hawley Poole, J. H. Blount, E. Hervey Evans, C. W. Mayo, Claude T. Hall, O. M. Mull, J. B. Speight, Charles J. Shields, E. V. Cummings, Ethel Parker, James G. K. McClure, W. B. Rodman, Jr., W. W. Graves, R. Hunter Pope, Larry I. Moore, Jr., Fred A . Green, Leo H. Harvey, J. C. Lanier, A. G. Floyd, and R. Flake Shaw.
6. Records of the several foundations are on file in the North Carolina State University Archives.
7. William Neal Reynolds professors appointed through 1983 were as follows:

Date named	Department	Name of recipient
1951	Plant Pathology	J. H. Jensen
1951	Genetics	S. G. Stephens
1951	Animal Science	G. H. Wise
1954	Entomology	Z. P. Metcalf
1954	Chemistry	W. J. Peterson
1955	Crop Science	P. H. Harvey
1956	Agricultural Economics	C. E. Bishop
1956	Animal Science	J. E. Legates
1956	Plant Pathology	C. J. Nusbaum
1957	Soil Science	N. T. Coleman
1957	Statistics	H. L. Lucas
1957	Food Science & Microbiology	M. L. Speck
1957	Crop Science	J. A. Weybrew
1957	Crop Science	W. C. Gregory
1961	Sociology and Anthropology	C. H. Hamilton
1961	Biological and Agricultural Engineering	F. J. Hassler
1962	Plant Pathology	Arthur Kelman
1962	Biochemistry and Animal Science	Gennard Matrone
1964	Crop Science and Genetics	D. U. Gerstel
1972	Statistics and Genetics	C. C. Cockerham
1972	Soil Science	W. A. Jackson
1975	Poultry Science	C. H. Hill
1975	Biochemistry and Animal Science	S. B. Tove
1977	Entomology	Ernest Hodgson
1979	Animal Science	L. C. Ulberg
1980	Animal Science and Microbiology	J. G. Lecce
1981	Biochemistry	H. R. Horton
1981	Soil Science	E. J. Kamprath
1981	Entomology	R. L. Rabb
1983	Poultry Science	W. E. Donaldson
1983	Genetics	C. S. Levings III

8. Hilton's prophecy was supported by what actually happened in the next 33 years. Of the 31 scholars selected, only three had resigned their positions. J. H. Jensen went to Iowa State as provost and then to Oregon State as president; C. E. Bishop went to the University of Maryland at College Park as chancellor and then served as president of the universities of Arkansas and Houston; and Arthur Kelman went to the University of Wisconsin as head of the Plant Pathology Department.
9. The North Carolina Board of Farm Organizations and Agricultural Agencies. *North Carolina Accepts the Challenge Through a United Agricultural Program,* 1952, 76 pp.
10. The North Carolina Board of Farm Organizations and Agricultural Agencies. *Expanding and Developing Agricultural Opportunities in North Carolina,* 1962, 16 pp.
11. *A Ten-Year Projection for Agricultural Research in North Carolina.* N.C. Agricultural Experiment Station, Bulletin No. 422, 1963, 114 pp.
12. *1.6 in '66, A Working Document,* N.C. Agricultural Extension Service, 1963, 200 pp.
13. *Target 2, A Working Document,* 1966, 288 pp.; *Impact '76, A Working Document,* 1972, 344 pp.; *4-Sight, A Working Document,* 1977, 236 pp.; *People's Plan 87, A Working Document,* 1983, 224 pp. All published by N.C. Agricultural Extension Service.
14. For detailed accounts of the school's response to environmental problems raised, see the following sections in Chapter 16: Behold the Environment, Integrated Pest Management, and Animal Waste and Water Quality.
15. For example, in 1971 a grant of $1 million came to the school from the U.S. Public Health Service for basic research into pesticide residues (1971 annual report, p. 7), and a 1973 grant of $992,000 from the Carolina Power and Light Co. was used to study the effects of construction and operation of a nuclear power plant (1973 annual report, p. 8).
16. "Water and Human Resources," 1965 annual report, p. 5. The Water Resources Research Institute published detailed accounts of research completed, an annual report, and a regular newsletter from its headquarters at N.C. State University.
17. "Coastal Studies Program Begun," 1966 annual report, p. 6.
18. An extensive array of materials were published by the Sea Grant program, including newsletters, annual reports, and special publications.
19. Humenik, Frank J. et al. *Not One Drop More.* N.C. State University, 1983, 20 pp.
20. "Special Attention Given to Chowan River," 1974 annual report, p. 8.
21. See annual reports: 1961, p. 28; 1962, p. 33; 1963, p. 36; 1964, p. 37; and 1966, p. 47. Also working documents prepared and published in connection with the development of extension long-range plans; extension circulars 201, 202, and 203 (1961); and *Research and Farming,* XVI(4), Spring, 1960, p. 10.
22. "Farm and Home Development," 1955 annual report, p. 26; "Farm and Home Development Growing Up," 1956 annual report, p. 28.
23. Marsh, C. Paul. *An Evaluation of the Farm and Home Development Approach to Agricultural Extension Work in North Carolina.* Extension Evaluation Studies, No. 3, 1962.
24. Annual reports: 1955, p. 28; 1957, p. 26; 1961, p. 28; and 1962, p. 33.
25. "Center for Rural Resource Development Established," 1973 annual report, p. 9.

26. Annual reports for 1970 and later years contained brief reports of the EFNEP activity in the extension section of each report.
27. Pugh, C. R., and W. L. Turner, *Agriculture . . . Industry's Growing Business Partner.* N.C. Agricultural Extension Service, Folder No. 168, 1959, 8 pp.
28. "Fuel for Farmers," 1973 annual report, pp. 31-32.
29. "Energy to the Forefront," 1979 annual report, pp. 2-3.
30. "Agricultural Policy Institute Established," 1960 annual report, p. 2. The institute published an extensive array of materials, including research and conference reports and annual reports during its 10-year existence.
31. "Water and Human Resources," 1965 annual report, p. 5.
32. For a general summary on international activity, see the following articles in the annual reports: "International Contacts Benefit State," 1966, p. 7; "International Programs Likely to Expand," 1976, p. 13; "International Activities on the Increase," 1978, p. 8; and "Significant International Activity in 1979," 1979, p. 7.
33. Waugh, Elizabeth. "No Creampuff Assignment, Peru," the *News and Observer.* August 29, 1965, p. III-1; William L. Carpenter," Carolina Farm Notes," *Southern Planter,* November, 1963, pp. 11 and 22; and December 1963, p. 23; annual reports—1955, p. 3; 1962, p 2; 1965, p. 5; 1966, p. 7; 1969, p. 6; 1971, p. 7; 1973, p. 7; and 1982, p. 8
34. "International Contacts Benefit State," 1966 annual report, p. 7.
35. "International Soils Grant Awarded," 1970 annual report, p. 6.
36. "Tropical Soils Program to Be Headquartered at NCSU," 1981 annual report, p. 9; "Tropical Soils Can Be Continually Productive," 1981 annual report, pp. 21-22.
37. Giles, G. W. *A Department Grows to Maturity* (The History of Agricultural Engineering at N.C. State University 1914 to 1977). pp. 44-45; and personal correspondence, G. W. Giles to W. L. Carpenter, December 11, 1984.
38. "School Awarded Grant for Nematode Study," 1975 annual report, p. 12; "Contract for International Nematode Project Renewed," 1980 annual report, pp. 8-9.
39. "International Activities on the Increase," 1978 annual report, pp. 8-9.
40. "Foreign Visitor Program Grows," 1960 annual report, p. 3; and "Foreign Visitor Program Recognized," 1972 annual report, p. 8.
41. "Faster IBM Service Now Available for Agricultural Research," 1956 annual report, p. 12. See photograph on page 293.
42. Carmichael, although located at Chapel Hill and generally thought of as associated with the university there, was for many years vice president and chief financial officer for the university system. He was very effective in money raising and legislative relations and as such was of tremendous help in the growth and development of the School of Agriculture at NCSU. For some details on his contributions to the foundations, the Reynolds professors, and other programs, see Louis R. Wilson, *The University of North Carolina Under Consolidation, 1931-1963, History and Appraisal.* Chapel Hill, N.C.: University of North Carolina Press, 1963.

15

Instruction Adjusted For the Times

A revised curriculum. Science, business, and technology. Medical technology. Better graduate study. The Agricultural Institute. Short course expansion. Financial help. The opportunities. Clubs and teams.

RETURNING WORLD WAR II VETERANS found a revised curriculum awaiting them, beginning in the fall of 1946. The new programs were designed to give the student less training in general agriculture but more in the social sciences and humanities. Greater flexibility was added in that a student could choose more "free electives."

A Revised Curriculum

In addition to the general curriculum in agriculture, a specialized curriculum, particularly designed for students contemplating graduate work, gave more emphasis to the scientific aspects of agriculture. Also, there were special curricula for students majoring in dairy manufacturing, forestry, landscape architecture, and wildlife conservation and management.

The returning veterans were much better students than most members of the faculty had expected. They played poker and used other skills they had acquired in the military, but instead of simply taking advantage of the G. I. Bill, they were mature and serious-

minded. Many were married and with their families found housing in Trailwood, Westhaven, and Vetville.[1]

In announcing the new program, Dean L. D. Baver said the revisions were designed to improve the quality of training offered and to advance the School of Agriculture and North Carolina State College to a place of national leadership in agricultural education.[2]

In 1949 the program in landscape architecture was moved to the new School of Design, and a change from the semester to the quarter system in 1954 necessitated some course rearrangement. But these 1946 revisions were the basis for the instructional program for the next 12 years.

It is not possible to assess the success of the curriculum in moving the school into national prominence, as envisioned by Baver. What is clear is that the program offered would not forever draw in the students necessary for a viable instructional program. Undergraduate enrollment in the school held between 600 and 700 through the early years of the 1950s and advanced above 800 for the latter years of the decade. Graduate enrollment increased each year but the decreasing number of freshmen showed that something was wrong. In the fall of 1958 only 89 freshmen enrolled in the agricultural program.

The opportunities for employment of agricultural graduates were there. A 1955 report stated that agriculture—once just called farming—now embraced eight major fields with over 500 occupations that could employ 15,000 new college graduates each year. But the nation's land-grant colleges were graduating only 8,500 a year. The eight areas and number of graduates needed were:

Farming—crops, livestock, fruits, vegetables—2,000
Research—production, marketing, processing—1,000
Industry—meat, dairy, poultry, feed, fertilizer—3,000
Business—grading, marketing, credit, cooperatives—3,000
Education—college, extension teaching, secondary—3,000
Communications—writing, reporting, radio, TV—500
Conservation—soil, water, range, forest, wildlife—1,000
Services—inspection, regulation, quarantine—1,500[3]

The school's 1955 annual report pointed out that in North Carolina there was "desperate need for college trained people to farm their own land and for well schooled specialists in the fertilizer, dairying, feed, insecticides, farm implements and distributing industries." For some time the school administrators had been discussing possible changes in the curriculum. Many high school graduates were perceiving training in agriculture as offering only two alternatives—

preparation for work in a government agency or a return to the farm. To remedy this false image, the program planners turned to an annual open house, started in 1959, that would give the school a chance to picture the great depth and broad dimension of the school's programs.[4] A number of promotional techniques were designed to acquaint high school counselors with the school.

To modify the curriculum, school administrators turned to the then-popular agribusiness concept.

Science, Business, and Technology

In 1955 there were approximately eight million persons working on U.S. farms. Six million more were producing for and serving farmers, and another 10 million persons were processing and distributing farm products. In total, 24 million of the nation's 62 million labor force were employed in agriculture and related industries.[5] Would not a lot of college graduates be needed for this large agriculture industry?

In studying the kinds of training to be given young persons in the School of Agriculture, it was agreed that the curriculum should be divided into three broad areas—agricultural science, agricultural business, and agricultural technology:

> The curriculum in *Agricultural Science* places much greater emphasis upon science and its application to agriculture. It provides excellent training for employment opportunities including research for public institutions and industry.
>
> *Agricultural Business* trains young men in business and agriculture. The program brings into existence a new combination of business, science and agriculture. Men in this curriculum are trained to work in agricultural industries closely related to farming. There is a great demand for this unique combination of training in science, business and technical agriculture.
>
> *Agricultural Technology* emphasizes applied science and technology. In this curriculum men are trained in agricultural production and in the technical processes involved in agricultural industry.[6]

Under these three programs, B.S. degrees would include 34 majors offered by 15 departments.

This new concept of instruction served the school well. Not all of the programs developed, but 10 years later, (in 1968) the undergraduate program included 30 majors in 18 different areas of specialization. By the 1980s the applied and commodity-type departments had concentrated on the science and technology tracks. The basic disciplines,

such as botany and zoology, had concentrated on the science track. The business track had been concentrated in agricultural economics. Agricultural economics dropped the technology track, but double majors between one of the commodity departments (such as poultry science) and agricultural economics became popular.

New programs were added as the need arose and to meet the changing needs or interests of the students. In 1963 two new undergraduate programs were put into operation—biological sciences and an international option.[7] The program in biological sciences provided undergraduate training for several of the basic departments that did not have an undergraduate curriculum. It was especially designed for students preparing for graduate study and for those planning educational careers in biology. The international option was available within all curricula in the school. This option included intensive study of a foreign language and was designed to promote understanding of international relationships and the culture of other societies.

Further capitalizing on high interest in a particular area, a curriculum in conservation was developed in 1967.[8] The joint pro-

In 1962 agricultural students were predominantly white, male, and with a rural background. The makeup of the student body would soon change.

gram between Agriculture and Life Sciences and the School of Forest Resources combined courses in forestry, wildlife management, and soil science. It was designed to develop personnel who could make sound judgments in conserving both renewable and nonrenewable resources and in planning and directing resource management and use.

Revisions and groupings of course offerings in entomology, plant pathology, and crop science in 1972 resulted in a pest management curriculum for baccalaureate students. Four years later the Department of Horticultural Science joined the other three in a revised pest management program.[9] The curriculum came in response to agribusiness needs for broadly-educated students and to increased attention being given to the "management" philosophy of pest control.

By 1981 computers were being used on the farm. To meet this development, two computer courses were offered in the Department of Biological and Agricultural Engineering, one for four-year students and one for two-year students.[10] The courses were built around the use of micro-computers—the type being used on farms and in small businesses.

A special program for "honors" students was started in 1959[11]. Juniors and seniors whose overall average was B or better were invited to attend a special seminar. The following year, freshmen and sophomores were added to the program. In 1963 a special honors research course was approved, and those students eligible for this course carried out research projects under the direction of selected faculty members. By 1976 some 200 students were participating each year in the seminar and another 125 in the honors research program. Five years later another dimension was added—a teaching option. In 1981 about one-fourth of the students in the honors program selected the teaching option, in which a student was paired with a top professor and served as the professor's teaching assistant.

An experimental undergraduate program for individualized study came along in 1971 in response to the demand by students that they have more freedom to choose their courses of study.[12] Under this program the student would develop his or her own program, meeting the minimum course requirements for the university and for the school. The program did not have large numbers but did meet the needs of the mature or independent student desiring a course program in depth or breadth. One problem was that the program often did not

meet the needs of prospective employers, who were looking for graduates with more in-depth training in a particular area.

More popular was an external learning experience developed to provide the student an opportunity to get working experience while carrying out an academic program.[13] Under the arrangement, students received degree credit for closely supervised off-campus experience related to their majors. The program grew from 24 students in 1977-78 to 51 in 1980. In a related Cooperative Education Program, after the freshman year a student worked one semester and attended the university one semester, following an alternating schedule until the degree was completed.

Medical Technology

A shortage of doctors was proclaimed about 1970, particularly by the press, supporters of a new medical school at East Carolina University, and new residents in fast-growing areas like the Research Triangle who had difficulty finding doctors who would accept them as patients. Also, there was a rapidly increasing demand for medical personnel other than doctors. It was estimated that 90,000 medical technologists would be required in the U.S. during the 1970s.[14]

In 1969 a joint medical technology program was developed in cooperation with the School of Medicine at the University of North Carolina at Chapel Hill. In that program, administered through the Department of Zoology at North Carolina State University, the student would spend three years on the NCSU campus with courses in zoology, humanities, and the social, physical, and biological sciences. The fourth year would be taken in residence at an approved hospital.

A second program consisted of a four-year college curriculum with a B.S. in zoology, followed by a year of training in a hospital laboratory school.

By the end of the 1970s the School of Agriculture and Life Sciences had become a popular place for premedical and predental training. Of 98 NCSU students applying to medical colleges in 1978, 54 were accepted by medical schools. With an acceptance rate of about 50 percent over several years, NCSU ranked well above the national average of about 33 percent. Of the 54 students accepted from NCSU, 36 were enrolled in curricula in the School of Agriculture and Life Sciences.

By 1973, of all the students in the freshman through senior classes who had declared their curriculum goal, 228 had declared preveterinary medicine as their major area of interest.[15] Unfortunately, not nearly all of them would find a spot at which they could study to fulfill their aspirations. In 1975, of 97 North Carolina students from the several program areas and universities providing preveterinary instruction and declared eligible to attend veterinary school by a special state-level screening committee, only 28 were admitted to veterinary schools. Five were admitted to the University of Oklahoma, 4 to Ohio State, 10 to the University of Georgia, 6 to Auburn, and 3 to Tuskegee Institute. Statistics such as these helped persuade the North Carolina General Assembly that there was a genuine need for a school of veterinary medicine in the state.

New programs plus recruitment activities and increased interest in the natural sciences enabled the school to move forward rapidly in its instructional programs. From a low of 686 students in 1963-64, enrollment grew steadily until a peak of 2,900 four-year students was reached in 1975-76.[16]

Student participation was high in the honors program started in 1959. In this program students attended special seminars, assisted professors in their teaching and research, and carried out their own research projects.

Ceilings imposed on student growth for the university because of space limitations in 1976 reduced the number of students majoring in agriculture. Particularly affected was the number of transfer students; only 70 could be admitted that year compared to 200 the year before.

Two noticeable changes in the student population over the years were the increasing percentage enrolling from urban areas and the rapid increase in female students—up to 45 percent of the students by 1980. Particularly popular with both urban and female students were the programs in food and horticultural sciences.

A survey of the 1983 entering freshmen indicated that the parents of about one-fourth of the students were involved in agriculture in some way.[17] Parents continued as the person(s) most influencing students' decision to attend NCSU (43%); friends remained in second place (28%). Only about 7 percent of the freshmen had been influenced to attend NCSU by faculty or staff, but the reputation of the School of Agriculture and Life Sciences continued as the second most often named reason (20%) for attending NCSU. Curricula offered remained the major factor for selecting NCSU (57%). The 1983 freshman class in the School of Agriculture and Life Sciences represented 95 of North Carolina's 100 counties and 25 other states.

Better Graduate Study

Agricultural graduates of the 1930s almost always had to go outside the southern region to obtain graduate training in the agricultural sciences. Southern agricultural schools offered a limited number of master's programs but not the doctorate.

In 1941, the peak prewar year, the School of Agriculture and Forestry granted 22 master's degrees.

That same year the college announced with considerable fanfare the inauguration of its first doctoral program following consolidation of the university.[18] It was also the first doctoral program in agronomy in the South. The new program would "permit Southerners to earn the Doctor of Philosophy degree in this important field without having to attend a northern or western school where agricultural practices differ from this section's."

In 1943 doctoral programs were introduced in agricultural economics, entomology, plant pathology, and rural sociology.[19]

Additional doctoral programs were introduced in animal industry and experimental statistics in 1947; botany (in the fields of physi-

ology and ecology) and zoology (in the fields of ecology and wildlife) in 1951; genetics in 1953; agricultural engineering in 1957; bacteriology, food science, and physiology in 1963; biochemistry and microbiology in 1965; adult education in 1966; nutrition in 1969; horticultural science in 1970; and toxicology in 1979.

As the departmental designations and titles changed over the years, some graduate program designations changed to coincide with the offering departments.

Until 1948 the doctorate programs at North Carolina State College were offered in cooperation with the University of North Carolina at Chapel Hill under supervision of the Graduate School of the Consolidated University of North Carolina. Recipients traveled to Chapel Hill and received their degrees during commencement exercises there.

The first to receive the Ph.D. degree in Raleigh (1948) was David Mason, who started his doctoral program in soil physics and statistics under the direction of L. D. Baver at Ohio State. Mason was first by virtue of luck of the alphabet. His name came before Canadian Allen Paull, who received the degree in statistics; North Carolinian Thomas Quay, in zoology; and Australian Maurice Rothberg, in rural sociology.

The rapid development of graduate programs through the 1960s gave the school a position of leadership in graduate education in the South, and a 1979 study revealed a high national ranking.[20] That year the school granted 212 master's degrees in agriculture, exceeded only by 266 at Texas A & M and 216 at Wisconsin. In doctorates, with 66 awarded, the school ranked sixth in the nation that year, behind Cornell with 124, Wisconsin with 116, Michigan State with 76, Texas A & M with 74, and Purdue with 73.

The Agricultural Institute

By 1956 school administrators were promoting a two-year program in agriculture. The Advisory Council and school administrators visited four midwestern universities that year, and they particularly talked about this idea after visiting Michigan State University, where such a program had been successful over a number of years.

Support for the idea was generated by the tour, but obtaining the money from the General Assembly was a major problem. The effort failed in 1957 but succeeded in 1959.

The program was opposed in various quarters, particularly on

the campus where some members of the faculty believed the offering of a nondegree program was inappropriate for or beneath the dignity of a great university. Some feared it would take students away from the four-year program.[21]

Considerable effort was made to convey the notion that the Agricultural Institute was an addition to and not a substitute for the regular degree-granting program of the school. Also promoted was the idea that the instruction offered would be designed to train men and women for technical jobs in agriculture that required education beyond the high school level but not necessarily four years of college.[22]

The college administration provisionally accepted the proposal with the stipulation that enrollment would be limited to 300 students.

It was realized that such a program would not automatically succeed (similar programs had failed elsewhere). Soon after his selection to head the program, Homer Folks visited a number of similar programs at other institutions. The attempt was made to incorporate into the new program the strengths observed in other states and to avoid any weaknesses found.

When the first class of 95 arrived on campus in the fall of 1960 there were five programs of instruction: farm equipment sales and service, general agriculture, livestock management and technology, poultry technology, and pest control.

Many potential students were acquainted with the school's programs through the annual university open house, which started in the School of Agriculture in 1959.

Two new programs—field crops technology and ornamental crops technology—were offered in 1961. After several years the poultry technology program was dropped because of lack of participation. By 1970 new programs had been added in soil technology and turfgrass management. A program in food processing, distribution, and service was begun in 1974.

From that class of 95—representing 48 North Carolina counties, five other states, and one foreign country—enrollment climbed steadily, reaching a peak of 418 in the fall of 1980. In line with the general enrollment decline, in 1983 some 344 students were enrolled in the institute. By the end of the 1983-84 year, a total of 2,360 students had graduated from the program.[23]

When the program was developed it was envisioned that it would appeal to young people who wished to become farmers and to others who liked agriculture but did not desire to or would not have the opportunity to operate a farm of their own. Included would be work in farm service organizations such as farm machinery distributors, and feed mills. In the earlier years more than half of the institute graduates went into farming on their own. A survey of the 137 1980 graduates, on the 20th anniversary of the program, revealed that 45 percent of them went into farming and farm management and 17 percent chose agribusiness careers. Only 14 percent went into non-agricultural jobs.

In 1980 the institute program received the first annual Award for Excellence in Agricultural Technology presented by the National Association of State Departments of Agriculture and R. J. Reynolds Industries, Inc.

Short Course Expansion

Following a lull during the war, the short course and conference program was rejuvenated in 1946. Eugene Starnes moved from agricultural extension to the College Extension Division to coordinate the agricultural activities.

In announcing a new program, Dean L. D. Baver declared that special instruction would be offered "to scores of North Carolina farm boys who are not interested in studying farming practices to the extent of receiving a college degree but who need the practical uses of the many agricultural skills which will be taught by the college professors."[24] Baver said many farm leaders had long felt the need for such a program of intensive instruction.

It was anticipated that a number of eight-week courses would be offered. One was in animal production, from January 14 to March 1, 1946. Veterans could enroll under the provisions of the "GI Bill of Rights." Records have not been found to document the success of this course, to determine whether it was repeated, or to indicate whether similar ones were ever offered.

In January, 1947, a four-week course in dairy production was held. By 1949 a similar course in crop production had been added. Courses started in early January, ran simultaneously for four weeks, and were sometimes called "farm production short courses."[25]

Other courses offered in 1949 were Beef Production, Frozen Food Locker, Ice Cream Making, and Market Milk, each to last two weeks; and DHIA Testers, Artificial Breeding, and Farm Managers, each to last one week.

Courses and conferences less than one week in length were the Fertilizer Dealer's Short Course, Seedmen's Short Course, Dairy Manufacturing Conference, Dairy Fieldmen's Conference, Commercial Flower Grower's Short Course, Nurserymen's Short Course, State Garden School, Workshop in Freezing Preservation of Foods, and Insecticide and Fungicide Dealer's Short Course.

In 1951 the beef production course expanded to four weeks.[26] The school offered 34 short courses and conferences during the 1950-51 school year with an attendance of 1,885. Eight of these were offered by the Department of Animal Industry, with some 1,200 persons attending. Included were the beef cattle conference and the dairymen's conference, both offered for the first time. Each attracted 300 or more participants.

The Short Course in Modern Farming, begun in 1953, represented a new approach to short courses for young men on the farm.[27] Bankers and county agents selected young farmers in each county who were doing an outstanding job, showed a high interest in farming, and expected to make farming a lifelong occupation. Tuition and living costs for this two-week course were paid by the sponsoring bankers. Through 1983 more than 3,000 had attended this short course.

By 1955 the number of short courses and conferences had grown to 43 with 3,203 in attendance. Some 40 courses were held in 1965, and the majority of the departments were offering at least one adult education program annually to interested groups.[28] However, as the years went by, commodity associations assumed cosponsorship of

many of these events and in some cases took over the sponsorship from the school.

