

HISTORY
COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATION
AGRICULTURAL EXTENSION SERVICE
UNIVERSITY OF TENNESSEE
1869 - 1952

With Data on the East Tennessee
Farmers' Convention, Community
Organizations and the Land-Grant
College System of Education

By
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Agricultural Editor

INTRODUCTION

This book is a compilation of articles, bulletins, publications and talks on the history, organization and development of the College of Agriculture, University of Tennessee, in the Land-Grant College System of Education, including Resident Teaching, Research and Extension.

Data is also given on the East Tennessee Farmers' Convention, community organizations in Tennessee and the organization and development of the Land-Grant College System of Education.

Four copies of this book have been bound and one copy each has been placed in the Agricultural Library, the University Library, Office of the Dean and Director of the College of Agriculture and the Office of the Department of Information.

Acknowledgement of assistance in the preparation of the data contained in this book is made to former Director C. A. Mooers; Dr. H. A. Morgan, former dean and director, and president of the University; Charles A. Keffer, former director of the Agricultural Extension Service; Fred H. Broome, former Experiment Station editor, and many other past and present members of the College staff.

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A BRIEF CHRONOLOGICAL HISTORY OF THE ORGANIZATION AND DEVELOPMENT
OF THE COLLEGE OF AGRICULTURE, UNIVERSITY OF TENNESSEE
UNDER THE LAND-GRANT COLLEGE SYSTEM

By A. J. Sims, Editor and Chief
Information Department

The University of Tennessee, founded in Knoxville as Blount College in 1794, received a charter from the Territorial Legislature of the Territory South of the Ohio River on September 10, 1794.

On April 6, 1806, Congress endowed the College with a grant of 50,000 acres of public land and State Legislature, on October 26, 1807, established the East Tennessee College and provided that it should absorb Blount College.

In 1840 the name was changed by the State Legislature to East Tennessee University. The new College, like all early colleges, had a hard struggle for existence. During the Civil War the University suspended operations and the buildings were used first by Confederate and then by Federal troops for a hospital and barracks.

The Institution was reopened in 1866, and in 1869 it was designated by the State Legislature, over keen competition from other colleges in the State, as the Land-Grant College of the State, under the Morrill Act of Congress of 1862. The scrip from the 300,000 acre "land grant" was sold to a New York concern and ultimately amounted to \$400,000, giving the University an annual income of \$23,960.

Beginning of the College and Experiment Station

The College and Experiment Station developed out of a combined School of Agriculture, horticulture and botany, headed by Prof. Hunter Nicholson.

In 1869 the original College Farm consisting of 100 acres around Morgan Hall, where the College is now located at Knoxville, was purchased. Improvement and some experimental work was started in 1870 but no students were enrolled in agriculture until 1871.

In 1879 the name of the University was changed from East Tennessee University to the University of Tennessee by State Legislature. That same year Prof. J. M. McBryde succeeded Prof. Nicholson as head of the School of Agriculture.

In 1882 the School of Agriculture and Experiment Station was established as a distinct department of the University with Prof. John W. Glenn as its first director.

In 1882 the courses in agriculture were made more definite and complete; text-books and references were used, and an agricultural building (old ^{Morrill} ~~Carrick~~ Hall on the main U-T campus) was erected. "This was a handsome brick structure, 31 feet by 63 feet, and two stories in height, with the first floor divided into two rooms, one a lecture room for the professor ^{of} agriculture, horticulture, and botany and the other a laboratory for the same subjects. The upper floor was to become an agricultural museum where there would be collected and exhibited models of farm machinery, specimens of agricultural products, and samples of soils and fertilizers of Tennessee."

Reorganization Under Hatch Act-1887

In 1887 the Experiment Station was reorganized under the Hatch Act of Congress, March 28, 1887, which gave the Station an annual income of \$15,000 and placed it under the immediate supervision of a director and a committee of five members of the Board of Trustees. Dr. Charles W. Dabney, newly elected President of the University, was named director of the Station under the reorganization. C. S. Plumb, Massachusetts Agricultural College, was appointed assistant director of the Station and professor of agriculture; C. L. Newman, assistant professor, and F. Lawson Schribner, professor of botany and horticulture. All literary, scientific, agricultural and language courses, including Latin, were taught in the School of Agriculture and Mechanical Arts.

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Carrick Hall was the agricultural building when the Station was reorganized under the Hatch Act of 1887. The building was enlarged in May, 1888, and the members of the East Tennessee Farmers' Convention, which was in session in Knoxville participated in the ceremony of laying the cornerstone.

In 1890, Prof. F. Lawson Scribner was made director of experimental work, and the college farm, comprising 100 acres, together with all equipment that had been used in teaching, was turned over to the Experiment Station; one of the conditions of transfer being that all farm work should be so conducted as to illustrate and agree with the instruction given in the classroom.

In 1893 the office and title of the director of the Experiment Station was abolished and the duties again transferred to the President of the University when Director Scribner resigned to join the staff of the U. S. Department of Agriculture. Charles F. Vanderford who was appointed professor of agriculture and assistant Station director in 1891, was made manager of the Station Farm.

In 1899 Dr. Andrew Souls, later president of the Georgia Agricultural College, was appointed professor of Agriculture and manager of the Station Farm to succeed Prof. Vanderford who had died that year.

In 1903 the office and title of director of the Station which^{had} been abolished in 1893 was re-established and Dr. Soule was made director and head of the School of Agriculture.

The School of Agriculture took an active part in farmers' meetings, short courses, and similar educational work. Extension Short courses of one week were first given in 1903. Four of these short courses were held the first year, over four hundred students being enrolled in the four courses. From 1903 to 1915 approximately 6,000 men, women, boys and girls were taught the lesson of better farming methods and richer country life in these extension short courses.

It was also in 1903 that the State Legislature became interested in the Station and made its first direct appropriation (\$10,000 to supplement the

annual income of \$15,000 received from the Federal Hatch Act of 1887) for Experimental work and purchase of 40 acres of land adjoining the original 100 acres purchased by the University in 1869 under the Morrill Land-Grant Act of 1862.

Farmers of the State now began to take interest in the work of the Station and requests for branch experimental farms in other sections of the State began to be heard.

Morgan Named Director In 1905

In 1904 Dr. Soule resigned to go to the Virginia Experiment Station and Dr. H. A. Morgan, President of the University, 1919 to 1933, succeeded him in 1905 as professor of Agriculture and director of the Station.

In 1906 the Adams Act of Congress increased the Annual Hatch Act appropriation to the Station by \$15,000, making a total of \$30,000. This was trebled by the Purnell Act of 1925.

In 1907 the Bureau of Entomology of the U. S. Department of Agriculture established some tobacco insect investigation work in cooperation with the Station near Clarksville. This work was enlarged into Mericourt a sub-station in 1913 through gift of land to the University by Hunter Mereweather, a prominent citizen of Clarksville. This Station was merged in 1943 with the Highland Rim Station at Springfield.

In 1907 Madison County provided land for a Sub-Station at Jackson, and the Legislature, within the administration of Gov. Malcolm R. Patterson, appropriated money for original buildings in 1908. The Station has always received enthusiastic support of farm families.

In its long history, the Jackson Station has had two superintendents. Shelby A. Roberts served in this capacity from 1909 until he resigned in 1929 to accept a position with a railroad. The present superintendent, Ben P. Hazlewood, has served since 1929.

The U-T Board of Trustees approved enlargement of the Jackson Station in 1941, from the original 200 acres to the present 660 acres. This enlargement, funds for which were made available by Governor Prentice Cooper, greatly facilitated expansion of research in pasture and forage utilization, livestock, and reclamation and stabilization of soils common^{to} the area.

In 1912 Oliver Perry Temple Hall, built by the East Tennessee Farmers' Convention was dedicated. It was named for Judge O. P. Temple, one of the organizers of the Convention and a large contributor to the building fund. See history of the Convention in this book.

In 1913 the Knoxville Station was enlarged by the purchase of Cherokee Farm, across the river, with an appropriation of \$125,000, made by Knox County, and \$18,000 contributed by Knoxville business firms.

Morgan First Dean of College-1913

It was also in 1913 that the School of Agriculture was changed to the College of Agriculture and Dr. Morgan was named its first dean in addition to his duties as director of the Station. A Total of 71 students were enrolled in the College in the class of 1913-14.

Dr. Morgan was elected President of the University in 1919 and was succeeded as dean of the College of Agriculture by C. A. Willson; as director of the Station by C. A. Mooers. Dean Willson died in 1937 and was succeeded by Dr. M. Jacob.

Extension Service Created.

July 1, 1914 the Division of Extension, now the Agricultural Extension Service was established in the College in cooperation with the U. S. Department of Agriculture under the Smith-Lever Act of Congress of May 8, 1914. Charles A. Keffer, College horticulturist, was made director of the new Division. ~~The name was changed to Agricultural Extension Service in 1923.~~

by acting Secy of Agriculture Warman.

Farmers Cooperative Demonstration Work, started in 1904 in Texas under the direction of Dr. Seaman A. Knapp, Bureau of Plant Industry, U. S. Department of

Agriculture, spread to Tennessee in 1909 and was merged in the newly created Division of Extension of the College in 1914. *The name was changed to Agricultural Extension Service in 1923.*
Morgan Hall and New Sub-Station Added

In 1915 the U-T Cooperative Creamery was established by the College to train students and stimulate interest in dairying.

In 1917 the State Legislature authorized the establishment of the Middle Tennessee Experiment Station for which Maury County and some public spirited individuals provided the land near Columbia. This Station farm was sold and the W. A. Haynes farm, seven miles north of Columbia, was purchased for the Station, in 1950.

In 1921, the new agricultural building, Morgan Hall, named for Dean and Director H. A. Morgan, was completed on the Station Farm at Knoxville. A small two story brick building erected on the site for the Station and the School of Agriculture in the early 1890's was torn down in 1920 to make room for Morgan Hall. Some early students lived in the upstairs of this building and worked on the College Farm. The resident teaching, research and extension staffs of the College of Agriculture, which had been housed in Carrick and Morrill Halls on the main U-T Campus occupied the building in May. Governor Alf Taylor presided at the dedication June 6, 1921.

Both Governor Taylor and Dr. Morgan stated at the ceremony that this large and magnificent building should meet the needs of the College of Agriculture for next 50 years. As a matter of record, the building was over crowded in less than 20 years. In 1940 the first wing of an Agricultural Engineering building was completed to relieve the crowded condition in Morgan Hall.

In 1927 a Junior College of Agriculture and Home Economics, with a college farm, was established at Martin, Tennessee, by the State Legislature. This Junior College was made a four year college by the 1951 Legislature.

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In 1929, a new bridge, now Alcoa Highway Bridge, was constructed across the Tennessee River, connecting the original station farm with Cherokee Farm. It was dedicated May 20, 1930, by Governor Henry Horton in connection with the 57th Annual Meeting of the East Tennessee Farmers' Convention.

In 1932 a tobacco sub-station was established near Greeneville in cooperation with the U. S. Department of Agriculture with Frank S. Chance as superintendent. Funds were appropriated by the State legislature the Station. The original purchase consisted of 165 acres.

On February 22, 1932, the four elm trees at the west end of Morgan Hall were set by G. L. Herrington, 4-H Club leader, and Director C. A. Keffer, in the name of 4-H Clubs of the four Extension districts of the State. Each club member had been asked to set a tree on that date in observation of the George Washington Bi-Centennial. The Washington Elm at the fork of Kingston Pike and the Alcoa Highway was set at the same time by the DAR.

From 1934 to the present time (1952) the Station has cooperated with the Tennessee Valley Authority in many studies, especially in the fields of Agricultural Engineering, soil fertility, conservation, land-use and forestry investigations.

An agricultural engineering quonset laboratory erected on the U-T Farm in 1947 by TVA was turned over to the Station for research and teaching purposes in 1952.

In 1935 Bryn Mawr Mining and Land Company turned 9000 acres of timber land in Morgan and Scott Counties over to the University for research in forestry. This land was transferred to the Experiment Station in 1949.

In 1936 funds for the Station were substantially increased by the Bankhead-Jones Act of Congress and again in 1946 by the Research and Marketing Act.

The Corn and Cotton Research Building, west of Morgan Hall, was erected in 1936 by the U. S. Department of Agriculture on Station land deeded to the Government by the University - site for the building and one foot from its base on each side.

The dairy barn and milking parlor on Cherokee Farm was also built in 1936.

REORGANIZATION - EXPANSION - CONSOLIDATION - 1942-1952

April 1, 1943, C. E. Brehm, director of the Agricultural Extension Service, was appointed dean of the College of Agriculture and director of the Extension Service.

This was the first step in a move by President James D. Hoskins and the Executive Committee of the Board of Trustees to coordinate all of the agricultural services of the University to the State under one administrative head.

In his position as dean, Dr. Brehm succeeded Dr. M. Jacob, dean of the College from 1937 to the time of his death, March 22, 1943.

Prof. N. D. Peacock, head of the horticultural department, was named vice dean of the College.

Frank S. Chance, superintendent of the Tobacco Experiment Station at Greenville, was appointed assistant to Director C. A. Mooers of the Agricultural Experiment Station, on July 1, 1943.

New Sub-Stations Established

In 1943 two new sub-stations, the Highland Rim Station, near Springfield, and the Cumberland Plateau Station, near Crossville, were established with funds provided by the State Legislature. Funds for the purchase of 175 acres were provided by the State Legislature for the Highland Rim Station. Additional acres, totaling 429, were paid for out of money from the sale of the Mericourt Station at Clarksville. The 1943 Legislature also appropriated funds to improve a tract of 600 acres of land purchased by Cumberland County for the Plateau Station.

Additional land totaling 1382 acres, known as the Grassland Farm, south of Crossville, was acquired from the Cumberland Homestead tracts.

A Prisoner of War (World War II) Camp near Crossville was turned over to the University in 1947 and was converted into a 4-H Club Camp and research farm in connection with the Plateau Station.

John A. Odom was appointed superintendent of the Plateau Station in 1945. Lawson M. Safley, former assistant agent in Lincoln County, was appointed superintendent of the Highland Rim Station March 15, 1951. Dennis Latham was acting superintendent up to that time.

From 1942 to 1945 the Knoxville Station was enlarged by the purchase of 510 acres on the Alcoa Highway in Blount County. March 1, 1944 J. Newt Odom, special agent in soils work in Rhea County, was appointed general superintendent of Station farms. W. A. Campbell, foreman of the Station Farm at Knoxville for more than 30 years, retired in 1949.

Information Department Created

On July 1, 1943 a Department of Information was created to serve the three branches of the College of Agriculture - research, extension and resident teaching.

A. J. Sims, Extension editor since 1920, was named head of the new department, which consolidated the Experiment Station and Extension editorial offices, mailing rooms and libraries.

Fred H. Broome, Experiment Station editor and secretary since 1897 continued as Station editor until his retirement in 1949.

The work of other departments, representing all of the major enterprises - crops, livestock, dairying, horticulture, entomology, engineering and soils - was more closely coordinated in the planning and development of information for use in resident teaching, Extension work and research studies.

Period,

During the World War II/ 1942 - 1945, there was marked decline in the number of students enrolled in the College of Agriculture and several members of the teaching staff assisted the Extension Service with the added responsibilities for food, feed and fiber production during the emergency.

Administrative Staff Changes

In November 1945 J. H. McLeod, assistant director of the Agricultural Extension Service, was made vice director of the Extension Service. R. W. Moore, director of the Extension Farm Labor Program, was appointed assistant Extension director, succeeding H. S. Nichols, who died October 23, 1945.

July 1, 1946 C. A. Mooers, director of Experiment Station since 1919 retired. C. E. Brehm, dean of the College and director of Extension, was named to succeed Director Mooers, thus bringing the three branches of the College - resident teaching, research and Extension - under one head for the first time.

Frank S. Chance, assistant director of the Station, was named vice-director. L. R. Neel, superintendent of the Middle Tennessee Station for 24 years, also retired July 1, 1946 and was succeeded by John A. Ewing, who had been assistant superintendent. C. M. Hume, assistant supervisor of cooperative experiments in several Middle Tennessee counties was the first superintendent of the Station - 1918-1922.

In August 1946 President James D. Hoskins retired and the University Board of Trustees named Dean and Director Brehm as Acting President of the University.

Hugh Falts, County Agent in Greene County, was appointed superintendent of the Greeneville Tobacco sub-station November 15, 1946, to succeed Frank S. Chance, who was appointed vice director of all U-T Stations in July.

The Highway Patrol Building at the junction of the Kingston Pike and Alcoa highways, was erected on the U-T Farm in 1946.

August 12, 1947, the College of Agriculture and the School of Home Economics were consolidated under the name, College of Agriculture and Home Economics, by actions of the University Board of Trustees. Under this change Dr. N. D. Peacock

continued as vice dean of agricultural instruction and Miss Jessie Harris, who had been head of the school of home economics for a number of years, became vice dean of home economics.

The Home Economics Building, on the Main Campus, was completed in 1926 and was dedicated on October 28, of that year.

Brehm Named U-T President

In August 1948 Dr. C. E. Brehm was made President of the University by the board of trustees...J. H. McLeod was named dean of the College of Agriculture, director of the Experiment Station and director of the Agricultural Extension. Dr. Brehm had been acting president since 1946 and Mr. McLeod had been vice-director of the Extension Service.

R. W. Moore, succeeded Mr. McLeod as vice-director of the Extension Service and E. C. McReynolds was named associate director in October 1948.

Frank S. Chance continued as vice director of the Station and Dr. N. D. Peacock as vice dean of the College.

In 1948 a contract was entered into by the University and the Experiment Station with the Atomic Energy Commission for study at Oak Ridge of the cattle that were exposed in the first Atom Bomb explosion in New Mexico in July 1945.

In connection with this study other projects for the investigation of the use of isotopes in the study of animal and plant metabolism were developed. About 2,000 acres of tillable land in the Oak Ridge area were provided by the Atomic Energy Commission for this work. Dr. C. L. Comar was appointed laboratory director and research coordinator. J. M. Bird was named farm superintendent. Scarboro School in the area was enlarged as a laboratory for this work in 1949.

October 1, 1948, the Lewisburg Dairy Experiment Station, established in July 1929 by the Bureau of Dairy Industry, U. S. Department of Agriculture, became a cooperative Station with other U-T Stations, under a memorandum of understanding between the U. S. Department and the University of Tennessee.

July 17, 1949, The Clyde Austin 4-H Club Camp, adjoining the Greeneville Tobacco Station, was dedicated. The Camp was built by donations received from 4-H Clubs and public spirited citizens of East Tennessee, under the leadership of Mr. Austin, member of the U-T Board of Trustees and one of the principal doners.

In October 1949, the famous Ames Plantation of some 18,000 acres in Hardeman and Fayette counties, was turned over to the University by Mrs. Hobert Ames by will and deed of trust to a Board of Trustees for agricultural research and teaching purposes.

November 1, 1949, John A. Ewing, superintendent of the Middle Tennessee Station since 1946, was named assistant to Vice Director Chance. E. J. Chapman, agronomist for the West Tennessee Station, succeeded Mr. Ewing as superintendent of the Middle Tennessee Station.

McCord Hall Dedicated

November 4, 1949 McCord Hall, the new dairy building was dedicated. Governor Jim McCord for whom the building was named, cut the ribbon, opening it for inspection. Governor McCord, for many years a leader in the dairy field and a newspaper editor at Lewisburg, was also one of the principal speakers.

Companion building in the dairy group - the dairy and food processing buildings - were completed in early 1950.

In December 1949 the Albert Noe, Jr. Memorial Hereford Herd was established at the U-T Station through gift by the Noe family of five prize animals - a bull, two cows and two heifers - from famous Milky Way Farm, Pulaski. Governor Gordon Browning added three other animals to the group from the Noe dispersion sale. This nucleus herd was established at the University to perpetuate the bloodlines of the world famous herd for research and teaching purposes.

Early in 1950, the administrative offices of the College of Agriculture - resident instruction, research and Extension, and the information department, were moved from the second and third floors to the first floor of Morgan Hall.

At the same time the various departments of the three branches of the College were regrouped in most cases, closer working relationship.

During the year the Roadside Marketing building was constructed by the College on Cherokee Farm near the Alcoa Highway Bridge. A new three story agricultural building was also completed at the Junior College in Martin in 1950.

In 1950 the original Middle Tennessee Experiment Station farm near Columbia, established in 1917, was sold and the 593 acre W. A. Haynes farm seven miles north of Columbia, was purchased. A new administrative building and auditorium was constructed on this farm in 1951.

In 1951, Neyland Drive, (named for Robert R. Neyland, famous U-T football coach) including the North Cloverleaf to Alcoa Highway, was completed through the University Farm.

August 8, 1951 the Frank S. Chance Administrative Building on the Greeneville Tobacco Station was dedicated.

A small branch laboratory constructed by the Station in cooperation with the U. S. Department of Agriculture for the study of X-Disease of cattle was also completed in 1951.

BULLETIN
OF THE
AGRICULTURAL EXPERIMENT STATION,
OF THE
UNIVERSITY OF TENNESSEE,
STATE AGRICULTURAL AND MECHANICAL COLLEGE.

Vol. I.

APRIL, 1888.

No. 1.

- I. HISTORY AND REORGANIZATION.
II. DEHORNING CATTLE.
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KNOXVILLE, TENNESSEE,
U. S. A.

ANNOUNCEMENT.

THE TENNESSEE AGRICULTURAL EXPERIMENT STATION, established by the Board of Trustees of the University of Tennessee on June 8th, 1882, has been reorganized in accordance with the so-called, "Hatch Experiment Station Act," and the Act of the General Assembly of Tennessee of March the 28th, 1887, which endowed this Station with the benefits of the said Act.

The necessary laboratories are being erected and the Station will be fully prepared on the first of September next to undertake any of the work required of it by the laws under which it is established.

The Station is a bureau of information for farmers, and every Tennessee citizen interested in developing our agricultural industries or resources has the right to apply to the Station for any assistance that comes within its province to render, and the Station will respond to all applications as far as lies within its power.

The Station will have good facilities for analyzing and testing fertilizers; cattle-foods, milk and dairy products; seeds, with reference to their purity or germinating power; for identifying grasses and weeds and studying forage plants; for investigating the diseases of fruits and fruit trees, grains and other useful plants; for making reports on injurious insects, and the best means of combatting them, and for investigating the diseases of domestic animals. No samples can be received for chemical analysis until the new laboratory is completed on the first of September. The Station will make such analyses, seed-tests, reports, etc., for the citizens of Tennessee, without charge, provided,

1. That the results are of use to the public and are free to publish.
2. That the samples are taken from fresh stock, now on the market and in accordance with the Station directions for taking samples.
3. That the samples, or specimens sent are fully described according to directions. In case of fertilizers a complete transcript of the brand and the analysis printed on the packages, or given by the manufacturer and a statement of the price at which it is retailed, must be given.

All other work proper to the Experiment Station and coming within the laws under which it is established that can be used for the public benefit, will be made without charge. Notes of observations and suggestions of subjects of investigations, clearly and briefly written, will be welcomed.

The Bulletins and Reports, giving the results of experiments and investigations that are of general interest, will be sent, free of charge, to all persons "actually engaged in farming" who request them.

Packages by express, to receive attention, should be *prepaid*.

All communications should be addressed, *not to any individual officer*, but simply to the

EXPERIMENT STATION,

KNOXVILLE, TENN.

The Experiment Station building, containing its offices, laboratories and museum, and the plant-house and horticultural department are located on the University grounds, fifteen minutes walk from the Custom House in Knoxville. The Experiment Farm stables, milk laboratory, etc., are located one mile west of the University on the Kingston pike. The farmers are especially invited to visit the buildings and experimental grounds.

Article I.—HISTORY AND RE-ORGANIZATION.

BY THE DIRECTOR.

The Agricultural Experiment Station of the University of Tennessee grew out of its School of Agriculture, Horticulture and Botany. The experimental work of this school was inaugurated by Prof. J. M. McBryde, who was at its head from June 1879 to June, 1882. Three reports, 150—200 p p. each, on experimental work, for the most part field and feeding experiments, were published during this period. They commanded favorable attention in and out of Tennessee. The success of this work led to the establishment of the Station by the following action of the Board of Trustees, taken June 8th, 1882:

In order to increase the efficiency of and give wider usefulness to the Agricultural Department of the University of Tennessee, and bring it into closer relations with the farming interests of the State, by affording to the Commonwealth the advantages to be derived from the practical results of experiments persistently prosecuted through a series of years, the Board of Trustees hereby establishes and inaugurates, upon the College Farm, an Experiment Station, which shall be a distinct department for the promotion of the general interests of agriculture in Tennessee.

1. This department shall be conducted under the general management of a committee of the Board of Trustees, which shall be denominated "The Board of Control," and shall consist of five members, who shall be elected annually by the Board of Trustees. The Board of Control, in addition to the duties that shall be devolved upon it touching the Experiment Station, shall also discharge the duties heretofore appertaining to the Farm Committee, which is hereby abolished.

2. The work of the Experiment Station shall be under the administration of a Director, who shall be charged with the oversight and conduct of the experiments, investigations, etc., contemplated in the erection of the Station.

3. The Experiment Station shall be furnished with a chemist as assistant to the Director, to whom the chemical part of the work, especially of analysis, shall be entrusted.

4. The Director and Chemist shall be under the supervision of the Board of Control and directly responsible to the Board of Trustees, and the work required in the prosecution of the business of the Station shall not interfere with the discharge of any of the duties appertaining to the professional chairs of any members of the Faculty who may hold positions in the Station.

5. The accounts of the Station for all experimental work shall be kept separate and distinct from those of the Farm, as far as practicable.

6. As the object of the Experiment Station is to be the promotion of the agricultural interests of Tennessee, by practical and scientific experimentation and investigation, the Station shall hold itself ready to make for the citizens of Tennessee analyses of seeds, fertilizers, soils, minerals, etc., under the following conditions, viz:

The results must promise to promote the cause of agricultural progress, to prove of interest to the public, and be free for publication. Such experiments or analyses shall be made without charge, provided, the samples furnished are made in accordance with the instructions that will be furnished

on application. Botanical determinations, analyses of drinking waters and other work of benefit to the public, will fall under this head.

No more work shall be done by the Station than the means of the University will allow.

All analyses shall be made in the order of the arrival of the samples and at the discretion of the authorities of the Station.

Examinations and analyses for the benefit of private parties will be made on reasonable terms.

The Board of Control shall elect their own Chairman.

The details of the practical working of the Experiment Station is committed to the Director, subject to the approval of the Board of Control.

Appropriations of money for the prosecution of the ends of the Station shall only be made by the Board of Trustees.

Prof. McBryde resigned to take the presidency of the University of South Carolina, and Prof. Jno. W. Glenn, who was elected Professor of Agriculture, Horticulture and Botany in this University became the first Director of the Station in June, 1882.

The General Assembly of 1883 required the chemist of the Station to make the analyses of fertilizers for the State Department of Agriculture. In return for this, the Experiment Station received a small revenue, from \$700 to \$1,000 per annum, from the tax upon commercial manures.

The Station never enjoyed any fixed, or settled income until the present year. The Trustees of the University voted it such funds as they could spare from time to time from the general treasury. The amount from this source, not including salaries, which the officers received as professors, was necessarily very limited. In spite of these difficulties, considerable and valuable work was done, chiefly field and feeding experiments.

Prof. Glenn continued in office until June, 1887. Prof. W. A. Noyes was chemist to the Station from October 1883 to June 1886, and Prof. W. E. Moses from 1886 to the present time.

During this period the Station published a number of Bulletins and Reports.

On the 24th of July, 1887, the Board of Trustees elected Dr. Charles W. Dabney, Jr., Director, with authority to propose a plan and nominate officers for the reorganization of the Station which the General Assembly had made the recipient of the funds appropriated by Congress by the so-called, "Hatch Experiment Station Bill."

Prof. Charles S. Plumb was elected to take charge of field and feeding experiments and entered upon his duties on October 11th, 1887. Mr. Clifford L. Newman became assistant in the Experiment Station on September 1st, 1887.

As the promised funds were delayed and were considered by some uncertain, and as the Station had very limited resources of its own, it was necessary to proceed very cautiously. Some ex-

perimental work was started at once, however, and has been kept up constantly.

We found the Station without a laboratory of its own, without apparatus, library, etc.,—without everything, in short, which it takes to make a scientific station, and really having no existence, either in substance or in spirit, outside of the University and its farm. For seven months of this fiscal year, from July to February, the Station was almost wholly without funds, with which to carry on work. The University advanced the Station moneys, and some experimental work was undertaken. Under such circumstances, stock experiments, and work in the plant house and in the chemical laboratory of the University, was all that was open to us. What was accomplished under these disadvantages, this and future Bulletins will show.

As soon as the funds for the support of the Station were assured, the organization was further completed by the election of Prof. F. Lamson Scribner, Botanist and Horticulturist; Mr. W. E. Stone, Chemist and Prof. Henry E. Summers, Entomologist.

The present organization of the Station is as follows:

DIRECTOR:

CHARLES W. DABNEY, JR., PH. D. (Göttingen.)

University Virginia; Professor Chemistry and Mineralogy Emory and Henry College; State Chemist, Director North Carolina Agricultural Experiment Station; Chief Department Government and State Exhibits World's Exposition, New Orleans.

ASSISTANT DIRECTOR, In charge of field and feeding experiments:

CHARLES S. PLUMB, B. S.,

Massachusetts Agricultural College; Assistant Editor Rural New Yorker; Assistant Director New York Agricultural Experiment Station; Editor "Agricultural Science."

BOTANIST AND HORTICULTURIST:

F. LAMSON SCRIBNER, B. S.,

Maine State College; Professor Girard College; Botanist Northern Transcontinental Survey; Mycologist United States Department of Agriculture.

CHEMIST:

WINTHROP E. STONE, B. S.,

Massachusetts Agricultural College; in charge Houghton Farm Experiment Station; Assistant Chemist and Biologist Massachusetts Experiment Station; University Göttingen.

ENTOMOLOGIST:

HENRY E. SUMMERS, B. S.,

Cornell University; Fellow Comparative Anatomy, Cornell 1886-7; Entomology and Comparative Anatomy 1887-8; Instructor in Veterinary Science, Cornell.

ASSISTANT, In field and feeding experiments:

CLIFFORD LEWIS NEWMAN, B. S.,

Agricultural and Mechanical College of Alabama; Assistant Alabama Agricultural Experiment Station.

A special building for the Experiment Station is in process of erection, which is to contain the offices of the Station, a laboratory for chemistry, botany and biology each, a library and reading room, a lecture hall, etc. A tool and seed-house has been built and partly supplied. Over 250 varieties of fruit trees and small fruits have been set out, as the beginning of the Horticultural Department. Extensive experiments on grasses and forage plants have been started and a plant house has been put in shape for experimental work. A milk laboratory is being erected and equipped at the farm, where some studies of questions underlying successful dairying are to be carried on. Without making any large promises, we will say that the Station is being put into shape as rapidly as is consistent with safe progress and will endeavor to do good and faithful work for the farmers of Tennessee and the country.

This Agricultural Experiment Station will issue three classes of publications, viz:

1. Annual Reports.
2. Regular, quarterly Bulletins.
3. Special Bulletins, at irregular intervals.

The Annual Reports will contain the full, regular reports from the different departments in the Experiment Station, and will probably form pamphlets or volumes of 100 to 150 pages. These reports will give detailed accounts of experiments made and the results obtained, so far as it will be useful to publish them.

The Quarterly Bulletins will give briefer papers outlining the work done and the results obtained, in cases where earlier publications are necessary.

The Special Bulletins will be issued as circumstances may require, to give the farmers of the State information which may be urgently needed, and, which, without requiring long experiments may be worth communicating at that particular time, or will answer numerous inquiries.

These bulletins and reports will be issued in uniform style, so that they can be bound together. Each year's publications will make, thus, a volume of, perhaps, from 250 to 300 pages.

The sections of the law referring to the work of the stations and to these bulletins and reports, is appended hereto. We are required to send all of these bulletins or reports "to such individuals actually engaged in farming as may request the same, as far as the means

of the Station will permit." The indications are, that we will be able, at first, at least, to send them to all who apply, free of charge.

EXTRACTS FROM THE EXPERIMENT STATION LAW.

Sec. 2. That it shall be the object and duty of said Experiment Stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective States or Territories.

Bulletins Free. Sec. 4. That bulletins or reports of progress shall be published at said stations, at least, once in three months, one copy of which shall be sent to each newspaper in the states or territories in which they are respectively located, and to such individuals actually engaged in farming as may request the same, and as far as the means of the station will permit. Such bulletins or reports and the annual reports of said stations shall be transmitted in the mails of the United States free of charge for postage, under such regulations as the Postmaster General may from time to time prescribe.

Article 2.—DEHORNING CATTLE.

BY CHARLES S. PLUMB.

The subject of dehorning cattle, especially beef animals, has been the cause of considerable discussion in some states, for the past two or three years, and as a result vast numbers of cattle have been dehorned. Much has been written in relation to this subject, yet almost all of this has been in the way of simple statements either advocating or denouncing the operation.