Financial Help

In 1964, when the cost for an in-state student to attend the university was estimated at $1,500 to $1,600 per year, almost one-third of the students in the school were coming from homes where the gross income was so low that it was necessary for the student to have some form of financial aid. Administrators were aware of the situation:

> One situation which is of concern to both students and the administration and which has not been improving over the years is the matter of scholarships. In the face of both rising costs of attending college and the increase of student enrollment, there has been no noticeable increase in the number of scholarships available to students in the School of Agriculture and Life Sciences. Approximately 25 scholarships are presently available. The lack of adequate scholarship support is of deep concern to the administration.[29]

Efforts were being made to increase the scholarship support available. One plan that offered hope was an Endowed Scholarship

Over the years there was a movement away from the practical to the more scientific aspects of agriculture, but laboratory work continued to be an important part of the training.

Fund sponsored by the Agricultural Foundation. Under this plan friends of agriculture were encouraged to established named scholarship endowments for themselves or in memory of loved ones. A long-term goal of $500,000 was established.

At first growth was slow. In 1968 there was $34,000 in the fund; by 1972 it had grown to $191,000. On November 29, 1979, Robert N. Wood, assistant director of foundations, wrote director of academic affairs, E. W. Glazener: "The total amount of the endowments has increased by $60,818.42 during the past fiscal year to $533,682.66." The original goal had been reached.

By 1983 the Endowment Fund in the Agricultural Foundation had passed the $900,000 mark and a similar one in the Dairy Foundation contained more than $100,000. For the 1983-84 academic year some 40 percent of SALS students were receiving some type of financial aid. A total of 175 scholarships worth approximately $128,000 were awarded. Support for approximately 90 of these came from earnings on endowed scholarship funds; the remaining 85 were those granted by various individuals, businesses, and organizations.

The 1982 annual report stated that administrators of the school, while continuing efforts to seek financial assistance for needy students, were also working to increase funds for scholarships that could be awarded solely on a merit basis.

The Opportunities

In 1960, as enrollment appeared to be picking up, a listing of potential employers was developed. It included more than 1,000 agricultural or related businesses located in North Carolina and 200 national firms. A survey of the 1960 four-year graduates indicated that 33 percent of them had gone into agricultural business and industry, 25 percent to professional and graduate schools, 15 percent to military service, 11 percent to educational or governmental service, 8 percent returned to the home farm, and 8 percent were placed in a miscellaneous category.[30]

A three-year study (1965, 1966, 1967) looked at the location of graduates after placement. Of the 186 four-year graduates going on to jobs, approximately 77 percent located in North Carolina, 16 percent in other southern states, and 8 percent outside the South. This study also revealed that some 80 to 85 percent of the agricultural school graduates were going to work in the broad area of agriculture or in related businesses.[31]

The table below shows placement data for 467 four-year graduates in 1980 and 396 graduates in 1983.

Placement of Four-Year Graduates

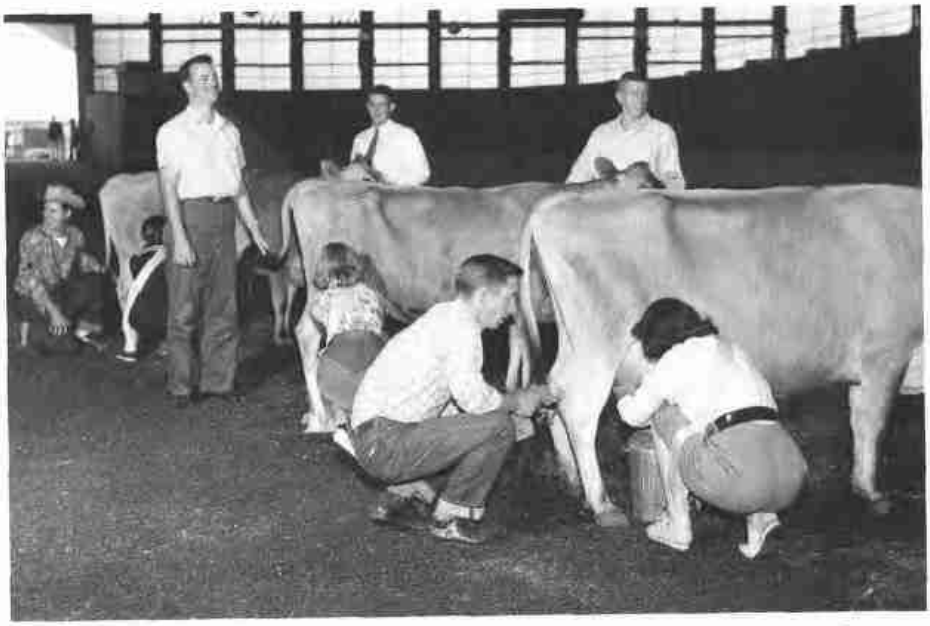
Career Choices	1980	1983
Farming and farm management	10%	7%
Agribusiness sales, production, and management	30%	21%
Government and education	14%	3%
Research	2%	18%
Graduate, professional, and further studies	35%	32%
Nonagricultural positions	5%	1%
Not available or seeking work	4%	18%

Clubs and Teams

Clubs and teams remained important. As new programs developed, the students organized clubs to represent their particular subject area. Twenty student clubs were active in 1983.[32]

Many times the clubs were singled out for special recognition. In 1970 the Agronomy Club was selected by the American Society of Agronomy as the best in the nation for that year.

As the departmental and area clubs grew stronger, emphasis



An annual student livestock day gave students and guests a chance to demonstrate their skills in the fitting and showing of animals and in related activities.

shifted away from the Agricultural Club, which went out of existence about 1960. It was replaced in part by the Agricultural Council, established in 1960. The activities of the council were directed by six officers elected by the students and two representatives from each departmental club. The Agricultural Council held a monthly meeting to which all students of the school were invited.

In addition, the fraternity of Alpha Zeta continued active. Among the 59 Alpha Zeta chapters in the nation, the North Carolina chapter in 1970 was judged the best in the country.

Despite the changing needs and desires of students, judging teams continued to be popular. In 1983 the school sent out six such teams—in livestock, poultry, soils, horses, dairy, and flowers. They competed in regional and national contests. The poultry judging team scored highest in the country in both 1976 and 1978. It was said that members of the judging teams put in as many hours as they would for a course and logged as many miles as the football team.[33]

The article contained a statement that could be ascribed to the total student body, their activities, and their accomplishments: "And they usually do the school proud."

NOTES TO CHAPTER 15

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14. See annual reports for 1963, p. 7; 1971, p. 12; 1978, p. 13.
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20. "Advanced Degree Graduates in Agriculture and Related Areas in Land Grant Institutions by Region in 1979," internal mimeograph in office of dean of agriculture, 1 p. Also, J. E. Legates interview, October 27, 1980.
21. Later the state's community colleges added a number of two-year agricultural programs with only limited success.
22. "Agricultural Institute Organized," 1959 annual report, p. 5.
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25. Annual reports for the period and personal conversations with faculty members involved.
26. 1950 annual report, p. 8; 1951-54 annual report, p. 34.
27. "Short Courses Extend Services," 1955 annual report, p. 7.
28. "Continuing Education," 1965 annual report, p. 12.
29. "What We Need," 1964 annual report, p. 10. See also "Scholarships Available to Ag Students," 1950 annual report, p. 7.
30. "Enrollment Up," 1960 annual report, p. 5. See other issues of the annual report for the period covered.
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32. Student clubs in 1983: Agricultural Institute, Agricultural Economics, Agronomy, Animal Science, Biological and Agricultural Engineering, Biochemistry, Biology, Botany, Conservation, Food Science, Horticultural Science, Medical Technology, Microbiology, National Agri-Marketing Association, Pest Management, Poultry Science, Pre-Medical/Pre-Dental, Pre-Professional Health Society, Pre-Veterinary, and Wildlife.
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16

New Technology for the Man on the Land

Improved pastures. Animal nutrition and health. Reproduction and breeding. To the top 10 in hogs. The chicken story. Enhancement of the golden leaf. Fruits and vegetables. Five steps to increase corn yields. Expanding the high-protein crops. To show and tell. Names and places. Behold the environment. Integrated pest management. Animal waste and water quality. Hams, milk, and fish. Markets and money. Relieving human drudgery.

THE RECOMMENDED PASTURE MIXTURE for an acre of fertile, well-drained soil in the North Carolina Piedmont region in 1940 was:

Kentucky bluegrass	4 pounds
Redtop	5 pounds
Orchard grass	8 pounds
Tall oat grass	4 pounds
Dallis grass	4 pounds
White clover	5 pounds
Alsike clover	2 pounds
Lespedeza	8 pounds
	40 pounds

Improved Pastures

Not many farmers followed the recommendations. For most, pasture was just what the Lord had provided—native weeds and grasses or a fence around the woods. To a farmer who fought grass in the crops all summer, there seemed something wrong about trying to grow grass—especially fertilizing it to make it grow faster.

But fertilizer was needed. Researchers W. W. Woodhouse, Jr. and R. L. Lovvorn pointed out that low soil fertility was the major pasture production problem in North Carolina.[1] Liberal amounts of lime, phosphate, and potash were recommended.

Woods pasture was not all bad. Farmers in the mountains and Piedmont were often urged to get the cows out of the woods because soil compaction decreased tree growth and grazing increased erosion. But across the Coastal Plain and Tidewater regions many years of research had shown that cattle could be profitably grown on the native forages—mostly reed or cane.[2]

The search for improved pasture techniques had begun in earnest in 1937. A number of legume and grass plants were screened to determine their adaptability and productivity in North Carolina. Ladino clover showed up in the experiment station literature in the station's 1941 annual report. An article stated that Ladino looked promising in lower coastal plain pastures. In tests at the Willard Station a combination of Ladino and Dallis grass yielded 4,000 pounds of dry matter per acre during the growing season of 1941.[3]

A number of fescues were tried. Alta and tall fescue showed up well in the station tests from the beginning. In palatability tests at Raleigh, the cows preferred orchard grass, but when not given a choice they consumed the fescue and received total digestible nutrients equivalent to the orchard grass. The growing season for fescue was spread out more over the year than was that for orchard grass, whose growth was more concentrated in the spring.

Adoption was rapid. As the number of workstock and family milk cows declined, the amount of land in pastures likewise declined, but the 1954 U.S. Census of Agriculture reported almost 400,000 of the state's acres in improved pastures, defined as "pastures on which one or more of the following practices have been used: liming, fertilizing, seeding, irrigating, draining, or the clearing of weed or brush growth."

In 1983 North Carolina had about 1.3 million acres of Ladino-grass pastures.

Governor Kerr Scott designated November 25, 1952, as "Green Pastures Day" in North Carolina. On that date 10 counties that had led the state in pasture improvement were recognized. The counties were Cabarrus, Chatham, Currituck, Forsyth, Graham, Henderson, Person, Stanly, Union, and Wake.[4]

Existing pastures were plowed up and the "new" pasture mixture of Ladino and fescue or Ladino and orchard grass planted. "Permanent pasture" became a common phrase. Many of the pasture acres were those that had been withdrawn from production of cotton and other row crops. (Cotton production, which hit a high in the state of 1,825,000 acres in 1924 dropped to 841,000 in 1940, to 390,000 in 1960, and to 65,000 acres in 1980.) Permanent pastures were seen as an effective way to "reclaim" some of the severely eroded hillsides of the Piedmont.

In the original scheme, the clover was to provide nitrogen for the grass—as well as to enhance volume and feed value—but as synthetic nitrogen became cheap in the 1950s and 1960s, many farmers turned to all-grass pastures. When petroleum prices escalated in the 1970s, attention again turned to a clover-grass mixture.

In a 1950 lawn publication, tall fescue was listed under the heading of "lawn grasses sometimes recommended." But the grass proved popular and rapidly spread beyond the pasture fences—to lawns, roadsides, cemeteries, golf courses, and elsewhere. It turned North Carolina green in winter. It also laid the base for the state's livestock expansion.

Animal Nutrition and Health

From the earliest days of the Agricultural Experiment Station, poor livestock feeds and feeding systems were perceived as major North Carolina farm problems. If profits were to be improved and livestock expansion to occur, a better program of livestock feeding had to be developed.

From the turn of the century, much attention was given to finding a way to make cottonseed and its products a satisfactory feed. This meant feeding at levels in which gossopyl toxicity would not be a problem and adding the necessary mineral and vitamin supplements. Cottonseed meal was the largest available source of protein feed in the southern states, but as soybean production increased, attention turned to the problem of soft pork produced when hogs

were fed soybean or peanut products. A wide variety of nutrition studies were carried out. As interest in human nutrition increased, situations often occurred where the results of the research were discussed in terms of their implications for humans.

In swine nutrition, the ability of the sow as a mother was questioned. A study published in 1949 showed that it was feasible to wean pigs from their dam after consumption of colostrum for 36 to 48 hours. Hand-reared piglets that were fed reconstituted whole cow's milk powder or skim milk plus butterfat were 10 pounds heavier than sow-reared pigs at 56 days of age. A mechanical pig brooder, called an "autosow" by developer James G. Lecce, made it possible to remove pigs at birth from the mother sow.[5] Pigs raised in the mechanical contraption were free of pathogens, parasites, and the many harmful organisms common in all pigs reared in a free environment. Also, pig mortality was virtually nil, and it was possible to have the sow back in the breeding pen several weeks earlier.

The autosow was a circular device containing a series of small wedge-shaped cages located around the outer perimeter. Each cage was equipped with a small feeding tray at the narrow, inside end of the wedge. Atop the autosow was a refrigeration unit for storing the diet—enriched cow's milk. The pigs were fed automatically, usually at hourly intervals, when a timer set the process in motion. More recently collaborators have developed a simplified model for farm use.

Sheep in the operating room were no longer unusual after 1959 when L. C. Ulberg (center) and his colleagues began making embryo transplants.

Animal diseases and parasites commanded much attention. Two diseases that prevented cattle expansion were tuberculosis and brucellosis or "bangs" disease. The warm, wet North Carolina climate which is particularly good for growing both internal and external animal parasites, presented researchers and farmers with a challenge that at times was almost overwhelming.

J. Clark Osborne was employed as head of the newly formed veterinary section in the Department of Animal Industry in 1949. His work dealt with infertility in cows, calf diarrhea, and internal parasites. It was anticipated at the time that a program in research would have the effect of strengthening the roles of practicing veterinarians throughout the state. Also, administrators believed that eventually a school of veterinary medicine might be forthcoming and that it would be advisable to establish a program that could serve as a good foundation if and when such a school might evolve.[6]

It was early recognized that diagnosing animal diseases was an important function, and in 1950 an Animal Disease Research and Diagnostic Laboratory was proposed. It was a joint facility opened in 1954 and shared between the School of Agriculture and the North Carolina Department of Agriculture. Additions were made to the building in 1959 and 1967. In 1972 it was named the Grinnells Animal Health Laboratory, in honor of long-time veterinarian C. D. Grinnells. The school's part of the building housed the Department of Veterinary Science and some Animal Science personnel.

Reproduction and Breeding

Artificial insemination represented the most significant change in dairy cow management during the first 100 years of the N. C. Agricultural Experiment Station. The state's expanding dairy industry—with good rapport between college personnel and the dairy people in the state—provided a fertile field for the adoption of this innovation. F. I. Elliott was employed to direct the first investigations in physiology of reproduction and artificial insemination of dairy cattle. When he reported for duty in early 1947, the legislature had appropriated funds for a bull barn and research laboratory which included temperature-controlled chambers and facilities for collecting and examining semen produced under different conditions.

That same year extension specialists and agents helped farmers to form 22 county artificial breeding associations in the state. For each

association a laboratory was set up and an artificial insemination technician was trained at the college. More than 20,000 cows were artificially bred through these facilities that year.

Also in 1947, artificial insemination was given a boost when the Farmers Federation at Asheville constructed facilities near Asheville and the American Scientific Breeding Institute established a stud in this building to serve several southeastern states.

By 1950 the number of dairy cows bred artificially in a year reached 34,000. By 1970 the number was up to 98,500. (Numbers after that are not available because dairymen began doing their own breeding from semen stored in liquid-nitrogen tanks on individual dairy farms.)

Associated with the development of artificial insemination programs was a corollary research effort on the deleterious effects of summer temperatures on reproduction. Sophisticated environmental control chambers were used to study effects of humidity and temperature on semen production. In fact, artificial insemination pointed up the need for increased knowledge of the broad area of reproductive physiology, which led to the development of the Reproductive Physiology Research Laboratory in 1962.[7]

In 1959 L. C. Ulberg and his colleagues removed an embryo from the reproductive tract of one ewe and transferred it to the uterus of another ewe. The embryo was then allowed to develop in the recipient ewe. This technique, which became common procedure 20 years later, was considered a development of tremendous importance in 1959.

Sheep researchers unveiled a new breed, the Polled Dorset, in 1959. Interest was widespread. At a sale that year at the college, 33 ewes and 31 rams were purchased by 19 buyers from 11 states.[8]

Lamb production in the South was hindered by heat problems—it was difficult to get the sheep to breed in the summer so lambs would be ready for sale the following spring. One breed used in the cross-breeding program that had added heat tolerance was the Barbados Blackbelly.

The same hot, humid climate led to a search for new beef cattle blood for the South. North Carolina researchers participated in the evaluation of several "exotic" breeds that had performed well in the semi-tropics.[9] The new artificial insemination techniques made it possible to introduce new blood where regulations prohibited importing live animals. Semen from the Romo-Sinuano cattle of Colombia, South America, was used on commercial beef females in

North Carolina. The traditional English breeds were not replaced, but some genes from these breeds found their way into North Carolina livestock production.

Also, cross-breeding programs were developed. In 1978 animal scientists reported that both Angus-Holstein and Angus-Jersey dams bred to Charolais sires would produce calves weighing 600 pounds by seven months of age.[10]

An unusually successful project was the development work with dairy herds on the farms at five state institutions—Broughton, Caswell, Cherry, Dix, and Umstead—owned by the North Carolina Department of Mental Health until transferred to the North Carolina Department of Agriculture State Farms Operation Division in 1974. Breeding and genetics experiments were started in these Holstein herds in 1949. The long-term goal was to determine how much genetic improvement in efficiency of producing milk could be made by various methods of identifying, selecting, and using the "best" sires available. Shorter-term goals were to find out how various economically important traits of dairy cattle are inherited. The average production for all cows in the five herds increased from 13,029 pounds in the 1950s to 17,209 pounds in the 1970s.[11]

Production testing helped identify strengths and weaknesses in

This heifer, born June 5, 1949, was from a grade hereford artificially bred to a Romo-Sinuano bull located in Colombia, South America.

cattle programs.[12] The Dairy Herd Improvement Association (DHIA) program, dating from before World War II, helped North Carolina farmers identify the production and feed costs of individual cows. The 5,988 cows enrolled in the DHIA program in 1941 averaged 7,188 pounds of milk and 317 pounds of butterfat. In 1981, on the 40th anniversary of the program, the 68,224 cows enrolled averaged 14,742 pounds of milk and 527 pounds of fat.

The North Carolina DHIA center also operated the regional center that processed records from 12 states and Puerto Rico. The center initiated a new program in 1981 called DART—Direct Access to Records by Telephone. With this system a dairy farmer could dial the center's computer and get a report on his or her herd at any time rather than having to wait until the end-of-the-month billing.

Beef cattle performance testing came later. With funds provided by the 1959 General Assembly, the North Carolina Beef Cattle Improvement Program was started in 1960. The beef bull testing station was opened near Rocky Mount in 1969, followed by similar facilities at the Piedmont Research Station near Salisbury in 1973 and at the Mountain Research Station near Waynesville in 1980. In 1984 a new facility at Butner replaced the Rocky Mount station.

To the Top 10 in Hogs

Ham, hamhocks, pork chops, tenderloin, spareribs, backbones, barbeque, bacon, sowbelly, jowl, liver mush, sausage, sweetbreads, souse meat, pig's feet, pork brains, chitterlings, and meatskins—North Carolinians, like other southerners, have relied on pork as a primary ingredient in their diets. But despite the long tradition of raising hogs, the good climate, the abundance of feedstocks, and the constant need for increased farm income, animal experts watched hog numbers rise and fall in the state, never reaching a point where its farmers produced enough pork to feed the citizens of the state. A 1963 report stated that, as a region, the South was producing only about 60 percent of the pork it consumed and the processing plants in North Carolina were operating at only about 70 percent of capacity.

Long-range plans called for increased pork production. Extension specialists and agents continually urged farmers to grow more hogs. Research was set up to undergird an expanded swine program. The 1963 annual report described studies being carried out to obtain more efficient feed production, to relieve pig anemia, to lower the weaning age, and to solve the problem of digestive disorders in

nursing pigs. Other studies were under way in the areas of breeding, feeding, grain and forage production, disease and insect control, and marketing.

A swine evaluation station for testing littermate barrows and gilts was established at the Central Crops Research Station near Clayton in 1961.[13] This was a move to encourage swine producers to collect and use performance data in selecting breeding stock.

The station was converted to a boar test station in 1973. Ten years later the station report showed that 3,042 boars had been tested during the 10 years of operation and about half (1,728) of these boars had been sold at performance tested boar sales.

The Swine Development Center at the Upper Coastal Plains Research Station near Rocky Mount was established in 1965. The facility was designed to demonstrate to farmers the finer points of swine production. An average of 117 sows was maintained in the herd in 1982. Thousands of farmers from across the state and throughout the nation visited the center and studied the detailed records kept on all phases of its operation.

Finally, hog numbers began to move upward. In 1969 they reached 1.5 million head—about the number in the state when the first count was made in 1867. The two million mark was reached in 1978, and in 1980 more than 2.5 million head were produced in the state before poor prices resulted in some decrease early in the 1980s.

This surge in hog numbers pushed the state to No. 7 in the nation in terms of hog numbers, and the state gained the distinction of having more large herds than any other state. The confinement housing system that became popular in North Carolina particularly attracted attention from elsewhere.

The extensive development of military establishments in the state during World War II encouraged dairymen, such as George Coble, to buy up some of the small creameries and make them into milk processing plants and to build other plants to expand the supply of processed milk. There was also a greater demand for manufacturing milk. This increased demand, coupled with the development of pastures and forages, created a great deal of interest in dairying in the 1940s and 1950s.

The number of Grade A dairy farms hit a peak of about 5,200 in 1954, followed by a steady decline to some 1,200 in the early 1980s. The number of cows per herd, however, increased, from around 40 to 100 during the period. Still, the number of milk cows in the state decreased—from 399,000 in 1954 to 133,000 in 1982, but milk produc-

tion held steady as average per cow production increased to some 14,000 pounds.

Beef cattle numbers increased, from some 277,000 head in 1965 to more than 400,000 in the late 1970s and early 1980s. Despite several attempts by university researchers and specialists to encourage the feeding out of cattle, the state's industry continued to consist essentially of cow and calf herds, the offspring being shipped elsewhere for finishing.

Also, the efforts of researchers and specialists could not prevent a gradual but steady decline in the number of sheep on North Carolina farms from some 50,000 in 1945 to 8,000 in 1980.

For horses, it was a different story. Although the number of horses and mules kept as working stock all but faded away in the 1950s, an interest in pleasure horses developed. By 1980 it was estimated that there were some 150,000 in the state. Horses, like other livestock, presented a need for research and extension personnel who could respond to questions and calls for help from horse owners.

The Chicken Story

In 1950 North Carolina farmers grew 28 million broilers, 12 million other chickens, and 1/2 million turkeys. Already begun was what would be an almost unbroken string of record-breaking years for all three categories of poultry production in the state.

In 1950 the poultry extension slogan was "40 or 400." The notion was that 40 hens was a good sized flock to produce eggs for home consumption; any commercial egg operation should have at least 400 hens.

Also in about 1950 the change from floor to cage housing started. This change enabled one person to manage more layers than under the older system.

By 1959 the number of chickens on North Carolina farms for egg production had reached 14 1/2 million, and, for the first time, as many eggs were produced as were eaten in the state.

Breeding and disease control were the first two areas given research attention as the state began its climb to the top in poultry production. The development of the test for Pullorum disease removed one of the greatest causes of baby chick mortality (see chapter 9).

During 1946 and 1947, inbred lines of Reds, Rocks, and Leghorns for producing hybrids of superior egg production were developed,

and inbred lines of Barred Plymouth Rocks and New Hampshires for superior broiler producers were also developed. By 1949 the turkey breeding program had improved type production and hatchability of the Bronze turkeys. By 1950 eight promising inbred lines for producing hybrid chickens had been developed.[14]

Feed constituted the major cost of producing poultry meat, and considerable research was directed to this area. Feed efficiencies attest to success, along with breeding and disease control. In 1950 the average North Carolina broiler needed 3.25 pounds of feed for each pound of meat produced. By 1980 the conversion ratio was less than 2 pounds of feed for each pound of meat. Similar efficiencies were created with turkeys and laying hens. The time required for growing out broilers was shortened. In 1955 the average broiler weighed 3.0 pounds at 73 days of age. The average 1983 broiler weighed 4.2 pounds at 49 days of age. And the average number of eggs laid by commercial layers increased from 175 to 251 between 1955 and 1983.

Not all feeds are good for poultry, however. Crotolaria, long recommended as a soil-building legume for the more sandy soils, turned out to be deadly if accidentally mixed into turkey feed. All poultry was very sensitive to the aflatoxins that infested some corn fields.

Diseases remained a constant threat to the poultry producer, as illustrated by the 1983 outbreak of avian influenza that brought about the destruction of thousands of chickens in Pennsylvania.

But nothing halted the steadily rising importance of chickens and turkeys in North Carolina. Broiler production climbed rapidly, hitting the 100 million mark in 1957, constituting about 10 percent of the nation's broiler production. A total of 419 million broilers were produced in 1982 on North Carolina farms.

The year 1982 also found on North Carolina farms 7 million commercial layers, 8.2 million commercial pullets, and 7.8 million hens producing broiler hatching eggs. To illustrate the importance of the hatching egg industry, in 1982 between 20 and 25 percent of all broiler hatching eggs used in the United States were produced in North Carolina.

The year 1981 was an important one for turkeys. North Carolina surpassed Minnesota as the top turkey-producing state in the nation, with some 26 million produced. That same year more than one-fourth of all the turkey poults hatched in the United States came out of eggs produced in North Carolina.

In 1983 poultry scientists reported the first major improvement

Increased poultry production stimulated interest in new poultry products. Governor Luther Hodges promoted poultry sausages in 1958.

in turkey egg hatchability in nearly 40 years. Hatchability improved by 6 to 12 percent following injection of thyroid hormones. It was predicted that each 1 percent improvement in hatchability would be worth approximately $5 million to the North Carolina turkey industry.[15]

In 1983 farm receipts from poultry (broilers, turkeys, eggs, other poultry products) exceeded $900,000,000. This income, however, was not spread around nearly as much as were the receipts from other farm enterprises. In 1982 there were 2,281 broiler farms but only 270 commercial egg and pullet farms, 699 broiler breeder farms, and 404 turkey farms.

Why so many chickens and turkeys in North Carolina?

Poultry came south in part because of the demise of cotton. The loss of cotton created a vacuum in terms of loss of income and farmers looking for a replacement farm enterprise. Poultry was a natural to fill this income need while using relatively little land.

Why has the industry been concentrated more in some states than others? Certainly a good research and educational program helped. And, by any standard that could be used, the location of North Carolina in relation to available space, feed supply, and marketing was good. There was also a close working relationship between the agricultural leaders and the feed manufacturing industry. Beginning in the late 1930s, when D. S. Coltrane was assistant commissioner of

agriculture in charge of feed inspection, annual meetings involving feed manufacturers and nutrition specialists at N. C. State College were conducted. Both the poultry industry and feed manufacturers became increasingly aware of the relationship between the research supported by Nickels for Know-How and an expanding industry.

The growth of the industry stimulated further research and educational programs. The North Carolina Random Sample Egg Laying Contest was established at Salisbury in 1959; a turkey meat test ran from 1960 until 1963. A Sensory Physiology Laboratory, the only such facility in the world, operated from 1961 until 1968.[16]

And the nature of the poultry business, completely integrated vertically with contract growout or egg operations, called for a unique educational program aimed at representatives of the integrated companies who supervise the growers under contract with them.

Enhancement of the Golden Leaf

By 1950 Granville wilt, black shank, and root knot nematodes had spread across the tobacco belt. When Oxford 26 rescued growers from the ravages of Granville wilt and Oxford 1 and 3 met the black shank threat, the barrier to new varieties had been broken. Two new black shank-Granville wilt resistant varieties released in 1949—Dixie Bright 101 and 102—permitted hundreds of farmers to produce good crops where regular varieties would have been wiped out.

The developments in tobacco research, and to some extent in pasture and hybrid corn, caused many people to see for the first time the real benefits of the agricultural research program, which was reflected in the increased legislative support for the program. Establishment of the position of assistant director of research in charge of tobacco research in 1953 indicated increased attention to tobacco. Although grown on only about 9 percent of the North Carolina cropland, in 1950 tobacco accounted for 50 percent of the state's farm income. It was natural that significant breakthroughs in tobacco research would have unusual impact on the farm economy and the political scene.

Tobacco research was also a good investment. The 1954 annual report stated that some 150,000 acres of Dixie Bright 101 were being grown each year, and the variety had paid farmers $80 million to $100 million each year more than they could have earned with other varieties. The report also stated that the total cost from both federal

and state funds to develop this and other Dixie Bright varieties was estimated at less than $250,000.[17]

New varieties came regularly after that—Dixie Bright 27 in 1950, Dixie Bright 244 in 1956, NC 73 in 1958, NC 75 in 1959, and NC 95 in 1960. The latter for the first time contained resistance to the root-knot nematode.

It was fairly simple to mechanize land preparation and most cultural practices for tobacco. They were either the same or slightly different from those for other field crops. But from there on tobacco was different. The time-consuming tasks were preparing plant beds, transplanting, topping and suckering, harvesting and barning, and curing.

In this latter area, 1960 marked a significant development. Bulk curing of flue-cured tobacco by experiment station scientists on a Robeson County farm demonstrated that flue-cured tobacco could be cured in bulk. Barning labor was reduced by 60 percent, and tobacco cured by the bulk method was well accepted by buyers. The bulk curing process was the result of 10 years of research; the search for the nematode-resistant variety had started 25 years earlier.[18]

But research could not solve (at least in the short run) all of the problems that would be faced by tobacco and those who grew it. In fact, research was sometimes charged with creating or causing problems.

> Farmers, researchers and politicians turned eyes and ears to the question of tobacco quality in 1962. Cause of the consternation was an increasing number of complaints from buyers of Tar Heel leaf that quality was not what it used to be.
>
> Blame was placed on many things—a sucker-controlling chemical, adverse weather, farmers' cultural practices, and all-out efforts to maximize income by increasing yields on limited acres.
>
> The tobacco research program, always responsive to shifting situations, made adjustment in research activities to help meet this crisis of the golden leaf.[19]

One of the most severe criticisms of the high-yielding varieties that had been introduced was a poor "chemical balance," indicated by the low nicotine content. In 1957 the USDA, through the Agricultural Stabilization and Conservation Service, initiated a discount-variety program. Six varieties were eventually added to the discount list because they produced tobacco low in nicotine and flavor.

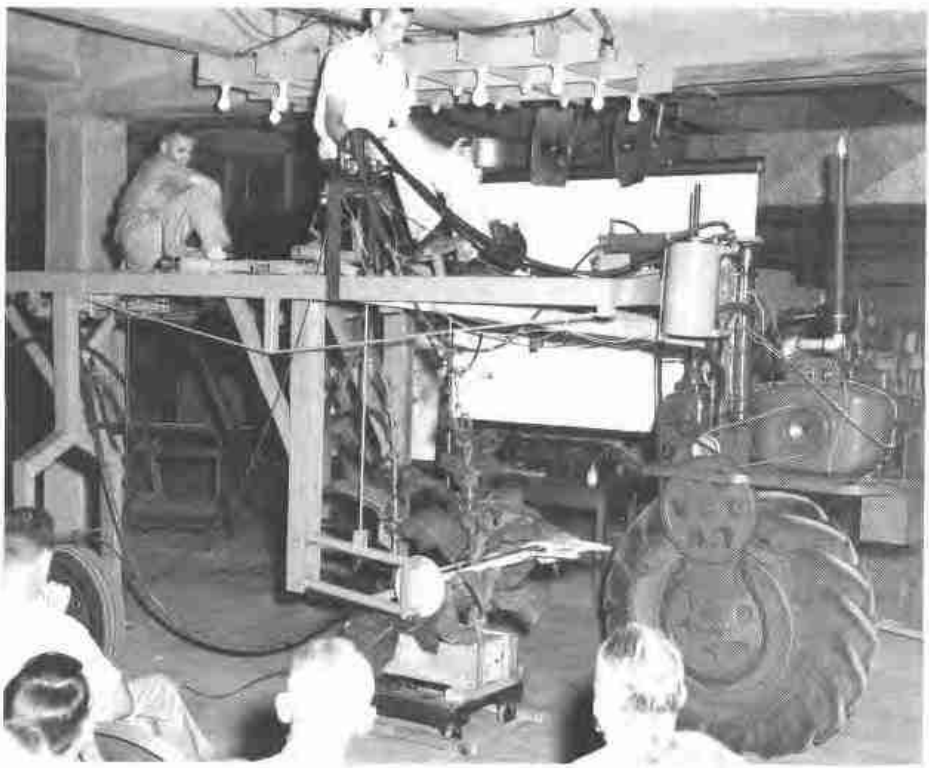
Mechanization efforts continued. Principles and techniques developed by station engineers were incorporated into a commercial machine by a North Carolina manufacturer. This machine mechani-

cally removed tobacco leaves from the stalk and deposited them in containers for tying, stitching, or bulk racking for curing.[20]

Mechanical tobacco harvesting followed many years of research into the biology of the plant and considerable skepticism—from farmers and from people on campus—that ripe leaves could be selectively removed from the tobacco plant by machine. Also, finding the right equipment for leaf removal was not easy. Research Station Superintendent W. C. Allsbrook recalled some of the earlier efforts. "The first time tobacco was taken off the stalk mechanically (at the Central Crops Research Station) was with an electric drill with a chicken plucker attached. We had a 100-foot electric cord and walked up and down the row and guided this tool by hand."[21]

Mechanical harvesting was possible because a curing system which permitted the curing of tobacco in bulk rather than strung on sticks had been developed a few years earlier, also accompanied by much skepticism about the possibility of curing tobacco leaves piled and pressed together.[22]

The twin developments of bulk curing and mechanical harvesting brought change to the tobacco farm. By means of bulk curing, the



Engineer Charles Suggs operates a 1955 version of an experimental tobacco harvester inside a campus laboratory.

labor required for curing was reduced from around 200 to 70 man-hours per acre. About 35 hours of back-breaking labor per acre were cut from the harvesting process.

In 1966 a leading importer of North Carolina tobacco, West Germany, enacted legislation that established pesticide tolerances on tobacco, to become effective January 1, 1971. This law hastened pesticide residue research and monitoring, and researchers undertook health-related research whereby both the physical and chemical properties of tobacco could be modified at both the curing and processing stages.[23]

One year after the oil shortage of 1974 a solar-heated tobacco curing barn was tested, and a new cross-flow curing system was announced in 1975. In 1979 researchers returned to wood as a tobacco curing fuel. Instead of using individual burners for each barn, however, the new approach used a large wood-burning furnace to heat water that was pumped through pipes to a number of curing barns.[24]

The state's agricultural researchers ranged far and wide in the search for more profitable tobacco production practices but they had to keep coming back to the problems of insects and diseases. In 1980 they announced the release of the first insect-resistant tobacco—a plant breeding line that had been developed contained resistance to the hornworm.[25]

These developments came just one year after blue mold, a problem in tobacco plant beds for decades, moved into the field. Estimates were that the disease reduced 1979 flue-cured tobacco production by 22 percent and cut burley production in half. The situation could have been worse in 1980, but the crop was saved, it was believed, because of a new chemical known as Ridomil and its quick adoption by growers. Responding to an intensive educational program by extension workers and others, about 90 percent of the growers treated their plant beds for blue mold control, and 70 percent treated their tobacco after it had been set in the field.

Also ever present was the quest for quality. It was generally recognized that flue-cured tobacco had captured a large share of the world tobacco market because American farmers produced the highest quality in the world. But farmers in other countries were making progesss—producing good quality at a lower cost. Farmers were constantly reminded of the need for high quality and of some of the cultural practices that would help meet this goal. Quality factors were particularly stressed during the 1978-79 extension winter production meetings. Some 30,000 copies of a leaflet outlining 33 steps that

growers could take to improve tobacco quality were printed and distributed.[26] And in 1983 the school joined other agencies and groups in an extensive educational campaign to encourage quality production. "Do It Right—Grow Premium Bright" was the slogan.

Despite the effort—by farmers, farm organizations, the school, and government agencies—tobacco was a declining business. In North Carolina flue-cured tobacco yield and price went up. In 1950 the average yield was 1,341 pounds per acre; in 1980 it was 2,011 pounds. The dollar value of the crop increased from $477,000,000 in 1950 to $1,089,608,000 in 1980. But these 1980 dollars were highly inflated, compared to the period of 30 years earlier. And during this period tobacco usage was on the decline.

It was hard not to grow too much tobacco. The acres alloted to North Carolina farmers for flue-cured tobacco declined from 640,000 in 1950 to 370,000 in 1980, with still bigger reductions coming in the 1980s.

The percentage of the state's farm income from "the golden weed" declined each year, from more than half in 1950 to less than a third in 1980. Fortunately, there were other farm enterprises that could take up the slack and enable North Carolina agriculture to move ahead—not just in livestock and poultry but in other crops as well.

Fruits and Vegetables

Many people have envisioned a great horticultural future for North Carolina; some have thought it could truly become a garden spot. A promotional brochure for the Seaboard Railroad in the 1920s predicted only profits and prosperity for fruit and vegetable growers in the Sandhills. A mid-1940s publication by the North Carolina Department of Conservation and Development proclaimed: "When Mother Nature decided to hit the Horticultural Jackpot, she chose North Carolina. Here long growing seasons, fertile soil, and neighboring markets constitute the Garden Spot of America."[27] (The publication neglected to mention, however, that one aspect of Mother Nature—rainfall—was not favorable to North Carolina. Too much or too little has made vegetable growing difficult in the state.)

A campus committee charting the future for the extension service in 1962 was less optimistic.[28] The committee said the overall picture for horticultural crops in North Carolina "looks reasonably bright." Within five years the income from horticultural products might be

expected to increase by around 33 percent, the committee said. The prediction was for a decrease in the production of Irish potatoes, but sweet potatoes would bounce back after a post-World War II decline. There would be a sizable increase in the production of pickling cucumbers, snap beans, trellised tomatoes, watermelons, strawberries, blueberries, apples, nursery crops, and greenhouse plants.

Some of this expansion would hinge on the development of the fruit and vegetable processing industry. The 1962 committee report noted that the demand for the product form had changed from predominantly fresh to about equal volumes of fresh and processed. University personnel worked closely with companies considering the state as a plant location. In addition to the Gerber plant at Hendersonville, large plants were established by Campbell Soup Co. at Maxton and Joan of Arc in Sampson County.

The prognosticators were right about sweet potatoes when they predicted growth for this crop in 1962. By 1982 the acreage of the crop had increased to 52,000 acres, more than double the 1961 acreage. During that interval North Carolina passed Louisiana as the number 1 state in sweet potato production, and sweet potatoes were North Carolina's largest vegetable crop in terms of acreage and value.

Collectively, cucumbers were the second most important vegeta-

Trellised tomatoes, along with Christmas trees, boosted farm income in western North Carolina. Extension Director George Hyatt (left) and Plant Pathologist J. C. Wells examine a tomato planting.

ble commodity in North Carolina in 1982, with some 38,000 acres being grown for both fresh market and processing. While the acreage for most vegetable crops held about steady, the acreages for Irish potatoes and snap beans declined.

In the small fruits area, between 1961 and 1982 there were increases for grapes, blueberries, and strawberries. In large fruits, peach production held about steady, but between 1950 and 1982 apple production potential increased from less than 1 million to more than 10 million bushels annually.

Vegetable gardens increased in popularity during the 1970s, primarily because of inflated food prices, concerns for personal health, energy costs, and environmental worries. By 1982 an estimated 680,000 North Carolina families were growing some of their own vegetables. Much of the increase was attributed to young college-educated people setting up households for the first time. These new gardeners sought much information and were anxious to learn.

In the horticultural area, research and extension efforts concentrated on the development of new varieties, mechanical harvesting, and disease, insect, and weed control.

Five Steps to Increase Corn Yields

Hybrid corn was good, but good seed alone was not enough.

Researchers could promise farmers a 25 percent yield increase over the best open-pollinated varieties if they used a locally adapted hybrid. Farmers were anxious to accept the challenge, but obtaining the supply of seed was a problem. For 1946 there was seed to plant some 100,000 acres or 5 percent of the corn acreage in the state.

But as early as 1944 there was evidence that switching to hybrid seed alone was not enough. Research showed that larger amounts of nitrogen and closer plant spacing were needed for really high yields. In 1944 studies on a Norfolk sandy loam under good rainfall conditions, the corn yields were increased from 19 bushels per acre where no nitrogen was used to 107 bushels per acre where 120 pounds of nitrogen were used. The intermediate yields from plots receiving 20, 40, and 80 pounds were 27, 45, and 82 bushels per acre, respectively.[29]

Also in this experiment, a stand of about 9,000 plants per acre was provided (with plants 16 to 17 inches apart in 3.5-foot rows), weeds were controlled by early shallow cultivation, and the corn was "laid by" when it was 2 feet high.

A "five step corn program" was beginning to take shape. By 1947 it had evolved into the following steps:

1. Plant adapted hybrids
2. Grow more plants per acre
3. Fertilize at planting time according to soil conditions
4. Apply liberal nitrogen topdressing
5. Cultivate shallow and early.[30]

By 1945 reports of yields exceeding 100 bushels per acre were coming in. The 100 Bushel Corn Club and a state contest were created in 1947. A total of 628 farmers qualified for the club that year. John Mullenax of Henderson County was the state corn contest champion with a yield of 131.5 bushels. He planted U.S. 282—the most popular hybrid in the mountains at that time. In 1948 well over 1,000 farmers topped the 100-bushel mark, and an easterner won the state contest. Lenoir County farmer F. L. Albritton produced 148.25 bushels using the popular Dixie 17 hybrid.[31]

Of far more importance was the state yield of all farmers. From a 10-year average (1937-1946) of 21.8 bushels per acre, the state average exceeded 30 bushels in 1947.

In 1949 Governor William M. Tuck of Virginia challenged North Carolina to a corn war. Governor W. Kerr Scott accepted. The challenge called for a contest based on the increase in average state corn yields in 1949 over the 1937-1946 average, figured on a percentage base. The North Carolina average for the 10-year period was 21.8 bushels. Virginia won the war, but North Carolinians were pleased with their efforts. The 1949 state average yield was 35 bushels per acre.[32]

The two states fought another corn war in 1950, and Virginia was again the winner. Hybrids were among the major weapons, with N.C. 27 and Dixie 17 being the "big guns." In North Carolina the 1950 state average yield was 37 bushels.

From that point on average corn yields rose rapidly, reaching 77 bushels in 1981.

In terms of acreage, it was a different story. When every farm had working stock, corn was grown for feed on almost every farm. As farms mechanized, corn acreage migrated to commerical corn farms. In the process, corn acreage declined from 2,248,000 acres in 1950 to 1,730,000 acres in 1980.

Farmers gradually adopted hybrids developed by the station and commercial breeders, and fertilizer and planting rates increased. Two disease problems commanded major attention.

Southern corn blight, in 1970, came up from the south. The blight was caused by a new race of the organism, *Helminthosporium maydis* (the T-race), which attacked and killed the leaves and in severe cases rotted the ears. Losses on susceptible hybrids ran from 25 to 50 percent.

As soon as the blight struck, the extension service organized a task force to begin channeling information to farmers and grain dealers on the nature of the disease, procedures for handling infected corn, and methods for extending short corn supplies. For the following year, information was offered on seed supplies and cultural practices to combat the disease. Agents and specialists told farmers how corn seed differed in its genetic makeup and how these differences could affect corn under varying blight conditions.

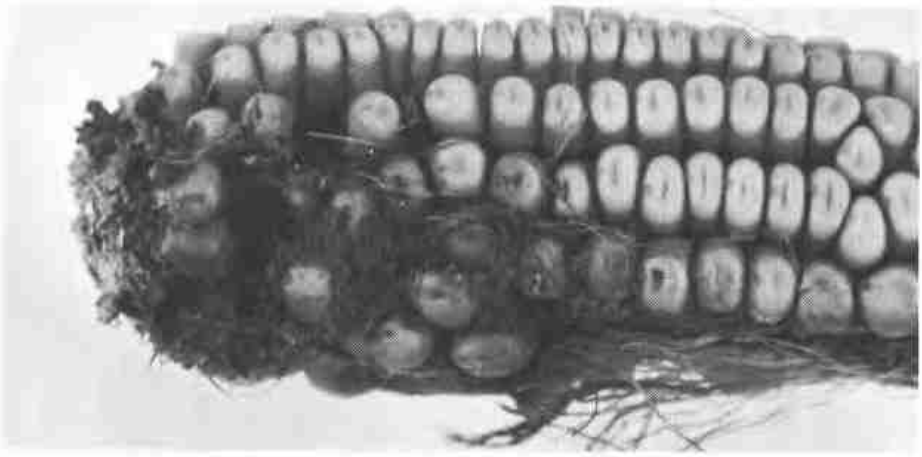
As a result, most North Carolina farmers planted corn developed from normal cytoplasm rather than from Texas male-sterile cytoplasm. Although the blight did reappear, losses in 1971 were much less than those experienced in 1970.[33]

Other blight-related activities included a Dixie Early Warning system to advise farmers on the location and severity of blight outbreaks. The system was manned in North Carolina by extension agents in 20 counties and extension and research plant pathologists at North Carolina State University.

The drought of 1980 was blamed for the severe outbreak of aflatoxin; the fungi that produced aflatoxin thrived on the drought-weakened corn crop. Corn producers and handlers lost almost $50 million because of corn they couldn't sell, price discounts, and the extra cost of drying and testing. Losses were about as high for farmers who fed corn to hogs, poultry, and cattle. Some deaths, especially of small pigs, were reported. But the biggest losses resulted from a decrease in feed efficiency for those animals fed corn with a high concentration of aflatoxin.

Again the school responded. Researchers and specialists from several departments offered suggestions for storing corn in a way that would keep aflatoxin buildup to a minimum. Farmers were given information on blending and detoxifying corn with an ammonia process and on marketing alternatives. Surveys were run to pinpoint the areas of aflatoxin outbreak and the levels of severity. Extension helped to prepare new guidelines for feeding contaminated corn to various classes of livestock and poultry.[34]

Aflatoxin was not a new problem. It had been identified in peanuts several years earlier. Researchers had known for some time



The effect of aflatoxin is clearly evident on this infected ear of corn.

that aflatoxin in the diet of animals had a toxic effect and also made the animals more susceptible to infectious diseases that might occur secondary to the infection. In 1979 an aflatoxin laboratory was established in the Department of Poultry Science to analyze corn for the presence of aflatoxin.[35]

Expanding the High-Protein Crops

Many of the acres taken out of corn production went into soybeans. Acreage increased from one-half million acres in 1950 to almost two million in 1980. Some three-fourths of this acreage was in the Coastal Plain.

There was a continuous stream of new varieties, pests such as the cyst nematode were conquered, and refinements were made in cultural practices. But the yield barrier could not be broken. In the relatively dry year of 1980, the state average yield was only 18 bushels per acre; in the better year of 1981 the state average yield was 25 bushels per acre.

It took a while to break the yield barrier in peanuts. E. T. York recalled that when he began peanut fertility work in 1949 he found that North Carolina peanut yields had been essentially stable—around 1,000 pounds per acre—as long as there had been records. The challenge, presented to him by department head W. E. Colwell, was to "see if we can't break through that ceiling which seems to be hovering over peanut yields."[36]

York recalled that good research was being done on peanuts, but it was not coordinated; each individual was looking at a particular

problem without regard to the other management practices being carried out. "We had in effect the 'weakest link of a chain' syndrome where any one factor might limit yields to the point that if you didn't put all factors together at once you might not realize the benefit from any one of them."

A team approach was tried. When a total package of recommended practices was used, yields went up significantly. But the farmers were skeptical. Several times farmers would say, "Well, I realize that this can be done on these little experimental plots but it is not practical to do farm wide." York recalled how he put his own piece of land into the program.

> I bought a farm in Edgecombe County in the winter of '50 that had about a 20 to 30 acre peanut allotment—not a large one but enough to do something with. We knew the record of the production on that farm through the ASCS office. They had been averaging 600 to 700 pounds over the past decade. The first year that we had the farm we went in with this "package" of production practices and averaged between 2,000 and 2,200 pounds—three times the average of the previous 10 years.

By 1965 the statewide peanut average yield was well above 2,000 pounds per acre. One of the production practices that made a difference was the use of recommended seed. NC 1, NC 2, and NC 4 were the first varieties to replace the farmer-selected seed. Field selection,

Each tag marks a plant with a definite heritable difference induced by irradiated peanut seed.

hybridizing, and the bringing in of genetic material from peanuts found throughout the world were all used. But the technique that created the biggest stir was the exposure of peanut seed to X-rays.

As Walton C. Gregory recalled the event, about 200 pounds of radiated peanuts were planted. The seed had been badly damaged by the radiation and all sorts of bizarre and distorted forms of plant life showed up in the planting—from perfectly normal plants to some so badly damaged that they would not even bloom and never produced a seed.[37]

From these experiments, the NC 4x variety, known as the "atomic peanut," was released. Looking back, Gregory believed the atomic peanut was glamorized beyond its worth. A much more significant contribution of the radiation program was induced resistance to the peanut leafhopper.

To Show and Tell

A packaged program approach worked for other crops as well as for peanuts. The term "all practice" first showed up in a headline in the 1950 annual report. The article described the demonstrations as those "which combined all improved peanut practices."[38]

By 1962 a specially designed demonstration program with the all-practice name had been developed. A unique feature was that the demonstrations were being carried out with the assistance of allied groups, identified as credit agencies; farm machinery people; and seed, feed, and fertilizer manufacturers. Later the manufacturers and distributors of agricultural chemicals would provide financial and other support. As to the value of this approach, the 1962 annual report said: "Agricultural scientists have made many valuable findings in recent years. But farmers have not had an opportunity to see these adaptable practices applied all at one time. The all-practice program has this as its goal."

A total of 429 all-practice demonstrations were carried out in 1964, with corn, cotton, peanuts, and soybeans accounting for 359 of these. Figures from the 1963 demonstration plots gave an indication of what farmers who followed recommended practices might expect in the way of yields: peanuts—1,126 pounds per acre more than the state average of 2,050 pounds in 1962; soybeans—34 bushels per acre compared to the state average of 24 bushels; and corn—90 bushels per acre compared to the state average of 53 bushels.

The all-practice demonstration approach was also given much credit in reviving fading interest in small grains. Seventeen all-practice demonstrations had been planted in 1963.

By 1968 another type of demonstration had come on the scene. Some 521 "on farm" tests were carried out that year. The new tests were described in the 1968 annual report as a form of applied research and a teaching device, but it was stated that their primary function was to enable extension workers to gather the practical type of information that they needed in making recommendations to farmers.

The 1968 tests included not only field crops but also horticultural crops, poultry, and livestock. The popularity of these tests peaked in 1969 when 790 were placed across the state.

But the demonstration concept remained popular. A county-by-county survey in 1978 showed that agents conducted 2,369 demonstrations that year and specialists conducted an additional 1,116. As could be expected, the vast majority of these demonstrations were designed to promote or gather information on an improved agricultural practice. However, about 450 demonstrations were on home economics subjects, and 70 dealt with community resource development.