The following matter as presented in this *Bulletin*, is the result of an effort to obtain accurate data regarding the merits and demerits of this practice.

Methods of fastening. Two methods were used for fastening the animals. When first attempted, a cow ten years of age was placed in an ordinary box-stall, with the head extending through a hole in one side of the stall. Two strong pieces of timber were placed, one on each side of the cow, one end of each resting upon

the ground about five feet behind the rear quarters, the other ends coming up through the opening containing the head, and extending on each side a short distance beyond the nose. The head was enclosed in a strong rope halter, and was fastened to the ends of the two poles, which were held in the opening so as to be immovable. The animal was thus secured.

The above plan was not satisfactory, however. Too much time was occupied in fastening the animal. Further, there was always a certain amount of twitching that could with difficulty be suppressed, so that another method seemed desirable.

A steer two years of age was cast upon a level piece of ground, and the feet were firmly fastened together at the hock joints with a stout rope three-eighths of an inch in diameter, one rear foot being laid over and fastened upon an opposite front foot, and over this latter was placed the remaining rear foot, beneath the other front foot, the last to be put in place at the point where the feet came together, after tying, a rope about 20 feet in length was fastened at its middle by taking one turn about the feet, or through the other rope. One end of this rope laid from, and at right angle to the steer's body, the other end extended directly over the body.

As in the first animal operated upon, the head was in a strong running-noose, rope halter. The rope was carried *behind* the ears, so as not to interfere with the saw. The side of the head was held closely to the ground, with one horn uppermost. Unless the soil chanced to be turfy, a handful of straw was placed beneath the head to keep it clean and to prevent dirt or rubbish of any kind getting into the cavity of the horn.

As thus fastened, a steer of ordinary strength or docility was sufficiently bound to not cause trouble during the process of dehorning. However, when the animal was vicious and struggled violently, a two-inch plank about 12 feet in length was laid across the neck, one end being held to the ground, and the other pressed down so as to bear firmly upon the neck. The rope halter was then wound once about the plank, and the animal's head drawn securely and closely to it. In this position, movement is almost impossible. This method was sufficient to enable us to dehorn with ease the wildest animals upon which we operated. The above plan of fastening was satisfactory in every way, and will serve every practicable purpose for dehorning when done on a small scale.

Yet for rapidity of work this was not entirely satisfactory. Should a stout, vicious steer be a subject for operation, difficulty may be experienced in fastening the legs. In such a case, the end of the rope halter should be passed through an iron ring

fastened six or eight feet high, and drawn up taut, thus raising the head as high as possible. A stout rope should then be fastened below the hock joint of the left rear leg, and another rope at the same place on the front left leg. The end of the rope on the front leg should be *thrown directly over* the shoulders and be brought back beneath the belly, and held loosely. The rope attached to the rear leg should be *passed under* the belly, and the end carried over the back to the left side again. When ready to be thrown, a man on each rope should pull firmly, and the animal will be cast. The halter rope should be loosened at the moment the other ropes are pulled, to enable the animal to drop freely to the ground. After falling, the feet may be safely tied.

In order to save time an attempt was made to fasten a steer to a post, binding the forehead stoutly to it, but notwithstanding how securely the head was fastened, the leverage of the body and neck enabled the animal to move the horns somewhat, so this was discarded as unsatisfactory. Further, this method of fastening enabled the animal to lunge more or less, unless the body was securely bound.

While various methods are in operation for fastening animals to be dehorned, one rarely meets with descriptions of these in the papers. The second method, which we adopted, was entirely satisfactory. Yet it is true, that, if dehorning is to be done on a large scale, as on a western ranch, a quicker process than this, that will secure the animal equally well, must be adopted. In this work but four men were found to be absolutely necessary.

Tools essential. In the first work that we did in dehorning, a saw made for this special purpose by Mr. H. H. Haaff, Chicago, Ill., and sent us by him, was used. This instrument is entirely made of iron, the back and handle being cast into one piece. It is constructed on the same principle as is the meat saw, and has an extreme length of 16 inches. The blade is very narrow (1-8 inch) and contains nine teeth to the inch. One end of this blade fits in a groove, and may be fastened there by an immovable pin. The other end of the blade is placed in a groove in a round pin that passes through a hole in the end opposite the handle. By means of a set screw on the end of this round pin containing the end of the saw, the latter may be tightened to a certain degree. We found this saw satisfactory, and yet unsatisfactory. The end of the blade held in the round pin could not be much tightened, so that it would easily turn in the wrong direction, while operating. Possibly this end was intended to have a certain amount of play to prevent the breakage of the blade in case an animal struggled violently. However, it was sometimes very unsatisfactory, and in one case the veterinary surgeon had much difficulty in guiding

the blade through the horn to the point to which he wished to carry it.

A meat saw was then obtained that consisted of three pieces; viz: handle, back, and blade fastened in grooves in the back. This proved unsatisfactory on trial, as the blade was not fastened sufficiently taut to keep it from diverging from its proper course in going through the horn, and there was no method by which it could be tightened and controlled.

Another meat saw was secured, made on much the same principle as Mr. Haaff's, only being much larger, with blade about one and a-half inch wide, and having a set screw on a pin that held one end of the saw. This pin was not round, so the end of the saw could not turn, yet the set screw enabled us to tighten up the blade as much as we pleased. This saw worked most satisfactory; first, because the blade could be properly guided; second, because of its much greater length than Haaff's saw, the horn could be cut off with more sweeping and effective strokes.

It has been mentioned that a fine cross-cut, hand saw would do for dehorning. If the steel is of first-class quality, and the saw to be used is such as is used with mortar-boxes, having a very stiff back, we see no reason why such a tool will not do very good work.

The other tools necessary besides a saw, are ropes or straps for binding. A strong five-eighths inch hempen or cotton rope, 20 feet in length, and another of three-eighths inch, preferably cotton, 10 feet long will be all that are necessary beyond the rope halter. However, if very ugly animals are treated, it will be well to have a strong half-inch rope in length 15 feet to assist in throwing.

Removing the horns. Having the animal securely fastened, the saw should be placed close to the base of the horn. Supposing the animal to be standing erect, with head in proper position, the saw blade should pass from the upper side, down laterally, or as close to the skull as possible without cutting the skin excepting perhaps one-half inch or less at the base of the horn, of the flesh which extends up it to a more or less extent.

It is essentially desirable not to remove the horn from an animal that is very much excited, as such are so much more difficult to handle. Until the work of the saw begins, moving about the animal should be done quietly. In sawing, the strokes of the arm should be firm, rapid and long as possible, and great care must be taken to keep the blade in the desired line, so that the lower part of the base of the horn will not be left more exposed from the head, than at the point where sawing began. Keep the upper part of the horn close to the stump, until entirely separated. By doing so the saw will be kept more firmly in its course, the ani-

mal will be given less pain, and blood will be less likely to be-spatter the person doing the work.

We have already stated that, the most satisfactory position for the animal, that we have found, is that of lying down and being firmly tied. In this position, with a clean turfy sod, or straw beneath the head, the upper horn is sawed off. Then, by means of the long rope, fastened to the feet, the animal is easily turned upon the other side, and the remaining horn removed.

Effects upon the animal system. The following notes are quoted from the records made of two animals that were dehorned Jan. 6. "A cow ten years old. The horns were sawed off as close to the head as possible, without cutting into the flesh at the base of horn. The animal apparently suffered but little, and bled but a comparatively small amount. From each horn spurted a tiny stream of blood a distance at least five feet, and in its motion could be discerned the pulse beat of the animal. In about five minutes the spurting entirely ceased, however, and but little blood passed off."

In the case of a two year old steer, "the animal bled profusely, and suffered more than the cow mentioned above. This was evidently owing to a layer of fleshy matter about the external, basal part of the horn, that was about one-third of an inch in diameter where the saw passed through. In both cases the horn was hollow, but the shell of the cow's horn was much thinner than that of the steer's, which was quite thick. The steer, after being unbound, remained lying down, making no attempt to move, nor would he for about a minute. However he recovered rapidly from the effects of the operation." Neither of these animals gave any cry of pain.

On January 13 the class in agriculture was taken to the farm, and assisted in dehorning two steers. One animal, four years of age, made no cry when sawing off one horn, but bellowed loudly, as though suffering, when cutting the second one. The other animal made no cry.

On February 24 a steer 22 months old, while being dehorned, bellowed somewhat, and trembled violently for a time after the operation.

In order to get some very positive data concerning the effects upon the animals, of the process of dehorning, the services of Dr. A. D. Galbraith, D. V. S., a regular graduate of the American Veterinary College, practicing in Knoxville, were secured. In company with him, on March 2, the horns were removed from four steers three years of age that were undergoing a feeding experiment. Dr. Galbraith witnessed the operation in every case, and took the temperature and pulse beat of each steer, immediately preceding dehorning, before the animal became at all excited,

then directly after removing the horns, and again some time later. Steers three and four had additional observations taken upon them. The Doctor also took the temperatures and pulse beats of these animals on the morning of March 3, and the afternoon of March 6.

Steer No. 1: Bled slightly, and did not bellow. Were 20 minutes doing the entire operation, from time of taking from barn, to return. Animal was unruly.

Steer No. 2: Bellowed some, and bled to a medium extent. Complete operation lasted 18 minutes. Animal unruly.

Steer No. 3: This animal bled badly, and bellowed loudly as though in severe pain or fright.

Steer No. 4: Did not bleed very badly, nor bellow. The entire operation, from first to last occupied 10 minutes.

The above four animals were strong and healthy, ranging in weight from 1,000 to 1,200 lbs. All of them had horns of 0001 size at the base, covered with a more or less amount of flesh.

The following are the figures obtained by the Doctor, which explain themselves:

1888.	STEER NO. 1.		STEER NO. 2.	
March.	TEMPERATURE	PULSE.	TEMPERATURE	PULSE.
	TIME.	TIME.	TIME.	TIME.
2	2:50 p. m. 98°	2:55 p. m. 60	3:00 p. m. 99°	3:00 p. m. 60
	3:35 p. m. 98½°	3:38 p. m. 140	3:58 p. m. 100½°	3:58 p. m. 101
	5:05 p. m. 101°	5:06 p. m. 80	5:10 p. m. 101½°	5:10 p. m. 78
3	8:00 a. m. 103¼°	8:05 a. m. 96	8:10 a. m. 100¼°	8:15 a. m. 84
6	3:15 p. m. 102°	3:17 p. m. 80	3:20 p. m. 101¼°	3:22 p. m. 78

1888.	STEER NO. 3.		STEER NO. 4.	
March.	TEMPERATURE	PULSE.	TEMPERATURE	PULSE.
	TIME.	TIME.	TIME.	TIME.
2	3:03 p. m. 99½°	3:03 p. m.	58 3:07 p. m. 98½°	3:09 p. m. 59
	4:45 p. m. 99¾°	4:47 p. m.	132 5:03 p. m. 101°	5:03 p. m. 102
	5:15 p. m. 102°	5:13 p. m.	90 5:17 p. m. 102¾°	5:16 p. m. 96
	5:27 p. m. 103°	5:27 p. m.	90 5:30 p. m. 102¼°	5:30 p. m. 96
3	8:20 a. m. 101°	8:20 a. m.	92 8:25 a. m. 100°	8:30 a. m. 90
6	3:25 p. m. 103¼°	3:30 p. m.	102 3:35 p. m. 102¼°	3:40 p. m. 90

A reference to these figures shows a very decided increase in temperature and pulse beat, even after four days. The most striking case occurred with steer No. 3, who bled the most severely of all, and who evidently suffered the greatest pain of any of the four. The increase in temperature, though slightest is noticeable.

These animals were dehorned on March 2nd. As before stated, they were a portion of six animals undergoing a feeding experiment, for beef production. Without here taking the kind of food into account, we present the following figures:

WEIGHTS OF FOUR STEERS.

March.	No. 1.	No. 2.	No. 3.	No. 4.
1	1,200 lbs.	1,170 lbs.	1,030 lbs.	1,155 lbs.
2	1,205 "	1,175 "	1,032 "	1,156 "
3	1,202 "	1,175 "	975 "	1,125 "
4	1,205 "	1,180 "	1,000 "	1,100 "
5	1,210 "	1,175 "	980 "	1,080 "
6	1,215 "	1,180 "	990 "	1,085 "
7	1,210 "	1,185 "	992 "	1,075 "
31	1,255 "	1,220 "	1,035 "	1,140 "

An examination of these figures gives the following results: No. 1 fell off three pounds the day after the operation, but the next day resumed his weight of the second day, and from then made a continual gain to the end of the month. No. 2 neither gained or lost in weight for one day, and thereafter made a steady gain. No. 3 shows a heavy loss on the third, a noticeable increase the next day, followed by another decrease on the second day after being dehorned, and thence after a constant gain. No. 4 shows the most striking loss in weight between March 2nd and 7th of the four animals, dropping from 1,156 to 1,075 lbs.

All of the above animals received the same kind of grain food, but 1 and 2 were fed ensilage, while 3 and 4 were given wheat straw, and this may account for the change in weight. Further, the rough food had been changed but recently preceding dehorning, 1 and 2 having been changed from straw to ensilage, and 2 and 3 from ensilage to straw. Hence these figures must be taken with consideration, and may not mean that the animals lost flesh from having undergone dehorning.

None of the four had much appetite for either water or dry feed at 6 p. m. of March 2nd, the day of dehorning, and No. 3 seemed somewhat indisposed for several days after. As late as April 1st one horn of this animal gave off a slight translucent, mucilaginous substance. It was further noted that those animals who appeared to suffer most from dehorning, handled the head carefully about the manger at first, and would shake it slightly at times during the three or four days succeeding the operation, as though it irritated them.

However, from the experience already had at the farm, the amount of suffering from dehorning depends very much upon the age of the animal, and the character of the horn, as we will endeavor to show in the plate on page 13.

A represents the horns from a steer of 22 months. These horns were cut off, and taken to a professional artist the same day and drawn in colors at once. The illustrations of the three sets are slightly reduced: In A, 1 is a thin, hard, oily appearing covering that entirely surrounds the bone; figure 2 is a thick, fleshy substance that extends a slight distance up the horn, this being the material that make so many horns thick at the base; this layer is quite yielding to the touch. Figure 3 represents the true bony tissue of the horn, with the cavity in the center; this tissue is very porous.

B, represents a cross section of the horns of an animal four years of age. The outer layer is 1; the next, or fleshy is 2, and 3 the inner bony tissue. B and C were drawn after the horns had been cut some days, so that the fleshy matter had shrunken some.

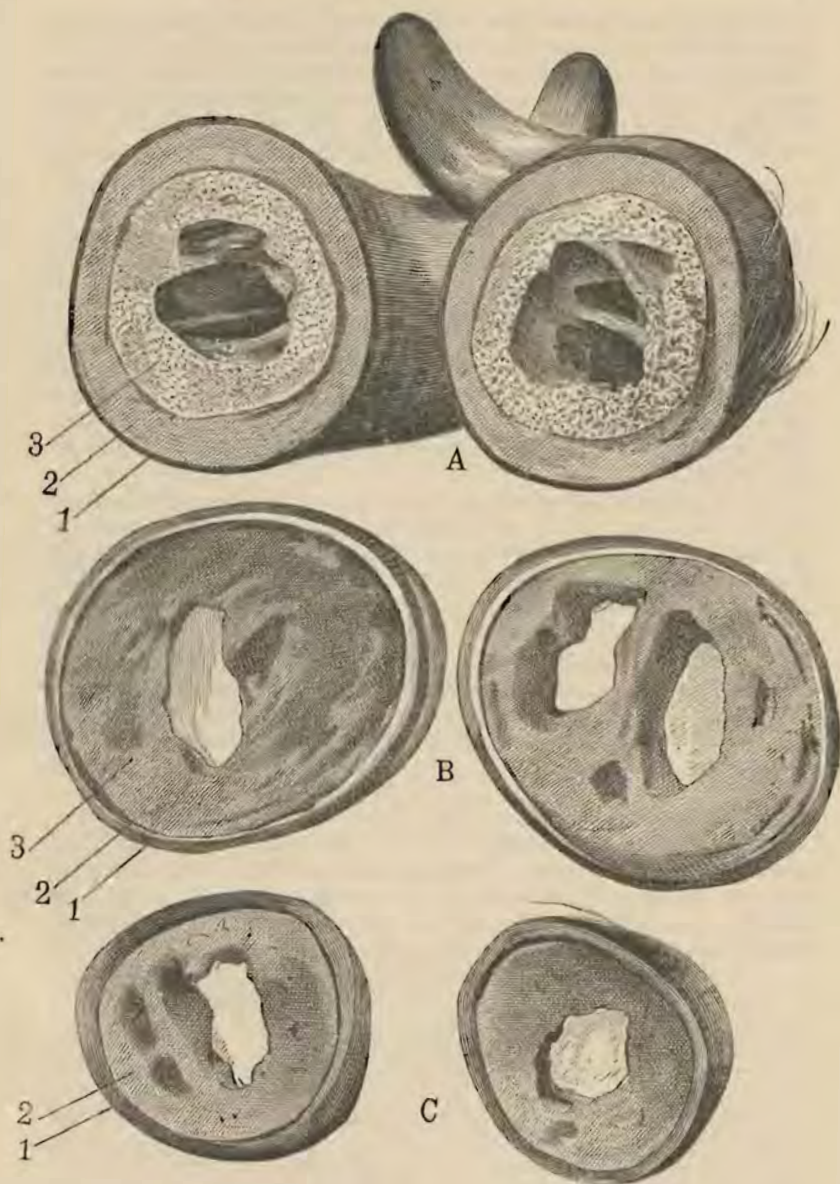


PLATE 1.—CROSS SECTIONS OF HORNS.

However, in an animal four years of age, in our experience, the layer of flesh about the base of the horn is not so thick as that in a younger animal. Further, the animal that appeared to suffer most from dehorning, was the steer 22 months old, whose horns are figured at A.

The horns shown at C are from a cow 10 years old, and present but two striking layers, viz: 1, the outer, hard, bony shell of the horn proper, and 2, the bony structure within. There was almost no flesh about the base of the horn. This animal appeared to suffer dehorning almost none at all. So far as our experience will enable us to judge, the three sets of horns, A, B, and C, represent distinct conditions of development, and that, the operation of dehorning becomes less and less painful, the more we approach C from A. While there is liability of the wounds about the stump of the horn, in A, becoming sore, and maturing for some little time, as occurred in the case of a steer the same age as that of A, they rapidly heal where the amount of flesh is very slight, as occurred with C.

In no case was any substance placed over the part of the horns left on the head. As soon as the horns were removed, the animals were returned to their stalls. The cavities in the stumps if left to themselves gradually fill up, first with blood and serum and later with bony tissue, and the hairs about the horns gradually cover the stumps.

The veterinary surgeon in attendance during the dehorning of the four animals under experiment, was requested to give his professional opinion, in writing, concerning the general physical effect upon the animals, from thus sawing off the horns. His letter was as follows, this being a true copy:

KNOXVILLE, TENN.

As I am called upon to give my opinion as to dehorning cattle, I will say the operation, of amputating the horns, is very painful and not infrequently followed by evil results. It is surely a cruel practice, excepting for disease, fracture, faulty direction, deformity, and to diminish damages from vicious cattle.

Respectfully,

A. D. GALBRAITH, D. V. S.

Why dehorn? The last sentence in the statement of Dr. Galbraith explains why dehorning is practiced. Where several animals are turned together, a "master" usually is found, that uses its horns remorselessly upon the others. In such cases more or less harm comes from fighting in the way of breaking horns, hooking, etc. Further, a strong master cow will easily keep from the hay rack or water trough, a dozen others, until she is ready to go. Such a

herd of cattle is constantly quarreling, always on the move, never peacefully quiet, excepting at wide range. By removing the horns from the most powerful and vicious of these animals, the entire herd can be made more peaceful.

Twenty polled animals, will occupy, the claim is made, less room either in stalls or in shipping than the same number having large horns.

The reason for the removal of horns from the bull is very evident—simply to make the animal more defenseless, and give the herdsman better protection. A considerable number of human lives are lost each year on account of vicious bulls.

Certainly, we must admit that it is much pleasanter to feed in the manger, a polled animal, than one with long horns.

In conclusion, the prime object of this bulletin is to bring out clearly, certain facts that heretofore have been rather obscure concerning this practice of dehorning. We present the evidence as we found it. It seems clear that there are circumstances in which it is better for certain animals to be without, rather than with horns, but as to which ones, no person is so capable of judging as the one having the care of the herd. At the present time, while dehorning is being very extensively practiced in the great cattle regions of the West where beef animals are raised, but little is said in favor of removing horns from high quality, pedigreed, breeding animals. To show the extent to which this practice is being conducted, we quote as follows :*

"At the farmer's institute at Bloomington, Ill., Mr. John Evans, of El Paso, speaking on the subject, said that, since October 1, (1887) he had dehorned 3,552 cattle. Mr. Gifford of McLean said he had dehorned over 1,000."

In the *New England Homestead* of March 10, 1888, Mr. G. S. Fisher says: "In October 1886, I personally saw 120 head of cattle dehorned in Nebraska, and not one of them moaned, even under the operation, and as fast as turned out immediately went to feeding.

In the same journal for March 24, 1888, C. F. Riston, Jr., of Illinois, says: "Those dehorned between 200 and 300 head myself without a single bad case."

In the *Country Gentleman* for Feb. 23, 1888, M. D. Tallett, of Ottawa county, Kansas, says about 700 head of cattle have been dehorned in his neighborhood since last fall. In December, 1887, he assisted in dehorning 30 head of cattle, of all ages, from four months up. The cows did not shrink in milk more than one milking, and all did well. Albuminous matter ran from the holes quite profusely for about four weeks, and then all healed over.

**Prairie Farmer*, 1888, p. 157.

Mr. T. has yet to hear of a single dissatisfied person who had the horns removed from his cattle.

Summary. A review of the preceding matter, based on our own experience, indicates:

1st. The most desirable method of fastening an animal for dehorning, so as to keep it satisfactorily quiet, is to cast it, bind the feet firmly together, and hold the head in a halter, close to the ground, either by the hands, or by placing a plank across the neck. To then remove the horn uppermost, and by means of a rope of sufficient length, fastened where the feet come together, to turn the animal upon the other side, and remove the remaining horn.

2nd. For removing the horns, an ordinary meat saw, with a set screw in the end of the blade furthest from the handle that will enable the blade to be tightened, but not to turn from side to side, is perfectly satisfactory. A strong running-noose rope halter, and and about 20 feet of five-eighths and 10 feet of three-eighths inch rope are also necessary.

3rd. The horns should be removed as close to the head as possible, without cutting the skull proper. It is best to cut down from one-fourth to one-half inch of flesh, at the base of the horn. The sawing should be done rapidly, and with long sweeps of the arm if possible.

4th. Animals one and two years of age appear to suffer considerably in dehorning. The painful effects decrease with increase of age, so that an animal 10 years old may suffer but very little. This is owing to the layer of flesh surrounding the base of the horn, which is much thicker in young than old animals. Dehorning causes an abnormal increase of pulsation and temperature, which extends over several days. The appetite is also affected during the 24 hours succeeding the operation.

5th. Dehorning is more especially to be recommended for those animals that are of vicious temperament, that are what are termed "masters"; to be applied to bulls, and to beef animals that are to be kept quiet and closely stabled or shipped.

6th. From evidence quoted from other sources, it appears that dehorning is not necessarily a cruel practice, but may be conducted to promote ends that are both humane and desirable in live stock breeding.

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Hunting 1882-1900 Page 7



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THIRTEENTH ANNUAL REPORT
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Packages by express, to receive attention, should be prepaid.

All communications should be addressed to the

AGRICULTURAL EXPERIMENT STATION,

Knoxville, Tennessee.

 The experiment station building, containing its offices, laboratories and museum, and the plant house and horticultural department, are located on the University grounds, 15 minutes walk from the Custom House in Knoxville. The experiment farm, dairy barn, stables, milk laboratory, etc., are located one mile west of the University, on the Kingston pike. Farmers are cordially invited to visit the buildings and experimental grounds.

Bulletins of this station will be sent, upon application, free of charge, to any farmer in the state.

REPORT OF THE AGRICULTURAL EXPERIMENT
STATION OF THE UNIVERSITY OF TENNESSEE
FOR 1900

To His Excellency, Benton McMillin, Governor of Tennessee:

Sir: I have the honor to submit herewith a report of the work and expenditures of the agricultural experiment station of the University of Tennessee for the calendar year 1900.

The agricultural experiment station has continued to make great progress during the past year. A number of improvements have been made in buildings, the most important one being the erection of a dairy laboratory. This laboratory has been fully equipped with boiler, engine, and apparatus for milk testing and for butter and cheese making. This laboratory supplements the excellent dairy barn erected the year before and completes our equipment for experimental work in this line, and also enables us to give thorough instruction in all subjects connected with dairying.

At a recent meeting of the board of trustees the office of vice-director was established in the experiment station and Professor Andrew M. Soule was elected to the position. M. Jacob has been appointed consulting veterinarian of the experiment station. Otherwise, the officers remain as before.

An experimental fruit farm has been established upon the north farm of the University. The location is a desirable one for fruit and vegetables, being on the crest and sides of a ridge extending east and west and thus affords northern, eastern and southern slopes adapted to the growth of different kinds of plants. This farm has been planted to 44 varieties of seedling apples and several varieties of other apples, 12 of peach, five of plum, three of cherry, four of quince, and many varieties of strawberries, raspberries, blackberries, currants, and gooseberries. This farm will be further enlarged and other plantations will be made this season. The fruit farm consists of eight acres. The greenhouse of the horticultural department has been rebuilt and enlarged during the year and rooms for grafting and potting have been added.

During the past year the chemist of the experiment station has conducted some very interesting experiments with fertilizers

upon typical soils and with different crops. He plans to develop a series of cooperative experiments with farmers, which are sure to be profitable to them and interesting to all.

All of the officers of the agricultural experiment station and several of those from other departments of the University have aided in the work of farmers' institutes conducted by the state commissioner of agriculture. Two or more members of the University have thus attended 30 institutes during the two years. Through these meetings and through the publications of the agricultural department the work being done for practical agriculture, horticulture and dairying and that of the chemical and botanical laboratories has been made available for the farmers of the state, with the result that they are manifesting more interest in our experiments than ever before.

As a result of the admirable work of the experiment station an earnest desire is being manifested in both Middle and West Tennessee for a branch experimental farm under the direction of our officers. This is a compliment which we appreciate, and should the necessary land, buildings, equipment and funds be provided this board pledges itself now to furnish the proper scientific direction and supervision and to publish the results.

INSPECTION OF NURSERY STOCK

At the earnest solicitation of the growers of nursery stock the board of trustees authorized the entomologist of the experiment station several years ago to inspect such nurseries in the state as might apply for his assistance in protecting their trees against the San Jose scale and other pests. Neighboring states into which our growers ship their stock have laws requiring that the stock be inspected or certified as pure. A few nurseries in Tennessee have unfortunately become infected with the San Jose scale, with the result that all our stock is under suspicion. This assistance was rendered our growers as a means of guarding their nurseries and meeting the requirements of the state into which they shipped trees.

As this inspection could not be efficiently enforced without a law and a small appropriation to cover expenses the entomologist was instructed to draw up a law and submit it to the fifty-first general assembly. This was done and a law copied after that of our neighboring states was submitted to the agricultural committees of the general assembly. Although the matter was

earnestly advocated by the growers nothing was done with regard to it.

This board has never had any responsibility with regard to this matter, but only allowed its entomologist to inspect these nurseries for the accommodation and assistance of the owners of stock. It was soon found that without a law to enforce it this inspection amounted to nothing.

The entomologist of the station resigned on July 1, 1899, and owing to the pressure upon our means for other agricultural work no successor has yet been appointed. After the failure of our effort to secure a law and the resignation of the entomologist application was made to us by growers for private assistance in caring for their own stock, and Mr Chambliss, the former entomologist of the station, was authorized and consented to act in this capacity, provided the owners would meet the necessary expenses.

The experience of the last two years has taught us, however, that it is utterly impossible to accomplish anything with regard to this matter without legislative and financial support. There is nothing to prevent infected nurseries from shipping their trees into other states, with the result that the stock is destroyed and the reputation of all Tennessee stock greatly injured. Many thousand trees have recently been destroyed in this way in the state of Georgia. Under the circumstances this board can not afford to have any officer connected with it act in regard to the matter, and it has therefore been constrained to withdraw its inspector. It is wrong to try to do what it is impossible to do, especially when one is liable thereby to be held responsible for mistakes which can not be prevented.

The board would earnestly call the attention of the legislature to the apparent demands of the situation and assure you that it will give it pleasure to cooperate with the state whenever the means and the authority are provided. We can suggest nothing better for the protection of our nurseries than the act submitted to the last general assembly, a copy of which will be forwarded whenever asked for.

Four regular bulletins have been published during the year, as follows:

VOL. 13

- No. 1 Frost protection. Climate of Tennessee.
 2 Experiments with winter wheat.
 3 Fertilizer experiments on potatoes, corn, cowpeas, peanuts and effects of fertilizers on the germination of seeds.
 4 Feeding native steers.

Six press bulletins have also been published, as follows :

- No. 14 Grades on country roads.
 15 Calf feeding.
 16 Live stock problems.
 17 Winter gardening. Winter violets.
 18 Advantages of dairying.
 19 Formulas for spraying mixtures.

As a further means of interesting and instructing the farmers an agricultural handbook has been published and distributed to all persons applying for it. This handbook contains articles on subjects of practical importance to Tennessee farmers, fruit growers, dairymen and stockmen. The second number is now in the press. Copies of these handbooks, together with the bulletins and reports of the agricultural experiment station, have been mailed to every member of the general assembly as an exhibit connected with this report. You are requested to examine them carefully, as they furnish the best means of informing you with regard to the excellent work of this and the related departments.

As this is the last report of the century the president has prepared a history of the experiment station since its beginning. This experiment station was established by this board of trustees June 8, 1882, about five years before the Hatch experiment station act was passed by congress. While the national experiment station has completed its thirteenth year, the experiment station of this University has completed its eighteenth. The interesting history of this, which was one of the first stations established in America, is given in the paper attached hereto.

Attention is called to the reports of the agriculturist, botanist, horticulturist, chemist, librarian, and meteorologist appended to this report. Respectfully submitted for the board,

CHARLES W. DABNEY, President.

HISTORY OF THE TENNESSEE EXPERIMENT STATION 1882 TO 1900

The agricultural college was founded in 1869. The college farm was bought the same year. The agricultural experiment station of the University of Tennessee grew out of its school of agriculture, horticulture, and botany, which was founded in the year 1870. The first man in this chair was Prof. Hunter Nicholson.

The first conception of an agricultural college was that of the manual labor school or a place where young men should be taught the practical operations of the farm. This policy never prevailed here, but for many years it was not understood anywhere what should be taught in such a college.

The experimental work of this school was established on a large scale by Prof. J. M. McBryde, now president of the Virginia college and director of its experiment station, who was at its head from June, 1879, to June, 1882. Much valuable experimental work was done during this period, and three reports of nearly 200 pages each were published giving the field experiments with wheat and feeding experiments conducted upon the farm. This work attracted wide attention and led to the establishment of the station as a department of the University on June 8, 1882. This was done by the board of trustees unaided from any source whatsoever. This action of the board under these circumstances and at this time exhibited a most patriotic and progressive spirit. The few other experiment stations in this country had been established with state appropriations. The board of trustees of the University of Tennessee was the first one and with the exception of Cornell university the only corporation who ever took upon themselves the responsibility of establishing a station without any special endowment. It was one of the first five experiment stations in America which by their good work fastened the attention of the people of the country and secured the magnificent recognition of this type of institution expressed by the Hatch experiment station act of congress. For this reason this action of the board of trustees deserves to be noted in the history of agricultural science in this country. According to the resolution of the board adopted at this time, the object of the experiment station was to be "the promotion of the agricultural interests of Tennessee by practical and scientific experimentation and investigation." This has been the guiding principle in the administration of this station, the advancement of Tennessee agriculture.

The only assistance ever received from the state was a small allowance made by the bureau of agriculture for defraying the expenses of analyses of fertilizers, soils and agricultural products made at the station for that bureau. This was only paid for a few years and ceased entirely in 1897.

Prof. John W. Glenn succeeded Dr McBryde as professor of agriculture, horticulture and botany, and became the first director of the station in June, 1882. He held the office until June, 1887. On July 24,

1887, Dr Chas. W. Dabney, director of the North Carolina station, was elected director of the Tennessee experiment station with authority to propose a plan and nominate officers for the reorganization of the station under the Hatch act. Prof. Chas. S. Plumb, now director of the Indiana experiment station, was appointed professor of agriculture and agriculturist to the station and entered upon his duties October 11, 1887. Dr W. E. Stone, now president of Purdue university, the land grant college of Indiana, was elected chemist, and Prof. F. Lamson-Scribner, now agrostologist of the United States department of agriculture, was chosen botanist and horticulturist. Dr Dabney served as director until 1890, when Prof. Scribner was elected director. He served until 1892. The staff was reorganized in July, 1892, at which time Dr Chas. W. Dabney



THE FARM OFFICE

was made director as well as president of the University, and Prof. Chas. F. Vanderford, who had succeeded Prof. Plumb as professor of agriculture, was made secretary. Prof. S. M. Bain, the present professor of botany and botanist of the station, succeeded Prof. Scribner in 1892. On the death of Prof. Vanderford, January 3, 1899, Prof. Andrew M. Soule was elected professor of agriculture and agriculturist of the experiment station, and he entered upon his duties May 1, 1899. Prof. R. L. Watts, who had been elected horticulturist, succeeded Prof. Vanderford as secretary of the experiment station. Prof. Watts resigned September 20, 1899, and was succeeded as professor of horticulture and horticulturist by Charles A. Keffer. F. H. Broome was appointed acting secretary and

continues to serve in this capacity. Lucius P. Brown succeeded Dr Stone as chemist, and he was followed by J. B. McBryde, who resigned July 1, and was succeeded by Chas. A. Mooers. To the chemist has been assigned recently the supervision of cooperative experiments with fertilizers. The station staff has been further strengthened by the addition of George A. Flickinger, assistant in charge of the dairy laboratory, and Phares O. Vanatter, assistant in charge of plot work.

The station is governed by the board of trustees, who appoint a committee to have immediate charge of its affairs. The staff consists of the president of the University, the agriculturist, botanist, horticulturist, chemist, farm manager, dairyman, plot expert, meteorologist, librarian and secretary, gardener, and stenographer. The president is the executive officer of the experiment station and directs the work of its different branches.

The station buildings consist of the Morrill Hall on the University grounds, an office building at the farm, a cottage, two barns, an old and a new one, a dairy building, a greenhouse, and some small farm buildings. Morrill Hall, the main building, was erected in part in 1882 and completed in 1888. It is a two-story brick building, the old part being 30x60 feet and the addition 40x60 feet, and contains the laboratories of chemistry, botany, horticulture and soil physics; the herbarium, museum, library, two lecture rooms, four offices, photographic department, etc. The office building at the farm contains work and seed rooms, office and laboratory, and some lodging rooms for the assistants. A frame cottage is occupied by the farm manager. The old barn contains the horse stable, the stable for fattening beef stock, mows for hay, fertilizer bins, and tool and implement rooms. The large new barn contains the cow stable, the silos, storage barn, and threshing and seed rooms; and a wing contains additional wagon and tool rooms and sheds for sheep and hogs. The green house has been recently enlarged by adding grafting and potting rooms thereto. The farm consists of two tracts known as the south farm or "college farm," consisting of a little over one hundred acres, and the north farm, consisting of nearly one hundred acres. The latter, which was unimproved for sometime, was recently turned over to the horticulturist and the chemist for a fruit and experimental farm. About one-half of this is still covered with a young forest growth. Ten acres have been planted in apples, cherries, quinces, plums, pears, etc. A hundred trees representing 40 varieties of Tennessee seedling apples are among the most interesting growths. Trial plantings of strawberries, blackberries, gooseberries, and currants have also been made. A vineyard is provided for experimental purposes.

The south farm is devoted to the experimental field work of the division of agriculture. Twenty acres are occupied by a series of about eight hundred uniform test plats. Seventy acres are devoted to more extended field tests. The station owns 30 cows, four calves, six horses, three mules, 15 head of beef stock, and other stock purchased from time to time as necessity required. It also has a full equipment of agricultural implements of all kinds, including thresher, cutter and shredder, etc. The



GENERAL VIEW OF THE PLATS AND THE ROAD

new dairy building deserves special mention. It was erected and equipped during 1900 at an expense of \$10,000. It is about 40x80 feet, with boiler and engine room 25x31 feet, and contains 4,000 square feet of floor space. It is a one-story brick building, with marble trimmings and cement floors, and contains nine rooms, each devoted to a special purpose. It is fully equipped with machinery for experimental dairy work, including milk and cream vats, separators, sterilizers, pasteurizers, bottling machines, churns, and butter workers. It has a refrigerator and cheese room. The building is heated throughout by steam and lighted by electricity.

The division of botany has an herbarium of 25,000 specimens, including a fine collection of fungi, 500 lantern slides, and full equipment of apparatus of all kinds for work in physiological botany. The station has also a collection of over 5,000 insects and 400 bottles of alcoholic materials.

The separate station library contains about 2,350 volumes and 3,500 pamphlets, besides 5,000 unbound bulletins and reports of other experiment stations and the United States department of agriculture. The station has also a collection of over 1,000 photographic negatives of experiments, plants, animals, etc., taken in the course of its work, which forms a valuable part of its record. It also has about 200 soil samples of Tennessee and many specimens illustrating the flora and fauna of the state.

The United States weather bureau has established a station at the University of Tennessee in connection with the station and equipped it in an admirable manner. The weather observer is meteorologist of the station and the equipment of the office is at the disposal of the station for its use. There is also an equipment of weather instruments at the station farm. The main features of the equipment of the station are shown in the accompanying illustrations of buildings, laboratories, and barns.

VALUE OF BUILDINGS AND EQUIPMENT OF THE AGRICULTURAL DEPARTMENT AND EXPERIMENT STATION

With the exception of a portion of the station building, which cost \$2,500, and the old barn and the cottage at the farm, all of this equipment has been provided since the organization of the Hatch experiment station in 1888, and the bulk of it has been paid for from general funds of the University. The value of this building and equipment as it stands at present is as follows:

Station building and equipment	\$19,000
Greenhouse and horticultural equipment.....	1,300
Old barn and equipment	1,000
New barn and equipment	5,450
Old dairy house	200
New dairy building and equipment, including loaned machinery \$2,000	10,000
Office building and equipment	6,000
Cottage	600
General farm equipment, including live stock	3,600
	\$47,150

Under the law, only \$3,000 out of the first annual station appropriation and \$750 out of each one since could be used for buildings and repairs. The reports of the treasurer for each year show that only \$10,618.41 has been spent in 12 years from the Hatch fund for building and repairs. Deducting this from the total amount for buildings, we have the amount of \$11,447.59 provided from the general funds of the University. All of the income from the college farm goes back upon it and is used exclusively in its maintenance or the improvement of its property and equipment and aiding agricultural students. This income has varied from \$1,100 to \$3,000 a year. The gross returns from the farm for the year 1899-1900, were \$3,769.62 and were the largest in its history.

It is impossible in so brief a space as that here allowed to describe all the work of the station during the last 12 years. Its scope will be shown in a general way by the titles of the bulletins published. The work of chief importance since the station was established has been the investigation and development of the agricultural resources of the state. Plans were early made for studying the climate and soils, the flora and fauna of Tennessee, with special reference to the development of its agricultural, horticultural, and animal industries. Among the more important published reports on this subject are those on the soils of the state, with a soil and products map, one on the grasses of the state, one on seedling apples of Tennessee origin, and one on the native grown feeding stuffs of the state.

The station commenced its survey of the soils of Tennessee in 1891. A preliminary soil map was prepared and typical samples of many of the virgin soils were collected and analyzed both chemically and physically. Notes were made at each place upon the geology, flora and fauna, agricultural methods and products. A large relief map of the state was made, colored and lettered to correspond to the geology and soils of the state. This magnificent miniature of Tennessee is preserved in the station as a subject of study.

In a similar manner a thorough study has been made of the grasses of Tennessee. The results of this investigation have appeared in two reports, one upon the botanical features and the other upon the agricultural features and uses of our Tennessee grasses and forage plants. Illustrations were especially drawn for the botanical report from specimens in the station herbarium. During the progress of this work a grass garden was carried on which still exists in part.

A systematic study has been made of Tennessee seedling apples which were reported to be valuable but unknown outside of the immediate vicinity of their origin. The fruits were collected and compared and the most promising varieties were described and figured and thus brought before the public.

Among the minor crops which have been studied in like manner have been the peanut and the cowpea. The cowpea has been thoroughly studied in all its relations with other plants like corn and sorghum and as to its methods of cultivation and the best methods of using it and its several parts.

A careful study has been made of cotton seed meal and cotton seed cakes produced in Tennessee. A comparison has been made of the average composition of southern feeding stuffs and American feeding stuffs in general. A thorough study was also made of the cotton plant from the chemical point of view. Analyses were made of all the different parts of the plant, determinations of the relative amounts of each of these parts, and calculations of the fertilizer constituents contained in the average crop and of the cotton seed and its products.

Feeding experiments have been carried on at various times to determine the best method of producing beef, the average cost of milk produced by cows of different breeds under like conditions, to compare the milk yield of thoroughbred and grade cows, to compare the feeding value and effect of different feeding stuffs, especially of cowpea hay, cowpea and sorghum hay, and cowpea and maize mixed, cotton seed meal and hulls, producing both milk and beef.



INTERIOR OF DAIRY BARN

Cultural and variety tests have been made with potatoes and cereals; cooperative experiments have been carried on to determine the value of different feed stuffs, sugar beets, fruits and grains; and more recently different kinds of fertilizers have been tested upon different typical soils.

In the horticultural division cultural and variety tests have been made with small fruits, tomatoes and vegetables, grown both out of doors and under glass. Special attention has been paid to tomatoes, strawberries and grapes. A study has been made of the American and Japanese persimmons and their culture. Experiments in forcing lettuce were carried on for some years with excellent results in teaching gardeners how to grow and prepare the plant for market. A study of the wild onion, a weed which gives much trouble in some parts of the state, has been made.

Important investigations have been made on the diseases of the potato and grape and diseases of the Irish potato due to nematodes were first

described by the botanist. Prof. Scribner of this station, in cooperation with a French investigator, M. Viala, first determined the nature of the black rot of the grape and prepared the first official circular recommending the use of Bordeaux mixture published in the United States. Some of the experiments upon which these valuable reports were based were conducted at the Tennessee experiment station. For these great discoveries, now applied throughout the world, Prof. Scribner was decorated by the French government with the order of the Legion of Honor. The present botanist is making a study of the effect of various fungicides on peach foliage. The experiment station made an exhibit illustrating its soil survey, and of its grass survey of Tennessee at the Paris Exposition of 1900. Gold medals were awarded both portions of this exhibit, which, at the request of President Dabney, were issued in the names of Charles F. Vanderford, deceased, for the soil survey and Col. J. B. Killebrew, grass expert of the station, for the exhibit of work on the grasses of Tennessee.

For a number of years the station held farmers' institutes in different sections of the state wherever invited. Since August, 1899, it has cooperated with the commissioner of agriculture in holding these institutes, and during this time members of the staff have visited 30 institutes. Generally three members of the station staff give illustrated lectures at each institute. At some of them, exhibits illustrating the work of the station have been made.

PUBLICATIONS

During the 13 years since the organization of the Hatch experiment station 59 bulletins and 13 annual reports have been issued, besides many special bulletins, press bulletins, posters, and circulars. The regular bulletins and reports have contained in all 1,879 pages. The average edition of each of these publications was about 7,000 copies, not including press bulletins, which were issued in even greater editions. During the 13 years we have sent out 465,000 copies of reports, bulletins, and handbooks, not including press bulletins and specials. All of these have been distributed free of charge to Tennessee farmers whose addresses are sent in. The station has thus distributed over 13,000,000 printed pages discussing different subjects in scientific agriculture, horticulture, dairying, and animal husbandry. A list of the bulletins and reports is appended hereto. The mailing list consists of over 9,000 names.

In concluding this brief report of the work of the experiment station during the last 13 years we will quote the following judgment of the general results of its work from the report of the director of experiment stations of the United States made to the secretary of agriculture in 1900 (Bulletin 80, page 413): "The Tennessee station has performed an important work in its studies of the soils, grasses, and other natural conditions on which the agriculture of the state is based. It has shown the causes of the deterioration of soils and the methods by which they may be improved. It has promoted the diversification of agriculture by the introduction of grasses and forage plants, the extension of tobacco.

potato, and peanut growing, the development of the growing of small fruits and grapes, and the advancement of farm dairying and general stock industries. Its chemical investigations of the cotton and peanut plants and their products have been of general importance and have aided the wider use of these products as feeding stuffs. It has greatly aided the horticultural interests of the state by showing how black rot of grapes and other diseases of fruits, as well as injurious insects, may be repressed by spraying with fungicides and insecticides. It has done much to teach the farmers the discriminating use of commercial fertilizers and farm manures."

INSTRUCTION IN AGRICULTURE

Instruction in agriculture has gone on steadily and has grown much more popular and been greatly broadened in recent years. It is unnecessary to discuss again at this place the difficulties of inducing young men to study agriculture as a profession, but the disposition to enter farm life is increasing and we were never so much encouraged as now.

These institutions were founded not merely to teach practical agriculture, but to teach all of the sciences pertaining to agriculture and the mechanic arts. It is very unfair, therefore, to measure their work by the number of students who make agriculture the special thing. Hundreds of students have studied the sciences pertaining to agriculture here during the last 12 years who will become actual farmers, although they were not planning to do so at the time. It is a matter of common observation that a great many young people try to prepare at college for the so-called learned professions or for commerce but abandon these pursuits and return to the farm after a few years. It is of some interest, however, to ascertain how many students have announced upon coming to college their purpose to study agriculture as a specialty. If we examine the list of those who studied in the schools of practical agriculture and horticulture alone, there were only 10. Our encouragement is drawn from the fact that whereas there were only 10 students in practical agriculture in 1887-'88 there were 91 who elected studies in this school during the session 1899-'00. The school of horticulture was not established as a separate one until 1897. A list of those who have studied the sciences pertaining to agriculture would include three-fourths of all the students who have attended the institution during this period.

To sum up the progress of agriculture in the University, considering the station and the department of agriculture as one, we have in the 12 years invested \$47,150 for the improvement of our plant for teaching and investigating in agriculture and horticulture alone, not including the investment in chemical laboratories and other "sciences pertaining to agriculture," as against \$23,438 invested in the plant for teaching mechanic arts alone. We have increased our corps of officers and instructors from seven to 13 and have increased the number of students studying practical agriculture and horticulture from 19 in 1887-'88 to 91 in 1899-'00.

CHARLES W. DABNEY, President.

December 31, 1900.



PARTIAL VIEW OF THE PERMANENT AGRICULTURAL EXHIBIT

PUBLICATIONS OF THE TENNESSEE EXPERIMENT
STATION, 1882-1900

Publications	Title	Author
1882		
Report	Experiments in wheat culture, ensilage, and other crops. Top dressings on clover and grass.	J. M. McBryde.
1884		
Bulletin 1	Analyses and tests of manures and fertilizers for 1883-84.	J. W. Glenn.
Biennial Report. 1885-86	Biennial report, 1883-84.	
Report	Wheat culture and forage crops.	J. W. Glenn.
Biennial Report.	Biennial report, 1885-86.	
Biennial Report. 1888	Biennial report, 1886-87.	
Bulletin Vol. I		
No. 1	Dehorning cattle. History and reorganization.	C. S. Plumb.
No. 2	The experiment station; building and laboratories; germination of seed corn; analyses of commercial fertilizers.	C. W. Dabney and C. S. Plumb.
No. 3	Weeds of the farm.	F. L. Scribner and C. L. Newman.
Annual Report 1889	First annual report, 1888.	
Bulletin Vol. II		
No. 1	Notes on fertilizers and fertilizing materials.	W. E. Stone.
No. 2	Diseases of the Irish potato.	F. L. Scribner.
No. 3	Cotton-seed hulls and meal as food for live stock.	W. E. Stone.
No. 4	Grasses of mountain meadows and deer parks. Chemical composition and tests of varieties of strawberries.	F. L. Scribner. W. E. Stone.
Special Bulletin A	The army worm, how to prevent its ravages on cotton.	
Special Bulletin B	Analyses of commercial fertilizers.	W. E. Stone.
Annual Report 1890	Second annual report, 1889.	
Bulletin Vol. III		
No. 1	Experiment in growing potatoes.	C. S. Plumb.
No. 2	Field experiments with barley, corn, oats, wheat, sorghum and clover.	C. S. Plumb.
No. 3	Points about country roads.	W. W. Carson.
No. 4	Practical experiments in reclaiming "galled" or washed lands; notes on mulch and mulch materials.	P. F. Kefauver.

PUBLICATIONS OF EXPERIMENT STATION—*Continued*

Publications	Title	Author
1890—Cont.		
No. 5	Fruit trees at the experiment station.	R. L. Watts.
No. 6	Index to Vol. I, II and III.	
Special Bulletin C	The treatment of certain fungus diseases of plants.	F. L. Scribner.
Special Bulletin D	Potash and paying crops.	
Special Bulletin E	The cotton worm; the Hessian fly.	H. E. Summers.
Annual Report	Third annual report.	
1891		
Bulletin Vol. IV		
No. 1	Crab-grass hay; sorghum as a forage plant; test of feed value of first and second crops of clover; pasture grasses; black knot of the plum and cherry; pruning fruit trees; the glassy winged soldier bug; diseases of live stock; experiment station record.	C. W. Dabney, et al.
No. 2	The peanut crop of Tennessee, statistics, culture, and chemistry.	L. P. Brown.
No. 3	The true bugs or heteroptera of Tennessee.	H. E. Summers.
No. 4	Some fungus diseases of the grape.	F. L. Scribner.
No. 5	A chemical study of the cotton plant.	J. B. McBryde.
Annual Report	Fourth annual report, 1891.	
1892		
Bulletin Vol. V		
No. 1	Fruit trees and experiments with vegetables.	R. L. Watts.
No. 2	Grasses of Tennessee, I.	F. L. Scribner.
No. 3	A contribution to the study of the economics of milk production.	C. F. Vanderford.
No. 4	Experiments with fruit trees and vegetables.	R. L. Watts.
Annual Report	Fifth annual report, 1892.	
1893		
Bulletin Vol. VI		
No. 1	Some injurious insects of the apple.	C. E. Chambliss.
No. 2	Rational use of feeding stuffs; winter dairying in Tennessee.	C. F. Vanderford.
No. 3	Small fruits; strawberries, raspberries, blackberries and grapes.	R. L. Watts.

PUBLICATIONS OF EXPERIMENT STATION—*Continued*

Publications	Title	Author
1893— <i>Cont.</i>		
No. 4	Field experiments with tomatoes and onions.	R. L. Watts.
Annual Report 1894	Sixth annual report, 1893.	
Bulletin Vol. VII		
No. 1	Grasses of Tennessee, II.	F. L. Scribner.
No. 2	Fruits: Grapes, strawberries, raspberries, blackberries, pears, apples and peaches.	R. L. Watts.
No. 3	Cooperative experimentation.	
No. 4	Dehorning cattle; notes to correspondents.	
Annual Report 1895	Seventh annual report, 1894.	
Bulletin Vol. VIII		
No. 1	Spraying apparatus.	R. L. Watts.
	Insecticides.	C. E. Chambliss.
	Fungicides; spraying calendar.	S. M. Bain.
No. 2	The wild onion.	R. L. Watts.
No. 3	Some experiments with fungicides on peach foliage.	S. M. Bain.
No. 4	The Chinch bug (<i>blissus leucopterus</i>).	C. E. Chambliss.
Annual Report 1896	Eighth annual report, 1895.	
Bulletin Vol. IX		
No. 1	Apples of Tennessee origin.	R. L. Watts.
No. 2	Strawberries.	R. L. Watts.
No. 3	A contribution to the study of southern feeding stuffs.	J. B. McBryde.
No. 4	Varieties of grapes.	R. L. Watts.
Annual Report 1897	Ninth annual report, 1896.	
Bulletin Vol. X		
No. 1	Apples of Tennessee origin (Second report).	R. L. Watts.
No. 2	Pot culture of lettuce.	R. L. Watts.
No. 3	The soils of Tennessee.	C. F. Vanderford.
No. 4	Scale insects: San Jose and other species.	C. E. Chambliss.
Annual Report 1898	Tenth annual report, 1897.	
Bulletin Vol. XI		
No. 1	Persimmons.	R. L. Watts.
No. 2	Grasses and forage plants: I. Domesticated grasses.	J. B. Killebrew.
No. 3	Grasses and forage plants: II. Leguminous plants.	J. B. Killebrew.
No. 4	Grasses and forage plants: III. Meadows and wild pastures.	J. B. Killebrew.
Annual Report	Eleventh annual report, 1898.	

PUBLICATIONS OF EXPERIMENT STATION—*Continued*

Publications	Title	Author
1899 Bulletin Vol. XII		
No. 1	Stock interests.	Andrew M. Soule and George A. Flickinger.
No. 2	Soil and fertilizers.	Andrew M. Soule and Chas. A. Mooers.
No. 3	Horticultural work.	Charles A. Keffer, Chas. A. Mooers and R. H. Garrahan.
No. 4	Forage.	Andrew M. Soule, John R. Fain and Phares O. Vanatter.
Annual Report 1900	Twelfth annual report, 1899.	
Bulletin Vol. XIII		
No. 1	Frost protection. Climate of Tennessee.	Weston M. Fulton.
No. 2	Experiments with winter wheat.	Andrew M. Soule and Phares O. Vanatter.
No. 3	Fertilizer experiments on potatoes, corn, cowpeas, peanuts.	Chas. A. Mooers. Andrew M. Soule.
No. 4	Feeding native steers.	Andrew M. Soule and John R. Fain.
Annual Report	Thirteenth annual report, 1900.	

PRESS BULLETINS

Publications	Title	Author
1899		
No. 1	Value of leguminous plants.	Chas. W. Dabney.
No. 2	Home-made fertilizers.	Chas. W. Dabney.
No. 3	Farmers' institutes.	R. L. Watts.
No. 4	How the experiment station can help the farmers.	R. L. Watts.
No. 5	The East Tennessee farmers' convention and farmers' institute.	R. L. Watts.
No. 6	Sheep husbandry. (Condensed by R. L. Watts from address of Thos. W. Jordan).	
No. 7	The saving of soil moisture.	Andrew M. Soule.
No. 8	Farmers' institute to be held at Boons Creek, Washington county, Tenn., Tuesday and Wednesday, August 22 and 23, 1899.	R. L. Watts.
No. 9	Liming soils.	Chas. A. Mooers.

PRESS BULLETINS—*Continued*

Publications	Title	Author
No. 10	Farmers' institute to be held at Rogersville, Hawkins county, Tenn., Friday and Saturday, August 25 and 26.	R. L. Watts.
No. 11	The fertilizer question.	Chas. A. Mooers.
No. 12	Cowpea vine hay.	Andrew M. Soule.
No. 13	A short course in agriculture.	Andrew M. Soule.
1900		
No. 14	Grades on country roads.	W. W. Carson.
No. 15	Calf feeding.	Andrew M. Soule.
No. 16	Live stock problems.	Andrew M. Soule.
No. 17	Winter gardening. Winter violets.	Charles A. Keffer.
No. 18	Advantages of dairying.	Andrew M. Soule.
No. 19	Formulas for spraying mixtures.	Samuel M. Bain.



FARM TERRACES AND DORMITORY

REPORT OF THE AGRICULTURIST

The work of the agricultural division of the Tennessee experiment station is chiefly conducted on the University farm and is divided under three principal heads, namely: 1 Plat experiments and field trials with grain. 2 General farm work and stock feeding. 3 Dairy husbandry.

The present system of field trials and plat experiments was commenced on the University farm in the fall of 1899, the object being to study the relation and adaptability of the several farm crops to the soil and climate of Tennessee. The work of this division is incorporated under four principal heads:

- 1 Experiments with winter cereals, including wheat, barley, oats, rye, etc.

- 2 Experiments with forage crops, including corn, sorghum, teosinte, rape, millet, cowpeas, soja beans, velvet beans, etc.

- 3 Experiments with grasses and clover.

- a Clover variety tests, methods of seeding, culture of clover with different cover crops.

- b Grasses: Variety tests, mixtures for hay, pasture and lawns.

- 4 Experiments in soil restoration, including a rotation of crops, the use of green manures, application of commercial fertilizers, and the utility of barnyard manure, etc.

The growth of winter cereals in this state is a question of vital concern to our farmers. One principal line of work undertaken is with winter wheat, including tests with local and foreign varieties, the influence of dates of seeding, different methods of seeding and cultivating, interchange of seed to and from the different soil types of the state, seed selection and plant breeding. Farmers are of the opinion that they must change their seed every year or two as it runs out. If selection is properly carried on, the seeds of farm crops will not run out and a variety of wheat can be maintained on the same land for years, and when a variety well adapted to one section is secured, its preservation means dollars and cents to the farmers. The past year it was found that 1200 large heads of wheat contained 35,412 grains, with 29.5 grains to the head and 736 grains to the ounce, with a total weight of two pounds, 15 $\frac{1}{8}$ ounces; 1600 medium heads of wheat contained 25,623 grains with 16.07 grains to the head and 797 grains to the ounce, with a total weight of two pounds, 5-16 ounce; 3200 small heads of wheat contained 27,643 grains, with 8.64 grains to the head and 909 grains to the ounce, with a total weight of one pound, 14 7-16 ounces. Here it is seen that 1200 large heads produced about one pound and one ounce more grain than 3200 small heads; that the large heads contained 29 $\frac{1}{2}$ grains per head as compared with 16.1 grains in the medium heads and 8.6 grains in the small heads. Indifferent seed would thus often explain why the farmer secures such a small yield of wheat per acre. In the bulletin on wheat published last year, it was found that the average variety grown by the farmer produced from 12 to 15 bushels, whereas some varieties produced 40 bushels per acre. The average yield

of wheat in Tennessee is about 8.7 bushels per acre, yet many farmers secure 30 to 40 bushels per acre. Tennessee is admirably adapted to the production of winter wheat and instead of securing 8,292,727 bushels from 953,187 acres of land, at least three times this amount of wheat could be grown on this area if the question of the utility of the various varieties were understood and the proper methods of culture and seed selection practiced.

The University farm comprises about 105 acres, of which 70 acres are devoted to the culture of farm crops on an extensive scale and the working out of various problems of general agricultural interest. The following lines of investigations are being pursued in this division of the work. A study of crops adapted for ensilage production, including corn, sorghum, teosinte, cowpeas, etc. It is the purpose of this work to determine the cost and relative value of ensilage from corn, corn and peas, sorghum, and sorghum and peas, etc.; to determine the amount of nutrients derived from an acre of the respective crops, the cost of producing the same, the total yield of the crop secured per acre, and the utility of these crops for



THE EXPERIMENTAL PLATS, UNIVERSITY FARM

the production of meat, milk, etc. As an immense growth of sorghum can be produced after a crop of winter cereals and as it is rarely affected by drought and can certainly be made into a most excellent quality of ensilage, it is of the utmost importance that its full feeding value be ascertained as soon as possible.

A rotation of crops is practiced on the farm for the purpose of building up the soil, and last year two crops were produced in a single season on more than forty acres of the area devoted to this work. As a rule, but one crop is produced in Tennessee and that is often of indifferent quality. Besides demonstrating the fact that two crops should be grown, it illustrates the value of intensive farming, as more than fifty head of stock have been maintained for a year on the roughness in the form of hay, ensilage, etc., produced on this 70 acres of land. If our farmers would give more attention to the proper culture of the soil and confine their areas within smaller limits, it would be vastly better for them.

During the season of 1900 eight native steers were fattened at the experiment station. They were of the ordinary type and yet gratifying results were obtained in that from \$6 to \$10 apiece was cleared after liberal allowances had been made for care, feeding, etc. The experiment demonstrated that cattle can be fed at a profit on a home-grown ration on Tennessee farms and it emphasized the fact that pea vine hay has an exceptionally high feeding value. In the slaughter test our animals dressed about 55 per cent and they were much superior to the cattle ordinarily slaughtered in the Knoxville abattoir. The so-called beef cattle of Tennessee will hardly dress 50 per cent, though there are today 286,841 head of cattle in this class. These animals should dress 60 per cent and the offspring of a first cross with an improved sire would easily do this. If we consider the average weight of these animals as 700 pounds, it means a loss of 20,078,870 pounds in slaughtering, which at the low estimate of three cents a pound amounts to \$603,166.10. Tennessee farmers are sim-



THE DAIRY HERD

ply throwing away this amount of money because of a failure to study this important question, and it is safe to say that if the cross indicated above were made the profit from feeding beef cattle could be easily doubled. This year an experiment with 15 head of cattle is being carried on and in the 60 days of the experiment expired, they have gained 1,457 pounds. The animals are divided into four groups and are being fed on four distinct rations for the purpose of studying their utility and profit for beef production. The importance of studying these feed stuffs is evident as the animals in one group gained 143 pounds in 60 days, while the group on ensilage gained 450 pounds. The cost of the ration will measure the profit derived from feeding in every instance. Hence, it stands to reason that a man who has studied animal anatomy and physiology and understands assimilation and nutrition, has some chemical knowledge of food stuffs and knows how to buy and blend feeding nutrients is in a position

to feed cattle in the most economical way and to make a profit even when circumstances are against him.

Feeding experiments with swine have been commenced this year for the first time with 12 grade Chester white hogs. They are divided into four groups, being fed corn meal and water (the common farm ration in Tennessee) skim milk and corn meal; whey, wheat meal and corn meal; and skim milk, shredded pea vine hay and corn meal. In the 30 days of this experiment these animals gained 706 pounds, the highest gain being made by Group III and the next highest by Group IV, the next by Group II and the smallest by Group I. The results of this experiment have not been worked out as yet, but they demonstrate beyond question the necessity of studying swine feeding from a rational standpoint and they indicate that it can be made a profitable business where conducted on an intelligent basis.

The third line of investigation carried on at the University farm relates to dairy husbandry. A herd of 30 cows is maintained for the purpose of carrying on feeding and breeding experiments to determine the utility and value of the various forage crops produced on the farm and to study the feeding value of the various forms of ensilage previously referred to. An accurate record is kept of each cow and composite samples of milk are preserved so that the amount of butter fat yielded can be determined on specific occasions. The milk is weighed night and morning and carefully recorded and the profit to be secured from milk or butter dairying can thus be ascertained. The dairy industry of Tennessee is comparatively undeveloped, though the climate, water supply and products of the soil all combine for its admirable adaptability to the state, and as most of the failures to conduct the dairy business successfully are due to a lack of education and proficient dairymen, the investigations being carried on at the University farm have a vital significance. Experiments already completed show that a pound of butter can be produced for 12 cents and a gallon of milk for 8 cents. It cost to feed a cow 10 to 14 cents per day and equally good results have been obtained from feeding a home-grown ration as compared with one where a good portion of meal adjuncts were bought off the farm. It may be stated that a year and a half ago milk sold in Knoxville for 16 cents a gallon and today it is selling for 25 cents, and in the near future it will sell for 30 cents. The University farm is working in harmony with the dairymen of the state and almost every day it is visited by the local dairymen who are delighted and pleased with the work being carried on. This work has helped them to increase materially the profits of their business.

The present equipment of the division is fairly satisfactory, though it does not answer all the demands of the work. The agricultural building, known as Morrill Hall, is badly crowded and barely suffices to house the library and offices of the various departments of the station. It does not permit of the development of laboratories commensurate with the present status of the work, and as it serves the double purpose of experimental work and agricultural education, it is sadly in need of enlargement.

On the University farm the new dairy barn answers every purpose for which it was designed, but there is no proper place for carrying on

feeding experiments. The new dairy building is already crowded, and there is not sufficient room in it for carrying on experimental investigations together with the instructive work required. A large and convenient soil physics laboratory with a small greenhouse for the investigation of the physical properties of the soil is essential to the welfare of the work, and it certainly seems that the station should be able to maintain a number of the improved breeds of cattle, sheep and swine beside the present dairy herd. The department can not hope to develop and properly serve the state without additional equipment for its work.

Very respectfully,

ANDREW M. SOULE, Agriculturist.



SORGHUM AND COWPEAS AFTER WINTER RYE

REPORT OF THE BOTANIST

Botany is the science relating to the plant kingdom. It includes a consideration of all facts relative to the plant itself or its method of life. Necessarily every salient feature of the plant's life has some relation, directly or remotely, to practical agriculture.

The botanical course in the University of Tennessee has been developed with special reference to practical instruction in plant physiology, the diseases of plants, and relationships of plants. The relation of the plant to the soil is taught in detail. The student is taught to recognize the various causes of plant diseases especially, and the remedies for them so far as known.

It would be hard to specify any special relation to the industrial



BOTANICAL LABORATORY—HERBARIUM ON LEFT

development of the state's natural resources, since the knowledge of the plant's method of life is so intimately connected with every agricultural pursuit, but especial reference may be made in this connection to the treatment of plant diseases and its relation to the development of the horticultural interests of the state.

The instruction in botany makes up an essential part of the general course in agriculture as given in the University, and much that has been said with reference to agriculture as a whole applies to the instruction given in botany. Necessarily much of the instruction as well as the investigation along these lines is technical and requires the use of costly and delicate apparatus and equipment. It is believed that no institution in

the south has better facilities for instruction in this important fundamental science than the University of Tennessee. Special mention may be made of the library, which is quite rich in valuable botanical works; the large collection so rich in representations of the Tennessee flora; and the botanical laboratory fitted up for individual student's work.