Special campaigns were conducted from time to time. A continuing theme was to promote more diversification in the state's agriculture. In 1965, when tobacco allotments for the year were slashed nearly 20 percent, "Successful '65" was a special effort to call attention to the need for diversification and for an analysis of which crops or livestock enterprises might be expanded and where they would best fit in the state.[39]

Field meetings where demonstration plots were discussed remained popular with farmers. This group heard about small grain practices at the Piedmont Research Station in 1956.

And special campaigns have been carried out to promote special agricultural practices. In 1968 a statewide campaign was launched against acid soils after an analysis revealed that acid soils were limiting gross North Carolina farm income by at least $40 million annually. During the following year lime usage was up about 25 percent.[40]

"Liming Pays" was the name of a campaign kicked off in 1980 and directed at soybean growers. An analysis at that time showed that soybean growers alone were suffering an annual $50 million loss because of acid soils. The 1981 annual report credited the campaign with a 40 percent increase in lime usage for that year—from 1.1 million tons used in 1979-80 to 1.6 million tons in 1980-81.

Names and Places

Candor, Whynot, Pekin, Norman, Troy, Biscoe, Emery, Winblo, Hamlet, and Ellerbe. Names of towns in the Sandhill section of North Carolina? True. But also the names of varieties of peaches grown in the North Carolina midsection.

After the initial breakthrough in the 1930s, new varieties for field and horticultural crops came rapidly. And place names or geographic areas were popular with plant breeders needing a name for their new creations. In North Carolina more than 80 varieties of fruits, vegetables, and field crops had been tabbed with names taken from places in the state.

At least 16 muscadine grape varieties carry Tarheel names: Burgaw, Cape Fear, Creswell, Duplin, New River, Onslow, Orton, Pender, Tarheel, Topsail, Wallace, Willard, Albermarle, Pamlico, Chowan, and Roanoke.

- Fletcher, Ashe, Calypso, and Samson are cucumbers
- Irish potatoes carry the names of Plymouth and Boone
- One could select the Angola, Ivanhoe, or Croatan blueberry.
- Or the Cameron or Carolina dewberry, and the Manteo raspberry.

Moving into the field crops area, there were the Dare soybean; Yancey, Carolee, Roanoke, Salem, and Madison oats; Wakeland wheat; Iredell, Davidson, Randolph, Davie, Clayton, Boone, Milton, and Anson barley; and N.C. Abruzzi rye.

Forage crop breeders also found favorite spots in the state—Cherokee and Apalachee alfalfa, Rowan and Yadkin lespedeza, a sericea lespedeza called Caricea, and Hatteras beach grass.

Numbers have been combined with places to provide variety identification. In tobacco there were Oxford 1, Oxford 2, Oxford 3, Oxford 4, Oxford 26, Oxford 1-181 and Oxford 3A. A long list of tobacco and other varieties and hybrids carry the state abbreviation as part of the official name, such as NC 12.

And a few varietal names honor breeders or others who have served the school well, such as (Carlyle) Clayton and (Franklin) Correll peaches, (Charles) Dearing and Carlos (Williams) muscadine grapes, Brooks (James) oats, Roy (Lovvorn) wheat, Wade (Hendricks) barley, and the (Emmett) Morrow blueberry.

Behold the Environment

Before 1960 a farmer's only concerns with what would soon become important matters of the environment were likely to be some thoughts of soil erosion and of the flies and odors that eminated from his own barnyard. The use of agricultural chemicals was certainly not among their concerns.

Added to the pesticide arsenal following World War II were some big weapons. DDT was tested for almost all important agricultural pests and recommended as a control for many of them. And there was something completely new—2,4-D for weed control. By 1950 it was being recommended for the control of weeds in corn, peanuts, pastures, small grain, and uncultivated areas.

But caution flags were being raised. Entomology Professor T. B. Mitchell, writing in one of the school's own publications in 1946, warned that DDT could kill honey bees and other beneficial insects.[41] He made reference to the balance of nature in the animal kingdom and expressed the hope that insecticides would be applied only by persons knowledgeable of all the ramifications of chemical pest control.

Another important insecticide developed during World War II, parathion, was extremely dangerous to humans and called attention to the need to handle chemicals with care. Also, improper use of 2,4-D could result in injury to many plants other than those scheduled for destruction.

Questions were also asked about the nature of pesticide residues and their potential effects on humans and other animals. Specifically, the question was raised early concerning pesticide residues on tobacco. As a result, the Pesticide Residue Research Laboratory was

established in 1953.[42] Through the years it monitored residues in tobacco and other crops and experimented with various application rates and methods to determine the most effective means of avoiding the residue problem.

A major toxicology program was begun in 1964, as reported in that year's annual report:

> Station scientists have begun an intensive study aimed at answering some of the major questions in the controversial area of pesticides.
>
> Financed by a grant of approximately $1 million from the United States Public Health Service, the study is being undertaken by researchers in the Institute of Biological Sciences. The grant, covering a seven-year period, reflects the urgent need for basic and applied research on the effects of pesticides.
>
> Knowledge gained from the research may lead to pesticides which will act only on selected forms of animal and plant life, without side effects on other organisms.
>
> Problems being tackled fall into two major areas: comparative toxicity and pesticide stability, accumulation, and degradation products.[43]

This program, with similar grants at about five-year intervals, under the direction of Entomology Professor Frank Guthrie, attracted nationwide attention.

Also in 1964, funds from the U.S. Department of Agriculture provided money to the states to set up pesticide education teams. The team in North Carolina included an agronomist, an entomologist, a plant pathologist, and an information specialist. An agent in each county was designated as pesticide-chemical county coordinator. In 1967 this group "explored almost every approach needed to cut into the misuse of pesticide-chemicals." Theme for the activity was "Making Chemicals work FOR, instead of AGAINST Man."[44]

In 1968 the committee reported that it had "developed a large and varied array of materials for use in delivering the 'safety messsage' throughout the State."

In the school's 1967 plan to chart activities for a decade, quality of the environment was one of three major areas of concern for the research program. The report stated: "Some of the most pressing sociological and biological problems of the future relate to the quality of man's environment. Problems of pollution and conservation must receive increased attention."[45]

In 1972, in an extension long-range plan, the need to protect and improve quality of the environment was spelled out as one of the major thrusts of that organization over a five-year period.[46]

The Agricultural Chemicals Advisory Committee was formed in 1968. Its functions were to advise the administration on policy matters related to agricultural chemicals, assist in developing guidelines for operations under the policies of the school concerning agricultural chemicals, and to take under study agricultural chemical uses that might have harmful environmental effects or other possible effects not in the best interests of North Carolina's agriculture or its citizens.[47]

Rising public concern over pesticides and tighter government regulations created a major educational challenge for extension in 1970. Several dozen extension publications had to be discarded that year, and a large number of recommendations had to be altered because of changes in federal pesticide regulations and registrations. The school's Agricultural Chemicals Advisory Committee filed petitions with several state and federal agencies pointing out that certain uses of DDT, aldrin, dieldrin, chlordane, lindane, BHC, and toxaphene were essential for the production of food and fiber. Uses of these chemicals, however, were discontinued or restricted.[48]

Extension began gearing up in 1972 to carry out the new education responsibilities it received under the North Carolina Pesticide

Jack Sheets (right) examines data being analyzed in the Pesticide Residue Research Laboratory established in 1953.

Act of 1971. The act required all dealers, applicators, and consultants handling restricted-use pesticides to demonstrate competence in handling them in order to obtain the licenses required. In addition, farmers applying restricted-use pesticides were required to be trained and tested before receiving a license to purchase such chemicals. Thousands were trained under this program in the safe and effective use of pesticides.[49]

Integrated Pest Management

All of this activity spurred the search for reduced pesticide use, including nonchemical means of pest control. A number of cotton insect scouts were trained in 1970 to scout cotton fields. In 1971 the program was extended to tobacco. The pilot tobacco program included about 2,000 farmers and 11,200 acres in five counties.[50]

Weekly surveys by the scouts kept cooperating growers informed on the population levels of both harmful and beneficial insects. Local extension agents advised the growers on insecticide selection and usage when harmful insects appeared in sufficient numbers. These prescription-type recommendations based on actual insect problems enabled growers to avoid widespread use of pesticides on a routine basis.

A 1973 survey showed that cotton farmers in the program netted $95 per acre more for their cotton than neighbors who did not participate. Reduced pesticide usage and the advance notice given by scouts of severe bollworm outbreak were reasons for the increased income.

From this work came Integrated Pest Management (IPM) designed to bring into play all the weapons available—mechanical, biological, and chemical—to control pests. By 1982 the effort had spread to nine crops totaling more than 40,000 acres, and producers of poultry and livestock had discovered that the IPM approach would work on animals as well as on plants. More than half of the state's six million breeder hens were on IPM programs.

Learning to live with a number of pests was one approach; getting rid of all of them was another.

In 1970 agents in northeastern North Carolina counties spent many hours in the hog cholera eradication program. Although authority for the program rested with the North Carolina and U.S. Departments of Agriculture, local extension offices usually served as

county headquarters and as clearing houses for information. After several years North Carolina was declared a cholera-free state.

Following the enactment of the Uniform Boll Weevil Eradication Act by the North Carolina General Assembly and a producer referendum, a boll weevil eradication program began in an area north and east of Fayetteville and extending north into Virginia in 1978. The program was conducted by the USDA Animal and Plant Health Inspection Service. Program costs were shared among the participants, with cotton producers paying half the cost and government agencies the remainder.[51]

By 1980 the program had been judged a success and in 1982 a two-year Boll Weevil Containment program was initiated, designed to prevent reinfestation of the boll-weevil-free area. In 1983 the program was expanded to include the remainder of North Carolina and all of South Carolina.

Animal Waste and Water Quality

As scientists and government personnel were testing agricultural pesticides and designing rules to regulate them, others were formulating regulations on animal waste management. The rules, which came in 1976 with the adoption of the state's waste management law by the North Carolina Environmental Commission, were strict and presented a severe problem for all livestock farmers.[52]

The school formed an Animal Waste Management Committee in 1970. By 1971 researchers were developing methods to adequately characterize animal waste. This was necessary because methods used for municipal sewage characterization were not always suitable for the different and more concentrated animal wastes.[53]

By 1973 detailed information had been gathered and management alternatives for handling dairy, swine, poultry, and beef cattle wastes had been developed. It was believed that recommendations could be made that were both economically feasible and environmentally acceptable. In general, the most effective approach was to collect the waste (in some cases retrieving and recycling some of the solid plant materials), pump the waste into settling ponds or lagoons, and then pump the liquid to fields for fertilization and irrigation.

By 1976 thousands of hours had been spent helping livestock and poultry farmers get ready for the regulations and providing training for regulatory personnel.

Similar research and extension activities were necessary in dealing with the disposition of waste from food processing and other industrial activities where a large amount of unused material must be disposed of.[54] In some cases the effluent could be applied to the land as a fertilizing or soil-conditioning material. In other situations efforts were made to neutralize or clean up the waste materials before they left the plants.

The extension service was given a major role in reducing the amount of chemicals (mainly fertilizers and pesticides) that escape from the farmers' fields to the waterways.[55] "Nonpoint source" pollution, it is called. In addition to the environmental hazards, it is to the farmer's financial benefit if he can retain on his land as much of the chemicals that he applies as possible, as well as the eroding soil that carries some of the chemicals with it. "No-till" or minimum-tillage farming is one approach that has been thoroughly investigated.

And through the mid-1970s much attention was given to urban problems of water control, such as septic tank construction and maintenance.[56]

Water management designed to maximize the benefits of limited water resources (or control an overabundance in some instances) has received considerable attention. The school's Water Conservation and Utilization Task Force, appointed in 1982, concluded that if water consumption in the state "continues to increase at present rates, our supplies of surface and groundwater will not be adequate to meet future demands."[57]

In 1983 the U.S. Soil Conservation Service adopted a water management model developed by Agricultural Engineer Wayne Skaggs. The computerized model, called "Drainmod," was designed to be used for planning improved water management systems for millions of acres of flat, sandy soil.[58]

Hams, Milk, and Fish

In 1955 Virgil Stadler had a problem. Insects were destroying the hams cured in a shed behind the family-run grocery store at Elon College. A call to his county agent led to a conference with Meats Specialist John Christian. The insect problem was solved, and in a year or two Stadler was aspiring to greater things. In 1958 he was operating the first ham house under controlled atmospheric condi-

Settling ponds or lagoons, like this one at the dairy facility on the Piedmont Research Station, became a useful tool in the handling of animal wastes.

tions. By 1983 his annual output of 500,000 hams made him probably the largest curer of country hams in the world.[59]

From the beginning the Stadler operation—and his willingness to show his operation to others—became a demonstration of a successful commercial ham curing operation. Interest was high. In 1961, when the Food Science Department was established and the meats work moved into it, there were 200 country ham plants in the state with total gross sales of $25 million and employing some 1,000 persons. By 1983 an estimated 5 million country hams cured in some 100 North Carolina ham curing plants gave employment to 1,200 and increased the value of the product by $150 million.

The base for the expanding country ham industry had been established earlier by Tom Blumer and his colleagues in the meats laboratory. Storage of country style hams under natural curing conditions had required from 9 to 12 months before a rich, aged flavor would develop. By controlling temperature, humidity, and airflow, the time required for comparable aging was reduced to 3 months or less.[60]

Under these conditions the growth of surface mold was eliminated. The exposed lean surface area was not as dry and hard as hams stored by conventional methods, and less spoilage was likely during aging since loss of moisture from the ham was uniform and rapid.

The result was an attractive product that required no surface trimming before use.

North Carolinians eating country ham could also enjoy a glass of milk free of the odors and off-flavors that had bothered milk drinkers since the domestication of cows, thanks to another development in the Department of Animal Industry. In 1948 dairy manufacturing scientists developed a process whereby milk was heated to 150°F and filtered air was blown through it from 20 to 60 minutes, depending on the intensity of the off-flavor.[61] Practically all volatile feed flavors were eliminated by this treatment. The machine designed to do this job was called a vacreator. Soon every milk processing plant in the state was using this process. (See photograph, page 351).

Sweet Acidophilus milk came in the 1970s. To the milk was added Lactobacillus acidophilus, an organism believed to enhance human health as an aid to the digestive system. Some industry sources believed the development could be the most significant in the dairy business since the introduction of vitamin D as a milk supplement during the early part of the 20th century.[62] Marvin L. Speck headed the research team.

Food science researchers used ultra-high temperatures to produce sterile milk that needs no refrigeration. The critical feature of the new process was the extremely rapid heating and cooling to avoid the cooked or heated flavor that usually results when milk is heated. Steam under pressure was injected directly into milk to raise its temperature 60 to 90 degrees above the boiling point in less than one second. After holding at the high temperature and pressure for three to five seconds, the milk was cooled by evaporation in less than one second.[63] Consumers were receptive to both new products, and they were soon placed into manufacturing and marketing channels.

In 1961 Food Science Professor Frank Thomas was assigned full time to seafood extension—to work with fisherman and processors on the coast and to respond to the growing interest in commercially raised catfish and trout across the state. Catfish farming failed, but some growth was noted in trout production in the mountains. The coastal program caught on, with support from the Sea Grant program in 1970 and from other state agencies. This resulted in the establishment of the NCSU Seafood Laboratory at Morehead City in 1973.

Markets and Money

New products and changes in crop and livestock production called for new marketing programs. But old marketing problems that had plagued farmers for a long time did not go away. Numerous surveys during the 1950s revealed a disparity in expectations between farmers and the experts. To many farmers, a good market was one that would take whatever they might produce, in whatever form it was presented, at a satisfactory price. As marketing entered the supermarket age, marketing experts were called on to try to explain to producers that consumers were in command and had specific desires about how the product should be presented to them. The marketers—supermarkets and others—required produce in specific bulk units and to grade specifications. For many products the marketing structure had to be rearranged.[64]

Organized sales played a major role in the development of the North Carolina livestock industry. Feeder calf sales were held at West Jefferson and Clyde in 1945 with some 300 animals being sold. In 1950 the North Carolina Department of Agriculture joined extension in the sponsorship of these sales. When the North Carolina Cattlemen's Association was organized in 1955 the sponsoring group became a three-way partnership. Yearling steers were added to the marketing program in 1954, and stocker spring sales started in 1955. The number of cattle handled through these sales increased from 1,232 head in 1950 to 46,773 in 43 sales in 1972 and to 59,163 head though 56 sales in 1982.

With hog producers, hog buying stations, purebred shows and sales, and hog market shows all proved popular. In the case of sheep, more than half of the slaughter lambs sold in the state in 1950 were sold though nine extension-operated lamb pools. Wool marketing pools were established in 1954.

A number of county marketing associations were organized for various commodities. The purpose was to assemble the produce in units sizable enough to attract buyers. For example, in 1956 the extension service helped Iredell County poultry farmers put together an organization to sell eggs to a wholesale outlet in Charlotte. By the end of the first year they were selling 470 cases a week. This activity had increased the gross income to the farmers in Iredell County by approximately $210,000 annually.

A 1957 analysis of the research program called for expanded work in processing, utilization, and marketing and emphasized the need

for new and expanded markets for agricultural products. The report called for more research in these areas, including more study of consumer preferences.[65]

Over the years more attention was given to processing and marketing firms. A 1970 survey revealed that there were 737 plants processing food in the state, many of them small. During that year the equivalent of 15 specialists were assigned to work directly with these firms. Information was provided on technological innovations, government policies, changing economic conditions, and shifts in consumer preferences.

At about this same time programs were developed to help farmers understand and use futures trading and other forward pricing and contracting arrangements.

As new technology came to the farm, the need for money increased. In effect, capital was substituted for labor. Farmers had long been accustomed to borrowing money from government sources, local banks, and others. But lending sources, particularly the small banker, had been accustomed to lending a farmer as little as possible instead of lending as much as was needed to bring about an economical operation. The early part of the 1950s was a time when

The auction market remained a useful and popular way of selling the state's increased livestock production.

new technologies applied to agriculture were requiring more capital than many banks were willing to lend.

A concentrated effort was made to acquaint bankers with the capital needs of agriculture. A banker's short course or credit conference brought bankers to the campus. Bankers were invited to go on tours, to attend local farm meetings, and otherwise become acquainted with modern farming. Arrangements were made with the North Carolina Bankers Association for a team composed of a livestock specialist, an agronomist, and a farm management specialist to participate in the program of the annual meeting in each banker's district in the state.

The major effort was to show the bankers how farm income could be increased by the use of capital. A special effort was made to encourage bankers to make loans to livestock farmers—an area in which most bankers were not as knowledgeable or as comfortable as they were with traditional row crop production.

The effort was successful. Credit became available. In the banker's organization a banker in each county was designated as a "county key banker." By working with these bankers through the executive officer of the North Carolina Bankers Association, young farmers were selected to attend short courses at the college with tuition paid by the banking institutions. In many instances the bankers also supported the 4-H club activities and such events as farm tours and other educational activities designed to improve the understanding of agriculture.

Some of the spinoffs of these activities were more banker involvement in sponsoring agricultural tours both within the counties and sometimes outside the state, bankers' support in the various community development organizations, and the encouragement of other businessmen to become interested in the changing agriculture.

Relieving Human Drudgery

David S. Weaver, agricultural engineer and later department and extension service administrator, often expressed the goal of relieving human drudgery in farming. He stated many times his thesis that before farming was mechanized man as a farm laborer was little above the beasts of burden that he commanded.

Many of his colleagues shared his view. In 1952-53 a series of news articles emanating from the school quoted farm management

specialists on the farm labor shortage and steps farmers might take to alleviate the problem. In the articles Farm Management Specialist Brice Ratchford described the farm labor shortage as "the biggest problem many farmers will have to face in 1953." Solutions suggested included mechanization, increased farm size, applying more recommended practices, more effective use of labor, job simplification, and good working conditions.[66]

Farmers continuously deplored the dearth of good farm labor. But the view was not an uncontested one. A 1972 national task force declared that "mechanization research has . . . been a bane to millions of rural Americans. The cost has been staggering."[67] The task force reported:

> Farm workers have been the earliest victims. It is outrageous that those who have been brutalized so badly by mechanization have been used as the excuse for mechanization. Again and again there are references in land grant research materials to the scarcity, unreliability and cost of farm labor as the factor requiring mechanization. In fact, mechanization has been the force that has eliminated farm jobs.

Such severe criticism was recent. Professional agricultural engineers, however, had spoken to the issue at least as early as 1937.[68] At the annual meeting of the American Society of Agricultural Engineers that year, C. W. Warburton, USDA director of extension, contended that "machinery did not replace farm labor; machinery was forced upon the farmer by a scarcity of labor."

This was probably pleasant for the engineers to hear. However, Harold E. Pinches of Connecticut State College disagreed. He said that mechanized agriculture caused "unemployment . . . labor displacement . . . economic unbalance, social unrest, political upheaval . . ." But Pinches did say he believed that the benefits outweighed the costs.

Over the years farmers and representatives of agribusiness concerns spoke to the colleges loudest on their needs. In looking back it is interesting to note that in North Carolina extension moved out with an aggressive program in agricultural engineering from 1914; but it is also surprising to note that in research and teaching, agricultural engineering was not judged important enough to be placed in a department of its own until 1940—63 years after the initiation of the research program and more than half a century after the first students walked across the campus.

There was plenty of opportunity to employ labor-saving devices on North Carolina farms. In contrast to some other sections of the

country, North Carolina farmers trailed badly in the charge toward farm mechanization. The small grain combine had caught on rapidly, but few farmers had yet adopted tractors for planting and cultivating by the beginning of World War II. As the '40s wore on, there was need by engineers, agronomists, and economists for hard-headed evaluation of cotton harvesters, corn pickers, and other machines.

Many machines could be created specifically for North Carolina conditions. In 1950, in anticipation of some chemical that would control suckers on tobacco, the "clip-oil" applicator was developed to simultaneously clip the flower from the tobacco plant and apply a chemical that would run down the stalk and kill the new suckers.[69]

In the early 1950s a once-over peanut harvester was developed that would dig, pick, clean, and bag peanuts in one trip through the field. This system never worked out, however. The peanuts contained too much water, and it cost too much to remove the water through artificial drying. The result was two-stage harvesting, a compromise worked out cooperatively by researchers in several states. In this process the nuts were dug and dried in a windrow for several days before being combined by another machine. Soon after this process was perfected, the picturesque stacks of peanuts stretching across the northeast fields in the fall were seen no more.[70]

The demand to reduce tobacco harvesting labor was strong. And vegetable growers called for relief. After many years of experimentation it was announced in 1980 that a new cucumber harvester had cleared the last hurdle. Success with a sweet potato harvester was announced in 1983.[71]

At least part of the engineering success could be attributed to a new concept, first espoused at the 1937 meeting of the American Society of Agricultural Engineers (ASAE). A speaker at that meeting expressed unhappiness at what he termed the existing philosophy of the profession as "simply the service of mechanical, civil, electrical, architectural, and industrial engineering taken to the industry of agriculture." He suggested that the philosophy should be "the engineering of biology."

The idea lay dormant for more than 20 years until at a national ASAE meeting North Carolina's G. W. Giles was credited with resurrecting it. He labeled agriculture a "biological factory" and said agricultural engineering should give more attention to "the internal mechanism of biological production and to the external operations and environment that influence this mechanism."[72] This concept of

Student Zane Blevins demonstrates the 1950 version of the "clip-oil" applicator—one of the school's first attempts to reduce the amount of labor in tobacco production.

plant-machine relationships was reflected in the 1965 change of the department's name to Biological and Agricultural Engineering.

New ways of looking at relationships, viewing the tasks at hand, or bringing together experts from several disciplines had not occurred in just one department. Across the school innovation had been a factor in approaching the problems of agriculture and bringing new technology to the man on the land.

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17

Home Economics and 4-H Bring Service to All

A powerful force. The poor and the elderly. Good nutrition for all. EFNEP. Stitches in time. For better housing. Handicrafts grow in popularity. Club members think international. Research at Greensboro. Much cooperation. 4-H on the go. To community clubs. 4-H goes to town. Operation expansion.

ACTIVITIES FOR FARM WOMEN AND THE CHILDREN in farm families predated the Smith-Lever Act creating the cooperative extension service by a number of years (see chapter 7).

As the extension movement was spreading across the state, at any one time there were more counties with agricultural agents than there were with home economics agents, but the gap was never large. In most counties the agents accepted the responsibility for youth work before specialized county youth agents were appointed.

By 1940 extension programs were in all counties, and the programs included home economics and youth activities.[1] Also, in the 1940s a home economics research program was started in Greensboro.

A Powerful Force

The 1945 extension annual report labeled the rural women of North Carolina the most strongly organized of any educational group in the state, represented by the North Carolina Federation of Home Demonstration Clubs and the North Carolina Negro Home Demonstration Clubs, 55,185 members strong.

Home Demonstration club membership peaked at around 70,000 members in the early 1950s, but the 63,635 members of 2,534 clubs in 1957 proved to be a significant political force in the state. The power of the group came to the fore when in 1957 a state advisory committee recommended a diminution of home economics work by the Agricultural Extension Service.[2]

First, the committee hinted at a need to reduce the portion of the budget allocated to home economics work (page 45):

> The Committee does not feel that of the total resources available for conduct of the work equal shares should be devoted to Agriculture and Home Economics. By force of sheer volume and variety of need and because adequate agricultural income would solve a great many of the problems in home economics, Agricultural Extension is clearly entitled to a larger share of the budget.
>
> Income generating work has received a larger share of the budget in the past; and our studies have convinced the Committee that in the future even a higher percentage of the budget should be devoted to income generating work.

The committee noted that there were 16 home economics subject matter specialists in six groups, in addition to six white district home economics agents and three Negro district agents, providing support to the county home economics agents. A reduction in the number of home economics specialists was one way the committee anticipated that the home economics budget might be reduced (pages 72-73):

> The Committee questions both this refinement of specialization and the necessity for so many specialists in the Home Economics field.