The experimental research of the botanical division has been for several years confined to one special line. It is believed that in this way much more has been accomplished and still greater results may be expected in the future as the work develops.

Much correspondence with different farmers in the state has been carried on, and specimens of the native plants as well as weeds and various diseases have been gathered in this way, and many valuable data collected for future use. Several years ago in looking over the field of plant diseases in the state of Tennessee, at the suggestion of the horticulturist of the experiment station, the botanist undertook an investigation of the disease commonly known as peach rot, and has confined all of his spare moments since that time, outside of instruction work, farmers' institute work, and various other duties connected with his position, to a study of this difficult question. It is hoped that during the incoming season practical field tests of results obtained in the laboratory and greenhouse may prove of great value to the fruit growers of the state. In this connection it may be mentioned that the botanist of the Georgia station estimated that during the season of 1900 the fruit growers of Georgia lost between \$500,000 and \$750,000 due alone to the ravages of this disease. Much advancement has been made within the last 25 years in our knowledge of plant diseases and methods of their treatment. No practical and effective methods are known for the treatment of many of our worst diseases such as pear blight, wheat rust, etc. This important work has great possibilities, and it is believed that no more important line of investigation could have been taken up by the experiment station. In the course of this work many valuable pieces of apparatus have been accumulated, some of them designed by the botanist, nearly all being of permanent value. Care has been taken to spend no money that was not needed at the time for practical work.

In connection with the special work in the investigation of fruit diseases some considerable outside work has been done, especially with reference to certain insects. Special mention may be made of the investigation of certain raspberry insects and the woolly aphis of the apple in the neighborhood of Columbia, Tennessee, and the discovery of an injurious insect on asparagus in the vicinity of Memphis.

On the whole the prospect for the accomplishment of results of vital importance to the agriculture of the state seems especially bright in this direction.

Respectfully submitted,

SAMUEL M. BAIN, Botanist.

REPORT OF THE HORTICULTURIST

On assuming charge of the work of horticulture and forestry in the University on January 3, 1900, I found in progress a most interesting and valuable investigation into the merits of seedling apples of Tennessee origin and their adaptability for general culture. My predecessor, Professor R. L. Watts, had collected trees of 44 such seedlings and had planted them in the most available site to be had on the University farm. As the University farm was needed for the field work of the department of agriculture and a much better site for horticultural operations was afforded on another tract of land belonging to the University, this department was assigned a sufficient acreage on the "north farm," for present and future needs.

The new location is a desirable one for experiments in fruit and vege-



GENERAL VIEW OF FRUIT ORCHARD

table culture, and also affords means of illustration for forest study. It includes the crest and sides of a ridge extending east and west, with its eastern terminus within the property. There is thus afforded northern, eastern, and southern slopes, with almost level land on the north, east, and south sides of the ridge. The valleys which separate this ridge from those adjacent open upon the Tennessee river, provide air drainage. The strata of underlying shale lie vertical to the surface, insuring good soil drainage.

As soon as the assignment of land to the department was made, three acres lying on the north slope and reaching to the crest of the ridge were

cleared, and with two acres of old land to the north were planted to fruits. The plantation includes, besides the 44 varieties of seedlings mentioned above:

- 70 trees in seven varieties of apples.
- 120 trees in 12 varieties of peach.
- 80 trees in eight varieties of pears.
- 50 trees in five varieties of plum.
- 30 trees in three varieties of cherry.
- 40 trees in four varieties of quince.

Between the rows on the crest and higher slope representative collections of strawberries, raspberries, blackberries, currants, and gooseberries were planted.

Throughout the season the orchard has received the best of care, and the growth made by the trees is very satisfactory. Less than two per cent were lost, and these were, with one exception, of two varieties. The fences around the fruit farm have been put in thorough repair, and the plantation enters the winter in excellent condition.

The division has purchased during the year a good equipment of tools and implements, making it for the first time independent of the division of agriculture, to whom it had long been under obligations for the use of necessary machinery. The equipment purchased includes plows, cultivators, and harrows of various types, seed drills, hand cultivators, pruning, grafting and budding supplies, and greenhouse conveniences.

The location of the new Barbara Blount Hall made the removal of the greenhouse necessary and the opportunity was used to rebuild its work rooms, to the great improvement of the plant. The greenhouse now stands in the garden on the slope below the new Barbara Blount Hall. The sloping land between Science Hall and the new building has been laid off for a rose garden. Considerable additions have also been made to the ornamental plantations in the campus.

The correspondence of the division covers a wide range, both as to territory and subjects. Frequent inquiries of the horticultural interests of the state are received from citizens of northern states who are seeking a location in a milder climate. In several instances parties have made personal inspection following such correspondence. Citizens of Tennessee are more and more availing themselves of the station as a source of information on horticultural subjects.

During the year farmers' institutes have been attended in Gibson, Carroll, Hamblen (3), and Monroe counties, and also the annual meeting of the East Tennessee horticultural society at Harriman. At all these meetings the keen interest manifested in horticultural topics warranted the belief that the work of this division will be increasingly appreciated as it is extended. During the growing season weekly press bulletins on horticultural topics suggested by the work at the station were sent to the newspapers of the state, and their very general publication is a source of satisfaction to the division, indicating widespread interest and appreciation.

Respectfully submitted,

CHARLES A. KEFFER, Horticulturist.

REPORT OF THE CHEMIST

The following report of the work of the chemical division of the experiment station for the year 1900 is respectfully submitted:

The principal line of work has been a study of some of the most important types of soils with particular reference to their fertilizer requirements. To this end, some time has been spent in the collecting of soil samples, analyses of which have for the most part not been made. In connection with the soil analyses some cooperative field experiments with fertilizers were carried out, but to a much more limited extent than was desired. Most of the farmers at distant parts of the state who expressed a desire to cooperate in this way failed for various reasons to carry out the experiments even after the fertilizers had been sent to them. Nearly fifty per cent of all the experiments which were conducted near Knoxville and which received the personal supervision of the chemist were ruined either by dry weather or by the unequal fertility of the different experimental plots, which inequality at the time the plots were selected could not be foreseen. The most important and trustworthy results from the season's work have been published as Bulletin 3 of Volume 13. In this bulletin are the results of experiments on three important types of soils, the blue limestone, the cherty dolomite, and a river bottom soil. Some chemical work both on the soils and on the crops is also published there. In addition to testing for the special requirements of these soils experiments were made to determine the relative fertilizer values under field conditions of the nitrogen of cotton-seed meal and of nitrate of soda, and other experiments were made to determine whether the use of a nitrogenous fertilizer either for cowpeas or for peanuts was advisable. Another series of experiments was carried out to test the effects of fertilizers on the germination of seed, with particular reference to the present practice of drilling wheat and fertilizer together. While conclusive results from field experiments can not be hoped for in a single season those published were thought to be worthy of consideration by Tennessee farmers, for whom they were primarily intended.

That there is a widespread interest in the subject of fertilizers is proved by the questions which come from all parts of the state. While there may be areas in Tennessee where fertilizers are not needed in order to produce even maximum crops, it is probable that on the majority of the upland farms a judicious use of fertilizers would be profitable, and there are some large sections, the Cumberland Plateau, for example, where fertilizers or manures are a necessity in order to get even moderate yields. Farmers have almost deserted the cherty dolomite ridges of East Tennessee because of their unproductiveness. At the same time, judging from results already obtained, this kind of soil can be economically brought to a high state of fertility by means of mineral fertilizers and cowpeas. There is therefore a great and growing demand for information on the subject of soil fertility. The fertilizer mixtures sold throughout the state are not and can not be expected to be well adapted to all the varied conditions. That the solution of the problem of profitably increasing the

fertility of upland soils is sure to follow laboratory work supplemented by intelligent, systematic, and continued field experiments with fertilizers is not doubted. To carry out a work of such fundamental importance will demand a great amount of laboratory work and cooperative field experiments. The results of this season's effort at cooperative work with farmers indicate that they will not undertake the somewhat complicated experiments advocated in the report of last year. It is now planned to get cooperation in the carrying out of very simple experiments for example to find out first of all what returns can be gotten from a high grade complete fertilizer and next whether potash can be profitably omitted. These experiments demand only three plots, one blank and two plots for the



FERTILIZER EXPERIMENTS ON CORN

fertilizers. There could be practically only one simpler series which would be to omit the plot fertilized without potash. The plan for the coming year is to carry out as many cooperative experiments as possible both at a distance and on the typical soils in this vicinity, and to make with these experiments chemical analyses of the soils.

Another problem of importance which we wish to undertake is the increasing of the starch content of Irish potatoes, as suggested by the work of the past season. Still another line of work in which some results have been already obtained is a comparison of some of the most important leguminous crops, such as cowpeas, velvet beans, and soja beans.

with respect to their ability to gather nitrogen from the air. That is, which one when grown for a soiling crop would furnish most nitrogen to the soil, or if to be used as a feed would produce the most protein. Of course conclusive results can only be obtained after several seasons' work.

The following is a summary of the analytical work:

MATERIALS	NO. OF ANALYSES
Soils	6
Mineral waters	8
Potatoes	10
Corn (kernels)	12
Sorghum	2
Miscellaneous feeding stuffs	7
Fertilizer materials	8
Minerals sent in for examination	88

In addition to the above some time has been profitably spent in working out laboratory methods better adapted to the work in hand than those which are commonly used.

Respectfully submitted,

CHAS. A. MOOERS, Chemist.



AGRICULTURAL CHEMISTRY LABORATORY

REPORT OF THE LIBRARIAN

The library of the experiment station contains about 2,350 volumes, treating principally of general agriculture, agricultural engineering, animal industry, cereals and grasses, chemistry, geology, botany, horticulture, forestry, zoology and entomology. Among this number is a good collection of government and state reports of various kinds, over 150 of which were donated the past year by the president of the University.

The primary object of the library is to furnish references for the use of the experiment station staff in their scientific investigations, and hence a large proportion of the books are of a technical character. There are, however, some popular works which are made use of by agricultural students.

About 100 periodicals are received, which may be similarly divided into technical and popular. The former, which are chiefly subscribed for, consist of standard scientific journals of Germany, France, England and America, devoted to agriculture and related subjects. Most of those in the latter class, which includes a majority of the papers received, are sent to the station in exchange for bulletins. Among these exchanges are almost all of the best agricultural and horticultural papers of this country. They are of special value to students of agriculture and are also freely consulted by members of the station staff. Many miscellaneous papers on subjects related to agriculture are also on file.

Bulletins and reports from the other experiment stations and the United States department of agriculture are on file and can be readily referred to by means of indexes prepared at Washington. Publications of the departments of agriculture of Ontario and Ottawa, Canada, are also accessible. When extra copies of bulletins from other stations are received they are filed by subjects, to be mailed, like our own publications, to persons writing for such information as they contain.

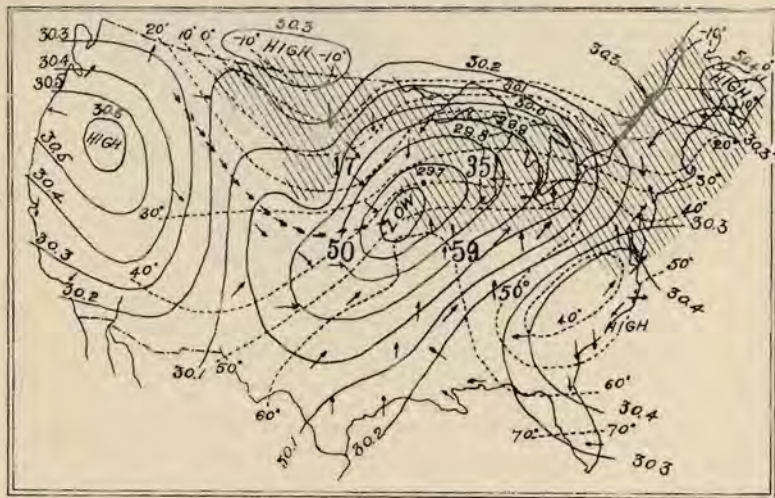
The bulletin mailing list consists of over 9,000 names. This is an increase of over 6,000 within two years. In 1899 and again in 1900 circular letters were enclosed with bulletins to all persons in the state whose names were then on our list asking them for the names of farmers and others who in their judgment would appreciate the bulletins of the station. The names of several thousand persons were thus secured, to whom specimen bulletins were mailed with a card which was to be returned in case they wished to have the bulletins regularly. In this way and through correspondence the mailing list has made the rapid growth noted, practically all persons who now receive our bulletins having made personal application for them.

Respectfully submitted,

F. H. BROOME, Librarian.

THE USE OF DAILY WEATHER CHARTS

With the growth of science and the advance of civilization, our national weather service is becoming more efficient. It is seeking to benefit agriculture along many lines. Besides the publication of weather forecasts, charts, bulletins, etc., a large amount of climatic data is being collected, and the study of these data is gradually establishing a closer relation between climate, soil and plant life. As fast as new discoveries are made they are reduced to practical form and placed in the hands of the farmer. This progress of applied weather science may be compared with that of improvement in farm implements. When any new agricultural implement is placed upon the market, the object for which it is designed, its construction, the manner in which it operates—all of these particulars



WEATHER CHART—8 P. M., DEC. 15, 1893

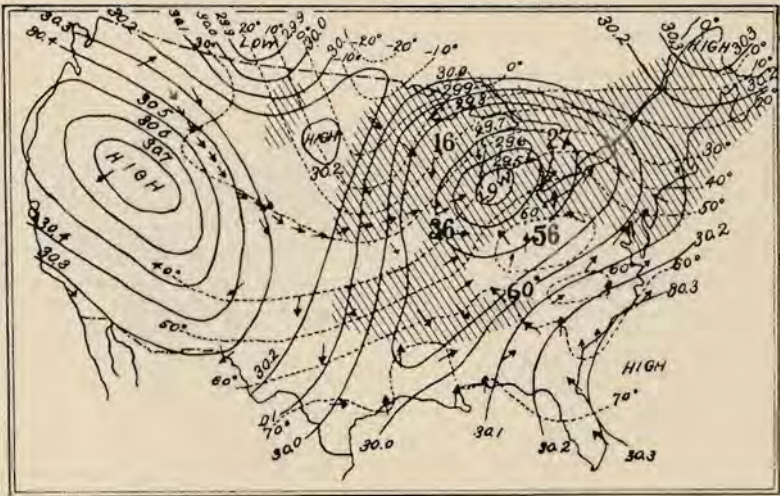
must first be explained to the farmer before he can make intelligent use of it. So is it with the publications of the weather bureau. They must be understood before they can be of value. This is especially true of the daily weather charts. Through the recently inaugurated rural delivery system of our postal service, these charts find their way to nearly every postoffice in the state, and they are there posted conspicuously so that they may be consulted by the intelligent farmer when he goes for his daily mail.

It is proposed, in the present article, to explain briefly the objects for which the weather charts are designed, the method of their construction, and in short to impart such information as may open the way to a clearer understanding of this subject on the part of the intelligent reader. The

study of the charts is like learning a new language, and it at first costs some labor, but when once the lines and symbols are understood there is a pleasure in reading them which compensates for the labor expended. If some one in each family will take the trouble to study the charts from day to day, it will not be long before every member can take an interest in them, and they will at length be found as indispensable on the well regulated farm as some of the implements used in tilling the soil, or in harvesting the grain.

OBJECT OF THE DAILY WEATHER CHARTS

The charts contain a variety of information. For one thing they show weather conditions over a large portion of the United States, and thus



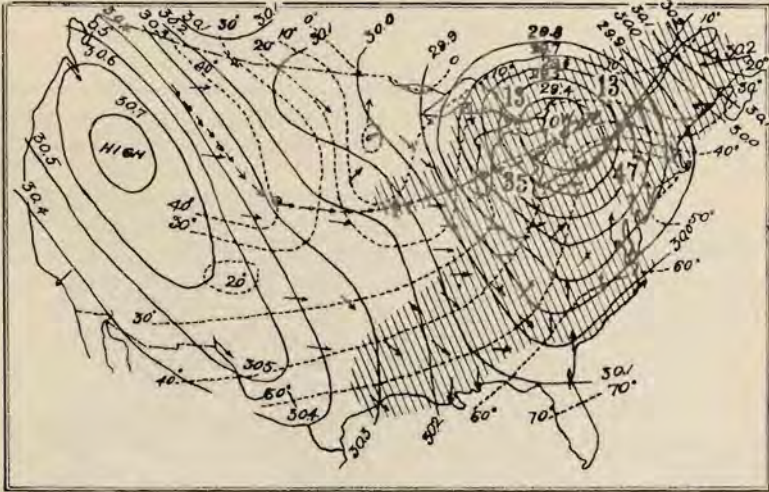
WEATHER CHART—8 A. M., DEC. 16, 1893

keep the people of one section posted relative to conditions prevailing elsewhere. They also contain a weather forecast for the 36 hours following the date of issue. But of greater importance still, perhaps, is the fact that they furnish information from which each individual citizen may often foresee coming weather changes for himself, and thus act with greater intelligence in making use of the forecasts. These facts will be appreciated more fully after reading the following description of

HOW DAILY WEATHER CHARTS ARE CONSTRUCTED

The weather bureau has about 150 observatories which are equipped with apparatus for observing weather conditions. These observatories are well distributed throughout the entire United States, the West India Islands and the northern coast of South America. Trained observers are on duty at the observatories, and at least twice each day (8 a. m. and 8 p. m., 75th meridian time) the observers make observations of atmospheric

pressure, temperature, wind velocity, wind direction, humidity, dew-point, vapor pressure, rain, snow, ice, frost and clouds with their kind and direction. This information is quickly enciphered into a short message which is transmitted by telegraph to the Central office at Washington, D. C. In the case of the 8 a. m. reports, each observatory receives in return for its report, the reports from a number of other observatories. This is accomplished by means of an ingenious system of telegraph circuits, so that nearly all observatories receive a sufficient number of reports from other observatories to justify the issuing of a daily weather chart. The charts issued from these observatories are the ones most extensively distributed throughout the country, since those from the Washington office could not be received by mail early enough to be of value. Those issued from the weather bureau observatory at the Tennessee agricultural experiment



WEATHER CHART—8 P. M., DEC. 16, 1893

station are distributed in this section of Tennessee. The following remarks which apply to the construction of daily weather charts at this observatory will also apply in a general way to the charts issued elsewhere:

As soon as the telegraphic reports from other observatories are received here, the barometric pressures, temperatures, wind directions, etc., are written upon an outline map of the United States at the respective stations to which the data belong. Solid lines, called "isobars," are then drawn connecting all points having the same pressure, a line being drawn for each tenth of an inch of pressure. Next are drawn dotted lines, called "isotherms," connecting all points having the same temperature, a line being drawn for each ten degrees. Arrows are placed at the reporting stations showing the direction of the wind; the arrows fly with the wind, or opposite to the ordinary wind-vane. The state of the weather—whether

clear, partly cloudy, cloudy, raining or snowing—is indicated by the circular symbol. Sometimes a shading is placed upon the chart to show regions over which rain has fallen during the preceding 24 hours. The regions of highest and lowest pressure are marked “high” and “low” respectively. The “lows” are storm centers, while the “highs” are centers of clear, cool or cold, weather. The general movement of these lows and highs is from west to east similar to a series of atmospheric waves of which the highs form the crests while the lows form the troughs or depressions. These highs and lows have an average easterly movement of about six hundred miles per day. High winds, with rain or snow, usually precede the low area, often extending to a distance of 600 miles to the eastward of the center of the storm. In advance of the low the winds are generally southerly, and consequently bring high temperature. When the center of a low passes to the east of a place the wind at once shifts to the west or northwest, bringing lower temperature. The temperature on a given parallel of latitude west of the low may be reasonably looked for on the same parallel to the east when the low has passed, and frost will occur along and north of an isotherm of about 40 degrees, if the night is clear and there be but little wind. Following the low usually comes an area of high, bringing sunshiny weather, which in its turn is followed by another low.

By bearing in mind a few general rules as to the direction and rate of movement of the low and high, with the blowing of the wind from the high toward the low, and studying the map carefully, coming weather changes may frequently be foreseen. The centers of lows do not, as a rule, move across isotherms, but follow their general direction. Areas of low pressure frequently move to the south of east from the Rocky Mountains to the Mississippi and then change direction to the north of east over the eastern half of the country. Storms in the Gulf of Mexico occasionally move to the west or north of west, but after reaching the coast, they generally change direction and move to the northeastward. High areas move to the southeast and are usually attended by fair and cool or cold weather. A cold wave is always accompanied by a high.

The cloud and rain area in front of a low is generally about the size of the latter and oval, with the west side touching the center of the low in advance of which it progresses.

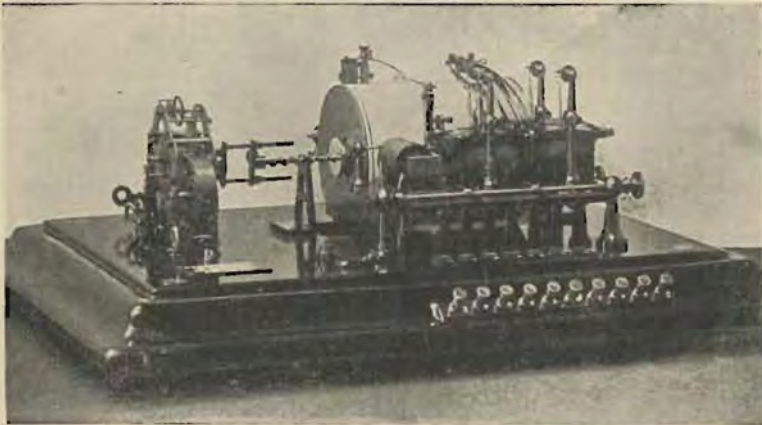
When the isotherms run nearly east and west no decided change in temperature will occur. If the isotherms directly west of a place incline from northwest to southeast, it will be warmer; if from northeast to southwest, it will be colder. Southerly to easterly winds prevail west of a nearly north and south line passing through the middle of a high, also east of a like line passing through the middle of a low. Northerly to westerly winds occur west of a nearly north and south line passing through the middle of a low, and also east of a similar line through the middle of a high.

An absence of decided waves of high or troughs of low pressure indicates a continuance of existing weather conditions which will last till later maps show a change, usually first appearing in the west.

The accompanying illustrations give charts whereon is shown the actual conditions which existed at 8 p. m. of December 15, 1893, and at 8 a. m. and 8 p. m. of the following day, during the passage of a winter storm across the United States at that time.

The foregoing remarks must not be construed as an attempt at a complete discussion of these atmospheric movements. The detailed study of these constitutes quite an extensive branch of meteorological science. It is, however, hoped that these few simple remarks will stimulate closer study of the weather charts. Such study is sure to reveal many interesting laws regarding weather changes which can be turned to practical account by the farmer.

W. M. FULTON, Meteorologist.



METEOROGRAPH

TREASURER'S REPORT,

JULY 1, 1899 TO JULY 1, 1900

The Agricultural Experiment Station of the University of Tennessee,

IN ACCOUNT WITH THE UNITED STATES.

	<i>Dr.</i>	<i>Cr.</i>
To unexpended balance on hand July 1, 1899	\$ 18 34	
July 5, to United States treasury draft, 1899	3,750 ..	
Oct. 7, to United States treasury draft, 1899	3,750 ..	
Jan. 6, to United States treasury draft, 1900	3,750 ..	
April 6, to United States treasury draft, 1900	3,750 ..	
By Salaries		\$ 6,662 29
Labor		2,978 02
Publications		1,008 27
Postage and stationery		241 11
Freight and express		190 50
Heat, light and water		315 04
Chemical supplies		35 ..
Seeds, plants and sundry supplies		375 35
Fertilizers		110 21
Feeding stuffs		323 31
Library		176 54
Tools, implements and machinery		998 93
Furniture and fixtures		12 ..
Scientific apparatus		201 36
Live stock		600 ..
Traveling expenses		364 75
Contingent expenses		98 27
Building and repairs		399 05
Balance		18 34
Totals	\$15,018 34	\$15,018 34

This is to certify, that, as the authorized auditing committee of the board of trustees of the University of Tennessee, we have examined the accounts of the treasurer of the agricultural experiment station for the fiscal year ending June 30, 1900, and find them correct; that the above is a true balance sheet corresponding with said accounts; that the said accounts show no more than \$399.05 was expended for building and repairs, and that there is \$18.34 cash balance.

EDWARD T. SANFORD,
JAMES MAYNARD,
HU L. MCCLUNG,

Auditing Committee.

We hereby certify that Edward T. Sanford, James Maynard and Hu L. McClung are the authorized auditing committee of the board of trustees of the University of Tennessee.

CHAS. W. DABNEY,
President University of Tennessee.
J. W. GAUT,
Secretary Board of Trustees.

State of Tennessee, County of Knox.

Before me, Thos. D. Morris, a Notary Public in and for said State and County, personally appeared the foregoing signers, personally known to me to be trustees and officers of the University of Tennessee, who made oath, in due form of law, that the above statements are true to the best of their knowledge, information and belief.

Witness my hand and official seal at office in Knoxville, Tennessee, this 21 day of February, 1901.

THOS. D. MORRIS.

Section 3.

HISTORY OF THE AGRICULTURAL EXPERIMENT STATION AND
THE COLLEGE OF AGRICULTURE, UNIVERSITY OF TENNESSEE
Prepared by A. J. Sims, Agricultural Editor

FOR BETTER CROPS WITH PLANT FOOD, June 1929

BEGINNING with a staff of five men and 100 acres of land in 1867, the Tennessee Experiment Station has developed a program to match the wide diversity in the farming interests of the State. Today there is scarcely a tiller of the soil from the delta, cotton-growing lands of West Tennessee to the mountain coves of East Tennessee who has not benefited by the work of the institution. A staff of 30 specialists is employed and the experimental plots, fields, pastures, feed-lots, orchards, and the State's four substations and farms contain approximately 1,000 acres with two-score buildings and purebred herds and flocks. Enough wealth has been realized by the State from the results of research, experiments, investigations, and recommendations of the Station to cover many times over the cost of the entire University which runs into millions of dollars.

The board of trustees of the University of Tennessee was the first, and, with the exception of Cornell University, the only corporation in the United States to establish an agricultural experiment station without any special endowment. It was also one of the first five stations to be established in America.

The Station developed out of a combined school of agriculture, horticulture, and botany which was started in 1870 at Knoxville. The College of Agriculture had been founded in 1869 under the first Morrill Act, passed by Congress in 1862. The original college farm consisting of 100 acres, where the experimental work of the main station is now carried on, was also purchased that year.

Professor Hunter Nicholson was the first head of the school, and experimental work was begun by Professor J. M. McBryde who was at the head of the school from June, 1879, to June, 1882. Experimental work done by Professor McBryde with field crops and livestock feeding led to the establishment of the Experiment Station

as a distinct department of the University in June, 1882, with Professor John W. Glenn as its first director. Professor McBryde severed his connection with the institution in 1882 to take the presidency of the University of South Carolina. He later became president of the Virginia Agricultural and Mechanical College and Director of the Virginia Experiment Station.

INTRODUCED BORDEAUX MIXTURE

In 1887 the Station was reorganized under the Hatch Act of Congress, which gave to it an annual income of \$15,000, and was placed under the immediate supervision of a director and a committee of five members of the board of trustees of the University. Dr. Charles W. Dabney, Jr., newly elected president of the University was also made director of the station. He had associated with him, four specialists: Charles S. Plumb, assistant director, in charge of field and feeding experiments; E. Lamson Scribner, botanist and horticulturist; W. E. Stone, chemist; and H. E. Summers, entomologist.

All of these men later gained nation-wide prominence either in educational or investigational work. Professor Plumb is noted for his work in animal husbandry at Ohio State University, Professor Summers was professor of entomology and entomologist for the experiment station at Iowa State College for a number of years. Dr. Stone became president of Purdue University. Professor Scribner left the institution in 1894 to join the staff of the United States Department of Agriculture as agrostologist.

Professor Scribner introduced into this country from France the celebrated bordeaux mixture which was used by him for the first time in America in spraying a vineyard near Knoxville where it was applied to prevent rot of grapes. The tests were successful. Other experiments covering a wide range of disease control were made and now this mixture is considered indispensable in the production of grapes, peaches, and other crops throughout the country.

The Station at the time of its reorganization in 1887 was without buildings,

laboratories, apparatus, library, or other equipment. A small building on the campus which had been used by the agricultural school was turned over to it. In 1890 Dr. Dabney was made chemist and Professor Scribner was elected director and botanist. During this year the college farm of 100 acres with its buildings, equipment, and livestock was turned over to the station. One of the conditions of the transfer was that the farm should be so conducted that it would serve to illustrate the methods taught in the agricultural classes.

Charles F. Vanderford, professor of agriculture in the University, was made assistant director of the station and manager of the farm in 1891. In 1893 the office and title of director were abolished and the duties of the director were transferred to the president of the University who was assisted by a secretary. Professor Vanderford was selected for this office. That same year Professor C. A. Mooers, now director of the station, joined the staff as an agricultural chemist, and Professor S. M. Bain was added to the staff as assistant botanist.

Professor Vanderford died in 1899 and Dr. Andrew Soule, later president of the Georgia Agricultural and Mechanical College, was elected to succeed him. In 1903 Dr. Soule was made director and the Station entered an era of rapid development such as it had never experienced before. The State Legislature became interested and in 1903 made its first appropriation to the Station, \$10,000 for the purchase of 40 acres of land adjoining the 100 acres already owned. Farmers of the State for the first time began to take a real interest in the work of the Station and requests for branch experimental farms began to be heard.

Progress was temporarily interrupted in 1904 by the resignation of Director Soule to become director of the Virginia Experiment Station, Blacksburg. He took with him the assistant agriculturist and the assistant for plat work. Dr.

H. A. Morgan, later president of the University, was selected to succeed Dr. Soule as director. *and Professor of Agriculture in 1905. He was made dean, the first in 1912.* Dr. Morgan came from Louisiana State University where he was professor of entomology in the university, entomologist for the experiment station, and state entomologist. He was elected president of the University in 1919 but

~~continued as director until 1923.~~ Professor C. A. Mooers, who had been chemist and agronomist for several years was acting director from 1919 to 1923 and director and agronomist from 1923 to the present time. *C. A. Willson succeeded Dr. Morgan as dean of the College.*

INVESTIGATIONS ARE STATE-WIDE

Tennessee being a state of multiform soil types, it became evident early in the history of the Station that experimental work must be conducted in the sections of the different soil types. It was realized that a central station, carrying on some investigations that applied to the State as a whole, could not render the needed service along agronomic and soil lines. The State appropriation for the branch station in West Tennessee at Jackson ^{in 1908,} was followed in 1917 by a similar appropriation for a Middle Tennessee station at Columbia. Dairy and beef cattle herds are maintained at both places and extensive experiments with all the leading crops of each section are carried on.

In 1907 the Bureau of Entomology of the U. S. Department of Agriculture established some tobacco insect investigations at Clarksville, Montgomery County, in cooperation with the Station. In 1913 there was established at the same place a substation for other tobacco investigations in cooperation with the U. S. Bureau of Plant Industry which has been of much value in determining the most profitable kinds of fertilizers, the effect of liming, and the comparative effects of various crop rotations on tobacco. The value of work of this kind so impressed a prominent citizen of Clarksville, Hunter M. Merewether, that he gave the University a farm and buildings valued in the neighborhood of \$40,000 to be used for permanent investigation in agriculture.

the above farm at Knoxville was also purchased that year - 1913

The headquarters of the scientific staff, the laboratories, and special equipment of the Station are located at the University of Tennessee at Knoxville. The chief lines of investigation now being carried on (1929) are as follows:

Plant-food and lime requirements and the crop adaptabilities of the various soil types throughout the State; the effects of liming on various soil constituents, such as nitrogen, sulphur, and potash; maintenance and increase of

soil nitrogen; study of crown gall, or "hairy root," a serious trouble of apple trees that threatens the nursery business of the State; a study of the root rot of wheat and the possibility that this disease is materially reducing the wheat yield; selection and breeding of various crops to get strains immune or highly resistant to the wilts and blights which are prevalent; and the fluosilicates as insecticides;

For a number of years the Station has been studying, particularly by laboratory methods, two important subjects, soil nitrogen and the effects of various liming materials when applied to the soil. The laboratory methods, which have included the use of plots, cylinders, and lysimeters or leaching tanks, have been supplemented by field experiments. The lysimeter equipment, the essential features of which were developed by Director Mooers, has been enlarged from time to time until it is now the most extensive to be found anywhere. This equipment has enabled the Station's present soil chemist, Dr. W. H. McIntire, to make an enviable reputation by his investigations concerning liming.

CONCLUSIONS ARE REACHED

Listed below are some of the practical conclusions reached from the field and laboratory studies.

1. Large areas of the State have become greatly depleted in soil nitrogen, so that an increase of this element is a first requisite to their improvement.
2. Crops of alfalfa, sweet clover, and red clover are the most efficient practical means of increasing the supply, but such legumes as cowpeas and soybeans must be either pastured off or turned under to be of any special value.
3. Nitrogen is lost from the soil both by the removal of crops and by leaching. Soil in grass which was harvested yearly for hay was found to lose much less nitrogen than the same soil on which cowpeas harvested for hay were grown and the soil left bare through the winter.
4. The larger the crops grown, of any kind, the more is the soil supply

of nitrogen conserved, soluble soil nitrogen not utilized by crops being lost by leaching.

5. Limestones are generally cheapest, are the easiest to apply, are "foolproof," and in the Station's experiments were found to be effective over a longer period than burnt lime which may be used to advantage under some conditions. Other materials, such as marl and wood ashes, may be used when available. Liberal applications of duplex basic phosphate were found to supply sufficient lime for red clover on some soils.

6. Alfalfa and sweet clover have the highest lime requirements; next come red, alsike, and white clovers, also garden beets. Cowpeas, soybeans, corn, wheat, hay grasses, and a number of garden crops are highly responsive to liming on Tennessee soils, but liming was found of little direct benefit to cotton, tobacco, peanuts, sweet potatoes, and strawberries, though it may be of much indirect benefit to some of these crops when they follow clover, for which liming is necessary.

LIME INCREASES YIELDS

In five series of experiments on representative soils in different sections of the State, the average yield of alfalfa with lime was 3.13 tons per acre of cured hay, but without lime only 1.16 tons. In 11 series of experiments, the average yield of clover hay on common soils of East, Middle, and West Tennessee was 2.31 tons per acre with lime; but only 1.48 tons and badly mixed with weeds, where no lime was used.

Numerous experiments have been made to determine the effects of liming on both corn and wheat under common farm conditions throughout the State. The results show a marked and rather uniform increase in yield from liming. In 12 series the average yield of corn was 36.5 bushels per acre where limed, but where unlimed the average was only 30.8 bushels. The actual increase in bushels per acre for wheat on limed land is not so great as for corn, but the percentage increase is about the same.

The average yield of 13 series with soybeans was 1.78 tons of cured hay per acre under liming, and 1.45 tons without liming. The average of eight series with cowpeas was 1.13 tons of hay per acre under liming, and 0.85 tons without liming.

The effect of even a moderate liming was found to last for a number of years. Appreciable increases in crop yields from a single application have continued for at least eight years at the Station. To build up a poor soil that is deficient in lime without the aid of liming is an especially difficult task for several reasons. One reason is that the best improvement crops cannot be satisfactorily grown where lime is deficient. With the aid of ground limestone, clover flourishes on farms where it has long been a stranger.

The effects of liming both on crop production and on changes taking place in the soil have been subjects of special investigation by the Station. Much of the work is only of scientific interest at the present time but may well be of practical significance as the knowledge of soils increases.

LIMING INCREASES POTASH NEED

A rather outstanding practical discovery was made, however, in the continuous experiments in a rotation of cowpeas and wheat, with regard to the effects of liming on the availability of soil potash, which was clearly demonstrated to become more quickly deficient on limed land than on unlimed land. Later it was shown in lysimeter tests that less potash leached from limed than the unlimed soil. Still later soil samples from various places in the State where lime and fertilizer experiments were being conducted were analyzed for water-soluble potash with the result in nearly every instance that less potash was obtained from the limed than the unlimed soil. The conclusion seems now to be well established that liming will increase the soil need of potash rather than diminish it as has been generally believed.

More than \$3,000,000 is spent annually by Tennessee farmers for fertilizer, and it is conservatively estimated that five times this amount could be profitably

utilized. The Station maintains a staff which long has been studying the various soil types, their plant food requirements, the most economical fertilizers for the various types, lime requirements, crop rotations, etc. The most extensive work done by the Station is along these lines and the results have laid a solid foundation for the rational use of fertilizers and for the improvement of the various kinds of soil found in the State, which has been subdivided into a dozen or more well-defined large areas with special requirements.

The Station has conducted experiments for 19 years to determine the value of barnyard manure in increasing soil fertility. The average gross returns in increased crop yields were found to vary greatly with the crop on which the manure was used, but averaged more than \$4.00 per ton of manure.

Plot or field experiments have been carried out on the major types of soil throughout the State and it has been found that phosphorus, nitrogen, and lime constitute the principal need but that there are wide variations in the requirements of different soils. The greatest recent advance along this line is the separation of West Tennessee into two large divisions. The soils of one have no special need of phosphate, so that superphosphate can rarely be used profitably either by itself or in mixtures with nitrogen and potash.

This division covers, roughly, the western two-thirds of West Tennessee and included most of the truck-growing areas where fertilizers have long been used.

The experimental evidence indicates that the good results obtained from the use of fertilizers on truck crops come largely from the nitrogen, and to a less extent from the potash of the commercial mixtures used, and that the phosphate has probably been used at a loss in many, if not most, cases. In connection with the low response to phosphate on western Tennessee soils, it is of interest to note that these soils do not analyze high in phosphoric acid, containing in the neighborhood of only one-tenth of one per cent. Another interesting fact is that the soils at the West Tennessee station, although unresponsive to phosphating, respond unusually well to liming. This is contrary to a well-supported claim

from authoritative sources that acid soils are responsive to phosphating.

In contrast with soil needs of the western area, the eastern third of West Tennessee seems to be highly responsive to phosphate, superphosphate by itself being one of the most profitable fertilizers for general farm crops. Need of phosphate has also been found to be very pronounced on the Highland Rim soils of the type found in Middle Tennessee and in general throughout East Tennessee. Duplex basic phosphate has proved to be especially well suited to the Plateau soils, and on freshly cleared land may be used by itself to much advantage, especially as it partly supplies the soil's immediate need of lime.

ON OTHER SOILS

With the exception of minor areas of gray "crawfishy" land, the soils at the West Tennessee station were found to be well supplied with potash, but poor in both nitrogen and lime. Wheat, for example, was decidedly benefited by both nitrating and liming, but there was no increase from phosphate even where the trial was continued for a score of years and all the crops were removed from the land.

In 10 years of experimental work at the Crossville substation on the Cumberland Plateau chiefly with three-year rotations of corn, potatoes, oats and clover and grass, phosphate has been found a first requisite for all the crops, the response of the soil being very pronounced. Potash has been found profitable but much less so than phosphate.

Nine years of continuous experiments in a five-year rotation of corn-cotton, soybeans, wheat and clover, and grass (2 years), under a variety of fertilizer and liming conditions on the farm of the Middle Tennessee State Teacher's College at Murfreesboro, show profitable returns from the use of phosphate but not of potash on any crop. Nitrogenous fertilizers have given little or no profit. Liming, though not essential to most crops on the soils of this section, including red clover, was found necessary in the production

of alfalfa and sweet clover.

Results obtained at the West Tennessee station with nitrate of soda in experiments continued from three to eight years show the increase that may be expected from various amounts of nitrate. The average increase from the light application of 40 pounds per acre was 80 pounds of seed cotton, from 120 pounds of nitrate 150 pounds, from 160 pounds of nitrate 225 pounds, and from 200 pounds 230 pounds of seed cotton. These experiments were made on land in a fairly good state of productivity. On much poorer lands considerably larger increases were obtained, as might be expected because as the crop increases the moisture supply becomes more and more the limiting factor.

The gray-colored, so-called "crawfish" soils, not only of West Tennessee, but in scattered areas throughout the State have been found to be deficient in potash to an appreciably greater extent than the surrounding soils of different character. Such land on the West Tennessee Station Farm has given marked response to potash for such crops as cotton and various hay crops but has not been found profitable for any of the grain crops. A study of these gray-colored spots, which in the aggregate cover considerable area in the State and are not looked upon with favor by the farmers, promises information of much practical value. Tests indicate that when the special needs of this soil are supplied it is by no means as unpromising as its general reputation indicates.

TOBACCO EXPERIMENTS

In 1927 the fifth in a series of fertility experiments with tobacco was completed at the Clarksville substation in the dark tobacco section of the State. The data secured were summarized in a report of the director as follows:

The efficiency of different sources of ammonia as shown in the increased production of leaf tobacco is as follows: first, sodium nitrate; second, ammonium nitrate; third, urea; fourth, amc-phos.

Applications of magnesia, either as a sulphate or chloride did not prove

profitable, although slightly larger yields were obtained on the plots receiving these salts than on plots where none was used.

Data of the effects of previous cropping on the yield and quality of tobacco were obtained both with and without liming, and are summarized as follows:

1. Winter cover crops of cereals did not prove favorable; the yield and quality of tobacco after bare fallow being superior.
2. Red clover and sweet clover proved better than annual legumes.
3. The limed area appreciably out-yielded the unlimed.

The soil was found to be responsive to potash as well as phosphoric acid and nitrogen. The average yields per acre for the five-year period were as follows:

1. 600 pounds of complete fertilizer without potash—909 pounds leaf.
2. 600 pounds of complete fertilizer with 2 per cent potash—968 pounds leaf.
3. 600 pounds of complete fertilizer with 4 per cent potash—980 pounds leaf.
4. 600 pounds of complete fertilizer with 5 per cent potash—984 pounds leaf.

The study of varieties of crops, their relative value and adaptability to Tennessee conditions, and their improvement by selection and breeding have always occupied a prominent place in the Station's work. The comparative ease with which an improved crop variety can be brought into general use to the immediate benefit of the farmer has caused the Station to increase its efforts along this line in recent years. Special attention is being given to corn and cotton but other crops are being worked with, such as tomatoes and garden beans which are grown both for shipping north and for canning plants in various parts of the State.

COTTON VARIETIES

The Station has given particular attention to seven of the most promising varieties of cotton, and a uniform variety test has been organized and is now under way under the supervision of Professor Essary, station botanist, who has had long experience with this crop. These varieties have been studied in the field in the cotton counties of the State. It was found that they are the most widely grown varieties but it was also found that they vary greatly in different sections, are

badly mixed, and lack uniformity as to lint characters, type, and time of maturity. New varieties and strains, as well as new selections made in the work, will be placed in the new strains test which will be continued over a period of years. About 300 crosses have been made between different varieties for the production of new strains.

Trice cotton, one of the best early varieties now grown along the northern border of the cotton-producing area, was improved and introduced to general use by the Station and is recommended by stations in other states because of its adaptability to bollweevil conditions as well as its suitability to the northern limit of cotton production.

The question of shedding buds and young bolls, selections of strains resistant to diseases of the leaf and boll, cultivation, thinning, and topping are other questions that are being given close attention.

After six years of field tests with all the leading varieties of corn subjected to like conditions as to soil and cultivation, the Station found Neal's Paymaster to be best adapted for general use and the most productive under Tennessee conditions. This variety was accordingly recommended and today is the leading variety in Tennessee, being grown on about one-third of the 3,000,000 acres planted to corn annually. It yields on an average nearly three bushels per acre more than other varieties, which means an increase of about \$2,500,000 in the value of the State's corn crop annually.

WILT-RESISTANT TOMATOES

Inbreeding through self-pollination is being done with 12 commercial varieties of corn including Delta Prolific, Neal's Paymaster, and Jarvis Golden Prolific. Such a breeding method brings out rapidly the defects and the good qualities inherent in the variety. L. S. Mayer, a specialist working in cooperation with the office of cereal crops and diseases of the U. S. Department of Agriculture, is devoting full time to the corn breeding studies with a view to securing superior strains.

The tomato industry which had grown in large proportions in the Humboldt section of West Tennessee was threatened with destruction by a wilt disease. The disease appeared about 25 years ago and gradually grew worse until whole fields were completely destroyed. It was critically studied by Professor Essary, and after a few years of work there was obtained by selection a tomato that is resistant to the disease and that will produce abundantly in fields where the common kinds fail. It was also found that the disease appears under continuous growing of tomatoes on the same land year after year and that crop rotation and seedbed sanitation will help to control it.

Work on the selection of tomatoes resistant to leaf spot is under way. A number of leading varieties used by canneries are being grown for study and selection for disease resistance.

At one time the red clover crop of the State was seriously injured by a fungous disease. By selection of seed from plants that withstood the disease, a resistant strain was developed by Professors Bain and Essary and red clover can now be grown successfully on land where it would ordinarily be a complete failure. A recent publication from the U. S. Department of Agriculture recommends it as the best for southern conditions, and it is being used in the Department's trials as the standard of comparison.

For a number of years comparisons of domestic and foreign strains of red clover have been made in plots. The object has been to show the relative resistance of the Tennessee disease-resistant, produced by the Station a number of years ago, and other strains, to the anthracnose disease of red clover. Very interesting results have been obtained in favor of the Tennessee resistant. Much interest in the Tennessee seed has been aroused by the experiments and a number of growers have undertaken to produce the seed for the market to supply the large demand for it in this and other states where anthracnose is serious.

In 1900 alfalfa was practically unknown in Tennessee. Today largely as result of the Station's advice there are over 12,000 acres producing hay worth a half million dollars annually in addition to its value for pasture and soil improvement.

A distinct strain of lespedeza, or Japan clover, has been developed from the common variety which was once thought to be worthless. This new strain is more vigorous and productive than the common variety and has a more upright habit of growth so that it is especially suitable for hay. It is now beginning to be grown widely and will add hundreds of thousands of dollars to the value of the State's annual hay crop.

TENNESSEE'S PRIDE

By hybridization and selection the only beardless variety of winter barley that is hardy enough to go through the winter in Tennessee has been developed. This new barley, which is valuable for both hay and grain and which is recognized by the U. S. Department of Agriculture as the best of its type, is being extensively grown in Tennessee and is gaining in popularity in other Southern states.

From Culberson winter oats, an improved strain, which matures two weeks earlier than the Grey Turf commonly grown, has been obtained and found to be especially suited to rich land, where it stands up better and yields more than any other oats.

A selection from the Tokio soybean, which produces 20 per cent more hay than other varieties commonly grown and which would increase the value of the soybean hay crop in the State by \$2,000,000 when the mass of the farmers adopt it, is recommended by the Station after a long series of tests with over 100 different varieties.

Insect pests damage Tennessee crops to the tune of \$20,000,000 annually. The Station maintains a staff of trained men who study these insects and methods for their control. The value of sodium fluosilicate for control of the Mexican bean beetle and other insects as demonstrated by S. Marcovitch, the Station's entomologist, is one of the outstanding discoveries. The fluosilicates promise to displace paris green and other arsenicals now in common use because of both cheapness and efficiency. Also the fluosilicates will kill certain insects, such as the striped cucumber beetle and the blister beetle which are not killed by arsenicals and which

were previously practically beyond control.

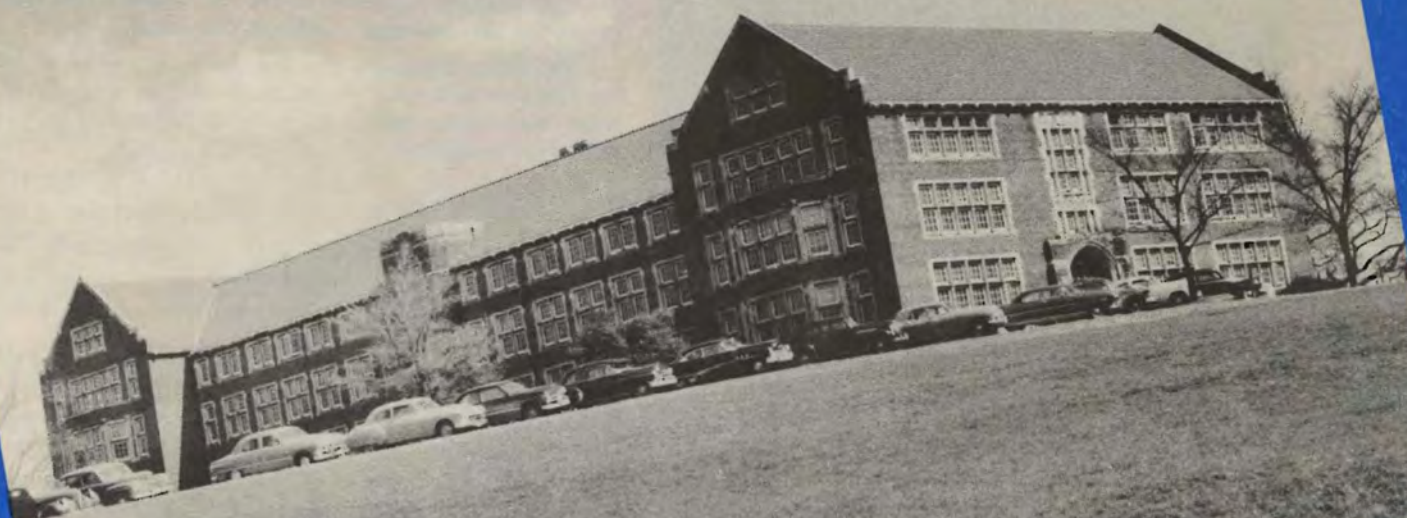
Tennessee is the leading livestock State of the South. The industry is valued at \$100,000,000. There are many problems in connection with the industry which must be determined experimentally. The Station is at work on a number of these problems and its efforts are influencing the development and improvement of the industry. The pasture work of the Middle Tennessee Station is outstanding in this connection.

In the study of plant diseases, Dr. C. D. Sherbokaff has discovered new and improved methods for the sterilization of corn and of cottonseed, thus ridding the seed of disease germs which might later injure the crop. He has also recently determined the exact nature of a cotton disease which has in years past produced heavy losses along the Mississippi river both in Tennessee and in other states.

Dr. Margaret B. McDonald, bio-chemist, has discovered how to rid milk of onion odor and flavor. The method is highly satisfactory and is beginning to be used by dairymen and by at least one cheese factory in the State which now never refuses "oniony milk."

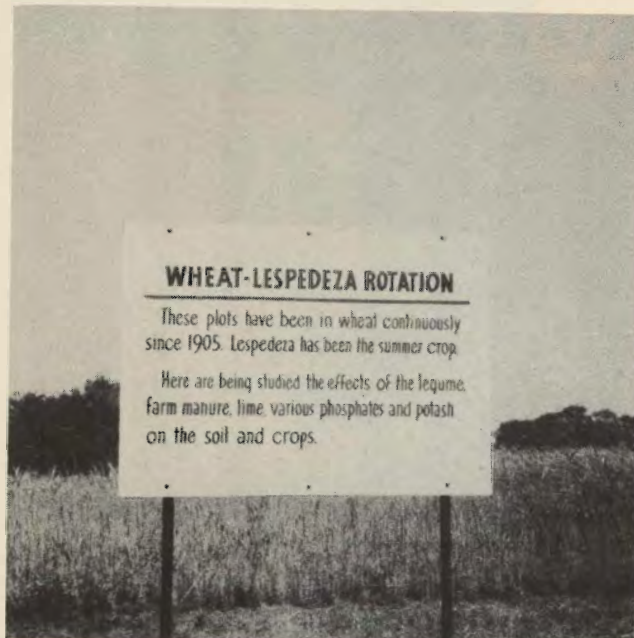
And so again it can be stated that the wealth realized by the State of Tennessee from the work of its Experiment Station runs into the millions of dollars. Furthermore, much of the research work done by agricultural scientists of the "Volunteer" State has spread beyond its boundaries to be adopted by other states in the improvement of their agriculture. Thus, Tennessee justifies and is proud of its Experiment Station.

Extra
DOLLARS . . .



For *Tennessee*
From Agricultural Research

EXTRA DOLLARS FROM AGRICULTURAL RESEARCH



WHEAT-LESPEDeza ROTATION

These plots have been in wheat continuously since 1905. Lespedeza has been the summer crop.

Here are being studied the effects of the legume, farm manure, lime, various phosphates and potash on the soil and crops.

A strong agricultural research program is an absolute necessity in this day when a rapidly increasing population demands low cost food and fibre, produced by an ever-decreasing farm population which operates under the burden of rising cost of machinery, labor, feed, seed, fertilizer, etc. These low cost production demands can be met only by increased efficiency in farming made possible through the findings of adequately supported agricultural experiment stations.

The research program of the U-T Agricultural Experiment Station is designed to solve these and other problems of Tennessee farmers so that they may make the best use of the State's agricultural resources for their own benefit as well as that of the entire State.

This special report summarizes some of the outstanding research projects which have over the years resulted in millions of *Extra Dollars* to Tennessee farmers, directly or indirectly affecting the welfare of every citizen.

The work of the Station, due to variations in soils, climate, and topography, is carried on at eight different points in the State. The main Station at Knoxville is headquarters for all agricultural research. Here fundamental research work is conducted in laboratories, greenhouses and fields. The application of the results of this research is made in experiments at the sub-stations, although some basic work is also done at the following sub-stations:

Tobacco Experiment Station, Greeneville, operated cooperatively by the University of Tennessee and the U. S. Department of Agriculture in the interest of one of the State's chief cash crops.

Atomic Research, Oak Ridge, operated by the University and the Atomic Energy Commission for the study of radioactive materials related to agriculture.

Cumberland Plateau Station, Crossville, operated for the study of problems of that area. Forestry studies are being conducted on 9,000 acres of land in Morgan and Scott counties.

The Middle Tennessee Station, Columbia, devoted to livestock, pasture, and crop problems of the rich bluegrass basin.

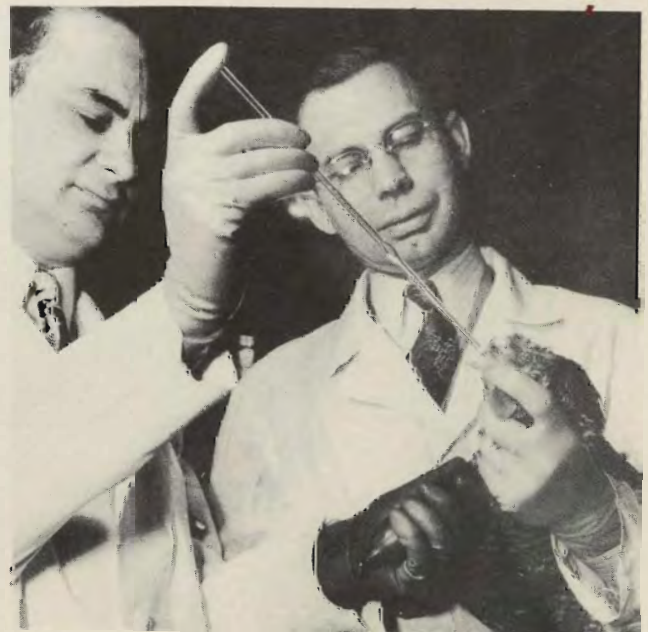
The Dairy Experiment Station, Lewisburg, operated cooperatively by the University and the U. S. Department of Agriculture, centers its work around the State's hundred-million-dollar dairy industry.

The Highland Rim Station, Springfield, centers its activities around Dark tobacco and the general crop and livestock problems peculiar to the soil, climate and topography of the extensive Highland Rim area.

The West Tennessee Station, Jackson, serves as the key research center for cotton, soybeans, and horticultural crops, and pasture and livestock problems peculiar to West Tennessee conditions.

The research staff of the main Station at Knoxville devotes a large portion of its time to projects at the various sub-stations in cooperation with resident staffs; thus making possible a unified, economical State-wide research program covering every segment of the varied agricultural interests of the State.

The results of research are made quickly available to farm people by the College of Agriculture through direct contact at the Stations, through classroom instruction, and the State-wide staff of the Agricultural Extension Service, working directly with farm people in each County.



MORE CORN ON FEWER ACRES

33

Tennessee farmers in 1950 produced 11 million bushels more corn on a million acres less land than they did in 1925.

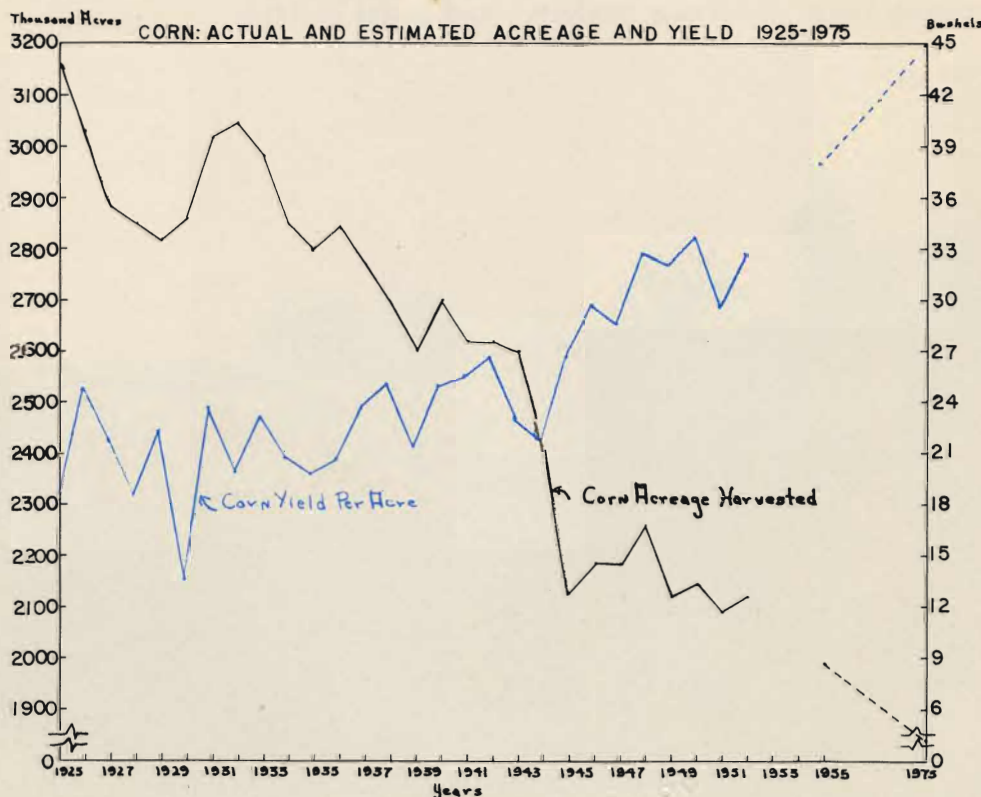
The 1950 corn crop totaled 69.6 million bushels, an increase of 19 percent over the 1925 total. Valued at 113 million dollars, it ranked first in value of all Tennessee crops. *The value of the increase amounted to over 18 million dollars.*

Much of this increased production per acre has been brought about by the development of high-yielding corn hybrids and better cultural practices. Both projects receive major emphasis at the U-T Agricultural Experiment Station. In terms of added value to the corn crop, this research repays each year several times the money required for operation of the entire Experiment Station research program.

The Tennessee Experiment Station was one of the first in the South to start a cooperative corn breeding program with the U. S. Department of Agriculture. The first hybrids developed in this program were planted by a few farmers in the late 1930's. Since then the acreage of hybrid corn has increased steadily, until in 1950 almost half the Tennessee crop was hybrid.



The Experiment Station under this program has released several new hybrids during the past few years—among them Dixie 17, Dixie 22, Dixie 33, and Tennessee 10. Each year it tests some three dozen hybrids and varieties at locations throughout the State to determine how they perform in Tennessee climate and soils. Of 13 hybrids in the 1950 tests which produced 100 bushels or more per acre, 11 were developed in the cooperative breeding work.



MORE AND BETTER COTTON

34



In 1951, Tennessee farmers produced 540 thousand bales of cotton on 775 thousand acres. This was an increase of 54 percent over the 1932 production on 27 percent less acreage.

The 1951 cotton crop was valued at 117 million dollars, of which some 11 million can be attributed directly to research work on use of fertilizers, better cultural practices, improved varieties, and control of disease and insects. Research on testing and measuring fibers, and testing products

made from these different fibers is of added value to producers, manufacturers, and consumers.

Fertilizer studies with cotton made over a number of years by the Experiment Station have formed the basis for wiser use of more fertilizers by cotton growers, a major factor in the striking increase in per-acre yields.

Two new varieties of cotton particularly adapted to Tennessee conditions, Cobal and Tennessee 241, have been released under the cotton breeding program carried on by the Experiment Station in cooperation with U. S. D. A. Both are now widely planted in the State. Encouraging reports come from research with hybrid cotton. Work is also under way on the development of varieties with stronger and better quality fiber and resistance to disease.

Work with chemical control of weeds has been outstanding, and promises to help cut the cost of cotton production still further by reducing labor requirements. Work is being continued on this project.

Practices and materials recommended as a result of Experiment Station research on cotton insect control continue to help increase both yields and quality of cotton.



NEW WEALTH FROM TOBACCO

35

The increased income from tobacco, ranking third in value among Tennessee crops, is an excellent example of the value of science to farm operations.

Burley yields have increased from 900 pounds to 1,400 pounds per acre since research began in 1932 at the Greeneville Tobacco Experiment Station in cooperation with U. S. D. A. Better varieties, resistant to disease, have been developed. Better use of fertilizers, improved rotations, and better control of insects and diseases have been worked out for tobacco growers throughout the State by research at Greeneville, Springfield, Columbia, and Crossville Stations.

Outstanding achievement in breeding research has been the development of Burley 1, a variety released to farmers three years ago. Highly resistant to black root rot, Burley 1 has a greater percentage of top quality leaves, and has consistently brought eight to 10 percent more money than other varieties—an increase of some \$40 to \$50 per acre. Based on a planting of 85,000 acres—the total Burley acreage harvested in 1951—Burley 1 alone could mean an increase of about \$3,500,000 to tobacco income in Tennessee.

Breeding work is now being directed at varieties resistant to black shank and wildfire, two re-



cent scourges of tobacco production, and to other diseases.

Rotation and management practices to both increase yields and combat diseases have been effective in increasing tobacco income. Research on tobacco insect control has resulted in higher yields and better leaf quality. Work on topping and suckering practices, priming, scaffolding out, and curing methods has also helped make production more efficient, and has added many dollars to the value of Tennessee's tobacco crop.



SOYBEANS—NEW SOURCE OF INCOME



Soybeans have long had a place in Tennessee agriculture as a hay crop. Soybeans produced for oil, however, have only recently become an important crop in the State, and last year ranked as fifth in value of all crops.

Primary factors in this rapid expansion of soybean production have been the Ogden and Vol-

state varieties developed by Experiment Station research. The Ogden strain, which yields more oil than other varieties, has not only become the leading variety for Tennessee, but for all other States in the Southeast. Estimates are, if the oil content of other varieties grown equalled that of the Ogden, it would mean an added \$15,000,000 income to soybean producing States.

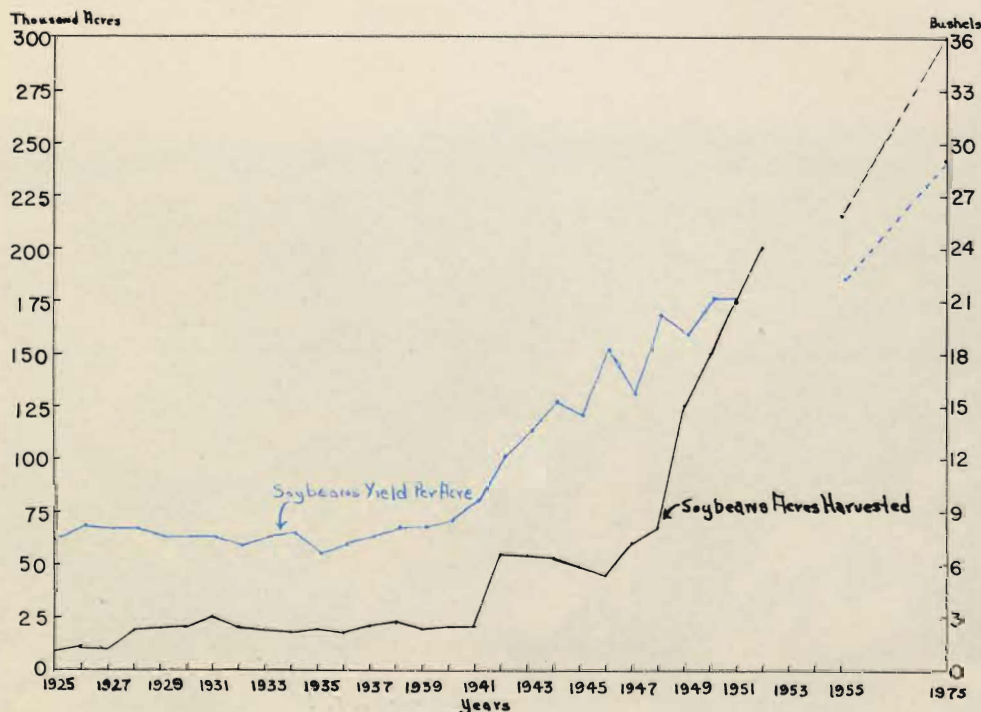
The Volstate makes a good hay crop in addition to its good bean yield, but matures too late for common use in some sections of the State.

Soybean yields have nearly doubled as a result of these new varieties and cultural practices applied on the basis of research findings.

The acreage of soybeans produced for oil represents only about one-third of the total Tennessee acreage; the other two-thirds are planted for hay production or "hogged off" as a valuable feed crop.

Work continues on developing still better varieties, and on working out more efficient cultural practices for still higher yields.