Some of the subject matter areas being covered were deemed not necessary (pages 45-46):

> The law authorizes extension education in (1) agriculture, (2) home economics, and (3) related subjects. The range of "related subjects" is literally unlimited. The Home Demonstration Agents spend considerable time assisting the Home Demonstration Clubs with music, art, reading, citizenship, religion, and family relations. These probably qualify under the law as related subjects. There is no doubt that they are worthwhile activities and it is logical for the organized clubs to include these subjects in their program.

However, the report continued:

> The Committee feels that Extension Service personnel should do only incidental work on the so-called "related subjects", thus leaving more time to work with people on home economics. The Committee also believes that a necessary preparatory step to reducing emphasis on "related subjects" is for the Service leadership to clearly define home economics and "related subjects" and suggests that this be done.

The home economics program had grown rapidly in the traditional areas during World War II and had expanded into other areas following the war. The family life relations section was established in 1945. By 1950 club members were pushing community improvement and numerous health drives, and agents were advocating financial planning and urging people to prepare wills. In the early 1950s it was announced that extension work was a whole family program "with certain educational projects for women and girls. The women's program included both the practical, work-a-day skills of housekeeping and the cultural 'extras' like music, reading and citizenship."[3] Training community leaders was viewed as a vital part of the program.

The committee report did tender a "left-handed compliment" for the home economics program when it noted (page 46) that the entry into the fringe areas had been stimulated by requests for programs by the club members themselves, assuming that they had thoroughly acquired the needed knowledge in the more basic subject matter areas. Also, the committee noted that "the same women tend to remain in the Club for many years." The committee suggested that agents work with more families who were not members of the organized clubs.

The 1957 committee also thought there was unnecessary duplication and that others could do some of the things being carried out by the extension service:

> There are many other public and private agencies available to provide assistance in these fields and adequately service these needs of the organized clubs (page 45).
>
> The work of the Extension Service in Home Economics is being strongly supplemented by vocational teaching in this subject in the public schools, by other public educational, health and welfare agencies, and by the tremendous educational forces created by private manufacturing, merchandising and publishing enterprises (page 73).

A major organizational change resulted from the study. In each county the white agricultural agent was named county chairman and the white home agent was named vice chairman. The same gender arrangement was made at the district level. It was this reorganization that brought the wrath of many home demonstration club members upon state and university officials.

As D. W. Colvard, dean at the time, recalled, "I think I have never seen the state as thoroughly covered with lobbying material to all county commissioners, to all members of the U.S. Congress, to all trustees of the university."

In retrospect, persons involved at the time credit the home economics members of the extension service with most of the rebellious

activity. Brice Ratchford, the school administrator assigned to work with the committee, recalled in a 1980 interview that the recommendation was expected to be explosive, and it was. However, the leadership of the school and the university moved ahead and the reorganization was implemented in 1958.

Other questions about the home economics programs came 22 years later when another state committee looked at the extension service.[4] The committee said:

> Several elements need careful analysis including: (1) how to reach the mass audience available beyond the currently organized clubs; (2) more explicit identification of program elements that reflect the central needs of people, thus, eliminating peripheral content; and (3) the role of home economics extension related to new agencies operating in counties.

Despite the questions and criticism, home economics work expanded both in depth and out into other areas.

The 1957 annual report emphasized the leadership role and training for it: "Home demonstration has brought to thousands of rural women a belief in themselves, in their families, and in their

By 1960 the Agricultural Extension Service was being perceived as providing education for all economic and many social aspects of the family, through its home economics and youth programs.

communities. It has brought to the farm women an opportunity to stand on their feet with poise and confidence."

In that same year a school-wide long range plan took home economics to town. A report stated: "In the past, assistance in home economics has been directed largely to rural families because their need has been greater than that of urban residents. An increasing number of rural non-farm and urban families are demanding and securing assistance with family living problems. In the future, Extension should provide assistance in home economics to every family."[5]

The first extension long-range plan, entitled 1.6 in '66, advocated a wide-ranging home economics program. The 1962 annual report indicated that this was indeed being carried out:

> Major progress was made in reaching new clientele in the form of young homemakers, homemakers employed outside the home, young parents, brides, and members of low income families. All of these groups traditionally have been characterized by their need for home economics information and their reluctance to join educational groups.
>
> Progress was made in identifying these special interest groups, and in tailoring extension programs to serve their needs.

The 1962 annual report particularly singled out young homemakers as a specialized audience on which extension was concentrating during the five-year period.

The Poor and the Elderly

Coordinating with and using money provided by the federal government, the home economics program turned specifically to low-income families in the mid-1960s. In 1966 three home economists were housed in neighborhood centers in low-income Charlotte areas. They were to carry out their program with the assistance of 15 subprofessional aides. In Forsyth, two economists and 10 home manager aides were placed in the Kimberly Park Self-Reliance Center serving 2,300 low-income families. Other programs were developed that year in Robeson, Scotland, and Richmond counties.

A specialist in aging was added to the staff in 1967. Ten years later special programs for this growing segment of the population were well under way. There were programs in nutrition, physical and mental health practices, consumer education, and income management in 75 counties; education in housing, furnishings, and equipment, including energy conservation, in 65 counties; and crime prevention programs in over half the counties. Intergenerational educa-

tional experiences (designed to change the attitudes of younger people toward the aged) had been carried out in 69 counties since 1971.

Inflation in the late 1970s elicited programs designed to help older citizens cope with financial problems. Self-sufficiency and self-maintenance skills were taught. From a program started in 1978, some 84,380 senior citizens were reported to have acquired these skills by 1981.

Extension was given a key role in the State Task Force on Rural Health established by the State Rural Development Committee in 1973. After a survey of rural health needs was conducted, materials were prepared to point out health services available to rural residents and to urge better family health care. During the same year considerable effort was expended to encourage better dental care. Dental health was an important part of the summer day camps conducted for children from disadvanted families.

In the family relations area, about-to-be-marrieds were a target audience in 1973. Five special classes were developed by family living specialists and covered topics on marriage role expectations, planning and paying for the wedding, bridal showers and wedding receptions, wedding attire and trousseau, and furnishing the first home. Later came programs in marriage enrichment and expanding families (1974); selecting toys for children (1975), lap reading with children (1976); preparing parents for the parenting role (1977); family communications (1979); aid for the divorced, widowhood support groups, and stepfamilies (1980); and training future parents (1981).

In response to the 1979 committeee report, a home economics task force was established to develop guidelines. Representatives of the U.S. Department of Agriculture and home economics program leaders from other states were involved.

The task force concluded that extension must "demonstrate that it is helping families make decisions and solve problems that will make a difference in their lives in terms of surviving in today's world."[6] The task force report pointed out that variations in life-style would change as more women entered the work force and as the economy continued to fluctuate. The changing needs of families would require changing ways that they might be reached with educational materials.

As to determining program content, the task force proposed to leave these decisions largely to the people in the counties. The report stated the program focus should be based on local needs, and within a

The Stokes County home demonstration choir was organized in 1953—one of the many home demonstration (later extension homemaker) club activities.

county the program should vary from time to time. To determine the needs, county advisory groups should have considerable input in developing county programs. At the state level attention should be given to selecting priority audiences such as young homemakers, career homemakers, low-income families, and other hard-to-reach audiences.

As to scope of program, the task force found that each family in the state was a potential client. Issues being faced by families were identified as economic pressure and inflation, family and work, preparation for marriage and family life, parents and children, family violence, housing, providing an adequate diet, energy and environment, aging, status of homemakers, building family strengths, and health care.

Despite all the human needs and the admonitions by study committees, much of the program continued to focus on food, clothing, and shelter.

Good Nutrition for All

In cooperation with the milling industry in the state, a campaign was launched in 1950 to get cornmeal fortified with the vitamins and minerals necessary to shore up nutritional weakness in the product. The project ran for about two years and the result was that most of the cornmeal produced in the state was fortified.

An overall program to improve diets and health launched in 1951 showed the effectiveness of a concentrated educational program. The 1954 annual report said that reports from club members were showing

that those who could name the "basic seven" food groups had jumped from 1 percent in 1951 to 45 percent in 1954; planning meals to include all "basic seven" from 21 percent to 68 percent; and similar increases in consumption of fruits, vegetables, and milk.

Low-income families and young homemakers were singled out for special attention in the early 1960s. In 1965 extension home economists worked with low-income families receiving donated foods in 62 counties. Classes and other activities were aimed at helping the families use unfamiliar foods and prepare familiar foods in a variety of ways.

A 1969 nutrition-on-wheels display challenged homemakers to ease the tension of food shopping by planning meals in advance to save time, energy, and money.

In 1972 extension joined the Department of Social Services, State of North Carolina, in providing hot meals to senior citizens. Two years later county personnel in Carteret County, with their kitchen know-how, teamed with food science specialists who had the laboratory know-how to solve practical problems in seafood processing, preparation, and cooking. Over the years a number of dishes prepared from marine species generally thought inedible were introduced to the public.

In the late 1970s, with the cost of food and the cost of medical care continuing to rise, making the right food choices became a challenge to the consumer, both for budget control and for physical well-being. Nutritional guidelines distributed by government agencies and others sparked lively debate.

Through good times and bad, family food production and conservation remained viable topics for extension education. Homegrown foods offered particular benefits to families with inadequate income and poor nutrition. A concentrated effort to encourage home food production in 1957 was titled "Raise a Square Meal Around Home."

Shortages of energy and inflation further stimulated interest in home food production and conservation. Gardening was one of the fastest growing hobbies in America. In 1974 it was estimated that about 540,000 Tar Heel families grew a garden of some type that year. In 1979 home economists reported assisting North Carolina families in canning 2,585,825 quarts of fruits and vegetables and 112,831 quarts of meat. In addition, there were 3,839,310 quarts of fruits and vegetables and 3,739,621 pounds of meat frozen. After being widely promoted during World War II, drying as a preservation tool lay on

the shelf until the technique again became of widespread interest in the late 1970s. And as many new conservers came along, dynamic food safety programs were popular.

EFNEP (pronounced ef-nep)

The Expanded Food and Nutrition Education Program was initiated in February, 1969. Using specially appropriated federal funds, the program was designed to improve the nutritional status of underprivileged North Carolinians and to increase their participation in public food assistance programs.

By the end of the year, the program was being conducted in 60 counties by 155 extension aides and was reaching more than 20,000 persons. Participants were largely rural—76 percent—and they were generally in the lowest economic categories. About 64 percent of the families were black, 31 percent white, and the remainder mostly Indian.

Aides, employed and trained for the program, worked under the supervision of home economics extension agents. Most of their work was with participating families on a person-to-person basis, with the average aide serving about 24 families.

Because of myriad needs of participating families, the aides could choose to emphasize such things as nutrition education, food preparation, meal planning, food buying, sanitation, food preservation, gardening, public food assistance, and child feeding.

Initial results of the program showed: (1) increased awareness among participating families of the importance of food and nutrition to family health; (2) a greater participation in public food assistance programs and more efficient use of donated foods and food stamps; and (3) higher consumption of milk and milk products and of fruits and vegetables.

A youth component was added to the program in 1970, with special programs for the children in the EFNEP families. In addition to learning how to prepare foods, youth were taught what role nutrients play in human health. They were taught how to buy and prepare foods, and were often encouraged to have gardens or minigardens. In families where the homemaker could not read, children often took the responsibility for food preparation and food buying, under the guidance of a program aide.

By 1971, 269 program aides were working in 96 counties. They reached more than 45,000 adults, and almost 30,000 children were enrolled in their special activities. These activities included a special camp program begun in 1972, in which 7,500 children from EFNEP families participated.

In 1982 some 20,581 youth were enrolled in the program. Fifty-four percent were under 13 years of age. Some 66 percent of the EFNEP youth participants were black, 31 percent were white, and 3 percent were Indian. Seventy-two percent resided in rural nonfarm areas and in towns of less than 10,000 population.

By the end of 1982 some 398,000 family members in 84,000 families had been reached with the program. A 1981 study indicated that more than 90 percent of those enrolled in the program were those often classified as "hard-core poor," with incomes of less than $7,500 per year. More than two-thirds (69 percent) were rural nonfarm families.

Stitches in Time

In the area of clothing, keeping everyone abreast of the changing world of fashions and new materials was a challenge. In 1972 construction of clothing for men and women from polyester knit was a popular program topic across the state, as was explaining the federal law concerning flammability of children's sleepwear.

Investment wardrobe planning was the 1977 theme of programs aimed at helping North Carolinians assess their wardrobe needs and wants while staying within the confines of a clothing budget. Recycling of clothing already available to the family was one suggestion for stretching the family clothing budget. An article in the 1978 annual report stated that home sewing still remained one of the best ways to economize, provided the fabric quality and fit were comparable to that of ready-to-wear clothing in the medium and higher price ranges. And sewing was not just for the women. In 1978 at least one menswear workshop to help men develop a more extensive wardrobe at lower cost was held in 65 counties.

Clothing for the physically handicapped has been hard to obtain. Fashion shows for the physically handicapped were presented in 1976. It was shown that garments could be constructed that make it easier for handicapped persons to dress themselves. Handicap clothing kits developed by extension specialists were used throughout the state.

In 1978 Stanly County homemakers made 180 Christmas stockings for patients at McCain center. Charitable work was a featured part of club activity.

Children are another group with special clothing needs. "Clothes that bind, chafe or fit improperly are often found among ready-to-wear items,"stated the 1978 annual report. A home seamstress could not only save money but also make durable, washable, practical children's clothes with elastic pull-ons, large buttons, and no-sew snaps that were easy for a child to put on without help.

Inflation hit the clothing budget hard; by 1979 expenditures for clothing had dropped to only 6.69 percent of the family budget. In 1982, in agent-taught programs on mending and repair skills, stain removal techniques, and refurbishing and storage, 275,376 garments were mended or repaired and 267,479 stains were removed. If these garments had been sent to drycleaners, stain removal would have cost $133,455.50.

For Better Housing

Twenty-four farm families—four in each of the extension districts—participated in the launching of a special farm housing project in 1950. In exchange for planning help from extension specialists, the families agreed to open their homes as demonstrations to the public.

By 1954 some 3,638 families had been helped with plans for new homes, 11,396 families had been helped with remodeling. In addition,

with extension service help, 17,543 kitchens and workrooms were improved, and 1,349 homes added storage. Also, 30 plans for new homes had been prepared, and more than 3,000 plans of one of these homes had been distributed.

Extension moved into the city with vigor in 1965. Demonstration houses were set up in public housing units in cooperation with local housing authorities. Tenants were instructed on care of walls, floors, and household equipment; furniture refinishing; window treatment; and storage utilization.

Mass exposure of the extension housing program came in 1968 when, in cooperation with several trade associations, a full-scale house was built on the North Carolina State Fairgrounds and open during fair week "to show people how they could get the most benefit from their housing dollar."

Two years later agents and specialists trained aides who worked with Turnkey III Housing in five cities. They provided these new owner-occupants with training in consumer education and home management skills.

In 1972 the extension service entered into an agreement with the U.S. Department of Agriculture to develop educational materials on storage, with emphasis on food storage, in the homes of low-income families. Two years later the extension service joined the North Carolina Manufactured Housing Institute to demonstrate the advantages and disadvantages of mobile home living and to show that use of mobile homes could be a way to decrease the number of substandard homes in the state.

The continuing energy crisis and economic uncertainty led to a series of workshops for homeowners in 1975. In the area of energy conservation, participants were taught how to read an electric meter and were given hints on how to conserve energy in the use of home heating, water heating, air conditioning, heat-producing appliances, refrigeration equipment, small appliances, and home lighting. In the home maintenance area, participants were taught how to repair items like a water faucet and how to winterize their homes. Energy cost reductions of 20 to 30 percent were reported by 53,000 families that made extension-assisted energy conservation changes in their houses in 1979.

Interest in solar energy and wood for fuel became popular, and by 1980 "do it yourself" practices increased, particularly in home remodeling and repair and new home construction. In 1980, 23,300 families used extension-taught skills to save $1,091,838 in home

repair and care expenses. An additional 22,008 families saved another $800,000 by becoming do-it-yourselfers in the house furnishings area.

Handicrafts Grow in Popularity

Any way the home economics program could foster a moneymaking scheme was always regarded by home economists as a feather in their caps. Curb markets were established to create a new market for farm products and to enhance family income.

Rural housewives were the original poultry farmers, the responsibility for poultry instruction resting primarily with the home demonstration agents in extension's earlier days.

The 1950 extension crafts program included instruction in wood carving, broom making, ceramics, copper, card painting and stenciling fabrics, and rug hooking. That year extension students made crafts for home use valued at $60,000 and 1,283 families sold $29,543 worth of articles. The 1950 annual report stated that over 300 North Carolinians had established crafts as a regular source of income.

In northeastern North Carolina, the Albermarle area home industries program was set up in 1966. It was designed to develop leadership training to establish a marketing program for salable home-produced items for low-income families and craftsmen already in the business. The Albemarle Craftsman's Guild was formed, and a district crafts agent was located in the area. The annual Craftsman's Fair became a popular area event.

Club Members Think International

An important international dimension of the program developed over the years.

North Carolina Extension Homemakers Club members have expressed interest in the United Nations and its work worldwide since 1953, with the first study tour to the organization's New York headquarters. By 1983 more than 1,500 extension homemakers had participated in United Nations observances. Delegates on the study tours saw the United Nations in action, had briefings about the issues currently before the body, and gained a working knowledge of various United Nations committees.

In 1974 the tour was expanded to include visits to several foreign embassies in Washington, where special briefings were held. Five years later, extension homemakers flew to Europe for a special study

As an international project, club members supported the work of the United Nations. The first United Nations flags in Catawba County were made by Extension Homemaker Club members.

tour that included a visit to the International Court of Justice at The Hague, the Food and Agriculture Organization in Rome, and the International Office of Refugees and the headquarters of the International Red Cross in Geneva.

Over the years, extension homemakers donated sewing machines to community centers in several African and South American countries, built a well for Indians in a remote village in Guatemala, and sent supplies to a hospital in Burundi, Africa.

In North Carolina, families of extension homemakers served as hosts to students from foreign lands who were studying at North Carolina State University. Students would have overnight stays with Tar Heel families, taking part in family and community activities. In 1981 the student exchange program was expanded, offering students at other Tar Heel universities a chance to be part of the "Adopt a Student" Program. Visit length was expanded to a week.

Also in 1981, extension agents in Forsyth County organized a seminar called "American Style" to teach Southeast Asian immigrants about such American things as foods and food stores, banking, dress patterns, income tax, and seasonal heating and cooling needs.

Research at Greensboro

The first studies that might be labeled home economics research came during World War II. The U.S. government, concerned with the nutrition of its military personnel stationed in the South and also with the large number of southern boys rejected for military service, asked the universities for research on the nutritive value of certain southern foods. In North Carolna this assignment went to the nutrition group in the Department of Animal Industry and to the Department of Home Economics at the Woman's College of the University of North Carolina at Greensboro.

In addition to showing the high nutritive value of sweet potatoes and collards, the research revealed tuber and variety differences in the vitamin content of sweet potatoes and the influence of cooking, storage, and handling practices on the nutritive content of vegetables.[7]

In about 1948 Agricultural Experiment Station funds were made available to support a research program at the Woman's College. There researchers in the Department (later School) of Home Economics examined the wearability of men's shirts, adapting home facilities to young children, sources of information and help for young children, and rural housing.

In research, the School of Home Economics of the Univeristy of North Carolina at Greensboro (since 1963) in effect functioned as one of the departments in the School of Agriculture and Life Sciences at North Carolina State University. Financial support was provided for the research, and the experiment station outlets were used for publishing the results. Several NCSU faculty members were cooperators on the projects.

As the research effort expanded throughout the 1960s and 1970s, attention was focused on textiles, housing and household equipment, and communication among and information available to parents, children, and families.

In 1960 a doctoral program was created in child development—the first doctorate offered at the university. Naomi Albanese, dean of the School of Home Economics from 1958 to 1982, declared: "Without the support of Agriculture and Life Sciences and the Agricultural Research Service we could not have developed a Ph.D. program on this campus. Support from the North Carolina Agricultural Research Service not only makes it possible for research to be pursued, but it also provides the opportunity for us to attract students and scholars." By 1980 more than 80 persons were enrolled in the several doctoral programs in home economics.

Much Cooperation

The ever-widening circle of home economics education soon carried it into subjects and areas already staked out by many other agencies, groups, and organizations. Extension evaluation committees had pointed this out. The spirit was one of cooperation rather than competition, however.

In 1951 a program on banking for farm women was initiated in cooperation with the North Carolina Bankers Association.

Listed as cooperators in 1965 were the U.S. Office of Economic Opportunity, state departments of public health and welfare, city and county housing authorities, the Donated Foods Program, the YWCA, The Salvation Army, and the public schools.

In 1971 families filing for bankruptcy in U.S. Middle Court in North Carolina were sentenced by the court to attend extension-taught classes in money management and personal finance.

Other cooperators have included the North Carolina Cultural Arts Council, the North Carolina Division of Health Services, and the Office of Child Day Care Licensing.

An item in the 1964 annual report spelled out how this cooperation worked:

> Cooperation with other agencies and organizations is an increasingly important means of implementing the Extension home economics program. One area in which real progress is being made is in coordination of the work of the Extension Family Relations Department and the North Carolina Mental Health Association. At the state level resource materials have been shared. At the county level agents have cooperated to establish better mental health facilities and supported local organized groups.
>
> Through leadership given the North Carolina Family Life Council by the family life specialist, home economics agents and family life committee chairmen of the home demonstration clubs are finding increasingly that attendance at the Council's annual conference is an important educational resource.

All things to all people? Perhaps. The number of the unreached remain far higher than the number of nonfarm women who have clamored for, and received, the benefits of extension's home economics education that liberated the farm woman.

It was about 1912, according to one writer, that a concentrated effort was launched to apply science to locating problems and finding external solutions to problems of the farm home.[8]

> The farmer's wife had had very little training in action on her own behalf. Her training had all been in submission to other's needs. To

change her—and even more difficult, her husband's—life habits must often have seemed a challenge greater than wrestling with sins. And yet, as she realized that "instead of laying it all on the Lord," science had given her weapons to use in favor of her children's health, science itself must have seemed a god. . .

But for personal contact and moral support, another aid appeared—women's clubs. Women's clubs multiplied rapidly during this time, filling both the need for knowledge and for moral support. At club meetings women could learn what action to take to get rid of flies, to plan nutritious meals, etc. And perhaps most important of all, they could exchange their feelings and needs, their hopes and fears with, not just relatives, but peers. Accustomed as we are to having been members, since our early school days, of organizations to fit our every interest, it is hard for us to imagine the impact of women's clubs. Here is one woman's experience:

"From Christmas to our meeting (July 15) I had not been off our farm. . . . One day a neighbor about a mile away came and brought me a piece about cheap and pretty curtains and told me to practice it for I was to read it the next week at the meeting. I said I could not, but she came for me, as she has a horse for herself, and carried me there. When I went to read I just broke down and cried and all the rest cried with me, and they petted me and told me I was brave just to try. Mrs. _____ coaxed me to try again and I did and read it right to the end. When I was young I used to recite so next time I am going to recite, 'The Curfew Shall Not Ring Tonight.' "

An unidentified writer in the 1957 annual report spelled out the benefits as perceived from headquarters:

Home demonstration has brought to thousands of rural women a belief in themselves, in their families, and in their communities. It has brought to the farm women an opportunity to stand on their feet with poise and confidence. . . .

Unlike those before her, the rural homemaker is now on the go. She attends community, district, state, national, and even international conferences. She realizes full well the values to be gained from participating in these meetings, the making of friendships, the sharing of experiences, and the exchange of ideas.

4-H on the Go

The enthusiasm generated in 4-H during the World War II years carried over into the postwar years. Enrollment in the state for the first time passed 100,000 and came to rest at 105,585 in 1947. Some 72 percent of the members completed projects; a total of 141,046 projects were completed.

As 4-H spread from farm to city, many projects, such as dog care, were instituted and proved especially popular with younger members.

The clothing project was the most popular, with 21,491 enrolled in it. Following clothing, enrollments in specific projects were 18,909 in health, 17,230 in food preparation, 14,899 in home gardens, 14,633 in food preservation and frozen foods, and 7,494 in room improvement.

Of the agricultural projects, corn was the leader with 6,812 members enrolled, while 6,445 were enrolled in poultry projects. The establishment of the Sears, Roebuck 4-H Poultry Chain in 1945 had contributed much to the growth of the poultry projects.

Projects were still oriented toward the farm and home. And a major purpose of the program was to train future farmers and rural homemakers. "For a prosperous agriculture to continue," read the 1948 extension annual report, "it is necessary to develop new leaders—leaders who love the farm and realize the pleasant life that can be enjoyed there. To be certain of these future leaders, the Extension Service, through the 4-H Club program, endeavors to train today's youth in the business of farming as well as cultivating their minds toward economic, physical, social and spiritual development."

This annual report then spelled out how these developmental areas related to the 4-H program:

> The physical development of these farm boys and girls was stressed through the teaching of proper food, health, clothing, and recreational habits. Health in 4-H Club work is recognized as a definite part of every member's club project.
>
> A health improvement program was promoted for all members, stressing the importance of better health, food, clothing, and recreational habits, medical examination . . .
>
> In developing the social phase of the 4-H program, club members were taught the proper ideals and attitudes for wholesome relationships in the homes, neighborhoods and communities through family living, club meetings, achievements days, and 4-H Camps. . . . Four-H Achievement Days, attended by 55,694 members and leaders, state and regional meetings, National Club Congress, and the National 4-H Club Camp served to further broaden the horizons of 4-H members and leaders.
>
> The major emphasis for the spiritual growth and development of 4-H members was through the daily vesper program at the 4-H camp and the State-wide observance of 4-H Church Sunday. During 1948, a total of 1,031 Church Sunday programs were presented in the state with 18,606 members participating.

This training program could serve all young people in the state, although at this time there was no perceptible effort to broaden the program from its base. There were, however, new projects and activities that would help when such a movement was ready to be started.

Relatively new were projects in agricultural engineering and electricity, initially designed to accommodate the state's mechanization and electrification of its farms and homes. Included in the new projects, however, were safety aspects that would form the base for important safety activities later on. The first State 4-H Electric Congress was held in Raleigh in 1947.