SOYBEANS: ACTUAL AND ESTIMATED ACREAGE AND YIELD 1925-1975



FEED AND GRAZING CROPS IMPROVED

37

Since Tennessee's climate and soils offer unlimited possibilities for livestock production, research emphasis for many years has been directed at improving feed and grazing crops to encourage this enterprise and to help farmers produce efficiently in a soil-building and protecting agriculture.

This has meant the development of winter feed and grazing crops that both protect the soil and produce abundant feed. Small grain, legume and pasture crops have been natural areas for this research.

Small grains breeding has resulted in a number of outstanding varieties including Jackson No. 1 barley, a smooth awn barley now in common use; Forkeddeer and LeConte oats. Balbo rye, discovered as a single plant in a sample of rye seed received from Italy was increased by the Station and is now the most widely grown rye in Tennessee. The increased acreage of barley and winter oats in Tennessee is the result of these varieties, bred for Tennessee conditions, higher yields, resistance to disease, and value as grazing crops in addition to grain production.

The U-T Experiment Station was the first to develop a red clover resistant to anthracnose, a clover wilt that almost drove red clover from Tennessee farms. A Tennessee-adapted strain of sericea, valuable erosion-control and summer grazing crop, was introduced. A number of new alfalfa



varieties have been tested for performance in Tennessee. Research is going forward on improved strains of grasses, and on the most desirable and profitable combinations of grasses and legumes for pastures in the different sections of the State. Tests conducted on liming and fertilization of all these crops have contributed immeasurably to the production and maintenance of legume and pasture stands for the growing livestock industry.

Added income to Tennessee farmers as a result of improvements on these crops alone has been many times the cost of all research carried on by the Tennessee Experiment Station.



MORE MONEY FROM DAIRYING



Tennessee is rapidly becoming one of the outstanding dairy States in the Nation. Long a leading source of farm income, dairying has for the past six years brought an annual income to Tennessee farmers of over 100 million dollars.

Dairy research, particularly that on pastures and feeding, has played an important part in this growth. This rapid expansion has created a field in which intensive research is increasingly needed,

and to which research can continue to add untold values.

Experiment Station dairy research, insofar as funds permit, is directed at increasing profits from dairying all the way from the soil itself to the consumer. Better pastures and feeding to increase production and cut costs; breeding for higher and more efficient production of milk and butterfat; control and prevention of diseases; and processing, manufacturing and marketing milk products all come in for close study and experimentation.

For every dollar invested in dairy research, Tennessee milk producers and processors can expect hundreds of dollars in return.

Improved stock as a result of widespread artificial insemination by good sires has increased production from five to 10 percent in herds using the service. Rotational grazing of alfalfa-orchard grass has increased milk production in the cows under test about 40 percent. Irrigation of pastures has increased per acre milk yields 40 to 50 percent. The demonstrated economy of winter grazing alone is valued at some six million dollars yearly. These are only a few examples of the findings from dairy research which, when generally applied, will add millions of dollars to Tennessee's dairy industry.



MORE MEAT AT LESS COST

39

The most productive pasture and feed crops, converted into high quality meat by the most efficient animals under the best possible management, is the general objective of livestock research at the U-T Experiment Stations.

Efficiency in livestock production is often the difference between profit and loss for the farmer. Application of research findings over the years has enabled many farmers to add profitable livestock enterprises to their farming operations, and has enabled others to increase manifold the returns for their cattle, hogs, sheep, and poultry.

Special attention is being given to beef, pork, and sheep production from improved pastures. Year-round production of grazing; extensive experiments in the production of beef from forage and pasture, with and without additional grain feeding; comparison of different pasture combinations for quantity and quality of beef production; efficient housing; studies of the most economical age to sell beef cattle for the greatest profits are some of the projects under way.

Breeding research is aimed at finding strains of common beef breeds that will make more rapid gains with low feed costs. Necessarily a long-time project, this research, it is felt, can show progress similar to that made in such fields as hybrid corn. Research on the production ability of different



ages of Western ewes in comparison with native ewes is valuable to Tennessee sheepmen.

Poultry research includes breeding for heavier, meatier, faster-growing birds, and for higher producers of eggs. Experiments in feeding for greater production at less cost, and new uses for various grades of poultry products helps poultrymen obtain greater returns.

Constant research on livestock diseases and parasites and their control also contributes to greater efficiency of production.



IMPROVEMENT OF FOOD CROPS



Most areas of Tennessee are well suited for the production of some one or several of the horticultural crops—fruits, berries and vegetables. Experiment Station research has developed improved varieties of these crops, and also has helped encourage production of those to which Tennessee climate and soils are especially adapted.

Four new and improved strains of strawberries have been developed, all particularly adapted to Tennessee, and superior in both flavor and yield.

Methods developed for producing healthier plants, control of disease and insects, weed control and improved cultural practices have all contributed to increased yields of better berries. Pioneering in research on freezing methods, the Experiment Station has helped revolutionize the production and marketing of Tennessee strawberries, bringing in greater profits to the grower, and adding income to the State from the expanding canning and frozen foods industry.

Two new varieties of raspberries, and a new pear variety superior in quality and higher resistance to fire blight, have also been introduced. Improved materials and methods for control of fruit insects and disease are constantly being tested.

Promising new varieties of vegetables, such as beans, cabbage, lettuce, sweet and Irish potatoes, and many others, are tested for performance under Tennessee conditions, and the better ones recommended for use by Tennessee home gardeners and commercial growers. Breeding research has developed a variety of wilt-resistant tomato which promises higher yields and greater profits for producers. Foods processing experiments attempt to find new uses and wider markets for fruits and vegetables, as well as for other food products which can be grown profitably on Tennessee farms.



BETTER USE OF FERTILIZERS AND INSECTICIDES

Research on fertilizers and insecticides both saves and makes money for farmers. Experiment Station research has helped develop better materials and more effective uses of them; enabling the farmer to buy the best materials in proper amounts for his needs, and to get more for his money in fertile soils and greater yields.

Fertilizer research has included physical properties; effects on different soils and crops; rates and times of application; and methods of placement. Substitution of dolomite for sand as a filler in mixed fertilizers, developed at Tennessee and later adopted by fertilizer producers throughout the country, gave the farmer fertilizers with vastly improved mechanical condition, and added the plant nutritive element magnesium. Cooperative work with the Tennessee Valley Authority has tested the performance of several new fertilizer materials, and formed the basis for the best use of these materials in a whole-farm demonstration program.

Findings on fertilization of all the important Tennessee crops—corn, cotton, tobacco, fruits and vegetables, pastures, legumes, small grain, soybeans—have increased yields many times. Work with radio-active materials promises valuable information on plant utilization of fertilizer elements.

The Experiment Station is the farmer's first line of defense against insect pests constantly en-

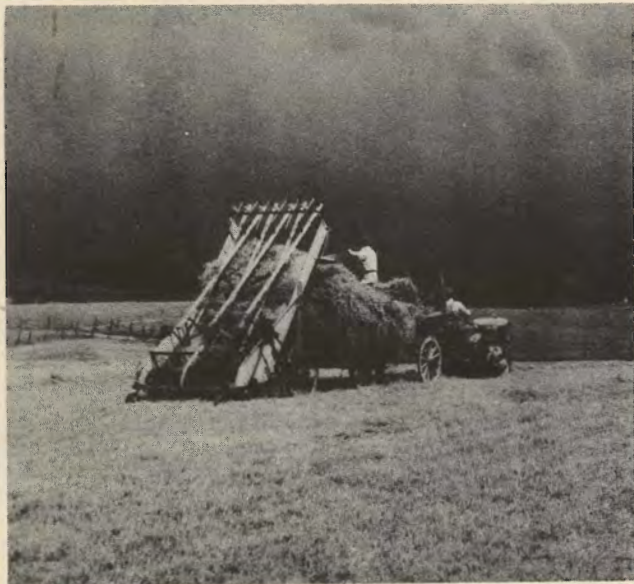


dangering his crops and his profits. Fluorine compounds as insecticides were first discovered by Tennessee research; their use on peanut insects alone a few years ago saved a 100-million-dollar-crop in the Southeast.

Treatments for combating the strawberry weevil, controlling cotton insects, curbing insect pests threatening legumes, small grain, and horticultural crops, are only a few samples of the intensive work being done to help protect the farmer's investments of money and time against destructive insects.



MORE EFFICIENT FARM EQUIPMENT



Time and labor are valuable assets to the farm family, and research that helps the farmer do things more quickly and easily is money in his pocket. Research with farm machinery and equipment also contributes to improved yields and better quality of farm products.

Examples of profitable results of such research are the barn hay drier, with which the farmer can produce better quality hay without risk of costly losses in Tennessee's climate; self-feeding hay bins; adaptations of various types of equipment for better performance on Tennessee terrain; and a strawberry capper that promises great savings of labor to processors.

"BETTER HOMES ON BETTER FARMS"

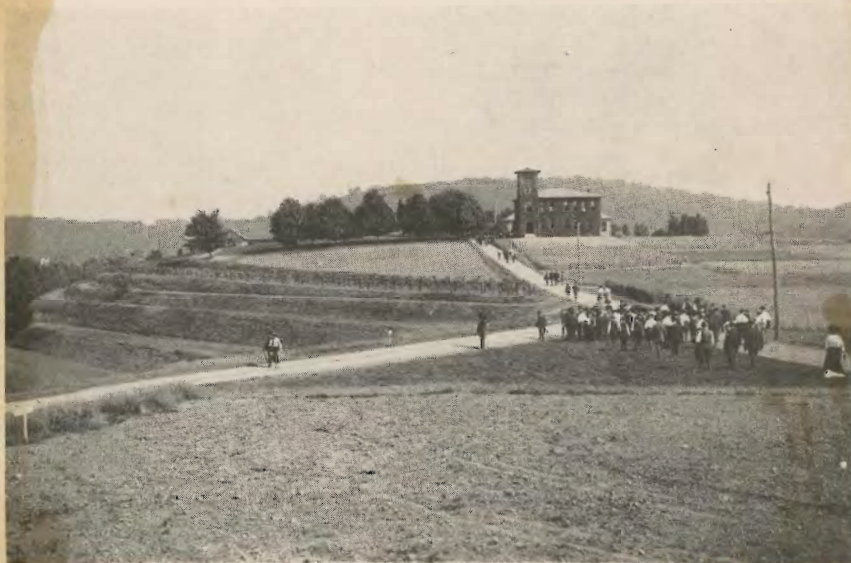
Intensive research is directed at problems of the home—nutrition, clothing, housing, furniture arrangement, lighting and electrical appliances, and many other aspects of living which affect the health, economy, comfort, convenience, and graciousness of rural life.

The central theme of this—and all other—Experiment Station research is "better homes on better farms," as findings help increase farm income and help translate increased income into better living and the general prosperity of the entire State.



Seventy-Fifth Anniversary
OF THE
East Tennessee Farmers' Convention
TUESDAY, MAY 18, 1948

UNIVERSITY FARM, KNOXVILLE, TENNESSEE



Site of Morgan Hall at 25th Convention *in 1898*
on the university farm

OFFICERS OF THE CONVENTION

President—Tom J. Hitch, Louisville, Blount County
First Vice-President—Vaughn Browder, Loudon, Loudon County
Second Vice-President and President of Homemakers' Section,
Mrs. Arthur Womac, Riceville, McMinn County
Third Vice-President and Vice Chairman of Momemakers' Section,
Mrs. O. M. Bean, Surgoinsville, Hawkins County
Secretary and Treasurer—H. R. Duncan, Knoxville, Knox County
Assistant Secretary—Miss Oma Worley, Knoxville, Knox County

PROGRAM

TUESDAY MORNING

9:00—Field Trip for Women—Starting from Temple Hall.

Leaders: Dr. Brooks Drain, Prof. F. C. Galle and Prof. Stanley.

Features: Vegetable production; new and old methods of pest control; diseases affecting berries, vegetables and flowers and their control; varieties and care of flowers and ornamentals.

SPECIAL SESSION FOR MEN

Temple Hall

Special program for fruit and vegetable growers at the new Packing and Marketing Building on Cherokee Farm at south end of the University Bridge.

9:00-10:30—Roadside Marketing—N. D. Peacock

Tree Fruits—R. C. Anderson

Irrigation—A. B. Strand

Strawberries—T. H. Jones

Brambles—B. D. Drain

Insect Control—W. W. Stanley

Disease Control—E. L. Felix

Vegetables—Arthur Meyer

9:00—Weed Killers—S. F. McMurray, Assistant Agronomist, Tennessee Experiment Station, Knoxville.

9:20—Improvement of Bluegrass Pastures by Manuring, Fertilization and Renovation—Dirt Farmer, Ben Clark, Monroe County.

9:40—Costs and Practicability of Different Methods of Making Hay and Silage—J. N. Odom, Farm Manager, University Farm, Knoxville.

10:05—Feeding Value of Hays and Silages Made by Different Methods—Dr. R. E. Hodgson, Bureau of Dairy Industry, Washington, D. C.

10:45—Intermission

JOINT SESSION

Temple Hall

11:00—Music—Bowmantown Chorus, Washington County.

11:15—Invocation and Address—Rev. McCoy Franklin, Madisonville, Tenn.

11:30—Seventy-five Years of East Tennessee Farmers' Conventions—President Tom J. Hitch, Blount County.

11:45—Address—Farm and Political Conditions in Europe as They Affect American Agriculture—Ransom Aldrich, President Mississippi Farm Bureau.

12:30—Adjournment for Lunch.



Here are some of the long-time leaders in the East Tennessee Farmers Convention, as they met at the 1946 meeting. They are left to right, Dr. H. A. Morgan, secretary of the convention from 1904-1926; Mrs. C. O. Browder, president of the Homemakers' Section, 1929-30; Mrs. J. A. Reagan, first president of Homemakers' Section, 1912-1915; Mrs. John Hawkins, president of Homemakers' Section, 1927-28.



LEFT—Temple Hall, seen here, was dedicated at the 1912 meeting. Seen also is the farm machinery exhibit.

Garden and greenhouse tours have been growing in popularity with the Homemakers' Section. Here a group at the 1946 meeting inspect a table of strawberries.





A field tour for men at the seventy-third meeting.



Honored at the 50th anniversary meeting in 1923 were these founders and prominent figures in the East Tennessee Farmers Convention. They are: BACK ROW—H. M. Willson, Niota; Phil S. Taylor, Telford; Nick P. Earnest, Chuckey; N. R. Willis, Mountain City; Prof. C. A. Keffer, U. of T., Knoxville; Dr. Andrew M. Soule, Athens, Ga.; Dr. H. A. Morgan, U. of T., Knoxville; W. B. Stokely, Newport; Jno. W. Cate, Cleveland; Ise Moore, Chattanooga; W. T. Roberts, Athens; Miss Margaret Ambrose, U. of T., Knoxville. FRONT ROW—Mrs. C. O. Browder, Sweetwater; Miss Ran Yearwood, Sweetwater. Mrs. C. W. Shackleford, Chattanooga; Mrs. W. B. Stokely, Newport; Mrs. L. B. Reagan, Chattanooga; Miss Mary Boyce Temple; Frank Gettys, Reagan; J. A. Reagan, Sweetwater; J. K. P. Wallace, Andersonville; Hon. Homer Hancock, Commissioner of Agriculture, Nashville; Hon. T. F. Peck, Etowah; Hon. F. M. McRee, Union City.

50TH ANNIVERSARY SCENES

UPPER LEFT—Lunch time on the farm campus. In the picture is part of Morgan Hall, dedicated two years before the 1923 meeting.

LOWER LEFT—The tobacco planter attracts the attention of men making the field tour.

LOWER RIGHT—Attendance at the 50th anniversary meeting set a new mark. This picture shows the many cars, the machinery exhibit, and many of the attendants.



TUESDAY AFTERNOON

1:30—Field Trip for Men to Blount County Farm.

Leaders: Vice-Director Chance and Assistants.

The Farm: Consists of 500 acres located 7 miles from Knoxville on the Knoxville-Alcoa Highway, secured in 1942 for expansion and resident teaching and experimental fields.

Special Features: variety tests on barley, oats and wheat; effects of nitrogen, potash and phosphate on small grains; spring and fall seedings of alfalfa alone and with different small grains; demonstrations of new weed killers on weeds and sprouts; corn fertilization; mixtures of fescue, orchard and other grasses with ladino and white clover; effects of different rates and kinds of fertilizers on pasture; Effects of surface and subsurface application of fertilizer on pasture; volunteer stands of hard-seeded crimson clover; hay driers for long and chopped hay; beef cattle, sheep and hogs.

HOME MAKERS' SECTION

May 18, 1948

Presiding Mrs. Arthur Womac, McMinn County
President Home Makers' Section

1:00 P.M.—Group Singing.

1:05 P.M.—Devotions—Mrs. O. M. Bean, Hawkins County
Vice President Home Makers' Section

1:15 P.M.—Introductions by counties.

1:25 P.M.—Group Discussion—Better Living through Organized Planning

Discussion Leaders—

Miss Mary Stanfill, Dist. Home Demonstration
Agent, Chattanooga.

Miss Claire Gilbert, Instructor, Extension
Methods, University of Tennessee.

Panel—Community Leaders from Contest
Communities.

2:00 P.M.—Safe and Sound Home Set-Up—Mr. Arthur Meyer, Associate
Professor of Horticulture,
College of Agriculture, University
of Tennessee.

2:40 P.M.—Demonstration: A Chance to Shine—Miss Iris Davenport
Editor, Woman's Department
Southern Agriculturist

4:00 P.M.—Adjourn.

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SEVENTY-FOURTH ANNUAL MEETING
OF THE
EAST TENNESSEE FARMERS' CONVENTION

THURSDAY, MAY 15, AND FRIDAY, MAY 16, 1947

UNIVERSITY FARM, KNOXVILLE, TENNESSEE



Present and Past Officers of East Tennessee Farmers Convention in Attendance at the 73rd Annual Meeting, May 16, 1946. Phil S. Taylor, Washington County, President 1923-24, speaking.

OFFICERS OF THE CONVENTION

President—J. Fred Bacon, Georgetown, Hamilton County
 First Vice-President—Tom J. Hitch, Louisville, Blount County
 Second Vice-President and Chairman of Homemakers' Section—
 Mrs. Myrtle Roberson, Pikeville, Bledsoe County
 Third Vice-President and Vice-Chairman of Homemakers' Section—
 Mrs. Arthur Womac, Riceville, McMinn County
 Secretary and Treasurer—H. R. Duncan, Knoxville, Knox County
 Assistant Secretary—Miss Oma Worley, Knoxville, Knox County



Temple Hall, built by farmers of East Tennessee for the Convention, and dedicated May, 1912.

(PERSONS SHOWN ON COVER PAGE)

Front Row—left to right—Elizabeth Hill, Home Agent, Anderson County; Ruby Morris, Home Agent, Claiborne County; R. A. Brown, Marion County, President 1946; Howard Hornsby, Meigs County, President 1944; Wm. Mattern, Carter County, An Old Timer, attending first in 1877 or 78; W. N. Ramsey, Hamblen County; President 1938; H. A. Morgan, Knox County, Secretary 1904-1926; Sam Smith, Hawkins County, Old Timer, attending first in 1878 and H. R. Duncan, Knox County, Secretary 1934 to date.

Middle Row—Mrs. J. A. Reagan, McMinn County, Old Timer, attending first in 1890; Mrs. John Hawkins, Greene County, now of Monticello, Florida, President, Homemakers Section 1927-28; Mrs. W. N. Roberts, Greene County, President, Homemakers' Section 1946; Mrs. Annie W. Eblen, Knox County, Secretary Homemakers' Section for several years; Mrs. J. F. Bowden, Cumberland County, President Homemakers' Section 1933-34; Mrs. Shields Wallace, Anderson County, President Homemakers' Section 1940-41; J. N. Haddox, Blount County, President 1929-30; Ise Moore, Hamilton County, President 1921-22; Boyd Fugate, Claiborne County, President 1941; Roy Bell, Sullivan County, President 1932-33.

Back Row—Mrs. John Carson, Monroe County, President Homemakers' Section, 1931-32; J. C. McAmis, Knox County, Secretary 1927-33; Joe Kelley, Knox County, President 1936; Nick Ernest, Greene County, President, 1919-20; M. P. Stephens, Bledsoe County, President 1942.

Present, but not showing—Mrs. C. O. Browder, McMinn County, President Homemakers' Section 1929-30; Miss Oma Worley, Knox County, Secretary Homemakers' Section; Mrs. J. J. Armstrong, Monroe County, President Homemakers' Section 1944.

Presidents of East Tennessee Farmers' Convention

(Subject to Correction)

1872-73	*O. P. Temple, Knox County
1874	*Col. C. W. Charlton
1875-76	Convention failed to meet
1877-78-79-80	*Capt. J. A. Turley, Grainger County
1881-82-83-84	*J. B. Stokley, Cocke County
1885-86	*J. M. Meek, Jefferson County
1887	*M. P. Jarnigan, Jefferson County
1888-89-90	*S. J. A. Frazier, Bradley County
1891-92-93	*J. K. P. Wallace, Anderson County
1894-95	*W. R. Rankin, Monroe County
1896-97	*A. B. Bowman, Washington County
1898-99	*J. A. Reagan, Monroe County
1900-01	*W. G. Lenoir, Loudon County
1902-03	*T. B. McLemore, Knox County
1904-05	*W. Gettys, McMinn County
1906-07	*H. B. Clay, Hawkins County
1908-09	*W. T. Roberts, Hamilton County
1910-11	*W. R. Reeves, Washington County
1912	John W. Cate, Bradley County
1913-14	*W. B. Stokley, Cocke County
1915-16	*H. M. Wilson, McMinn County
1917-18	*W. C. Shaw, Campbell County
1919-20	Nick Ernest, Greene County
1921-22	Ise Moore, Hamilton County
1923-24	Phil Taylor, Washington County
1925-26	*John Marshall, Sevier County
1927-28	Newton C. Myers, Greene County
1929-30	J. N. Haddox, Blount County
1931	C. C. Brooks, Morgan County
1932-33	R. F. Bell, Sullivan County
1934-35	*J. J. Hampton, Cocke County
1936	J. B. Kelley, Knox County
1937	*Edd Robinson, Hamilton County
1938	W. N. Ramsey, Hamblen County
1939	Alfred Swann, Jefferson County
1940	S. F. Conner, Rhea County
1941	Boyd Fugate, Claiborne County
1942	M. P. Stephens, Bledsoe County
1943	W. M. Todd, Scott County
1944	Howard Hornsby, Meigs County
1945	*W. H. Sharp, Carter County
1946	R. A. Brown, Marion County
1947	J. Fred Bacon, Hamilton County

*Deceased

1948	Tom J. Hitch, Blount County
1949	Vaughn Browder, Loudon County
1950	Ott White, Carter County
1951	Jim G. Willson, McMinn County
1952	A. A. Deakins, Washington County
1953	Walter P. Webb, Sevier County

Secretaries of East Tennessee Farmers' Convention

1872-78	C. W. Carlton
1879-1904	J. M. Meek, J. A. W. Wallace and A. M. Soule, and others
1904-26	H. A. Morgan
1927-33	J. C. McAmis
1934-to date	H. R. Duncan

Presidents of Home Makers' Section

1912-13-14-15	Mrs. J. A. Reagan, Monroe County
1916	Mrs. W. B. Stokley, Cocke County
1917-18	Mrs. J. I. Huggins, Jefferson County.
1919-20	*Mrs. H. G. Hutchinson, Monroe County
1921-22	Mrs. W. C. Shackleford, Hamilton County
1923-24	*Miss Ran Yearwood, Monroe County
1925-26	*Mrs. W. H. Moore, Knox County
1927-28	Mrs. John Hawkins, Greene County
1929-30	Mrs. C. O. Browder, Monroe County
1931-32	Mrs. John Carson, Monroe County
1933-34	Mrs. J. F. Bowden, Cumberland County
1935-36	Mrs. Floyd Evans, Rhea County
1937-38	Mrs. John Dail, Sullivan County
1939	Mrs. John Cate, Bradley County
1940-41	Mrs. J. S. Wallace, Anderson County
1942-43	Mrs. J. B. Lee, Bledsoe County
1944	Mrs. J. J. Armstrong, Monroe County
1945	Mrs. Will Trewhitt, Bradley County
1946	Mrs. W. N. Roberts, Greene County
1947	Mrs. Myrtle Roberson, Bledsoe County

*Deceased.

1948	Mrs. Arthur Womac, McMinn County
1949	Mrs. O. M. Bean, Hawkins County
1950	Mrs. Joe Carpenter, Cocke County
1951	Mrs. Roy Hart, McMinn County
1952	Mrs. Claude McConnell, Marion County
1953	Mrs. Hubert Bell, Hamblen County

HISTORY AND INFLUENCE of the EAST TENNESSEE FARMERS CONVENTION

Address by Phil S. Taylor, 73rd Annual Meeting, May 16, 1946

Twenty-one years have passed since I lifted anchor from the harbor of my Tennessee home and sailed southward. How much the world has lived and how much it has died during these fateful years!

In the past fifty years the world has lived more in progress than it lived in all the previous years. The triumphs of life have, in this half century, exceeded all past successes; surpassed all records. The tragedies of death in our item out match in their grimness and terror all that have gone before. In my brief day and yours, we have seen more than Alexander ever dreamed, more than Caesar could have seen had he lived two thousand years, more than Bonaparte, with his flaming imagination, ever saw in his farthest flights.

When I was a boy in East Tennessee, there was no such thing as a telephone; the automobile was an unborn child in the brains of men; the airship was as much of a dream as it was in the days of Isaiah. The radio, source of mystic power and magic service, was then undiscovered and unknown. The sending of a picture by wire would have been the silly notion of an addlepate. Television and radar existed only in the dreams of genius, and that most awful of all forces; Atomic energy, had not yet been harnessed and equipped for its deadly mission. How true, all life is a stage!

Every era is a drama, and at each curtain-rise, man stands aghast at the works of his own brain. The mysteries of today become the common utilities of tomorrow. Master and force, in multiplied and diversified form, are man's destruction and man's preservation—his peace and his woe, his enrichment and his poverty.

For these two decades I have been, in spirit, and exile from my native land. It has been a period of longing, but a period of communion in memory with the scenes of youth, and a yearning for the faces and the voices of those I have loved. But wherever I have wandered, and whatever each hour may have brought me, the spell of the past has ever enchanted me with a love and beauty as sweet as a dream. Instead of languishing, this sentiment has grown with the years; instead of the dying flame, the altars of my soul have grown warmer and brighter for all that was sacred and all that was hallowed in that life of infancy and youth in my native mountains.

This long separation intensifies the fervent feelings and the higher emotions of the human soul. I love East Tennessee better, perhaps because I have been away from it these many years. My native heath is an emotion with me as high and holy as ever touched the human heart, increasing as time passes. During this time of spiritual exile, when I meet other sons and daughters, who, like myself, were born here, I feel towards them a kindred sentiment as warm and close as blood. Let me whisper this advice in the ear of the young: "If you wish to occupy the fairest spot of earth, if you have

sentiment and emotion and love for your native hills, stay where you are and build your fortune here, else you may be a brokenhearted pilgrim, no matter how great your success in wealth and fame."

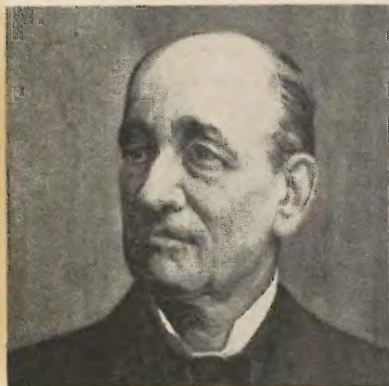
I like the old notion that blood will tell. I am satisfied in my own mind that the best blood in all the earth courses in the veins of the people of these hills and mountains. I believe in the aristocracy of human blood precisely as the cattlemen believes in the superiority of the blood of his herd and of his flocks. Kentucky race horses or Tennessee walking horses do not come of pestle-tailed ponies, neither do pedigreed Berkshires and Durocs appear in a litter of sandridge razorbacks. A full-blooded Jersey or a registered Shorthorn is not sired by a scrawny scrub.

I have listened with exquisite rapture to a foxchase. The bass notes of Old Lead, the tenor of Red, the alto and the treble of Rock and Sue, the rich baritone of Old Limber, was music more thrilling than the orchestra, more moving in its power than the notes of bugle or golden horn. In that pack was not a single cur or benchleg feist; but every dog was by blood and rearing of the aristocracy of hounds.

I do not mean snobbery when I speak of aristocracy. People do not have to be rich and occupy high stations to be aristocrats. But the man who spurns temptation and cherishes his own honor and that of his family above the lure of riches, who prizes virtue as the priceless pearl, although he may be an humble blacksmith or a ditch-digger—he is nonetheless an aristocrat and a lord among men!

Founding of Organization—1872

We are met today to honor and pay tribute to an organization which has a history of three-quarters of a century. It was on May



JUDGE. O. P. TEMPLE

16, 1872, exactly 74 years ago this very day that Judge Oliver Perry Temple, a distinguished jurist of East Tennessee, delivered an address in the Court house of Knoxville which must have been the inspiration for the permanent organization known as the East Tennessee Farmers' Convention and Institute. Judge Temple's speech was so full of wisdom that it is timely and applicable today and I propose to quote it on this occasion. He said, in part: "The assembling at this place of no body of men, within my recollection, has been the cause

of more just gratification than should this be. I have seen Conventions of all other callings and classes. For the first time in our history have farmers—the most numerous, the most important of all classes—assembled in Convention as a body to deliberate on their own

great interests. This fact is astonishing. Let us indulge the pleasing hope, let us resolve, indeed, that this meeting shall not be the last; but merely the beginning of a long series of annual, or semi-annual meetings, full of interest and instruction, continuing indefinitely through the future. Let the Farmers' Convention be the Mecca to which you will, annually, with, unfaltering determination make your pilgrimage, and offer your devotions.

"It is within the power of this Convention, by high resolves and generous and enlightened action, to mark the beginning of a new era in agriculture; to lift the farming profession to a higher plane of usefulness and influence; to command for itself more of that respect and honor which has heretofore been bestowed on other professions; and to arrest the tide of poverty and idleness which is now the curse as well as the disgrace of our section.* As long as the farmer looks to Cincinnati or Philadelphia or Baltimore, or to any political party or Convention, instead of looking to the improvement of his own fields, and herds and flocks, and to the education of himself and his children, so long may we expect worn and exhausted fields, short crops, scarcity of money, miserable scrub stock, hard times, no schools, dilapidated houses, badly dressed people, a general decline in the value of lands, houses and property, and an almost universal restlessness, and desire to sell out and get away.

"No, instead of calling on Hercules for help, or looking to government or party for relief, the first great law, applicable to farmers above all others, is, **help yourselves**. Elevate your own calling. Educate yourselves. Help one another. Meet together, consult, combine, co-operate; stimulate and emulate one another. Feel a just pride in elevating and improving your own class. Encourage schools and colleges. Educate your sons and daughters. Send them away from home occasionally. Fix up that home. Make home attractive, neat and happy. Fill it with books, papers and magazines; and so you shall keep your sons from the liquor shops, or the haunts of the wicked. Subscribe at once and before you leave here, for at least one farm magazine or paper. Purchase books on farming. Purchase a Jersey cow for your wife, for butter and cream, and a Shorthorn for yourself to raise beef. Get improved stock of all kinds. Save your manure—all of it—as if it were gold.

"And let each one of us resolve here, this day, that we will move forward, instead of standing still; that we will organize permanently as a Farmers' Convention; that we will at once purchase some blooded stock; in a word, that we will awake from our sleep, and do something to arrest the waste, deterioration, depreciation and poverty that threatened to overwhelm us in East Tennessee.

I must, for the sake of emphasis, again give you some of the words of Judge Temple as being the very soul and purpose of this organization. Solomon, himself, could not have better expressed this Convention's aims and objectives than did Judge Temple when he said, "It is within the power of this Convention, by high resolves and generous and enlightened action, to mark the beginning of a new era in agriculture;

to lift the farming profession to a higher plane of usefulness and influence; to command for itself more of that respect and honor which has heretofore been bestowed on other professions, and to arrest the tide of poverty and idleness which is now the curse as well as the disgrace of our section."

Wonderous Changes Noted

If he and those who heard him deliver that historic speech could come forth from their graves today and be with us in the flesh and see the wondrous changes that time has wrought over the hills and vales of Eastern Tennessee, they would have cause as we do for soulfelt pride and gratification. The prophetic words of Judge Temple have come true!

It is altogether proper and fitting that we here today review the harvest which has come from the seed sown by Judge Temple and the organization which he largely inspired. The generation to which we older living members belong and the generation now assuming leadership have viewpoints that bring into bold relief the achievements of the years that have passed. What magical changes hath been wrought by the mind and hand of man in these past three-quarters of a Century.

How vastly different are all of the advantages that make up the farmer's life in this good day! Science has given knowledge to the farmer, has added new methods, new machinery and new opportunities to his life. On the farms when I was a lad fifty years ago, they had a little "flea-bitten" mule and a "Georgia stock" plow. Today on the farms they have tractors, Percherons, riding plows, cultivators and modern harvesters. We fed our chickens a little corn on a cold day and put them to roost in the old apple tree. Then, eggs were 5c a dozen, payable in store goods. If the old speckled hen laid 50 eggs a year she performed prodigiously and cackled for an hour in loud self-praise. Now no hen is worth a rooster's admiration who does not lay 200 eggs a year. Then we practiced the perfect democracy of the barnyard—the hens and roosters cackled, crowed, scratched and roosted together! Today the old rooster crows all by himself, segregated and banished from his erstwhile harem, except perhaps for a few fleeting weeks in the year, and then only if his pedigree warrants that privilege. And, when I was a boy, we had in every neighborhood a little mongrel, brindle bull, altogether without pride of ancestry, whose blatant bellow sounded across field and woodland like a shrieking siren and whose posterity inherited from him only an excess of chuck and a deficit of rump. Today that 600-pound scrub bull has gone into chuck and bologna and his one-ton successor, majestic in his wrappings of sirloin and porterhouse, is the proud Prince of our pastureland and the Baron of the barnlot, a mighty monarch and aristocrat of our modern animal kingdom, whose progeny carries the blood and the bone of a lordly ancestry.

Livestock Improvements

Then we had in the woodlands hogs which we called pine rooters and razorbacks, some-times weighing 100 pounds at maturity, about all head and long bony nose—these inedible appendages vainly seeking to compensate for puny loins and rabbit-like hams. Today, we have veritable aristocrats of swinedom, bred to the purple and each pig in the litter of a dozen or more growing daily from birth into lard and sausage and bacon and ham at the rate of 200 pounds every six months. In those days we had old Muley and old Brindle grazing around the strawstack or on a sedge-grass hillside with now and then a few scant nubbins and a bundle of fodder for dessert, each with an udder about the size of a quart cup from which, with great toil, the milkmaid twice daily extracted a few pints of fatless secretion, then commonly referred to as "blue John." Today from the capacious udder of the pedigreed cow there comes a golden stream of six or eight gallons daily, abounding in butterfat and vital with vitamins.

In those old days we rode astride a mule from the farm ten or twenty miles over the rocky hills and through the muddy hollows to the county seat. It took 5 hours going and 6 hours coming back! Our roads were like the swamps of Egypt. Now they have modern, double-barrelled highways and I can go from my old farm in Washington County to Jonesboro in 20 minutes. As it was with our cattle and hogs and our chickens and our highways and our machinery and our roads, so it was with our schools and our Churches and our means of culture, entertainment and information. Then we subscribed perhaps for a single farm monthly and one weekly newspaper. For years I rode a mule 4 miles to the nearest rural postoffice to get the mail which came by old-fashioned star route carrier once or twice a week. Now a hundred programs flash out over the air from great broadcasting stations and are heard in millions of homes, bringing the world's happenings to every listening ear within minutes after they occur.

In those days we youngsters on the farm wore homemade blue jeans "britches," hickory shirts, yarn socks knitted by grandmother, heavy cowhide boots and brogan shoes with that marvelous protecting adornment known as the copper toe! We had one little Sunday suit, carefully removed soon after the Church services and hung in the closet along with the "Sunday-go-to-meetin'" outfits of our father, mother and nine brothers and sisters. Now my two young college-bred daughters down in the Sunshine State of Florida invest more money in two-pieced and too-scanty bathing suits than my mother and grandmother invested in their trousseaux.

I would not have the younger people in this audience draw a wrong conclusion from my remarks. I do not mean to cast reflection on the mode and method of our folks 50 years ago. Rather, it is my hope and purpose to have those who hear me now, pause in reverence and respect for their sires and grandsires. Out of those pioneer days have come the great, glowing, fastmoving and sometimes bewildering

complications of this era, which we call progress. Out of the hardihood and the courage and the frugality and the fidelity to duty and the deep underlying religious principles of your people and mine who lived and wrought and died within the last century has come most of the good and probably but a small part of the bad with which we must deal today.

Leaders With Vision

To men like J. K. P. Wallace, J. A. Reagan and Frank Gettys we owe an unpayable debt of gratitude. It was men like these who stood beside Judge Temple, who caught the vision of a better relationship between every farmer and his neighbor, between every farmer and his soil, between every farmer and his crops, between every farmer and his flock and orchards and between all farmers and their market places.

Following in the steps of these charter members came earnest and tireless leaders like W. B. Stokely, N. R. Wills, John W. Cate, H. M. Wilson, W. C. Shaw, A. B. Bowman, Nick P. Ernest, Ise Moore, and W. T. Roberts. It was my privilege, along with thousands of other farmers from Bristol to Chattanooga, to attend through many years the annual sessions of our Convention. Meeting with us in many of these Conventions were the Women's Section with such devoted and unselfish leaders as Mrs. J. A. Reagan, Miss Betty L. Browder, Mrs. H. G. Hutchinson, Mrs. W. B. Stokely, Mrs. J. I. Huggins, Mrs. C. W. Shackelford and Miss Ran Yearwood. After her father had passed away, we had as our constant friend Miss Mary Boyce Temple, who generously supplied needed finances to make possible the completion of Oliver Perry Temple Hall in which we are met today.

Of these past Presidents, men and women, I believe that only three men beside myself now live; namely, Ise Moore of Hamilton County, Nick P. Ernest of Greene County and John W. Cate of Bradley County. Of the women Presidents, it is my information that only Mrs. J. A. Reagan of Monroe County survives.

Permit me here to point out that so far as we know the oldest living member of the Farmers' Convention is Mr. T. L. Rogers of Cleveland, Tennessee, who is approaching his 87th birthday, which will be celebrated this coming July 22. Greetings and affectionate salutations to Mr. Rogers, who is with us here today!

The programs of our annual meetings were made notable by the participation of some of the most distinguished and most inspiring leaders of agricultural thought in the United States. At that time it was not uncommon to have an attendance of several thousand farmers and their wives from all of the counties of East Tennessee at our sessions. The deep, intelligent interest manifested by these great gatherings brought out the very best there was in our speakers.

Noted Speakers

Many of us will recall hearing Honorable James Wilson, then Secretary of Agriculture, Joseph E. Wing, who preached alfalfa even as Saint Paul preached the Christian religion, Dr. R. A. Shaw, Director of the Michigan Experiment Station, Dr. C. G. Hopkins of the Illinois Experiment Station, our own Dr. Tate Butler, who was the inspiration of thousands of farmers throughout the South, Professor C. S. Plum of Ohio State University, Colonel W. A. Harris, one of the truly great Shorthorn breeders of this county, and the unique and distinguished John Imboden, cattle feeder par excellence from Illinois. Personally my most vivid memory of our speakers clings around the address of Governor Frank O. Lowden and Aaron Sapiro, brilliant advocates of cooperation among farmers.

I now come to the mention of a man who probably did as much, if not more to carry on the fight for better agriculture in Tennessee than did even Judge Oliver Perry Temple. This gentleman, completely devoid of personal vanity and conceit, threw the full power of his mind, heart and body into the education, the inspiration, and the in-season and out-of-season guidance of better rural life. I count myself as one of the thousands of fortunate young men who sat at his feet, as thousands of young Americans sat at the feet of Mark



DR. H. A. MORGAN
Secretary, 1904—1926

Hopkins, and had him pour into our minds the vision of good farm practices and of a wholesome rural life. In the breadth and accuracy of his knowledge of nature and nature's laws, in his marvelous ability to teach and to inspire, in his far-reaching vision, his leadership of great, fundamental and vital movements, in the wisdom with which he has helped guide the development of the Tennessee Valley Authority and make of it the world's best example of conservation of natural resources, in all these things I count him as the peer of great American men and the benefactor and servant of this and succeeding generations. With no desire to commit fulsome eulogy, I come

back to my native State after the flight of two decades to bring a chaplet of Southern flowers to lay upon the brow of Dr. H. A. Morgan.

I returned to my old home from Florida the State of my adoption to join you here today in calling back from the past the leadership that gave character to the East Tennessee Farmers' Convention and to the lives of all of the people who lived and now live in the mountains and vales and on the hills of my native land. Many of these men I

was privileged to know. With some of them I had close association and friendship. From them I caught, as a youth, a vision of a better day and a more fruitful life for farm people. By their precepts and by their practices, they led the way towards a new and more fruitful relationship between man the creature and God the creator.

Sound Recommendations

Will you please listen as I read from some of the records of this organization? I want you to note that some of the Minutes of our past meetings, while they were recorded 20 and 30 and more years ago, gave evidence that they were then in order and we now know they were wise. In 1914, we recommended the enactment of a Rural Credit bill, endorsed rural delivery of mails, farmers insurance companies, consolidation of rural schools, introduction of agriculture and domestic science courses in public schools and the Torrens System of land title registration. In 1920, we urged the passage of a pure fabric law, endorsed the Farm Bureau organization which today is a potent power for agriculture in the United States; called on the State Legislature to pass a pure seed law, to give better support to public schools; commended Dr. Morgan as President of the University of Tennessee; endorsed the Tennessee Dog Law; deplored the increase of moonshine still and the drift of the youth to the city, and commended the practices of thrift and frugality and the living of the simple life to farm people. It is of particular interest just now to quote from the resolutions of the 1920 Convention on the subject of capital and labor. On that question we said:

"No man should be allowed to collect more from society than he has honestly earned****

We believe it is time for labor to shake hands with capital and pledge itself to do an honest day's work for an honest day's pay."

And, so, the farmers of East Tennessee,, through the larger part of a century, came together each year to learn and to plan and to make declaration of their deepest needs, their sacred principals and their solemn purposes. Their meetings were the forums where the heart and the soul and the mind found a common purpose and chartered a heroic course towards a better and a brighter era.

Today, as if in fulfillment of Biblical prophecy, the East Tennessee Farmer may say that "the cattle on a thousand hills are mine." Today school houses are temples of practical learning and your great University is the fountain from which flows back to farmers knowledge and wisdom that adds efficiency, security, respectability and contentment to those who dwell on the land.

In every civilization man has been prone to stress material achievements. It was so with the Greek, the Roman, and beyond them, the Egyptian.

Egypt built useless pyramids with whip-lashed slaves. Babylon erected towers and hanging gardens to satisfy vanity, Ephesus constructed temples for idol worship, Greece made of her cities a wilderness of marble and placed the Columns astride the waters at Rhodes, Rome squandered millions on tombs, and ponderous theatres for brutal combats. None of these blessed humanity and all are gone.

Building For The Future

But America is building structures that will minister to the welfare of the common citizenry of this country; conserving nature's powers and resources to make the deserts blossom as the rose, generating electricity and distributing it so as to break the bondage to slavish tasks and drive drudgery from thousands of farm homes.

But the materialistic is too much emphasized in American life. Our ideal of progress is the works of man. But the works of man do not constitute all of civilization. They are merely the material evidences of the workings of man's mind. None of these things are durable. A vast pile of stones and a few shafts are all that is left of civilization that once flourished in the valley of the Nile. Greece expressed its culture in stone. But her incomparable works are today pathetic fragments. Likewise, Roman grandeur is crumbling ruins. But Greek ideals and Greek thoughts and Roman thoughts and Roman ideals are as fresh and untouched by time as was the Parthenon on the day it was finished. The children of the mind, born of the great civilization of the past, will never die. The Acropolis is the scene of a decayed glory—where perfection was wrought in stone. They are gone, but things of the spirit endure. Socrates, Plato and Aristotle have left us the works of their minds that neither wither, crumble, fade, nor perish.

The thought I would drive home is this: That America, if she lives, must be eternally vigilant in the cultivation of the fruits of the spirit. We cannot live and be a nation of liars, and thieves and dissolute pagans.

I hold, therefore, that as we build with the things of the spirit, We shall grow and we shall not die. However, skilled our hands may be, however trained our minds, if the spirit is barren of the fruits of good, we die. The religion and morality that had its culmination in Jesus of Nazareth, is the only fitting formula for the individual, the nation and the world.

In my 21 years of life in another land, I am but a Tennessean transplanted. For I cannot forget the past. The story of my State I have never ceased to tell. Memories of her landscapes gemmed with hills where sequestered valleys lie, mountains fringing her borders like eternal sentinels, the murmur of her rivers, the music of her woods, are the pictures that hang forever in the gallery of recollections.

The tales of valor of her illustrious sons, the romance of her loves, her firesides of culture and her walks of the intellectual speak to me and sing for me, and edify my soul while the years go by.

The young English poet, Brook, whose brilliant life went out in the first World War like a falling star, wrote these lines about his native land: "If I should die in some foreign field, think this of me, that there is one corner of earth forever England."

That fervent love of native land is common to the hearts of all men of emotion and sentiment. When we leave the spot of earth that is native to our feet, the skies that bend above the mountain top, on which we have gazed, the rivers that water its grassy glens and valleys where we have played, the fields in which we have toiled, woods in which we have hunted—when these we leave behind us, there is born of the soul an angel of beautiful and eternal memories. It has been so with me and with the countless thousands, who like me, have departed from the old soil and pitched their tents to live and to die in other lands! When my end shall come and they consign me to Mother Earth, it may be said in truth, "Here is a spot of earth forever Tennessee."



A HISTORY OF EXTENSION WORK IN TENNESSEE



TWENTY-FIVE YEARS OF SERVICE
TO RURAL LIFE - 1914 - 1939

BY ALMON J. SIMS
EXTENSION EDITOR

PUBLICATION 223 ~ MAY 1939





DR. KNAPP

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"Someone has said that all great organizations and institutions are but the lengthened shadow of a man. That certainly is true of the Extension organization. It is the lengthened shadow of a man and an idea. The man was Dr. Seaman A. Knapp; the idea that of teaching by demonstration."—Dr. J. A. Evans, "Recollections of Extension Work."

ON THE COVER—This publication is dedicated to Charles A. Keffer, Director from 1914 to 1935, whose picture appears on the cover at the top of the page. Other pictures on the cover are, in order named: Director C. E. Brehm; Miss Margaret A. Ambrose, Assistant Director in charge of home demonstration work; H. S. Nichols, Assistant Director in charge of county agent work; Mrs. Elizabeth Lauderbach, home demonstration agent in Hamilton County since 1911; R. E. Ellis, county agent in Weakley County since February 1, 1913; a view of the University Experiment Station Farm and Morgan Hall, headquarters of the Tennessee Extension Service; and center, a community Extension meeting in Obion County.

REFERENCE MATERIAL CONSULTED—Tennessee Extension records, reports and special historical data prepared by Charles A. Keffer, Director, 1914 to 1935; Director C. E. Brehm, H. S. Nichols and Miss Margaret A. Ambrose, assistant directors; G. L. Herrington, leader of boys 4-H Club Work; A History of Agricultural Extension Work in the United States—Dr. A. C. True, USDA Miscellaneous Publication No. 15; Recollections of Extension History—Dr. J. A. Evans, North Carolina Extension Circular 224; Extension Work in Agriculture and Home Economics—C. W. Warburton, Director of Extension Work, USDA, Circular 6847; and other USDA circulars, publications and reports on Extension Work.

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A HISTORY OF AGRICULTURAL EXTENSION WORK IN TENNESSEE

Twenty-Five Years Of Service
To Rural Life—1914-1939

By Almon J. Sims, Extension Editor.

Foreword

The development of Agriculture in Tennessee, from the turn of the eighteenth century, when Robertson and Sevier led their little bands of settlers from Virginia and North Carolina, over the mountains into the valleys of East Tennessee, to hew homes from a wilderness that today is a land of wide, productive fields, is an interesting story.

These early settlers depended as much on their guns as on their plows for sustenance. Each, by the aid of his axe and brawn, cleared his patch of corn land from the forest in the shadow of block-houses, close to some clear swift flowing stream. His skill with the rifle provided food on which his family largely lived until the first crop was grown. Thus did Agriculture have its beginning in Tennessee.

For a hundred years Tennessee fields were farmed with little thought of conserving the fertility of the soil for future years, and generations. Rotations of cultivated crops—corn and cotton with pasture, hay grasses and legumes, and other soil conserving forage plants—were not common. Little or nothing was done to restore the fertility to the soil—calcium, phosphorous and nitrogen—by the use of fertilizers, green manures, animal manures or nitrogenous plants. On the contrary, land was cropped year after year in corn, cotton, or other cultivated crops until yields declined so low it no longer paid to plant and cultivate it. Consistent cropping year after year with no vegetative cover on the soil, especially during the winter, hastened erosion, caused by the rapid run-off of water from the slopes.

This rapid washing away of the fertile top soil hastened the depletion of the valuable elements of fertility. Rivers and creeks began to run red with the top soil and its fertility from every hillside. Fields began to revert to the forest from which they had been

claimed by some early settler; new lands were constantly being cleared. Many farmers, as they "wore out" their farms moved on westward to fertile, new lands. At the beginning of the twentieth century practically all the new land on the prairies of the Middle West were taken up. New lands suitable for farming became scarce. People engaged in Agriculture were then confronted with a new problem—the problem of rebuilding and maintaining the fertility of their farms, if they were to gain a satisfactory living from the land. Also, increasing costs in the distribution of the farmers' products to consumers and increasing discrimination on the part of consumers made it necessary for farming to be on a more proficient and business like basis.

There was need for better bred seed of varieties of corn, cotton, wheat, tobacco, grasses, fruits and vegetables adapted to the various types of soil and regions in Tennessee. Farmers wanted to know how to prepare the land and fertilize these various plants; how to control insects and diseases. They wanted to know the best kind of rotation; how to terrace land, and other practices that control erosion and restore and maintain the fertility of the soil. They wanted to know the breeds and types of livestock best adapted to the various areas of the State; how to feed them; control diseases and parasites, and manage them so that the greatest profit might be derived from them. They wanted to know how to organize associations to market their products to best advantage.

The farm wife wanted information on the preparation of foods and balanced diets for the health of the family; on the improvement of the home and the health and welfare of the children. There was a demand that instruction be given farm boys and girls in farming and home economics that they might be more proficient farmers and homemakers in the future.

On these subjects, as well as activities of practically every phase of rural life, the farm, home and the community, there was an increasing demand for information and instruction that would make possible greater income from farming, promote better living on the farm and in rural communities, and train rural youth to be better citizens, farmers and homemakers in the future.

It was to meet these demands and circumstances, which were general throughout the country, that Dr. Seaman A. Knapp conceived the principle of teaching new information, developed from research and experiment, by actual demonstration; the basic principle of agricultural and home economics Extension instruction, as

provided in the Smith-Lever Act, enacted by the Congress of the United States and signed by President Wilson on May 8, 1914.

Since May 1, 1914
For ~~twenty-five years~~ the University of Tennessee and the United States Department of Agriculture, cooperating under this Act, have maintained within the University a distinct administrative unit designated as the Agricultural Extension Service to provide practical demonstration instruction in agriculture and home economics to farmers and farm women in each of the several counties of the State. The purpose of this publication is to sketch briefly the early history, development, objectives and some phases of the contribution that this Service has made in the last quarter of a century to increasing proficiency in farming, better living, and the general improvement of rural life under the slogan **"Better Homes on Better Farms In Tennessee."**

THE SMITH-LEVER ACT

As previously stated, the purpose of The Smith-Lever Act of 1914 was to enable State Agricultural Colleges, aided by the Federal Government, to carry useful and practical information relating to agriculture and home economics to rural people on their farms and in their homes by means of itinerant teachers—demonstration agents—now known as county agricultural and home demonstration agents.

The theory of the Act was that eventually every agricultural county in the country would have at least one trained itinerant teacher or demonstrator and that through these workers, by instruction, field demonstrations, publications and otherwise, the accumulated knowledge of agriculture—results of research and experimentation and experience of successful farmers—would be placed at the disposal of all farmers.



An Early Field Crop Demonstration in Franklin County—1915.

This idea was not only new to agriculture; it was new to all human experience—the extension of education to the countryside; to the farm and to the home.

The Act connected this new system of education with the Land-Grant Colleges. The work was to be carried on jointly. Federal funds in general were to be matched by state and county funds.

The Act was sponsored in Congress by Senator Hoke Smith of Georgia and Congressman A. F. Lever of South Carolina. Since it was the direct outgrowth of Farmers' Cooperative Demonstration Work, which began in Texas in 1904, under the leadership of Dr. Knapp, in an effort to overcome the effects of the cotton boll weevil, no history of Extension Work would be complete without a brief review of his early efforts and experience.

ORIGIN OF THE DEMONSTRATION METHOD

In 1896 Dr. Knapp, a native of New York State, resigned as president of Iowa State College of Agriculture to go to Louisiana as manager of a company which owned and planned to colonize a million or more acres of land in that State. Home seekers were brought in by the train load from the North and West but somehow or other they wouldn't buy. The natives who made their living by grazing inferior cattle believed that the land was not fertile enough for farming and when prospective settlers talked with them they frankly told them this. Years later Dr. Knapp in telling this experience said, "In desperation we then **resorted to demonstration**".

He subsidized a few good farmers from the Middle West, placing one in each township, and after two or three years they were able to prove that the soil was productive. He then found no difficulty in settling the area with Middle-Western and Northern people, and it soon became a rich and prosperous agricultural section. He said, "**I then learned the philosophy and power of agricultural demonstration**".

Shortly afterwards, Dr. Knapp joined the Bureau of Plant Industry of the United States Department of Agriculture. At that time the Bureau was especially interested in securing the adoption of better farming practices in the South, and in finding a way to get the results of research to farmers in such a way that they would readily accept and put them into practice on their farms. Bulletins, short courses, and other methods then in use had not proven effective. Dr. Knapp from his experience, suggested demonstration farms.

Accordingly in 1902, a number of Government farms conducted by paid managers were established. Experience in this undertaking soon convinced Dr. Knapp that this type of "demonstration" would not serve the purpose intended. It had served him well when the purpose was only to prove that the soils of the coastal plains of Louisiana were fertile, but the object now was to introduce new crops and to teach new methods of producing standard crops by improved farming practices. Farmers, he believed, would discount results obtained on such farms and say, "We could do that too if we had the Government back of us".

He then conceived the idea of demonstration farms, established by the community itself and conducted without government subsidy—such demonstrations to be carried on by farmers themselves on their own farms under ordinary farming conditions.

THE FIRST DEMONSTRATION FARM

Early in 1903 E. H. R. Green of Terrell, Texas, son of the noted Hetty Green, and president of the Texas Midland Railway, one of her properties, met Dr. Knapp and became very much interested in his idea of "Community Demonstration Farms". He influenced the Chamber of Commerce to invite Dr. Knapp to Terrell to explain it. He accepted the invitation and the "Porter Community Demonstration Farm" resulted. Eight business men of Terrell raised \$900.00 to guarantee the demonstrator against loss from the experiment.

Walter C. Porter, a farmer near Terrell, agreed to farm about 70 acres of his land according to Dr. Knapp's instructions and keep records of costs, yields and receipts. The farm attracted much local



This Group of Hawkins County Calves Finished by 4-H Club Members in 1918, was the Champion Group at the State Fat Cattle Show. Livestock Demonstrations have been a Feature of Extension Work from its Beginning in Tennessee.

attention and at the end of the year, Mr. Porter reported that he had made \$700.00 more by farming according to Dr. Knapp's instructions than he would have made if he had followed his former practices.

Thus was the beginning of the teaching of new farm and home methods and practices by demonstration, the foundation on which Extension work in agriculture and home economics, as we have it today, has been built.

BEGINNING OF FARMERS' COOPERATIVE DEMONSTRATION WORK

By 1903 the cotton boll weevil which had invaded Texas from Mexico some years before had spread nearly across the Southern part of the State, causing panic among cotton growers and business men. A clamor went up for Federal aid to fight it. A great mass meeting attended by the Secretary of Agriculture, the Chief of the Bureau of Plant Industry and other USDA officials, was held at Dallas, Texas, early that fall. The Secretary and other officials inspected the "Porter Community Demonstration Farm" and were convinced that the idea could be used in the boll weevil fight.

Late that fall Congress appropriated \$250,000.00 for the weevil campaign and the Bureau of Plant Industry gave Dr. Knapp an allotment of \$25,000.00 to use in establishing "Farmers' Cooperative Demonstrations" to prove to farmers that they could continue to grow cotton in spite of the weevil.

The bill was signed by President Theodore Roosevelt, January 15, 1904. Dr. Knapp opened offices in Houston, Texas, on January 25, and within a few weeks had appointed 25 or 30 "special agents" to establish "Community Cotton Demonstration Farms" of from 5 to 20 acres each near the principal towns in each county and to enroll as many other farmers as possible, as cooperators. Each agent covered 10 to 25 counties.

Both demonstrators and cooperators agreed in writing to follow instructions as to preparation, cultivation, etc., and to make a report on yields and cost at the end of the season.

This marked the beginning of Farmers' Cooperative Demonstration Work which was then strictly a Federal Project.

April 20, 1906, the Secretary of Agriculture signed an agreement with the Rockefeller General Education Board of New York City permitting the Board to finance demonstration work under Dr.

Knapp's supervision in states not then infested by the boll weevil. The Federal appropriation had been made only for the purpose of fighting the weevil in infested states.

The agreement with the General Education Board, which was primarily interested in the rural schools of the South but was convinced that these could not be properly supported until Southern farmers were able to increase their incomes through better farming, had a marked effect on demonstration work. Work was immediately started in Mississippi, Alabama and Virginia.

THE FIRST COUNTY AGENT

On November 12, 1906, the first county agent, W. C. Stallings, Smith County, Texas, was appointed to work exclusively in one county. Before crop time in 1907, five Texas and two Louisiana counties had county agents.

Demonstration work was started in North and South Carolina and Florida in 1907 and in Georgia in 1908.

With the coming of county agents, the demonstration plan began to change. The county demonstration farm was gradually replaced by individual demonstrations conducted by farmers. The whole program was broadened and became a program of general agricultural instruction, rather than an emergency boll weevil control program.

In the fall of 1907, Dr. Knapp's headquarters were moved to Washington and definite State field organizations with State and



An Early Canning Demonstration in Monroe County—1916.

District agents were established in several states. The work was then strictly a Federal Project known as Farmers' Cooperative Demonstration Work and was in no way officially connected with Land-Grant Colleges. However, by 1909 several Southern colleges were cooperating in conducting demonstration work in agriculture in public schools and other educational institutions.

Dr. Knapp died April 1, 1911. He was buried with simple but impressive honors on the campus of the Agricultural College at Ames, Iowa, the institution that he once served as president.

In his publication, "Recollections of Extension Work" Dr. J. A. Evans, one among the first "special agents" appointed by Dr. Knapp, has the following to say in regard to Dr. Knapp's work and philosophy of Extension work:

"In the last seven years of his life he had initiated and progressively expanded an educational movement that had attracted the attention of the entire world, and which, he predicted, is destined ultimately to be adopted as part of the educational system of every civilized nation.

"The underlying objective of all phases of the demonstration work, adult or youth, was to increase the earning capacity and the incomes of farm families—not as an end in itself, but as a means. To him greater earning capacity meant little unless translated into better schools, improved homes, better social and living conditions, better people. It was not enough, he said, to have as an objective 'We will increase the wealth and give the people greater earning power'. We must also try to turn all avenues of the wealth that we create into the proper channels, so as to create a better people".

BEGINNING OF CLUB WORK

In 1907 W. H. Smith, a school superintendent of Holmes County, Mississippi, who was later employed by the U. S. Department of Agriculture to do club work, started a Boys' Corn Club in the schools of the county.

In 1910 Miss Marie Cromer, a rural school teacher of Aiken County, South Carolina, inspired by boys' club work which had now spread to several states, organized the first Girls' Tomato Canning Club. As an outgrowth of this work, home demonstration work for rural women was started in 1913.

NEGRO WORK

Negro farmers were enrolled as cooperators in demonstration work from the beginning. On November 12, 1906, a cooperative agreement was made with Tuskegee Institute in Alabama for the appointment of T. M. Campbell to carry on demonstration work in two counties in Alabama, and on December 14, 1906, J. B. Pierce of Hampton Institute in Virginia was appointed to work in three counties in Virginia. These pioneer agents are now field agents for the Federal Extension office with headquarters at the above schools.

BEGINNING OF FARM DEMONSTRATION WORK IN TENNESSEE

Farmers' Cooperative Demonstration Work spread to Tennessee in the fall of 1909 when **W. W. Campbell** of Texas, a representative of the United States Department of Agriculture, was stationed at Jackson to stimulate interest in the movement. He devoted a major portion of his time to establishing Boys' Corn Clubs.

On October 1, 1910, **H. D. Tate**, who had been engaged in the work in Mississippi, later assistant director of Extension in Tennessee under the Smith-Lever Act from 1914 to 1917, succeeded Mr. Campbell as State Agent. He made his headquarters at Memphis, since funds provided for the work could only be used in cotton counties.



Madison County Club Boys Receiving Some Valuable Instructions on Corn Growing (1917) from H. S. Nichols, Veteran Worker in West Tennessee; Now Assistant Director.

On December 10, 1910, **H. S. Nichols**, assistant director of Extension work ~~in~~ 1935-1945 appointed the first District Agent in Tennessee with headquarters at Dyersburg.

The First County Agents

The first county agricultural agent in Tennessee was appointed **December 1, 1910**, and by the end of February, 1911, there were six county agents as follows: G. B. Rhodes, Tipton County; R. L. Moore, Dyer; J. B. Skinner, Obion; L. M. McCollum, Chester; O. W. Erwin, McNairy; and A. R. Bridger, Crockett.

These men were farmers and were employed as county agents three days each week, nine months of the year, and were permitted to look after their farms the other three days. They held meetings, invited all the farmers, and at each place a few who were willing to follow instructions were asked to become demonstrators. After a farmer agreed to become a demonstrator, the agent visited his farm as often as possible and also sent instructions by letter, circular and bulletins. Invariably these demonstrations were located where they could be easily seen by the largest number of people. When the agent visited demonstration farms the neighboring farmers were notified beforehand, so a field or community meetings could be held on the demonstration farm. In this way, instructions could be given to a group at the same visit. While methods have changed some with years, the demonstration is still the basis of Extension work.

The First County Appropriation

Madison County was the first county in the State to make an appropriation for cooperation in the Work. October 2, 1911, the County Court appropriated \$337.50 to match a like amount from the Federal Government and Sid S. Bond, a local farmer, was employed as county agent to work nine months of the year at \$75.00 per month.

Shelby County made the first appropriation for a full-time experienced county agent October 9, 1911. This appropriation was an amount to allow the agent a salary of \$1500 per year and **John E. Stansell**, who was then engaged in county agent work in Mississippi, was secured to devote full time to Extension work in the county.

R. E. Ellis was appointed county agent in Weakley County, February 1, 1913, on the same basis. He was met at the train with a reception committee and has remained county agent in that county since that date, the first and only county agent ever in Weakley

County. Mr. Ellis holds the distinction of being the only agent in the State and one of a few in the United States to work continuously in the same county from the beginning of the work to the present time. 1939

Plan For The Work

In a report of the work for the fiscal year 1910-1911, Mr. Tate said: "The plan for the work in Tennessee is practically the same as in other states, namely: **First, demonstration as to better cultural methods in the case of cotton: Second, demonstration in the production of home supplies; and, Third, demonstration in other crops for the purpose of rotation and diversification.** The necessity for those three lines of work is apparent. The cotton farmer must be placed on a new basis where he can be self-sustaining, whether he raises a cotton crop or not, and he must do his farming on a cash system and not under the advance system. The tendency of the cash system is to demand that the farmer put all of his land in cotton, which is a mistake from the standpoint of modern farming".

In 1911 funds were increased and the number of agents was also increased to sixteen. Twelve of these were county agents. Two agents were employed to work over considerable territory, mainly to assist in the organization of the Boys' Corn Club work. They, however, conducted a few scattered demonstrations with adult farmers in several counties.



A Garden Tour in Sumner County. The Importance of a Good Garden. Poultry, a Cow and Hogs for Production of Food for Home Use Has Been Stressed by the Extension Service from the Beginning.

The **latter part of 1912** the restrictions confining the work to the cotton area of the State were removed and headquarters were established at Nashville.

In 1913, the General Assembly authorized county courts to appropriate money to be used in cooperation with the United States Department of Agriculture in support of County Farm Demonstration Work.

Boys' Corn Clubs

In 1910, Mr. Campbell, through cooperation of county school superintendents, organized Boys' Corn Clubs in 12 counties in Tennessee with a total membership of 1,685. These counties and the number of members in each were as follows: McNairy 261; Madison 244; Tipton 65; Gibson 391; Fayette 77; Dyer 29; Weakley 179; Crockett 83; Lauderdale 140; Haywood 51; Bedford 24; and Shelby 364. For the first few years the work consisted only of growing corn.

On November 16, 1910, Thomas A. Early was appointed the first State leader of the Boys' Corn Club work. He resigned in 1912 and was succeeded by J. R. Fewell who was leader of the work until 1914 when it was placed under Mr. Tate who had been appointed assistant director of Extension under the Smith-Lever Act.