The International Farm Youth Exchange (IFYE) program came in 1948. William Shackleford of Wayne County spent the summer in England—one of 22 Americans who began the program. The first foreign youth to visit farm families in North Carolina came from France.

A base was being laid for dramatic expansion.

To Community Clubs

4-H began in the school system, L. R. Harrill believed, "because in those early days a good number of all local leaders were associated

with the schools."[9] A number of reasons have been given and some speculations have been offered as to why 4-H work moved out of the schools.

As additional activites were added to the school program, teachers were under some pressure to give up "outside" activities such as leading a 4-H program. "Increasing competition for school time and facilities was the major reason cited for making the change," declared the 1960 annual report.

As summertime 4-H activities increased during the 1950s, there was need of community organizations outside the school to direct these activities.

There were many who believed that a community-based organization would be more viable—that the direct involvement of parents and other leaders would strengthen the program.

And there are others who have wondered if the coming integration in the public schools might have caused the club folks to move out of the schools. James Clark, who has extensively studied the 75 years of 4-H history in the state, could not find any single reason for the movement from schools to communities.[10] He concluded that if the move was actually designed to side-step the integration of 4-H clubs by removing them from the schools where mixture of the state's races was imminent, this purpose has not yet become clear, although the one place where club work is still sparsely integrated is in the local clubs, which basically follow neighborhood lines.

By 1960 community clubs were being formed. By the end of 1962 there were 1,450 organized community clubs; a year later the number was up to 2,300.

Reorganization covered more than just the location of the meeting places. The new arrangement called for sponsoring committees for the clubs, a volunteer leader who would regularly meet with the members and generally direct the activities of the club, and subject-matter leaders who would provide instruction in the various areas. County extension personnel, rather than meeting with and providing instruction to the members in their regular meetings, would recruit the leaders and work with them rather than directly with the members.

In 1962 the 4-H state staff could report for the 1,450 community clubs, 871 sponsoring committees with 5,510 members, 3,662 trained community 4-H club leaders, and 2,634 subject-matter leaders. A year later a total of 18,460 trained adults had assumed 4-H responsibilities.

Extensive changes in the 4-H literature were called for. Litera-

ture for the members was developed on three levels, and instructional manuals and guides were prepared for the leaders. From a high of 166,000 in 1960, membership dropped to 45,000 in 1963—the first full year under the new scheme. Gradually membership recovered.

In addition, a new form of 4-H organizational arrangement appeared—special interest groups. Under this arrangement, youngsters interested in one specific activity would enroll in 4-H for the short term during which the activity would be carried out. By 1967, in addition to 54,000 holding regular club memberships, some 24,000 were involved in the special interest activities.

But the break with the schools was not a complete divorce. In 1969 some 3,000 Mecklenburg County youngsters enrolled in a pilot automotive safety program sponsored by local public school officials and civic and business leaders in cooperation with the Agricultural Extension Service. And from 1968 to 1974 a series of television programs developed under the auspices of 4-H but aimed at fourth, fifth, and sixth graders was offered in the state. Viewing groups were organized in the schools, and the youngsters viewed the programs either at school or at home later in the afternoon.

4-H became an effective means of introducing rural aspects to nonfarm youngsters and gave them an appreciation of the world and its natural resources.

4-H Goes to Town

Although the youth component of extension work was for many years specifically labeled as being for farm youth, it is highly unlikely that any youth were denied admission to the various clubs because they did not live on a farm. It is assumed that anyone in a position to grow the acre of corn, tend the tenth acre of tomatoes, or to handle the poultry flock would have been accepted in the early corn, tomato, and poultry clubs.

As industrialization proceeded in North Carolina, many residents chose to continue living in the country (and often on a farm) and commute to a job in town. Thus, by the end of World War II a large number of Tar Heel youngsters were members of rural nonfarm households attending rural schools where club work was available.

A statistical report for 1948 indicated that 16.5 percent or 19,074 club members were from nonfarm homes. By 1953, in a more precise breakout, 19.4 percent of the members were from rural nonfarm homes and 8.3 percent were from urban areas with populations of 25,000 or more.[11]

By the mid-1960s fully one-half of the club membership was from nonfarm homes. In 1983, 19 percent of the membership came from farm homes, 57 percent from towns under 10,000 and the open country, and 24 percent from towns and cities of 10,000 population or larger.

The involvement of nonfarm youth in club work came despite a clear identification of club work as a farm youth activity. In the 1954 annual report, a club member singled out for recognition was called "... typical of the 146,803 farm boys and girls who conducted 237,366 projects in 1954 in their 2,356 clubs located in every county." The writer, conditioned to think of 4-H as only for farm kids, was undoubtedly unaware that more than 40,000 of these youngsters did not live on a farm.

A contributor to the 1956 annual report expanded the horizons a bit when he said the program was "... organized to train rural youth ..." However, in the same article the primary purpose of the program was listed as teaching better farm and home practices in agriculture and homemaking.

The 1957 study of extension did not speak directly to the location of 4-H club members, but described in general terms the services provided to nonfarm people.[12]

> The Committee recognizes that the demand for Extension Service assistance by suburbia is real. It, in fact, is stimulated to some extent by the Extension Service's use of the press, radio, and television. It must be met in some reasonable measure. As we see it, however, the Extension Service should hold firmly to its base or course as an agricultural educational service, maintaining that service at an adequate level, serving suburbia to the extent that it can be served incidentally, but by no means moving aggressively into urban and suburban fields.

In developing its long-range, five-year plans, extension's desire and obligation to recruit nonfarm youngsters increased as time went by. In 1961, when the first such plan was developed, the framers of the plan cited the numbers of youth from 10 to 19 years of age in the various residential divisions and declared all of them eligible for 4-H membership. But the committee preparing the report hedged when the clientele to be cultivated was identified: "Every future citizen within the age group (with major emphasis on rural youth) and prospective leaders."[13]

It was at about this time that a slogan was removed from the bottom of the official 4-H Department letterhead that proclaimed: "4-H Club work trains farm youth in the art of living."

In 1966, when a second five-year plan was developed, the membership potential had reached one million but membership had dropped to 50 thousand, and the percentage of North Carolinians living on farms had dropped to 20 percent of the population. The

The camping program remained popular, with new camps added. The Betsy-Jeff Penn camp near Reidsville was the first "all-weather" camp with heated facilities.

five-year plan outlined specific steps to aggressively recruit nonfarm youngsters.[14]

This report pointed out that many of the youth to be recruited could not conduct "farm" projects but stated that "these nonfarm boys and girls will benefit from the training in self-discipline and other learning experiences afforded through the 4-H project."

Efforts were already under way to develop projects suitable for, or of special interest to, the nonfarm youngsters. By 1970 projects added included communications, photography, small engines, automotive work, model airplanes, bicycles, dogs, water safety, archery, woodworking, energy conservation, home grounds beautification, tourism, citizenship, crafts, music, and art.

The development of nonfarm projects and activities provided a good starting point when concern for the disadvantaged came to the fore.

Operation Expansion

Operation Expansion began in January, 1966, when counties were selected to participate in a pilot program designed to recruit additional members, particularly those from low-income areas. In October, 1966, 12 additional counties were added to the program.

Twenty-two program aides were added with the special federal funds that made the program possible. They secured sponsoring committee members, assisted with and organized community clubs and special interest groups, taught special interest groups, recruited new members and leaders, and supervised certain activities, according to the 1967 annual report.

Promotional activities included expanded use of the news media and personal appearances at schools and before public officials and other leaders.

Deliberate efforts were made to involve nontraditional audiences. At the end of 1967 special interest groups and community clubs were established in low-income and urban housing projects. Two counties conducted special summer programs for these youth, and mentally retarded youth participated in a week of camp and in special interest groups in crafts and recreation.

When an expanded extension program was placed on the A & T State University campus at Greensboro the focus of the effort to reach the disadvantaged was shifted to that program, where it became one of the four primary thrusts of the extension program there.

Traditionally, 4-H enrollment has been highest in the southern states, particularly during the period when 4-H was conducted in the schools. The charge was often made that the southern enrollment figures were inflated, however. It was pointed out that the 4-H club met while school was in session and attending the 4-H meeting was an option to staying in class. Also, there were alleged instances in which all class members of the teacher leading the 4-H program were counted in the 4-H enrollment.[15] Regardless of the validity of the figures, North Carolina surpassed Georgia as the leading 4-H enrollment state in 1950, when the Tar Heel enrollment reached 129,576.

Where land was available, youngsters enjoyed growing things. Gardens, the first youth activity, remained popular after 70 years.

Enrollment increased annually until a peak of 166,427 members was reached in 1959—as the era of school-associated 4-H clubs was coming to a close. During the transition from the schools to the communities, club membership dropped below 50,000, and the comeback for club enrollment was slow. But other activities helped reach Tar Heel youngsters. Among them were the special interest groups.

In the April, 1967, *Extension News*, 4-H Leader T. C. Blalock said that the large increase in the number of youth that the 4-H program worked with but who were not enrolled in 4-H was due largely to the emphasis that had been placed on organizing special interest groups in the counties. Rather than organizing general clubs, the approach being taken was to appeal to boys and girls on the basis of interest areas.

In 1965 the counties reported a total of 10,669 youth reached through the special interest clubs; in 1966 the number was 23,776.

By the mid-1970s the special interest groups had overtaken the traditional clubs in enrollment—57,196 compared with 38,393 in 1974. This trend continued; enrollment figures for 1983 showed

66,501 in special interest groups and 36,358 in community clubs—a 2-to-1 ratio.

More than any other activity, 4-H television programs boosted enrollment from 1969 through 1974. In special instructional programs prepared for use in 4-H and broadcast over the state's educational and commercial channels, enrollment reached more than one-half million for the six-year period. In three of the six years the TV club enrollment was more than 100,000.

There was some duplication, however. In 1974 when enrollment through the three channels totaled some 200,000 the number of individuals reached was tabulated at 178,563.

The constant search for additional voluntary leaders was a difficult job, but by 1983 the number of such leaders—senior teens and adults—had passed the 20,000 mark.

4-H continued to be most popular with the girls. Through the years about 55 percent of the members across all programs were girls.

4-H has been especially popular with blacks. In recent years black youngsters made up some 36 to 38 percent of the 4-H enrollment. Of all the efforts to recruit blacks and other minorities to the programs of the School of Agriculture and Life Sciences, the most success has come in 4-H.

NOTES TO CHAPTER 17

1. For more detailed accounts of home economics and 4-H activity, see the N.C. Agricultural Extension Service annual reports through 1949 and the extension section of the School of Agriculture and Life Sciences annual reports from 1950 through 1983. For accounts of county home economics activity, see Janice R. Christensen and A. Maynard Deekens (editors), *And That's the Way It Was 1920-1980.* North Carolina Extension Homemakers Association, Inc., 208 pp.
2. Extension Service Advisory Committee. *A Report on the Programs Organization, Management of the Agricultural Extension Service,* N.C. Agricultural Extension Service, 1957, 142 pp.
3. *Forward Together.* Annual report, School of Agriculture, 1951-54. p. 24.
4. Chancellor's Committee on Role Projection and the Response by the Extension Service. *Change, Technology and Accountability: A Blueprint for the Future of the North Carolina Agricultural Extension Service.* N.C. Agricultural Extension Service, 1980, 104 pp.
5. *Annual Report,* School of Agriculture, 1957, p. 26.
6. *Extension Home Economics in North Carolina.* Home Economics Task Force Report, 1982, 22 pp.
7. See 1944, 1945, and 1946 N.C. Agricultural Experiment Station annual reports.

8. Johnson, Mary Elizabeth (Editor). *Times Down Home: 75 Years with Progressive Farmer.* Birmingham, Ala.: Oxmoor House, 1978, p. 73.
9. Harrill, L. R. *Memories of 4-H.* The North Carolina 4-H Development Fund, N.C. State University, 1967, p. 77.
10. Clark, James W., Jr. *Clover All Over; North Carolina 4-H in Action.* N.C. State University, 1984, pp. 254-265.
11. *Long-Term 4-H Trends 1948-1975.* Extension Service, U.S. Department of Agriculture, 4-H-82 (12-77), Volume I, 76 pp.
12. Extension Service Advisory Committee. *A Report on the Programs, Organization, Management of the Agricultural Extension Service.* N.C. Agricultural Extension Service, 1957, p. 33
13. *1.6 in '66, A Working Document,* N.C. Agricultural Extension Service, 1963, pp. 108-110.
14. *Target 2, A Working Document,* N.C. Agricultural Extension Service, 1966, pp. 209-225.
15. Clark, *op. cit.* For a statistical profile of 4-H enrollment over the years, see the tables located throughout the book.

18

Education for Whites And Blacks

Assistance to Negroes. Specialist help. The segregated South. How much progress? The organization changes. The suit. Campus integration. Expansion at A & T.

"FROM THE VERY BEGINNING NEGRO FARMERS were just as much interested in improving their farming operations as white farmers," I. O. Schaub wrote in 1953.[1]

As an administrator from 1925 to 1950, Schaub was responsible for and the witness to the development of a large and effective (but separate and unequal) extension program for blacks.

Assistance to Negroes

Schaub credited Seaman A. Knapp with recognizing "the need and opportunity to give special assistance to Negroes." In 1906 Knapp arranged with Tuskegee Institute in Alabama and Hampton Institute in Virginia to initiate work with black agents serving black farmers.[2]

The first black county agent in North Carolina was Neil Alexander Bailey. A native of Chatham County, Bailey had graduated from A & T State College with a B.S. Degree at the age of 50. He was hired November 1, 1910, and worked until December 31, 1915, in Guilford, Randolph, and Rockingham counties. Bailey had modest success. In his last year his 40 corn demonstrators averaged 38 bushels per acre—better than twice the county average.

By 1913 the number of black county agents had increased to five, and 10 years later the number had increased to 18.

The first black home agents were appointed in 1917-18. Using special war emergency funds, assistants were appointed for two months during the summer in 19 counties and two cities. Their main assignment was to show black housewives how to produce a garden and then to dry or can a portion of what they produced.

Home demonstration club work for blacks started in 1922 when six full-time black home economics agents were appointed.

J. D. Wray was appointed as a special worker for Negro boys' clubs in 1915 under the supervision of Boys' Agricultural Clubs Leader T. E. Browne. Wray was located at the Agricultural and Technical College, in Greensboro. In 1916-17, L. E. Hall was appointed as the first Negro district agent and located at Chadbourn. In 1922 he was transferred to Raleigh, and his office was located in the Arcade Building in downtown Raleigh. Miss Dazelle Foster (Lowe) was named the first supervisor of the Negro home agents in 1924-25 and was also located in Raleigh.

Hall remained in the supervisory post until 1929, when he was succeeded by John W. Mitchell, an agent in Columbus and Pasquotank counties. At that time the Negro supervisors were moved to the A & T College campus in Greensboro.

C. R. Hudson was placed in charge of Negro farm agents' work in 1922. A reason for Hudson's selection for this post has not been discovered, but there is considerable evidence that he carried out this assignment with success until his death in 1940.[3] Hudson was succeeded by John W. Mitchell, whose title was Negro state agent.

Mitchell held this position only three years, moving to the U.S. Department of Agriculture in Washington as a field agent for the federal extension office. He was succeeded as state agent by R. E. Jones, who had served as Negro 4-H club specialist since 1936. J. W. Jeffries, a district supervisor since 1940, was given a dual assignment as assistant Negro state agent and livestock specialist. He was succeeded as district agent by Otis Buffaloe. Jones was named assistant director of the Agricultural Extension Service in 1965, and on his retirement was succeeded by Daniel W. Godfrey.

The black county staff continued to increase. By 1943 there were 35 black farm agents and 25 home agents. In 1956 there was a total of 132 black county agricultural agents, county home economics agents, and their assistants in 51 counties. When the extension civil rights suit (discussed later in this chapter) went to trial in 1981, the exten-

sion service employed a total of 1,554 full- and part-time people. Of that total, 333, or 21.4 percent, were black.

Specialist Help

B. W. Kilgore, the first extension director, stated that the white specialists were available to help the black county agents. However, I. O. Schaub said that although white specialists would attend conferences and meetings with blacks, from the standpoint of getting out and aiding the Negro agent with his problems, such a system was not entirely satisfactory.[4]

R. E. Jones recalled an incident when he was an agent in Craven County (from 1933 to 1936) that indicated a very good response from the specialist staff in Raleigh:

> I was working with a farmer on truck crops. We got him to do a program on increased production of Irish potatoes. I ran into a problem on the amount of water and it really wasn't going off the way it should. So the farmer called me down there and I went out and looked at it. I told him, "I'll call the specialist at North Carolina State and see if I can get him down here." So I picked up the telephone and called the Horticulture Department. I don't remember the name right now of who was there but anyway the next day he came down and we rode out to the eastern end of Craven County. We walked over this farm and decided what we would do and the guy had a beautiful crop.[5]

Attendance was good when Negro 4-H'ers held their first statewide dairy show in Greensboro in September 1945.

Schaub also pointed out that during those earlier days there were few adequately trained blacks available for specialist work. A contributing factor was the necessity for a black to go to a school outside the South to obtain graduate training.

W. L. Kennedy, head of the Dairy Department at A & T State College, grew up in Oklahoma, obtained his undergraduate training at the University of Illinois, and received his doctorate from Pennsylvania State University. He was the second black to receive a doctorate in agriculture at Penn State, and at the time (1937) he was one of fewer than five blacks awarded doctorates in the field of agriculture in the United States.[6]

Even in the 1980s the number of blacks adequately trained to fill research and specialist positions in agriculture was limited. For the academic years 1975-76, 1976-77, and 1977-78, blacks represented only 1.4 to 2.4 percent of the total recipients of master's degrees and from 1.2 to 2.1 percent of the doctorates in agriculture. A total of only 43 blacks received doctorates in agriculture in the United States during these three years; none was awarded in North Carolina.

Wilhelmina Laws was appointed home economics specialist in 1935 to work with the black home economics agents. She was located at A & T. Robert L. Wynn was hired in 1945 as the first full-time black agricultural extension specialist in North Carolina and, it is believed, as the first in the United States. As dairy farming advanced in the early 1940s, it was perceived that dairy cows on black farms could significantly contribute to both farm income and family health. Many families added a family milk cow, a large number with two or more cows produced manufacturing milk, and in about 1947 the first Grade A dairy farm run by a black farmer was established. Ten years later (1955) Wynn had been joined by black specialists in agronomy, horticulture, poultry, foods and nutrition, and clothing.

The Segregated South

There was never an exclusive arrangement of black working with black and white working with white—at either the specialist-agent or agent-clientele level. From the beginning, white agents were expected to work with blacks in those counties without black agents, and black agents reported that their help was solicited by some whites.

When the first black farm and home demonstration agents were appointed, there were some references in the annual report to indicate that the blacks were under the supervision of the white agents. Apparently these working relationships were accepted if social situations that would put members of the two races together were avoided and if the white person filled the superior role in a relationship. There is some evidence that C. R. Hudson, as supervisor of the Negro work, was threatened by persons who objected to his sharing a platform with blacks at meetings.

One of the charges that would later be made by civil rights advocates was that black clientele had been denied equal services. Equal training and services were hard to deliver. W. L. Kennedy recalled that when artificial insemination for dairy cattle came along, black agents and technicians were prohibited by state law from attending the short courses held regularly at North Carolina State College. They had to go outside the South to obtain the necessary technical training to carry out this practice.

For a number of years both Farm and Home Week and a state 4-H short course were annually held for blacks on the A & T State College campus.

When the first statewide dairy conference was held in Raleigh in 1951, invitations were sent to all Grade A dairy farmers. Some time later it was discovered that the invitations had also gone to the 40 or so black Grade A dairy farmers. The invitations had clearly stated that the registration fee covered the cost of a luncheon.

Dairy specialist R. L. Wynn and black dairy farmers often attended meetings at various places where they were the only blacks in attendance. Previously they had followed custom and disappeared when there was a sit-down luncheon or dinner. They would find their own food and reappear after lunch if the program was being continued. On this occasion there was no convenient place for the black guests at the college to find their lunch and return in time to hear the luncheon speaker, who was a special feature of the conference program.

The luncheon was to be held in the college cafeteria. The cafeteria manager was not available, so D. W. Colvard, head of the Department of Animal Industry at the time, spoke with the assistant cafeteria manager about having the black guests served along with the others. Colvard recalled that the assistant manager said that he could not have the white waitresses serving the black men. Colvard suggested

that he have some of the black men working in the kitchen serve them.

Although the assistant cafeteria manager never agreed to admit them, the conference arrangers made no effort to keep them out. When the door was opened and the guests entered, the blacks chose to sit together at one table. There was no incident and little attention was paid to this violation of established custom.

Extension directors I. O. Schaub, D. S. Weaver, R. W. Shoffner, and George Hyatt each had to face the problems of a segregated society; and each expended considerable effort to develop a viable extension program for blacks while state segregation laws were in effect and later to work toward integration of the extension service.

R. E. Jones declared in 1952:

> The Extension administration in Raleigh has been forthright in understanding the importance of, and giving support to, the Negro Extension program. As a result, comparisons show that in many respects Negro Extension work in North Carolina is far ahead of that in other Southern states.[7]

Jones pointed out that North Carolina ranked first among the states in the number of black county employees and specialists, had the largest state extension staff of any state, was one of the first states to employ full-time black clerical employees, and was the only state where an office building had been constructed with state funds for use by black administrators and specialists. D. S. Coltrane Hall housed the black extension workers on the A & T State College campus. (At the time the building was constructed, Coltrane had served as assistant commissioner of agriculture and director of the state budget. Later he served as chairman of the Good Neighbor Council, which attempted to ease tensions between blacks and whites in North Carolina.)

Through the 1930s and 1940s, the annual statewide extension conference on the North Carolina State College campus was integrated, but the black agents roomed and ate at one of the black colleges or at other facilities available to them in Raleigh. Through the 1950s, however, separate state or district conferences for the two races were held.

At the 1962 statewide extension conference held in Asheville, arrangements were made to house and feed the black workers at the George Vanderbilt Hotel while the white workers resided at the Battery Park Hotel. The meetings were held in the nearby Municipal Auditorium.

Pride and talent were demonstrated by the winners in the state dress review for black youngsters.

Asheville was especially selected for this integrated meeting because it was felt the meeting would receive less attention and there would be less possibility of problems in the western end of the state. The meeting was conducted without incident, although several white agents refused to attend the integrated meeting and there was criticism in some places.

As meetings were integrated, one problem to be confronted was transporting the agents to the meetings. It was pointed out at the time that it was quite acceptable for a farmer to transport a black worker, in his work clothes, in the farmer's automobile around the farm or even into town. But the residents of the same community would not accept agents of the different races riding together to the same professional meeting in the same vehicle. For several years district agents were given the responsibility of devising transportation plans that would overcome the problem of racial mixing.

Through the years the personal biases of the white administrators surely affected their attitudes toward service to members of the Negro race. W. E. Colwell recalled Dean Schaub's influence in integrating one meeting.

> I hit North Carolina as an assistant professor of agronomy in the fall of 1942 working on peanuts and was really quite naive as to the South and I didn't pretend to be otherwise. The first conference I ever had in Dean Schaub's office I was a very minor participant but I listened and didn't talk. The subject was whether or not for the forth-

coming peanut field day at Rocky Mount we could have only one field day for the blacks and the whites instead of having two like they had had for years and years and years. . . .

Finally, Dean Schaub made the decision. He thought the time had come that at Rocky Mount on whatever day it was scheduled we would have only one field day and both blacks and whites at the peanut field day. The event took place with no problems whatsoever with a beautiful experiment and it worked. Isn't that something in the fall of '42![8]

Schaub apparently followed the philosophy he espoused in the introduction of an extension publication in 1945.

> Citizens of North Carolina, white and Negro, do not hesitate to point with pride to the progress being made by that great number of progressive Negro families who till the soil of their native state. The first Negro farm agent was appointed in 1910 and since that time there has been a steady advance in the number of farm and home agents until today there are 82 at work in those counties with the larger Negro populations. Not only are there Negro farm and home agents at work but every white agent and each Extension specialist considers it an everyday, normal part of his duty to work with the rural people of both races.[9]

William Reed, dean of the School of Agriculture at A & T State College from 1949 to 1961, said the good relationship between the two land-grant schools was one of the factors that helped him decide to come to North Carolina.

> I remember very fondly the warm reception and support I received from Dean Hilton, Dr. Cummings, and Dean Schaub. Dean Schaub was a real inspiration to the Negro extension workers in developing a strong and effective program. He was an exceptionally fine director at the time that there was a lot of concern about the development of the Negro extension program and its reorganization in the South. Without a doubt, North Carolina had the best extension program in the South and the relationships between A & T and North Carolina State, I believe, were the best to be found anywhere.[10]

The first research grant A & T State College personnel received from the U.S. Department of Agriculture was to study the chemistry of bitterweed as it affected off-flavors in milk when consumed by the dairy cow. This grant came with the endorsement and urging by members of the Department of Animal Industry at North Carolina State College. Also, when Dean Reed was selected to visit the Soviet Union in 1955 as a member of an exchange delegation worked out by the two governments, the Agricultural Foundation provided travel funds.

Segregated eating and lodging facilities presented a special problem to black district supervisors and specialists who covered a large territory. Following the death of R. L. Wynn in 1982, Editor Tom Byrd remembered how a problem was handled after segregation had begun to break down:

> Bob Wynn's death reminded me of how segregated North Carolina was in the not-so-distant past. Soon after I joined Extension, Bob invited me to take a trip with him. He wanted to show me some black farmers who, with Extension's help, had started producing manufacturing milk.
>
> Since I was always looking for good feature stories, I eagerly accepted Bob's invitation. And a few days later, I set out on my first biracial trip. Our morning stops were in Union County. Our afternoon schedule called for us to be in Iredell.
>
> As we were travelling between the two counties, Bob turned to me and said, "Tom, I guess you're wondering how we'll handle lunch." I admitted the thought had crossed my mind. "Find a place you want to eat," he said. "Stop and eat, and I'll wait in the car. I'll try to find a place where I can get something later on."
>
> I drove on for several miles without responding, thinking all the time about the dumb situation we were in. Then I recalled a recent news story out of Charlotte. The downtown variety stores there had reluctantly agreed to desegregate their lunch counters after a long and bitter sit-in by blacks.
>
> To make a long story short, Bob and I ate at Woolworth's. The waitress was as nice as she could be. (Y'all come back and all that stuff.) Several passersby gave us "ku-klux" eyes, probably thinking we had just arrived from New York to ferment more trouble.
>
> Blacks who broke the color barrier at Woolworth's had hailed it as a great moral victory. Did it also occur to them, I wondered after lunch, that they had solved a very practical problem for whites and blacks who needed to work together?[11]

How Much Progress?

What was then called Negro Extension work grew slowly at first. The greatest success was probably with the youth work, which had started in 1915 with the appointment of J. D. Wray. Within a few years a sizable number of black youngsters were participating in the corn and poultry clubs.

Twenty years later, in 1938, there were 397 organized Negro 4-H clubs with a membership of 12,791. By 1944 the number had jumped to 536 clubs and a membership of 28,861—about one-third the total

4-H enrollment in the state. These black club members came from 20,187 families and reported 38,684 completed projects.

There were 2,017 enrolled in corn projects, 505 in peanuts, and 2,816 in pig projects. These boys and girls raised 197,442 chickens and turkeys in their poultry projects, and the 4-H girls canned 207,004 quarts of fruits and vegetables. The club members bought and sold $89,341 worth of war stamps and bonds and collected 500,264 pounds of scrap iron, 26,956 pounds of rubber, and 2,030 pounds of grease.

In 1982, of the approximately 100,000 4-H club members in the state, 37 percent were black. That same year, 46 percent of the 4-H camp participants and 28 percent of the volunteer leaders were black.

In 1944 there were 487 Negro home demonstration clubs with a membership of 12,952 persons in 39 counties. Club meeting demonstrations were given by 1,817 home demonstration project leaders that year.

In 1944 there were 7,017 trained black neighborhood leaders who voluntarily gave their time and ability to developing better agriculture in their locality, and to carrying information to families that the farm and home agents were unable to reach.

The black farmers were harder to reach with extension's message than were either their wives or their children. The tenure system was largely responsible. Of 76,850 black farmers in the state in 1930, only 19,711 were classified as owners. Some 34,805 were sharecroppers and 22,334 were classed as other Negro tenants. Tenants and sharecroppers did not make many important farm decisions. The 1938 extension annual report did claim, however, that about half of the 38,000 black farmers in the counties where there were black agents were influenced by the extension program that year.

And the black farm audience was growing smaller. From 76,850 black farmers in the state in 1930, the number dropped to 60,239 in 1940. World War II and its attendant activities sped the exodus from the farm.

The Organization Changes

A 1956-57 study by an Agricultural Extension Service advisory committee found:

> . . . the White County Agricultural Agent is responsible only for the agricultural extension program among the white population and has administrative responsibility only for his assistants in that work. The

> same is true of the White County Home Economics Agent within her field. In counties where Negro work is organized the Negro County Agricultural Agents and Home Economics Agents are organized and operate independently of each other and of the White Agents. Thus there are two independent organization units in 100 counties, and four in 51 counties.[12]

The 51 counties referred to were the 51 in which black agents were located. In those counties there were 49 black county agricultural agents, 23 black assistant county agricultural agents, 51 black county home economics agents, and 9 black assistant county home economics agents, along with 45 black clerical assistants.

The committee recommended that in all counties the work with the white population be unified under the white agricultural agent and a similar arrangement made for blacks. The term "chairman" was the one selected for the one or two administrative posts in each county.

In 1965, shortly after the effective date of the federal Civil Rights Act of 1964, the white and Negro branches of the Agricultural Extension Service were merged into a single organization with its headquarters in Raleigh. The six white and three Negro geographic districts were eliminated and six new geographic districts were created, with the white men retaining the top district administrative posts. The position of Negro state agent at A & T State College was eliminated; R. E. Jones became an assistant director but continued to maintain his office at A & T in Greensboro.

In the counties, the black agents were placed under the supervision of the white county extension chairman, and an effort was made to house all county employees together. Each agent, black and white, was given specific subject matter assignments and instructed to work with all clients, regardless of race or color.

The white male administrative arrangement at county and district levels was soon challenged. After several attempts by the extension administration to obtain acceptance of a black county extension chairman by county commissioners, Carl D. Hodges was appointed the first black chairman in Durham County on March 1, 1971. (The first female to be designated a county chairman was Mrs. Frances Voliva, in Tyrrell County in 1975.)

At the district level, John M. Spaulding was named the first black chairman in 1972. Mrs. Elizabeth U. Meldau was named the first female district chairman, named in 1975; and in 1977 Mrs. Josephine

A popular Johnston County event was the annual ham and egg show, under the leadership of county agent L. R. Johnson (right).

Patterson became the first black woman to serve as a district administrator.

The Civil Rights Act of 1964 demanded the integration not only of the extension organizations but also of the services they offered. The extension service moved with some dispatch to insure that all programs were available to all people but was not able to warrant that club activities, such as extension homemaker and 4-H club activities conducted by volunteer leaders, often in homes, would be integrated.

The effort was not enough for some. In 1965 a general complaint filed against the North Carolina Agricultural Extension Service by the North Carolina State Conference of NAACP Branches claimed racial discrimination by extension.

Nevertheless, in a 1972 report on Target 2, the 1967-1971 extension long-range plan, Director George Hyatt said it was with a great feeling of gratitude that the social changes brought about had not, except in a few isolated cases, become a major obstacle to moving towards the goals set in Target 2. The 1965 complaint set in motion numerous inspections throughout the five-year period by the Office

of the Inspector General to determine and measure progress in the areas where racial discrimination was claimed. "The inspection showed that the vestiges of two organizations, which had operated in a somewhat parallel fashion for many years, were being carefully blended into one," Hyatt wrote.[13]

Hyatt did admit that working conditions had become strained and there was inner conflict. Perhaps he had in mind the civil rights suit brought against the extension service by 55 black county agents and 19 others in 1971.

The Suit

The suit alleged racial discrimination in employment and in the services provided. Specifically, all agents claimed discrimination in salaries, a sizable number claimed they had been denied appointment to chairmanships because of race; and in a few instances discrimination in job assignments and working conditions were alleged. The suit also charged a failure to provide minorities with services equal to those provided to white persons and a failure to maintain nonracially segregated 4-H and extension homemaker clubs.

Listed as defendants were William C. Friday, president of the university; the university Board of Governors; the chancellor of North Carolina State University; North Carolina State University; the School of Agriculture; the director of the Extension Service; and Alamance, Edgecombe, and Mecklenburg counties.

Originally the U.S. Department of Agriculture was one of the defendants in the suit. Later it entered the suit as a plaintiff-intervenor, and USDA lawyers vigorously participated in the suit on behalf of the plaintiffs.

Ten years elapsed before the case finally went to trial in December, 1981. J. T. Dupree, Jr., United States District Judge, presided. On the delay,he wrote: "To some extent the inordinate delay between the filing date of the suit and trial is attributable to docket conditions in this court over the last ten years, but perhaps to a greater extent to the action (and sometimes inaction) of the parties in obtaining amendments to the pleadings, extensions of time and their intermittment assurances to the court that a settlement of all matters in controversy was probable." The trial lasted for approximately 10 weeks.

The action was instituted in the names of individual plaintiffs, but in addition to their individual complaints they alleged "across the board" discrimination and sought to have the action classified as a class action to cover all agents and all black clientele. The court denied all such motions.

In rendering his judgment on the class-wide claims, issued August 20, 1982, Judge Dupree concluded that the plaintiffs had not established their case:

> In summary the court has found that while there was ample evidence of disparate treatment of blacks by the Extension Service prior to the enactment of the Civil Rights Act of 1964, since that time this defendant has made conscientious and successful efforts to eradicate the effects of past discrimination; that it has at no time engaged in purposeful discrimination; and that plaintiffs have fallen far short of establishing by a preponderance of the evidence that defendant has engaged in a pattern and practice of discrimination. So long as its present policies are maintained and put into practice the Extension Service should be allowed to continue the great work in which it is engaged without interference from the courts.[14]

On September 17, 1982, Judge Dupree handed down his findings on the specific complaints of each individual plaintiff.[15] He concluded that each complaint was "wanting in merit sufficient to support a recovery in each instance." While several of the plaintiffs had retired during the 10 years since the suit was first filed, the majority of them were still employed with the extension service. They were "doing good work and (they) seem happy in their employment," Judge Dupree wrote.

He commended the Agricultural Extension Service on its efforts, writing that "the system is being administered by true professionals whose sole objective is the delivery of the highest quality of services to the people of North Carolina—an objective shared by the true professionals, including the plaintiffs in this action, who constitute the work force necessary to the accomplishment of Extension Service aims."*

Campus Integration

While the merits of this 1971 suit were being debated, the School of Agricultrue and Life Sciences was struggling, along with all other campuses and branches of the University of North Carolina, with the

*See note on page 486.

problem of integrating the student and professorial ranks.

In 1970 the federal government issued desegration guidelines to the university. After much discussion, the government in 1979 threatened to deny federal funds to the University of North Carolina System after rejecting the university's desegregation plan. That same year the university system filed suit to prevent the cutoff of funds. Administrative hearings on the issue began that year and continued for two years. In July, 1981, a consent decree set enrollment goals for fall 1986 of 10.6 percent black students at the university system's predominantly white schools and 15 percent white students at its predominantly black campuses.

Along with special scholarships and special programs, a variety of activities were carried out to entice black students to study agriculture. Under the leadership of Associate Director H. B. Craig, special attention was given to six counties northward from Raleigh, including visits to the homes of potential students. Undergraduate black enrollment in the School of Agriculture and Life Sciences increased from 65 (2.5 percent) in 1977 to 139 (5.3 percent) in 1982. This percentage compared with a 7.9 percent black enrollment for the entire NCSU campus in 1982.

At the graduate level, black enrollment in the school had risen from 11 (1.5 percent) in 1977 to 29 (4.1 percent) in 1982. Campus-wide enrollment was 5.0 percent black in 1982.

For the school's faculty, of a total of 427 positions during 1982-83, 9 were filled by blacks. The 1986 affirmative action goal for the school was 12 faculty positions filled by blacks.

In establishing affirmative action goals, the small number of blacks obtaining master's degrees and doctorates in the several agricultural sciences was recognized.

Expansion at A & T

As integration, rather than segregation, became the law of the land, an important question for university and school officials was how the two schools of agriculture in the state could best serve the North Carolina agricultural industry.

Beginning in 1970 a series of meetings was held, attended by the chancellor, the dean of agriculture, and other agricultural administrators from the schools of agriculture at North Carolina State and A & T State universities. The meetings alternated from campus to

Integration of the youth activities at state and county levels came relatively easy; integration of the local clubs was very difficult.

campus. In addition to determining policy matters, new developments on each campus were viewed. Adjunct professors were appointed from the A & T campus to the NCSU campus.

The most noticeable result of these intercampus activities was in the area of food science. In the absence of a food science program on the A & T campus, the Food Science Department at NCSU in 1974 initiated a joint program between the two schools. Under the arrangement, A & T students would spend from one to two years on the NCSU campus where they would enroll in some 26 hours of food science courses. Upon completion of the program, the student could graduate from either or both institutions. By the end of 1983, 9 students had participated in the program.[16]

An increase in the extension component housed on the A & T campus began in 1972, following the allocation by Congress of $8 million for research and $4 million for extension work at the 16 predominently black (1890) land-grant colleges and Tuskegee Institute. R. E. Jones, placed in charge of the expanded effort, said the money would be used "to expand the depth of Extension work in North Carolina."[17]

"We are trying to use our expertise and experience to develop an Extension dimension around the resources of A & T that will permit us to work more closely with people who have limited incomes and limited opportunities," Jones explained. He said particular emphasis would be placed on reaching urban residents.

NCSU Chancellor John T. Caldwell saw both campuses joined in one program with a common goal—to alleviate social and economic problems through education.[18] A & T Chancellor L. C. Dowdy also visualized the same goals being pursued, with activities at the two institutions not a duplication but an extension of the same program.[19]

The Food and Agricultural Act of 1977, however, somewhat redirected the extension program.

The 1972 legislation had brought increased funding but no changes in the administrative structure—the funds for the 1890 land-grant schools were still channeled through the state extension administrative offices at the 1862 institutions. Under the 1977 legislation, however, the annual extension appropriation was to be made directly to the 1890 institutions. This legislation seemed to create two separate administrative structures in the affected states, and was so interpreted by some USDA officials.[20]

While the legislation was being considered by Congress, U.S. Secretary of Agriculture Bob Bergland stated that the provisions for coordination of programs between the 1862 and 1890 institutions for each state were essential to ensure that the use of federal funds would result in a single program tailored to the needs of the people of the state rather than two separate programs with potential duplication or fragmentation of effort. He expected this to be done by "a reciprocal exchange of ideas between the institutions and by mutual agreement regarding the division of responsibilities and areas of active cooperation."[21]

Separate auditing, personnel, and editorial functions were established at A & T State University, but essentially both programs were directed by a joint administrative team. Using their prerogative under the provisions of the 1977 Act, the administrators at the A & T campus decided to focus on economically disadvantaged persons who had not been reached by traditional extension programs in four areas: (1) small and part-time farmers; (2) limited resource rural and urban families; (3) underprivileged rural and urban youth; and (4) community programs involving limited resource individuals and groups.

Under the 1972 act, research funds were channeled directly to the 1890 institutions. In an absence of any administrative obligations, Research Director K. R. Keller consulted frequently with the administrators of the research program at the A & T campus and urged NCSU researchers to work closely with their counterparts in the expanding A & T research program. Several joint projects were developed.

The ability of the two institutions to work together undoubtedly was based in part on a history of cooperation and mutual respect going back to 1910.

NOTES TO CHAPTER 18

1. Schaub, I. O. *Agricultural Extension Work: A Brief History*. N.C. Agricultural Extension Service, Circular No. 377, 1953, p. 31.
2. *Ibid.*
3. See extension annual narrative reports and Hudson personal papers in N.C. State University Archives.
4. Schaub, *op. cit.*
5. R. E. Jones interview, February 14, 1980.
6. W. L. Kennedy interview, November 12, 1980.
7. "Extension Helps Negro Farm Families Move Forward," *Extension Farm-News*, February 1952, pp. 4-5.
8. W. E. Colwell interview, October 29, 1979.
9. *The Negro Farm Family Moves Ahead*, N.C. Agricultural Extension Service, Circular No. 281, 1945, 16 pp.
10. William Reed interview, February 14, 1980.
11. *Extension News*, May 1982, p. 3.
12. Extension Service Advisory Committee. *A Report on the Programs, Organization, Management of the Agricultural Extension Service*, N.C. Agricultural Extension Service, 1957, pp. 56-58.
13. *Extension News*, April 1972, p. 1.
14. Opinion of August 20, 1982, Civil Suit No. 2879, Bazemore, et al., v Friday, et al., U.S. District Court for the Eastern District of North Carolina, Raleigh Division, 1982.
15. Opinion of September 17, 1982, *op. cit.*
16. "Food Science Develops Joint Program with A & T," 1974 School of Agriculture annual report, p. 14.
17. "Extension Developing New Dimension at A & T," *Extension News*, March 1972, pp. 1, 3.
18. Caldwell, John T. "Joined in One Program," *Extension News*, April 1973, p. 4.
19. Dowdy, L. C. "Fighting the Same Enemies," *Extension News*, April 1973, p. 5
20. *Evaluation of Economic and Social Consequences of Cooperative Extension Programs*, Science and Education Administration—Extension, U.S. Department of Agriculture, 1980, pp. 23-25.
21. Letter from Bob Bergland to Thomas S. Foley, U.S. House of Representatives, July 14, 1977.

*The decision was not acceptable to the plaintiffs and they appealed Judge Dupree's ruling to the 4th U.S. Circuit Court of Appeals. In 1984 the appeals court upheld Dupree's ruling. The lower courts said blacks could not sue to counter the effects of discriminatory differences in salaries that existed before the 1964 civil rights law was applied to public employers in 1972. The plaintiffs still did not give up. They carried their appeal to the U.S. Supreme Court. On July 1, 1986, the high court unanimously ruled that the extension service had discriminated against black employees.

Justice William J. Brennan Jr., in the opinion issued Tuesday, said the lower courts had been wrong:

"Each week's paycheck that delivers less to a black than to a similarly situated white is a wrong actionable under (the federal civil rights laws) regardless of the fact that this pattern was begun prior to the effective date of the law." Brennan wrote.

"That the extension service discriminated with respect to salaries prior to the time it was covered by (the law) does not excuse perpetuating that discrimination after the extension service became covered," he said. "To hold otherwise would have the effect of exempting from liability those employers who were historically the greatest offenders of the rights of blacks."

In a split 5-4 decision, the court said the continued existence of single-race clubs (4-H and extension homemaker) was not the result of any official policy and therefore not unlawful.

The court also accepted the plaintiffs' request to make the suit a class action, meaning that the decision would apply to all black employees who could demonstrate they were discriminated against. It appeared that cash awards to the plaintiffs would be decided in a lower-court trial, unless an out-of-court settlement could be reached. (Tom Mather, "High Court says N. C. extension service discriminated against black employees," *The News and Observer*, July 2, 1986, pp. 1, 8.)

IV

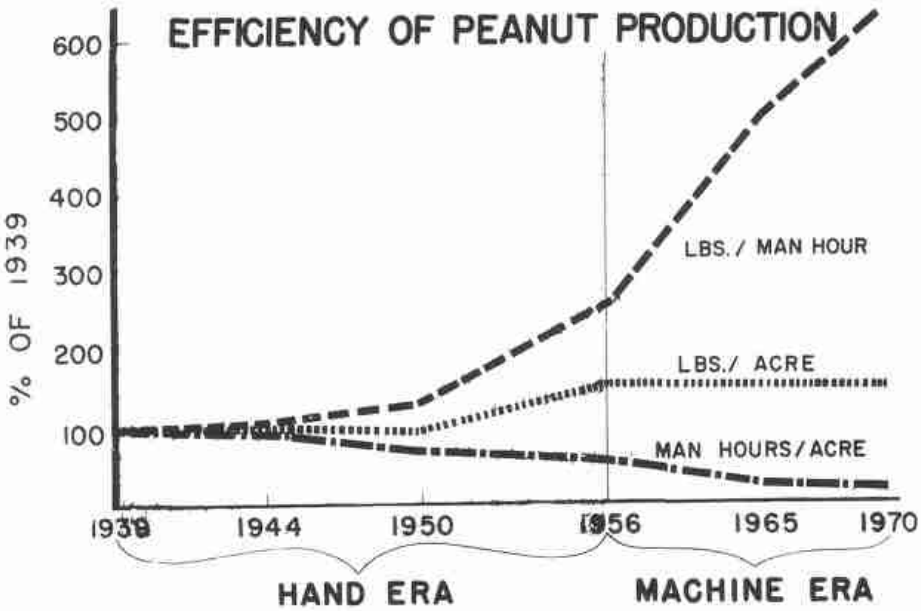
EPILOG

THE LEGISLATION OF 1877 that created the North Carolina Department of Agriculture and the beginning of the Agricultural Experiment Station gave a signal that more attention would be paid to the problems of agriculture. This attention was a necessary prerequisite for the creation of a college of "agriculture and mechanic arts" 10 years later.

During the first century of North Carolina's land-grant college farming moved from reliance on the muscle power of men and oxen to the muscle power of men, mules, and horses and then on to a combination of machine and mental power.

It is significant that the early employees of the experiment station, mostly chemists, were products of the German tradition in education and science rather than the English tradition that characterized the older state universities. Science was beginning to be put to work in service to farming.

Although the beginnings of research and educational programs brought about no immediate and dramatic changes, it would be hard to overestimate the importance of the turning point they represented. The relative weighting of the contribution of resources, people, and knowledge in the formula for production and progress was beginning to change. The foundation was laid to permit knowledge to liberate people from drudgery and resource limitations. There was at



least the prospect that the mind would become as important as or even more important than muscles.

Especially in the 40 years following World War II, the changes have been dramatic and far reaching. The prediction of the famous English economist Thomas Robert Malthus (1766-1834) that population growth would increase faster than food supply, resulting in mass starvation, has been negated by the application of science and technology as well as by birth control. Whatever hunger exists today results more from deficiencies in distribution than in production.

The pace of change seems unstoppable. Research and education continue to assure mankind of an adequate supply of food and fiber in the foreseeable future.

Some of the dramatic changes in agriculture and the role of the School of Agriculture and Life Sciences in the agricultural revolution during the 40 years following World War II are summarized in Chapter 19.

19

The Power of Knowledge

Reconstruction, wars, depression, and governmental programs, 1862-1940.
Revolution in agriculture and in the school, 1941-1984.
Eternal vigilance required. Knowledge is power.

AGRICULTURE DOES NOT OPERATE IN A VACUUM. It affects and is affected by what is happening in other parts of the economy. While the important state and federal legislative actions relating to agriculture were occurring during the latter half of the 19th century, the state was experiencing an exciting industrial revolution. The textile, tobacco, and furniture industries, all based on agriculture, were expanding rapidly. Railroad systems were improved and extended. The period from 1879 to 1900 was labeled the industrial revolution. These new employment opportunities encouraged the growth of towns and cities.

Unfortunately, agriculture did not share with the new industries in the prosperity of this period. Cotton farmers adjusted rather quickly and were able to maintain the volume of production without the use of slaves after the Civil War. But the system of tenancy and sharecropping they adopted was continuing to deplete the soil. Both the research and teaching programs started slowly. The citizenry was apathetic about college training for farmers and there was a lack of funds with which to pursue research. More time was required before any great impact of the new college and experiment station could be felt. But the forces which that movement unleashed have generated much of the agricultural progress since that day, as the efforts of the

land-grant colleges have extended the productive power of the land many fold.

For purposes of briefly viewing the 100-plus years during which educational institutions have been involved in agricultural change and progress, it is helpful to divide the time into two periods. The first covers roughly the period from the passage of the Morrill Act in 1862 to the beginning of World War II in 1940 and the second from 1941 to the present.

Reconstruction, Wars, Depression, and Governmental Programs, 1862-1940

During the last 40 years of the 19th century and the first 40 years of the 20th century, exploitation of land frontiers continued. By the end of the period the oxen era had passed and the mule era was nearing an end. The number of farms increased through most of the period. The number of farm people, though declining relatively, remained at a high level. Some technology in the form of tractors, other farm machinery, and new scientific developments was added, but the muscle of man and beast remained an important input in agricultural production. Scientific knowledge was accumulating but had not yet made a great impact in relieving dependence on new lands and the energies of man and mule power, certainly not in the Southeast.

In the early years of the 20th century the demonstration method of teaching farmers and their families was developed. This led to the Smith-Lever Act, passed in 1914 to create the Agricultural Extension Service for the purpose of disseminating new information throughout the state and nation. This action completed an organizational structure by means of which the land-grant colleges could create knowledge through research, teach scientific agriculture to students who, in turn, might become teachers and leaders, and disseminate knowledge to farmers and their families. However, funds to support the programs were limited, and demands were heavy to combat such problems as cotton boll weevil, Texas fever tick, tobacco diseases, and hog cholera. Periodic outbreaks of influenza and the problems associated with World War I placed extra demands upon the personnel during this period.

Although the importance of new knowledge increased with each passing year, there was increasing pressure on the land, especially that devoted to row crops, and farming still involved a great deal of human labor. Few farms were electrified, mules and horses were still

A 1953 State Fair exhibit by Guilford County Extension Homemakers portrayed housekeeping changes over the 100-year period.

the primary sources of energy. Cotton provided the largest source of income in North Carolina until about 1920 when it was surpassed by tobacco. A very high percentage of the cropland was planted to cotton and corn, the latter grown primarily to provide food for work animals and humans. Production of these row crops resulted in serious depletion and erosion of the soil. Livestock production was at a very low level during this era.

Production per person on the farms had increased sufficiently to release many workers for industrial employment, but the new knowledge had not yet provided much relief from the pressure on people and land in farm production. During this period it also became increasingly clear that farmers could not make use of the new technologies without more capital. Banks generally were reluctant to lend to farmers except when real estate was used as collateral. Neither the bankers nor the farmers knew very much about making loans for production on the basis of a schedule of income and expenses. A law to create credit unions was passed in 1915. Some new research stations were established, and the Smith-Hughes Act to provide for more teaching of scientific agriculture in the high schools was passed. The 4-H Club organization came into being to enlighten and inspire young people.

By the beginning of the 1930s the state was in a position of almost complete economic collapse. Cotton was bringing 5 cents per pound.

Farmers had trouble paying their taxes and other debts. Bank failures multiplied. The state and many of the counties were finding it very difficult to meet payrolls and pay basic operating expenses. Lacking the money to buy fertilizer and other supplies and equipment, farmers continued to extract a livelihood from the dwindling natural resources in the soil. Research, teaching, and extension personnel in the School of Agriculture were working diligently to assist farmers and their families, but they lacked the resources to come up with adequate solutions. They were able to help farmers improvise and alleviate at least some of the most critical problems. Home economics specialists helped by teaching farm women and their families to preserve food and make clothing.

In the midst of the severe economic depression, Franklin D. Roosevelt became president of the United States. Roosevelt's New Deal produced several programs designed to benefit farmers and conserve natural resources. The Agricultural Adjustment Administration provided incentives for farmers to limit production in the hope of stabilizing prices; the Soil Conservation Service was designed to prevent soil erosion and provide flood control; the Farm Security Administration was to provide credit; the Rural Electrification Administration was to encourage the extension of electrical lines into rural areas. These federal agencies turned to the land-grant colleges to help administer many of their programs. At North Carolina State College, the School of Agriculture and Forestry responded through the organization that was already in place. Research and extension workers made recommendations concerning cropping practices and in some instances actually administered the programs. Extension workers altered their programs to assist in setting up and operating these new federal activities.

At this time the number of farms in the state was at an all-time high of about 300,000, and the average farm size was near the all-time low of 65 acres. The mule population of the state reached an all-time high of 300,000 in 1939. North Carolina was one of the last states to eliminate its mule population. The burdens of production continued to be carried largely by land and the muscles of men and beasts. New machines and other technologies were more readily available, except for the intervention of World War II.

Following the outbreak of World War II the School of Agriculture once again put its forces to work to encourage and help farmers and their families produce their own food and supply the market as much as possible. "Food will win the war and write the peace"

became a slogan. Local groups organized "victory garden" clubs and were provided the most up-to-date recommendations on varieties of crops, fruits, and vegetables and on cultural practices. Many research efforts were planned to study substitutes for scarce commodities.

While the war was still under way, plans were being laid for what turned out to be the most dramatic and significant agricultural revolution in history. There had been relatively few changes or additions in the faculties of most departments in the School of Agriculture during the last half of the 1920s and the 1930s. Few of the department heads had doctoral degrees. Several professors, including the head of the agronomy department, were approaching retirement age.

Revolution in Agriculture and in the School, 1941-1984

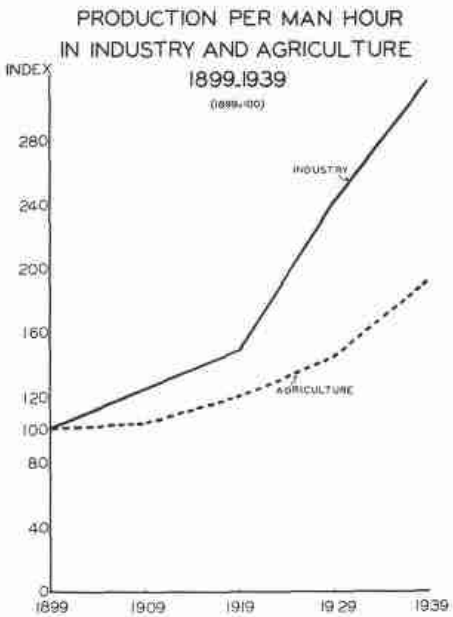
It was the vision of Dr. Frank Porter Graham, president of the consolidated university, perhaps more than that of any other individual, that set in motion the recruitment of new leadership, which in turn led to an upgrading of research and teaching and more effective coordination with extension programs. Fellowships were obtained to permit advanced study by some of the people already on the faculty. Others were recruited. The first extension specialists with doctoral degrees were employed. The School of Agriculture moved from the ranks of the undistinguished to become one of the leading institutions of its kind in the United States. Beginning about 1940 and extending into the 1980s, directors and department heads consistently insisted upon employing faculty with high levels of training and strong commitments to public service.

Farming in the 1980s little resembled that of 1940. The most pronounced revolution in the history of North Carolina agriculture coincided with the greatest resurgence in research, teaching, and extension in the School of Agriculture. The burden of farm production, formerly borne principally by land and people, shifted significantly toward reliance on knowledge.

These are some of the major changes that occurred during this period of more than 40 years:

The total amount of land in farms in North Carolina reached a peak of 20 million acres in the late 1930s and declined to 10.3 million acres in 1982, a 49.5 percent reduction. Cropland harvested declined by 44 percent, from 8.4 million to 4.7 million acres.

The farm population declined from 50 percent of the state's total in 1940 to about 5 percent in 1982. In the 10-year census period from



1970 to 1980 farm population dropped from 374,692 to 188,437, a 50 percent decline in that short period. Rural population, of which farm population is a part, actually gained in latter years and still accounted for about half the state's total.

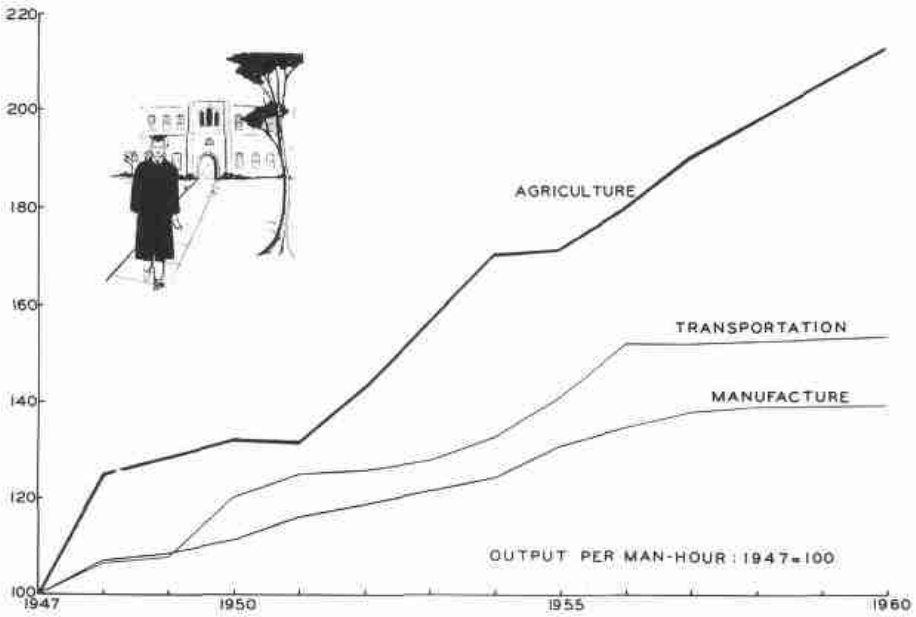
Political rhetoric about the demise of the family farm, however, can be misleading. In 1982 "eighty-eight percent of the state's farms were operated by individuals or families as sole proprietorships, up a bit from the 87 percent in 1978 and on a par with the national average. Ten percent were partnerships, unchanged from 1978 and equivalent to the U.S. percentage. . . . The corporate farm . . . remained slightly under 2 percent."[1] There were increases in large farms (not necessarily corporate) from 1978 to 1982—farms of 500 to 999 acres increased less than 1 percent from 2,667 to 2,690 and those of 2,000 acres or more increased 15 percent from 242 to 277. There was a decrease in farms of less than 50 acres from 33,404 in 1978 to 29,968 four years later.

In 1982, 54 percent of North Carolina farms had sales of less than $10,000 and accounted for less than 4 percent of gross sales. Only 12 percent of the farms had gross sales of $100,000 or more, but they accounted for 71 percent of the total.

In some livestock and poultry enterprises a few very large operations emerged. In 1982, 4 percent of the total farms reporting inventories of 1,000 or more hogs accounted for 65 percent of all inventories. Of the 30.8 million turkeys sold in 1982, 77 percent were produced in Duplin, Union, and Anson counties.[2]

Poultry enterprises, in contrast to corn, wheat, and soybeans, require very little land. Most poultry producers do not grow the feed their birds consume. In enterprises such as poultry and horticulture it is possible for a farmer to develop a large business on small acreage.

Acreage planted to corn for grain declined by 33 percent, from 2.4 million acres in 1940 to 1.83 million acres in 1982, yields increased by 418 percent from 19.5 to 101 bushels per acre, and total production increased 255 percent from 46.4 million to 164.6 million bushels.



Increases in production per man hour in agriculture trailed industry in the United States from 1899 to 1939 (left). However, following World War II agricultural productivity outdistanced industrial production.

Cotton acreage dropped by 92 percent from 829,000 acres in 1940 to 65,000 acres in 1982, and production fell by about the same percentage.

Flue-cured tobacco acreage harvested declined by 37 percent, from 498,000 acres in 1940 to 313,000 acres in 1982, yields per acre increased 106 percent from 1,038 to 2,140 pounds per acre, and total production rose by 29.5 percent from 516.8 million to 669.5 million pounds.

Soybeans became the number one crop in the use of farm land, increasing by 259 percent from 585,000 acres in 1940 to 2.1 million acres in 1982; yields per acre doubled from 12 to 25 bushels per acre, and total production jumped from 2.3 to 34.7 million bushels.

Peanuts used 43 percent less land, declining from 257,000 acres in 1940 to 169,000 acres in 1982. Yields per acre rose 77 percent, from 1,430 to 2,528 pounds, and total production increased by 51 percent, from 367.5 to 555.6 million pounds.

From 1950 to 1980 livestock production increased. Hog production rose by 173 percent; cattle, by 150 percent; eggs, by 148 percent; broilers, by 1,993 percent; turkeys, by 4,255 percent. North Carolina became the leading state in the nation in the production of turkeys, number 4 in the production of broilers, and number 7 in the production of hogs.

The vast acreages of eroded soils that resulted from continuous row-cropping and marred the landscape in North Carolina in 1940 were healed with grasses, legumes and trees. Much of this reclamation was accomplished long before the end of the 40-year period, and in many cases the land taken out of farming was conserved by following scientific guidance from the School of Agriculture.

These figures illustrate that in the 40 years beginning about 1940 there was an agricultural revolution in North Carolina. But with vast reductions in the amount of land in farms and the number of people who lived and worked on farms, how was it possible to increase production? The answer seems clear, though not simple. There was a vast increase in the technology and capital applied to farming. For example, in the 32-year period from 1950 to 1982, the average investment in land and buildings rose from $6,605 to $187,840, a thirtyfold increase. In the same 32 years the use of irrigation rose from 2,083 acres on 96 farms to 81,078 acres on 4,026 farms.

Before 1940, students who wished to pursue doctoral degrees in the agricultural sciences had to go to midwestern, western, or northeastern universities. The School of Agriculture at North Carolina State College was a leader in the Southeast in developing upper level graduate training in many specialties. Graduate students became a major resource for conducting research on a broad array of agricultural problems. In 1979 North Carolina State University granted 212 master's degrees in agricultural sciences and ranked third in the United States. Only Texas A & M University and the University of Wisconsin ranked higher. In the production of doctoral degrees North Carolina State University in 1979 ranked sixth behind Cornell, Wisconsin, Michigan State, Texas A & M, and Purdue and ahead of such distinguished universities as Iowa State and California.[3]

Funds to support high-level graduate programs, in addition to state and federal appropriations, have been provided by several foundations. William Neal Reynolds and other distinguished professorships have helped to recruit and retain a faculty of high competence.

At no time in the history of the world has food been plentiful for so long a period as it has in the United States since World War II. Also, at no place in the world has a food supply been available for so small a portion of the average workers' income as it has during the same period in the United States. In the 1980s the average worker spent 16 percent of after-tax income for food, in contrast to 22 percent that was required 40 years earlier.

Perhaps the key to this abundance is the productivity of the workers in agriculture. In 1984 the average U.S. farmer produced enough food for himself and 86 other people, compared to himself and 19 others in 1940.

The School of Agriculture and Life Sciences at North Carolina State University has not been solely responsible for all these changes. Some have resulted from the enlightened leadership and support of many agencies and from the actions of governments. Other changes have resulted from necessary adjustments when farm people have been employed by expanding industries and the growing demands for public services. The North Carolina Department of Agriculture and other state and federal agencies have been partners in the great transitions.

Other schools and divisions of North Carolina State University have contributed significantly to the high quality of educational offerings available to students in agriculture. During the 40 years of greatest progress the University of North Carolina system has had three distinguished presidents, Frank Porter Graham, Gordon Gray, and William Friday, the latter having served for three-fourths of the period. Leadership provided by these presidents and by chancellors John W. Harrelson, Carey H. Bostian, John T. Caldwell, Joab Thomas, and Bruce R. Poulton created an environment that fostered academic excellence.

The School of Agriculture and Life Sciences has also been fortunate in having the leadership and cooperation of three competent commissioners of agriculture, W. Kerr Scott, L. Y. Ballentine, and James A. Graham, during its 40 years of most extensive growth and change. Linkage between the North Carolina Department of Agriculture and the School of Agriculture and Life Sciences in recent decades has not suffered from the political turmoil that characterized earlier times.

Other groups and individuals have been added to the agribusiness team—those who provide the farmer with needed supplies and the large number of firms that carry the fruits of the land to the ultimate consumers. Vast new industries have arisen to manufacture and distribute the chemicals, machines, structures, vehicles, and packages required. Additional industries have been required for processing, improving customer acceptance of the products, and distributing them to a growing population.

Research and education (along with farmers' initiatives and management skills) were put to the test and met the challenge. But the

job was not finished. There were new horizons and old problems that kept cropping up. The U.S. Office of Technology Assessment predicts that in the immediate future technological advances will have the greatest impact on the animal sciences, food processing, and plant sciences, in that order.

Eternal Vigilance Required

On November 8, 1983, NCSU Chancellor Bruce R. Poulton announced the establishment of a university-wide Biotechnology Program.[4] Its purpose was to advance research and teaching in new technologies that use biological organisms to create new or improved products or processes for agriculture and industry.

Biotechnology was not a new concept. Earlier examples were the use of artificial insemination for disease control and for genetic improvement of animals and the development of hybrid corn to improve disease resistance and yield. But the term itself and several processes were new, such as recombinant DNA (the alteration of genetic codes), tissue culture and protoplast fusion for plant propagation, embryo transfer and manipulation for animal production, and the production of immobilized enzymes for food and pharmaceutical processing.

The establishment of the new program was the outgrowth of a two-year study undertaken by a special committee that identified some three dozen researchers on the campus already engaged in biotechnology research projects. More than $2 million of support was provided for these projects from such funding sources as the National Science Foundation, the National Institutes of Health, the U.S. Department of Agriculture, and the State of North Carolina.

In making the announcement, Poulton said that future biotechnology research might produce such results as:

- The development of trees and crops with new combinations of growth characteristics and tolerance to pests, diseases, and environmental stresses;
- The development of livestock and poultry with enhanced feed conversion efficiency, improved reproductive performance, and better disease resistance;
- The manufacture of vaccines, hormones, and pesticides by placing appropriate genes into bacteria;
- The use of bacteria specially engineered for greatest effectiveness in the food processing and pharmaceutical industries;

- The transfer of embryos to obtain extra offspring from superior cows and sows;
- The microinjection of isolated genes into fertilized eggs to alter livestock characteristics;
- The improvement of waste treatment and resource recovery through the use of specifically engineered bacteria;
- The design of microbes to degrade pesticides for the agricultural industry or cellulose for the forest industry.

But basic research and advanced technology may not immediately satisfy the farmer with sick chickens or wilting tobacco.

In 1970 the southern corn blight struck, and North Carolina producers saw a 25 to 50 percent reduction in their yields.

The severe 1980 alfatoxin outbreak in corn cost North Carolina producers and handlers almost $50 million.

Blue mold, a pest in the tobacco plant bed for almost 50 years, moved out into the field in 1979. This disease outbreak reduced flue-cured tobacco production by 22 percent and burley production by 50 percent. In the spring of 1984 tobacco researchers cautioned growers in the Southeast that a strain of blue mold resistant to the chemical most effective for control of the disease might be present in Mexico.

In 1983 Avian influenza struck poultry flocks in Pennsylvania and Virginia. Some 15 million birds were destroyed and farmers and others suffered financial losses.

Early in 1984 it was announced that an epidemic of soybean stem canker in several southern states had scientists, seed companies, and growers on the alert.

And the dreaded gypsy moth that denuded thousands of trees in the northern states continually threatened North Carolina.

Weather continues to be of concern somewhere in the state almost every year. The market is still beyond the farmers' control. The case of agricultural exports alone illustrates how the individual farmer and farmers in general are at the mercy of the market. The value of U.S. agricultural exports increased from $6.2 million in 1965 to $21.9 billion in 1975 and to $43.3 billion in 1981. Then a decline set in, with the value of U.S. agricultural exports dropping to $36.1 billion in 1983.

The depression that hit most of the farm sector in the early 1980s dramatically demonstrated that farmers alone cannot solve the problems that continue to emerge. Regulatory agencies can temporarily stamp out new infestations that flare up, and commercial concerns

can develop new chemicals. But commercial companies, lawmakers, and other government agencies cannot provide the long-term control and protection that farmers need.

Coupled with the application of new technology and the greater use of capital in farming is the requirement for better managerial skills. Some farmers have overspent, using borrowed funds to pay for items that cannot be justified by resulting increases in production or reduction in the labor costs or other factors. There is a great temptation to buy an expensive combine or tractor with a capacity far greater than is needed for the crop to be harvested. In many instances lenders require that real estate be mortgaged as security for loans. A bad crop year, an outbreak of diseases in animals, or a severe drought may reduce income so greatly that the farm has to be sold to repay outstanding debts. As the numbers of farms have declined, the knowledge required for successful operation has increased. There is a growing need for both borrowers and lenders to relate capital commitments to income.

Past experience has indicated that control and protection must come from a systematic research program that studies the problems and devises solutions, followed by programs to carry the information to those who need it. Most indications suggest that the future agricultural environment will be more "information intensive, more specialized, more flexible in the face of change, more directly linked to market shifts, less federally dominated . . . more closely related to state policies affecting small business and enterprise development than to federal farm policies."[5]

In a study published early in 1986, Southern Growth Policies Board, an organization sponsored by southern governors, concluded:

> Southern farm economies are closely tied to the global marketplace . . . Agriculture is being transformed into a high-tech, consumer business which can be an important source of local wealth and good-paying jobs. In global terms, the transition is unstoppable. In local terms state policies will play a major role in determining whether southern farmers will profit from, or indeed help lead, this revolution, or continually play catch up, if that is even possible, to technologies developed and implemented elsewhere . . . The states can facilitate this transition by providing management and financial assistance, greater investment in state extension service and university agricultural research labs, job training programs for those farmers who lose their farms in the restructuring, and by coordinating policy and planning between the state agriculture department and other state economic development policymakers in the governor's office, legislature, department of commerce and universities.[6]

Regardless of whether farmers with less than $10,000 in gross sales are drawn away from their farms for other more rewarding employment, whether they remain on the farm and seek supplementary employment, whether they restructure their farming operations for greater returns, or whether they may be forced by economic pressures to leave the farm, they will need information to help them make the adjustments required. With the increasing capital requirements of farming an understanding of the relation of expenditures to expected income may determine success or failure.

Knowledge Is Power

Within the land-grant college system, research workers have always sought to create knowledge; teachers have disseminated this knowledge in the classroom; extension workers have interpreted and demonstrated principles to farmers, farm women, and other users of knowledge. These objectives seem simple. The progress brought about by interaction of these groups, however, has been phenomenal.

This agricultural revolution has been based on the substitution of knowledge and ideas for acreage and muscle power. Scientific research, when interpreted and applied in the classroom and elsewhere, has several great impacts: (1) it has taken out of production vast acreage of land and eliminated the need for many farm workers; (2) it has made possible an agricultural expansion more than adequate to meet domestic needs; (3) it has set in motion programs designed to conserve natural resources; (4) it has given rise to new industries to serve agriculture and, at the same time, has both provided workers for them and released additional workers for other industries; (5) it has produced food and fiber in such abundance that the American consumer takes for granted that an adequate supply will always be available and that an ever-diminishing percentage of total family income will be required to feed the family; and (6) it has extended education to youth and adults and thereby increased the capability of the farm and rural people to cope with dramatic societal changes.

The School of Agriculture and Life Sciences stands alone among institutions in the state in its commitment to discover and disseminate knowledge of the complex biological interactions of organisms with the soil, water, and sun. It concerns itself with production, conservation, and beautification. It is concerned with family life,

including nutrition, health, home management, and youth education. It shares the information coming from its own research and that produced by other scientists throughout the world. It is committed to both discovery and application.

This book is the history of the School of Agriculture and Life Sciences and its evolution as it has responded to opportunities to serve. It is a story of a university system and a state with a commitment to excellence in education and the enhancement of the quality of living. It is the history of an educational institution constantly guided by those who believe, with Sir Francis Bacon and T. W. Palmer, that knowledge widely disseminated is power.

The future of agriculture in North Carolina will depend as much upon the fertility of the mind as it does upon the fertility of the soil.

NOTES TO CHAPTER 19

1. Pierce, George E., *Agriculture: North Carolina Style.* Agriculture Division of Census, U.S. Department of Commerce, Washington, D.C., Oct. 11, 1984.
2. Statistics taken mainly from reports of the North Carolina Crop and Livestock Reporting Service, N.C. Department of Agriculture, Raleigh; and U.S. Census of Agriculture reports.
3. When Dr. Naomi Albanese was employed as dean of the School of Home Economics at The University of North Carolina at Greensboro in 1958, a few graduate students were enrolled in the master's degree program. No doctoral degrees had been offered. Bolstered by research conducted in cooperation with the North Carolina Agricultural Experiment Station, the graduate student enrollment increased to 183 in 1980, with 88 being candidates for the doctoral degree.
4. News release, Office of Information Services, N.C. State University, November 8, 1983.
5. Pierce, *op. cit.*
6. Conway, Carol, "The State Role in Agricultural Trade Promotion," *Southern International Perspectives.* Southern Growth Policies Board, Research Triangle Park, N.C., Spring 1986, 14 pp.

A Note on Information Sources

From the beginning of the North Carolina Agricultural Extension Service in 1914 through 1967 an annual written narrative report was required from each extension section or department, highlighting and often detailing the unit's activities for the report year. These reports are available on microfilm in University Archives (located in the D. H. Hill Library on the North Carolina State University campus).

Extension Farm-News (*Called Extension News* since 1957) contains a fairly detailed accounting of all extension service activities (and to some extent other college and university functions) throughout its history, except for a short period in 1921 when it was not published. Bound copies of this publication are found in the University Archives.

A vast amount of how-to information has been published in the various extension service publications series since 1914. A study of these publications gives some insight into farming conditions and the activities of the extension service since its beginning. However, a number of these publications speak directly to the work of the organization, such as the several reports on long-range plans.

Publications of the Agricultural Experiment Station (Agricultural Research Service since 1979) likewise give recommendations as they report the research activities of that organization. Collectively, particularly in the earlier years, they give a picture of the range and areas of research concentration.

Research and Farming, first published in 1943 and renamed *Research Perspectives* in 1981, reports on many of the research projects when completed or in progress.

The annual reports of the experiment station (1877 to 1949) and the extension service (1914 to 1949) highlighted the work of each section or department within the agency for the respective report period. Since 1950 a combined annual report has portrayed the work of the school in general and the research, extension, and teaching functions for the annual report period. The custom varied over time, but in many years faculty and staff personnel were listed in the annual reports. Also, some of the earlier station and extension publications listed personnel.

Complete or almost complete sets of the annual reports and other

publications are available in the bookstacks in the library. Some are available in University Archives.

Following his retirement in 1950, I. O. Schaub wrote histories of both the experiment station and the extension service. His station history concentrated on the various directors and their relationships with the college and the State Department of Agriculture. Some research was highlighted.

Schaub's extension history initially appeared in serial form in *Extension Farm-News* (September, 1952 through June, 1953). It chronicles the beginnings of extension work in the several areas and clientele groups.

Retired station director R. Y. Winters wrote four pamphlets related to the beginning and early development of the experiment station. These were published by the station in the 1960s. R. S. Curtis's *History of Livestock in North Carolina* (1956) relates school activity in this area.

The idea for departmental histories originated, or was publicly espoused, on December 1, 1969, by Dean H. Brooks James. Each department was requested to prepare such a document. By 1986, histories of the majority of the departments had been published in a variety of forms and several more were in various stages of preparation. Also, histories had been published on 4-H, extension home economics work, the North Carolina Crop Improvement Association, and by Epsilon Sigma Phi, the extension personnel fraternity.

As an integral part of this writing project, 64 interviews were conducted by D. W. Colvard between July 10, 1977, and February 1, 1982, with persons who had been in some way connected with the school during the past 50 years. Transcriptions as well as the original tapes of these interviews are available in University Archives.

From these materials it is possible to piece together a fairly complete account of the school's activities from inception to the present. The serious researcher, however, will find a dearth of materials on the intimate, day-to-day activities of the administrators as they guided the school and its various programs. Administrative correspondence and records, long stacked in boxes in the attic of Patterson Hall, were declared a fire hazard and most or all were discarded before an effective university archive collection was established. I. O. Schaub, during his long retirement years, began bringing together and cataloging materials that formed the base for the current University Archives. A few materials, under the category of "personal papers," have been preserved.

The mass media, as it existed during the various periods of time, has paid attention to the school and its activities. Particularly, the *Progressive Farmer* has carried numerous writings by college personnel, and the Raleigh *News and Observer* has chronicled the day-to-day activities of the college (university) and its agricultural school.

All of these materials, along with the following listed materials, the station and extension publications, and various articles listed in the notes at the end of each chapter, have been very helpful to the authors of this book and should be of benefit to future researchers.

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Appendix

Top Administrative Officers—School of Agriculture

Dean of Agriculture

1917-1923	C. B. Williams	1953-1960	Dean W. Colvard
1923-1925	B. W. Kilgore	1960-1970	H. Brooks James
1926-1945	I. O. Schaub	1971-1986	J. Edward Legates
1945-1948	Leonard D. Baver	1986	Durward F. Bateman
1948-1953	James H. Hilton		

Director of Research

1877-1880	Albert R. Ledoux	1937-1940	I. O. Schaub
1880-1887	Charles W. Dabney	1940-1941	R. M. Salter
1887-1897	H. B. Battle	1941-1948	Leonard D. Baver
1897-1899	W. A. Withers	1948-1950	James H. Hilton
1899-1901	George T. Winston	1950-1955	Ralph W. Cummings
1901-1907	B. W. Kilgore	1955-1970	Roy L. Lovvorn
1907-1912	C. B. Williams	1970-1976	J. C. Williamson
1912-1924	B. W. Kilgore	1976-1979	K. R. Keller
1925-1937	R. Y. Winters	1979-1986	Durward F. Bateman

Director of Extension

1914-1924	B. W. Kilgore	1963-1978	George Hyatt
1924-1950	I. O. Schaub	1978-1981	T. C. Blalock
1950-1961	D. S. Weaver	1981	Chester Black
1961-1963	R. W. Shoffner		

Director of Instruction

1924-1944	Z. P. Metcalf	1953-1955	Roy L. Lovvorn
1944-1948	Leonard D. Baver	1955-1957	Victor A. Rice
1948-1950	James H. Hilton	1957-1960	H. Brooks James
1950-1953	Carey H. Bostian	1960-1986	E. W. Glazener

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