Canning Club Work

Miss Virginia P. Moore was appointed the first agent in Tennessee on December 12, 1910, to work with women and girls in developing canning clubs. Her office was in Nashville, and she worked in cooperation with the State Department of Education. She was assistant director in charge of home demonstration work and leader of the girls' club work under the Smith-Lever Act from *July 1* 1914 to *Aug 30* 1919, when she resigned to join the Florida Extension Service where she is still located as Extension home improvement specialist.

For the first few years, work with girls in Tennessee was growing and canning tomatoes and raising poultry.

The First Home Agents

The first home demonstration agents in Tennessee were employed during the canning season of 1911. They were: Mrs. Myra Tandy, Lawrence County; Mrs. Maggie Lansden, Madison County; Mrs. Katherine Vaughan, Coffee County; **Mrs. Elizabeth Lauderbach, Hamilton County;** **Mrs. Lizzie B. Reagan, McMinn County;** Miss Melissa Byrd, Bradley County.

Mrs. Lauderbach, who was the first home agent in Hamilton County, still holds that position in 1939; being the only home demonstration agent in Tennessee and perhaps in the country to hold the distinction of working in one county continuously from the beginning of the work.

These first agents were employed by the State Department of Education and the Rockefeller General Education Board, in cooperation with local county boards of education. They worked only during the canning season in 1911, but in 1912 and later years,



Boys' and Girls' 4-H Club Activities in Hamilton, Madison, Hamblen, Blount, Montgomery, Shelby and Giles Counties—1920.

until the passage of the Smith-Lever Act, some were employed for 6 months, others 8, 10 and 12 months. They were known as County Co-laborators, received \$50.00 per month and paid their own traveling expenses. While some of them were employed for only a few months of the year, they worked the whole year.

In one of her early annual reports Miss Moore had the following to say in regard to the value of the work and its influence in farm homes: "It has helped the farm women to earn while they learn. They have learned to work in larger groups and have a larger realization of the home in its entirety. They also realize that the home is not four square walls, but that their influence is needed in the community, in the county, in the State, in the Nation. She had learned to have an open mind for men and progressive things".

The enrollment in girls' clubs in 1913 was 1,900 and the total value of all garden club products produced by them was estimated at \$39,693.50.

U. T. DIVISION OF EXTENSION ESTABLISHED

On July 1, 1914, the College of Agriculture of the University of Tennessee and the United States Department of Agriculture, cooperating under the provisions of the Smith-Lever Act, organized a Division of Extension, now known as the Agricultural Extension Service, with Charles A. Keffer, then head of the college horticultural department, as Director. The Farmers' Cooperative Demonstration Work and Boys' and Girls' Club Work, which up to that time had been disassociated from the College, were merged with the Division, with Mr. Tate, as Assistant Director in charge of the Farm Demonstration Work, and Miss Moore, Assistant Director in charge of Home Demonstration Work, and Headquarters were established at the University of Tennessee at Knoxville.

At that time there were employed in the State, in addition to Mr. Tate and Miss Moore as State agents: two district agents: H. S. Nichols, West Tennessee, and J. M. Dean, Middle Tennessee, 20 county agents, 4 agents who worked in more than one county, and 22 county home demonstration agents or co-laborators as they were then called; a total staff of 50 people.

On June 30, 1915, the end of the first fiscal year of the Division of Extension, county agents were employed in 31 counties and the number of home demonstration agents, who were then known as county agents in home economics, had increased to 26.

First Specialists Named

Soon after establishment of the Division of Extension, several subject matter specialists were employed to aid the directors and district agents "in planning demonstrations, in securing and disseminating information and in aiding county agents in their several lines in actual work upon the farms and in the homes of the State."

R. M. Murphy, graduate of the College of Agriculture of the University of Tennessee, who was engaged in short course work for the College of Agriculture at the time, was the first specialist employed. He was appointed as specialist in animal husbandry when the Division of Extension was organized July 1, 1914. He resigned in 1919 to become field agent for the American Shorthorn Cattle Association. At the present time he is county agent in Knox County.

J. C. McAmis, a graduate of the College of Agriculture who had been a special county agent in Obion County in 1912-13, now director of the Agricultural Division of the Tennessee Valley Authority, was the second specialist named, being appointed specialist in Agronomy a few weeks after the organization of the Division.

C. A. Hutton, another graduate of the college who was then dairy agent for the Southern Railway, was appointed Dairy Extension specialist November 1, 1914, a position he still holds.

Early Plan of Work

In regard to the work of the Division, Director Keffer had the following to say in his first annual fiscal report June 30, 1915:

"In planning the work of the Division of Extension an effort was made to bring into close relation all agencies interested in the development of agriculture and in the improvement of all conditions affecting life on the farm. It was felt that the problems to be solved were largely educational problems and from the first an effort was made to find a basis of cooperation with the public school system of the State. The State Department of Agriculture under existing law had for many years conducted farmers' institutes and it was believed that the purpose of this work, being purely educational, could be achieved to better advantage in cooperation with the Division of Extension. The railroads of the State had, through their land and industrial departments, conducted demonstrations and disseminated information pertaining to agriculture. These agencies operate in all parts of the State. In addition to these the Division of Extension has had the cooperation and financial support of county courts,



From a modest beginning with 24 county farm agents and 22 home demonstration agents in 1914, Agricultural Extension work has grown in Tennessee until there is a county agent in each of the 95 counties, 82 assistant county agents, 65 home demonstration agents and 4 assistant home demonstration agents. In addition, there are 10 negro men agents and 8 negro women agents employed for work with their people. Extension work is now within the reach of every farm and farm home in the State.

In 1938 alone, over 3,000,000 contacts were made with rural people by Extension agents through meetings, demonstrations, tours, farm and home visits, 4-H clubs, soil erosion control associations, women's clubs, office calls, and otherwise.



From the beginning, the demonstration method has held a prominent place in Extension teaching. Field and home meetings are held regularly to familiarize local people with the results of improved practices. In 1938, demonstration work was carried on in a total of 2487 Tennessee communities. Reports for that year show that 122,629 farms and 61,064 farm homes made improvements as a result of Extension work.



The Agricultural Extension Service slogan is "Better Homes on Better Farms in Tennessee". It is recognized that home improvement must keep step with farm improvement if rural people are to realize a richer and fuller life. In 1938, a total of 29,786 rural women were enrolled in 295 community home demonstration clubs. Through regular meetings of these clubs, short courses, demonstrations, lectures, and other mediums of teaching, homemakers received advice and assistance in canning, clothing, foods and nutrition, handicraft, health and sanitation, and in the general improvement of their homes, and welfare of their families.



Thousands of Tennessee farm homes have made improvements during the Better Homes Campaigns of recent years. Reports from 89 of the 95 counties show that 67,795 homes reported improvements in the 1938 campaign alone. These included: 3,309 homes installing running water, 4,695 installing electricity, 12,025 homes painted, 18,312 roofs improved, 21,925 repaired or replaced broken steps, and 45,685 improved and beautified lawns.



Summer short courses and camps are arranged for rural women yearly. In 1938, over 5,000 women attended these meetings where study and recreation were conducted by home demonstration agents. Over 500 women attended Farm Women's Week at the University of Tennessee in Knoxville.

It is conservatively estimated that over half a million Tennessee boys and girls have received practical training in farming and homemaking through the 4-H clubs. Beginning with 1,011 corn club boys and 1,685 girls in canning and poultry clubs in 1915, enrollment has shown a steady increase until it reached the all-time high of 62,212 in 1938.



In 1938, 33,736 girls received assistance and instruction in canning, sewing, gardening, poultry, and other worthwhile projects designed to make their future home and family life more useful. A total of 27,476 boys carried on projects in corn, tobacco, potatoes, cotton, swine, beef cattle, dairy cattle, poultry, sheep, colts, farm accounts, and similar farming operations.



Organized and directed play and recreation is an essential part of 4-H club work. Over 13,000 boys and girls attended county, district, and State camps conducted by Extension agents for periods of three days to a week in 1938. In addition, wholesome entertainment was arranged for thousands of others through rallies, achievement days, and regular meetings.





Lime, legumes, and livestock have been by-words of Extension workers for years in their crusade for successful farming — in recent years phosphate has been added to this trio. Advantages of climate and moisture, which encourage pasture and grain production, and accessibility to markets have favored an expansion in the livestock industry.



Practically every farm in the State keeps some poultry. Commercial production has increased rapidly during recent years, until now poultry and eggs rank among the leading sources of income. Likewise, the dairy industry has made a pronounced development. The value of milk produced is estimated to be around \$30,000,000 annually. Tennessee is known throughout the world for its fine Jersey cattle.



The increase in hay, pasture and forage crops, stimulated by the Agricultural Conservation Program during recent years, has brought about an upward trend in livestock numbers. Emphasis is being placed on livestock both for home consumption and as a saleable product. The last 25 years have seen a marked improvement in the quality of beef cattle, swine, horses and mules, and sheep on Tennessee farms. The "razor back" hog is gone and the "yellow hammer" calf is on its way.

Extension agents have encouraged farmers to keep records as a good business practice for a number of years. Well kept records encourage thrift, form the basis for planning future improvements, and aid in proving performance under the AAA. The Extension Farm Management Department now has on file data from over 15,000 accounts accumulated during the past 12 years. In addition, several hundred home accounts have been obtained during the past two years.



From the beginning, crop improvement has received major emphasis. One very important development has been in the spread of Burley tobacco. Until 1916, its production was confined largely to Greene and Washington counties and that year the total production was only 2,595,625 pounds which sold for \$439,955. At the present time, due largely to the efforts of county agents, Burley is grown in some 50 East and Middle Tennessee counties. Annual production is approximately 70,000,000 pounds and the average annual income from the crop is around \$12,000,000.

Improvements in the quality and increased staple length of cotton, brought about by the one-variety community demonstrations, have increased the value of Tennessee's crop millions of dollars. These demonstrations have been conducted in each of the major cotton growing counties of the State.

Better crop practices advocated by Extension agents, including more careful preparation and cultivation of soil, use of recommended fertilizers, use of better seed, testing of seed before planting, the planting of adapted varieties, control of insects and diseases, and other recommended practices, have contributed materially to increased yields and returns from all crops.





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County farm and home agents, Extension officials and specialists in attendance at the twenty-fourth Annual Meeting of Tennessee Extension workers, University of Tennessee, October 24-26, 1938

Soil conservation activities: Winter cover crops, strip cropping, terracing, subsoiling, reforestation, contour tillage, gully control work, and similar measures to conserve soil and water are in evidence throughout Tennessee. In 1938, a total of 154,134 farmers owning 13,374,303 acres were actively enrolled in soil conservation associations.



Reports for 1938 show that 31,560 Tennessee farmers followed crop rotations recommended by county agents on 1,423,315 acres; 39,220 farmers grew 776,743 acres of winter cover crops; 4,194 terraced 55,903 acres; 4,338 did gully control work on 26,940 acres; 2,295 practiced strip cropping on 22,856 acres, and 6,361 followed contour tillage on 74,917 acres.

Increased emphasis is being placed on forest trees, both for land protection and as a source of fuel, posts and lumber. Farmers are encouraged to turn certain cleared lands not suitable for cultivation back into woodland. In 1938, over 3,000,000 trees, principally black locust, were planted in the State.





County agents throughout the State have stressed the importance of phosphate and lime, particularly for hay and pasture crops, for a number of years. Over 20,000 tons of concentrated phosphate fertilizer manufactured by the Tennessee Valley Authority at their experimental plant in Muscle Shoals, Alabama, have been used by Tennessee farmers for demonstration purposes under the supervision of Extension agents. These materials were used to treat 208,000 acres of legumes and grasses.

The use of limestone has shown a continuous increase for the last several years, until now over 500,000 tons are being applied annually. In addition, reports show that 29,964 farmers used 664,920 tons of other fertilizing materials recommended by Extension agents in 1938, 70 percent of which was phosphate.



The acreage planted to legume hay and pasture crops is now the largest in the history of the State. Alfalfa, for example, was practically unknown in 1900, but now there are approximately 75,000 acres in Tennessee and annual seedings amount to around 40,000 acres. More than 100,000 acres are seeded to red clover each year and more than a million acres of lespedeza are cut for hay and seed annually.



Negro farmers and homemakers have been enrolled as cooperators in demonstration work from the beginning. In 1938, 8 women agents and 10 men agents, working in 23 counties, carried on educational work in farm and home improvement in 268 communities. A total of

over 200,000 contacts were made with rural people through meetings, demonstrations, tours, visits, office calls, and otherwise. Home improvement, sufficient home grown food for the family and feed for livestock, crop and livestock improvement, soil conservation, health and sanitation, 4-H club work, and wholesome recreation

are being emphasized. In 1938, there were 420 negro 4-H Clubs with a total enrollment of 7,360. Among adults, 3,947 farmers and 2,039 homemakers reported worthwhile changes as a result of their contacts with Extension work.



county school boards, chambers of commerce and other organizations of business men, banks, and individual citizens."

"The entire work of the Division of Extension for the year ending June 30, 1915, was done under one general project, since it was thought that a year could well be taken for general study of the field. The principal work was a continuation of Farm Demonstration Work and Girls' Canning Club Work".

Early Accomplishments

That year, 1,011 boys were enrolled in corn clubs, 1614 farmers were enrolled as crop demonstrators, 1685 girls were enrolled in canning and poultry clubs and 300 women were enrolled in canning, gardening, cooking and sewing work.

The report of the Director shows that 213 cotton demonstrators produced an average of 1031 pounds of cotton per acre on 2,218 acres and that their total increased income over ordinary methods of growing cotton was \$36,289.00.

A total of 841 corn demonstrators reported an average yield of 42 bushels of corn per acre on 16,442 acres and an increase return over ordinary methods of \$118,755.77.



Demonstrations of the Use and Value of Lime on the Farm Were Among the First Activities of the Extension Agronomy Specialist in 1914. This Demonstration was in Jefferson County.

During the year the specialists were active in their various lines. In animal husbandry, progress was made in compiling a directory of breeders, farmers were aided in securing purebred animals and feeding plans, and building barns and silos.

The specialist in dairying was active in the organization of cooperative creameries, cream routes, the planning of dairy barns, and in promoting the development of dairy interests generally.

The specialist in agronomy developed plans for school demonstration plots, worked on a forage crop system for hogs, and co-operated with the N. C. and St. L. Railroad in conducting a number of demonstrations of the use of ground limestone on clover and alfalfa in five counties.

The poultry specialists assisted agents in organizing poultry clubs in six counties.

PERSONNEL OF THE ORGANIZATION OF JUNE 30, 1915

Director	Chas. A. Ketter
Assistant Director	H. D. Tate
Assistant Director in Home Economics	Miss Virginia P. Moore
Secretary	V. G. Young
**District Agent, West Tennessee	H. S. Nichols, Jackson
District Agent, East Tennessee	D. T. Hardin, Knoxville
District Agent, Middle Tennessee	J. M. Dean, Columbia
Specialist in Agronomy	J. C. McAmis
*Specialist in Animal Husbandry	R. M. Murphy
Assistant in Animal Husbandry	Dr. C. D. Lowe
*Specialist in Dairying	C. A. Hutton
Assistant in Dairying	H. C. Stockwell, Jackson
Poultry Club Organizer	Leo J. Brosemer

COUNTY AGENTS

A. S. Admond	Anderson County
**C. P. Barrett	Lawrence County
H. M. Bizzell	Tipton County
B. A. Brady	Dyer County
Neely Bowen	Williamson County
F. S. Chance	Cumberland County
C. H. Denson	Haywood County
**R. E. Ellis	Weakley County
*J. H. Evans	Coffee County
F. W. Fleming	Marshall County
*C. M. Franklin	White County
W. G. Gordon	Gibson County
F. S. Harkleroad	Greene County
I. L. Herron	Roane County
F. R. Hines	Polk County

C. M. Hume	Clallam County
W. M. Landess	Hamilton County
A. L. Love	Giles County
D. Mercier	Shelby County
J. W. Molfatt	Fayette County
K. A. Neely	Hamblen County
H. P. Ogden	Montgomery County
J. A. Patrick	Hardeman County
A. Phillips	Knox County
H. A. Powers	Henderson County
E. S. Roberds	Hardin County
**T. H. Richardson	Houston County
W. P. Stanford	Wilson County
J. E. Stansell	Shelby County
F. L. Teuton	Moore County
G. B. Thackston	Smith County
*W. K. Tipton	Washington County
Ebb Thomae	Crockett County
R. M. Wiley	Lake County

HOME DEMONSTRATION AGENTS

**Miss Margaret Ambrose	Knox County
Mrs. Artie W. Bryan	Van Buren County
Miss Melissa Byrd	Bradley County
Miss Nancy Lee Broady	Blount County
Miss Lula Chriesman	Williamson County
Miss Rosamond Clark	Henry County
Mrs. Ora Dillion	Houston County
Miss Mary E. Doney	Polk County
Miss Florence Foster	Roane County
Miss Mertie Hardin	Benton County
Mrs. Tennyie Hardin	Lincoln County
Mrs. Ella Johnson	Anderson County
***Mrs. Elizabeth Lauderbach	Hamilton County
Miss Ruby E. Moffatt	Shelby County
Mrs. Maggie Lansden	Madison County
*Miss Mabel Moore	Sevier County
Miss Jennie Moore	Unicoi County
Mrs. Ada H. Peay	Sumner County
Miss Mary L. Phillips	Tipton County
Mrs. Lizzie B. Reagan	McMinn County
Miss Bettie Smithson	Warren County
Miss Florence Train	Rhea County
Miss May Treadwell	Campbell County
Mrs. Katherine Vaughan	Coffee County

*With Service now. 1939

**Twenty-five or more years continuous Extension Work. 1939

***In same county. 1939

Expansion In 1915-1916

On July 1, 1915, Miss Margaret A. Ambrose, home agent in Knox County, was appointed District Agent in home demonstration work in East Tennessee and on October 1, Miss Sarah L. Kinsey was appointed as a second District Agent, to work in West Tennessee with headquarters at Jackson. Up until January 1916, the work had been largely limited to Girls' Club Work.

On January 1, 1916, Miss Geneva Conway was employed as the first Home Economics specialist. She stressed diet for the family all the way from the child to the grown ups. Special emphasis was given to vegetable cookery and its place in the family diet. A few women offered their kitchens as a meeting place where bread, dairy, and other demonstrations were given.

By June 30, 1916, 800 women had carried out a definite piece of home demonstration work, either intensive gardening, home dairying, bread making, poultry, conveniences, such as fireless cookers, iceless refrigerators, fly traps, wheel trays, cleaning devices, screening, etc.

In April 1916, Mrs. Lena A. Warner was employed as Health Specialist for rural work and a District Home Demonstration Agent for Middle Tennessee was employed in May.

During the fiscal year, 1915-1916, the first Extension editor, Harry B. Potter, was employed to handle publicity and publications; and R. N. Crane was appointed poultry specialist.

Negro Work

In 1916, two years after the passage of the Smith-Lever Act, the Director of Extension Work in Tennessee appointed two negro



Mrs. Lena A. Warner, Health Specialist, in One of Her Early Short Course Classes in Home Nursing and Care of the Sick—White County.

women and three men agents. Their first work was largely through community organizations and dealing with the adults, but they soon learned the lesson that the most effective way to reach the parents was through the boys and girls.

The first negro 4-H clubs were organized in 1917. Club work for women and girls was at first confined largely to gardening and canning, and later cooking, sewing, health and home improvement were added. The entrance of the United States in the World War increased the number of negro workers to five women and seven men.

Tate Resigns

~~in 1917~~ H. D. Tate, assistant director, resigned ^{June 30, 1917} and was succeeded by W. A. Schoenfeld, who had been employed ~~since~~ ^{Aug. 16, 1916} fiscal year 1915-1916 as specialist in markets and rural organization.

Mr. Schoenfeld was succeeded ^{Oct. 1, 1920} as marketing specialist by C. E. Brehm, who succeeded him ^{in 1920} as assistant director and who has been director since the death of Charles A. Keffer in December 1935. Mr. Schoenfeld is now Dean of the College of Agriculture and Director of Extension in Oregon.

WORLD WAR PERIOD

On April 6, 1917, the United States entered the World War which gave sudden and tremendous impetus to the work of the Division. Established methods of the organization were interrupted and every effort was made to promote the increase of food supplies in the State.



A Community Meeting in Davidson County, 1918. Since 1914, Over Half a Million Community Meetings, Conducted by County Farm and Home Agents, Have Been Held in the State.

A State-wide campaign to increase food production was launched and the number of agents was increased rapidly under the stress of the emergency. By 1918, 80 county agents and 93 home agents were employed, largely with emergency funds provided by the Federal Government.

State and county councils of defense, and county food supply committees were set up with the close cooperation of the agents. The slogan was "Food Will Win the War", and practically all efforts of the Division were centered on increased production of food and feed crops during duration of the war—1917-1918.

When the World War ended, the emergency Extension forces that had been so rapidly built up began to collapse. On July 1, 1918, the working force of the Division numbered 227 persons including 4 administrative officials, 18 specialists, 23 clerks, 9 district agents, 80 county agents and 93 home agents. On July 1, 1919 the number had dropped to 196, of which 67 were county agents and 75 home agents. By the end of 1920, the number of agents had dropped to 49 county agents and 41 home agents. The headquarters force was correspondingly reduced. By July 1, 1921, the number of county agents had dropped to 37. In addition to these, there were three assistant agents and five negro farm agents. The number of county home agents had declined to 26 and one assistant agent and four negro agents were employed.

The crash of farm prices in 1920 and 1921 caused a wave of economy to sweep over the country, and many county courts declined to make appropriations for a continuation of the work even though they realized its value. However, in 1923 a favorable re-



A Terracing Demonstration in Lawrence County—1919. Since 1914, 38,000 Farmers in Tennessee Have Terraced Over 700,000 Acres of Land to Control Erosion.

action set in and the number of counties making appropriations for the work began to increase from year to year until in 1933, in the emergency of the depression, agents were employed in each of the 95 counties of the State.

During the period of 1918 to 1922, many changes in the staff occurred. In 1919 Margaret A. Ambrose, district home demonstration agent in East Tennessee, was appointed assistant director in charge of home demonstration work, to succeed Miss Moore.

PERIOD OF REORGANIZATION AND EXPANSION 1923-1938

In 1923, the name of the organization in Tennessee was changed from Division of Extension to the Agricultural Extension Service. That year the work began to expand again and each year since has made steady progress, both in growth and service rendered.

In 1938, in addition to the 95 county agents, 10 regular assistant agricultural agents and 82 assistant agents in soil conservation and readjustment were employed, the latter in cooperation with the Tennessee Valley Authority. Home demonstration agents were employed in 64 counties. Negro agricultural agents were employed in 10 counties and negro home demonstration agents were employed in 8 counties. Some of the negro agents work in two or more counties.

In addition to the present staff of 259 agents and assistant agents, there are 14 administrative officers, including eight district agents, 39 specialists and 134 secretaries and clerks, making a total staff of 446 persons directly engaged in Extension Work. This does not include several hundred clerks and other workers who are employed in the State AAA office at Nashville and offices of county agents in connection with the AAA Agricultural Conservation Program. Including county workers, specialists, and administrative officials, there are now (1939) approximately 8,000 people engaged in Extension Work in the United States.

C. E. Brehm, ~~the present~~ Director in Tennessee, ¹⁹³⁵⁻¹⁹⁴⁵ succeeded Charles A. Keifer, who was director from the beginning of the work under the Smith-Lever Act in 1914, until his death in December 1935. H. S. Nichols, one of the first Extension workers employed in the State in 1910, ¹⁹²⁵⁻¹⁹⁴⁵ assistant director in charge of county agent work. Miss Margaret A. Ambrose, who joined the staff in 1912 as girls' canning club agent in Knox county, is assistant director in charge of home demonstration work. J. H. McLeod, who was ~~one~~ ¹⁹¹⁹⁻¹⁹⁴³

of the early workers in Texas and Arkansas, is assistant director in charge of specialists and program planning activities. 1936-1945

In 1936, a branch office of the Extension Service in which the district agents in Middle Tennessee, District Two, and the State Offices of the AAA and Farm Security Administration are located, was established in Nashville. Seven of the Extension specialists also have headquarters in that office.

The district agents in Middle Tennessee are A. B. Harmon and Miss Helen Cullens. Other district offices and district agents are as follows: West Tennessee, District I, Jackson, Judd Brooks and Miss Mildred Jacobs; Chattanooga, District III, Charles L. Doughty and Miss Bama Finger; East Tennessee, District IV, Knoxville, B. M. Elrod and Miss Oma Worley.

AGRICULTURAL ADJUSTMENT

In 1930 an economic storm swept the country. Rapidly falling prices and a drought aggravated the situation. The Federal Farm Board was created, relief programs were launched, and emergency duties absorbed much of the time of Extension workers. Then in



Branch Office of the Agricultural Extension Service, 2321 West End Avenue, Nashville, established in 1936. District Agents and Specialists in Middle Tennessee have Their Headquarters in this Building in which the State Office of the AAA and the Farm Security Administration are also Located.

1933, with a change of administration in Washington, came the Agricultural Adjustment Act.

Space will not permit going into all the economic factors involved. Suffice it to say that during the World War period prices for all staple agricultural products advanced in sky rocket fashion and reached their peak in 1919. Cotton rose from 5 cents in 1914 to 36 cents a pound in 1919. Corn jumped from 68 cents a bushel in 1914 to \$1.57 in 1919; prime cattle on the Chicago market went from \$9.85 per cwt. in 1913 to \$21.50 per cwt. in 1919; wheat from \$1.04 in 1914 to \$2.22 a bushel in 1919. There has never been a period within the history of the country, except during the Revolutionary War and the Civil War, that prices went so high.

When the World War ceased the demand for products in such large quantities diminished; surpluses accumulated on domestic markets, and the price level declined until in 1932, when prices for some staple crops were as low or lower than in 1893. This situation emphasized the need of readjustment to domestic consumption requirements and to the smaller demands of foreign markets. To aid the farmer in making these adjustments, and to increase the purchasing power of farmers, Congress passed the Agricultural Adjustment Act, the administration of which was placed in the hands of the Extension Services of the Agricultural Colleges of the Nation.

The first Adjustment Act, invalidated in 1935, was succeeded by a Soil Conservation Act in 1936. This Act was succeeded by the Agricultural Conservation Act of 1938.

The aid extended by the Federal Government through these Acts had a very definite influence on raising the price level of all agricultural products, thereby increasing the farm purchasing power. They also had a tremendous influence on Extension Work. Proper administration demanded immediate and rapid expansion of personnel similar to the emergency of the World War period.

Congress also enacted other Acts, to aid various groups of farm people; the Farm Security Act to aid low income farmers in rehabilitating themselves and tenants to become farm owners; the Soil Conservation Act to aid farmers in maintaining and restoring the fertility of their soil, and others.

All these Acts of Congress, with which the Extension Service has been closely associated during the past six years, had as their objective aiding farmers to adjust themselves to post war changes

and maintain their income and purchasing power so that they could secure for themselves some of the comforts of life and at the same time contribute to industrial recovery.

Approximately 120,000 farmers have cooperated and benefited by the Agricultural Adjustment Program in Tennessee. They have received approximately \$50,000,000 in benefit and crops adjustment payments. Such payments in 1938 amounted to approximately \$11,000,000.

Much of the county agents' time, in fact, the time of the entire Extension organization, has been taken up with educational and administrative work in connection with the AAA programs since 1933 and while some phases of regular Extension work may have suffered, it is fully recognized that much good for the agricultural interests of the entire State has resulted from the program as reflected in better crop adjustment, a marked increase in the growing of soil conserving and soil building crops and improved farm income.

The Extension Service has cooperated with the National Soil Conservation Service in developing a program of erosion control in counties outside the Tennessee River watershed where such work is not being conducted in cooperation with the TVA.

The Farm Security Administration has been assisted in formulating plans and projects for rehabilitating over 5,000 rural families on a self-supporting basis.

COOPERATION WITH THE TVA

The Agricultural Extension Service, by virtue of its trained personnel of long experience and familiarity with agricultural conditions of the State, was uniquely qualified to be of assistance to the Tennessee Valley Authority, created by Act of Congress in 1933, in shaping and carrying forward its program for the improvement of the social and economic life of the area.

Sixty-three of the ninety-five counties in the State were included in the area selected by the Authority for its activities. Each of the 63 counties have county agricultural agents, 57 have assistant agents in soil conservation, employed in cooperation with the TVA, and 39 have home demonstration agents, all of which are cooperating with the TVA through the Extension Service on projects that have been started by the two organizations.

New phosphate fertilizers developed by the TVA are made available to farmers for use on farm-unit and watershed demonstrations to determine their value, best method of use, and economic

worth in restoring and maintaining soil fertility, in controlling erosion and in increasing farm returns.

In 1938, 3,968 farm-unit demonstrations, involving over 600,000 acres, were underway and 136 watershed area demonstrations had been set up to promote an improved land use and water control program through community organization.

EXTENSION RENDERED WIDE SERVICE TO STATE IN 1938

While new plans and programs inaugurated by the Federal Government in recent years to aid agriculture have, because of cooperative relationships, required much of the time and energy of Tennessee Extension workers, nevertheless regular Extension Work has been carried forward with gratifying results.

Through the Extension Service, the United States Department of Agriculture, and the College of Agriculture and Experiment Station of the University of Tennessee have been brought into direct contact with practically every farm and rural home in the State. In addition to demonstrations and instructions given to farmers, farm homemakers, and boys and girls individually, and in groups on their farms and in their homes, many thousands have been reached, through publications, the press and radio, and by community and county-wide meetings, clubs and other group organizations formed under the guidance of the agents and their assistants.

Reports of the agents from year to year have shown steady progress toward better living and farm practices as a result of the various Extension programs. For example, 122,629 farms in the State made changes in practices during 1938 as a result of Extension Work, these reports show. During the same period, changes in practices were made in 61,064 farm homes as a result of home demonstration work.

These agents are in daily contact with farmers, homemakers, boys, girls, bankers, merchants and other people, giving instruction on practically all phases of rural life. They travel not only on the hard surface roads, working with the higher income farm, but they get out in the mud and dust, back in the isolated parts of the county, in the small cabins and on the small farms.

In 1938 Extension Work was carried on in a total of 2,487 Tennessee communities. The total number of contacts made with farm people through demonstrations, meetings, 4-H clubs, farm and home visits, office calls and other educational media, ran well over 3,000,000.

A total of 62,212 rural boys and girls were enrolled in 4-H clubs to carry out and demonstrate practical projects in farming and homemaking. Over 13,000 attended study and recreation camps conducted by the agents for periods of three days to a week.

A total of 29,786 rural women were enrolled in 295 community home demonstration clubs to conduct projects and demonstrations in improved methods of homemaking under the guidance of home demonstration agents. Some 5,000 rural women attended summer camps and short courses conducted by these agents.

Assistance and instruction was given farmers in all phases of crop, livestock, poultry and dairy production, marketing, soil improvement and general farm management problems. Rural homemakers and 4-H club girls received advice and assistance in canning, clothing, foods and nutrition, handicraft, health and sanitation and in the general improvement of convenience and comforts of their home.

The Extension Program

The Extension program from the first, and with variations, has centered around the following:

1. Home production of food for the family and feed for livestock.
2. Maintenance and improvement of soil fertility through the use of lime, legumes, terracing and a judicious use of fertilizers.
3. Teaching of improved crop and livestock production practice and methods.
4. Teaching of farm boys and girls improved farm and home practices through 4-H clubs.
5. Teaching of improved methods in canning, cooking, sewing and gardening.
6. Improvement of the farm home for the convenience, comfort and contentment of the farm family.
7. The keeping of accurate farm records in cooperation with the Extension Farm Management department.
8. Cooperative marketing of livestock and livestock products, including poultry, and other farm products such as potatoes, strawberries, etc.

The planting of gardens, truck crops and orchards and the keeping of sufficient cows, poultry and hogs to produce an ample home food supply is stressed constantly by Extension workers.

Livestock Development

Considerable emphasis has been placed on livestock development not only to supply food for home use but for production of livestock and livestock products for sale. It is gratifying to note that in recent years there has been a distinct upward trend in livestock, particularly in the one-crop areas, cotton and dark-fired tobacco. This is a logical development in connection with the Agricultural Conservation Program which is bringing about a marked increase in pasture, hay and forage crops which are best utilized by livestock.

There will always be a place in Tennessee agriculture for more extensive systems of farming. Large areas of pasture land not suited for cultivation should always be devoted largely to beef cattle, sheep, swine and other kinds of livestock that go with more extensive farm operations. There has been marked improvement in the breeding quality of swine, horses, mules and beef cattle during the past 25 years. Several grand champions at the Chicago International Livestock Show have been from Tennessee.

Soil Conservation

Since the beginning of Extension Work, stress has been placed on soil conservation activities, including the encouragement of terracing on lands which should be terraced, the use of lime and phosphate on lands which respond to the use of these elements, and the sowing of cover crops, with particular emphasis on encouraging the deeper rooted legumes, red clover and alfalfa in particular. There has been considerable progress made in these practices and results are obvious throughout the State.

A total of 154,134 farmers owning 13,374,303 acres were enrolled in soil conservation associations in 1938; 31,712 farmers applied 524,400 tons of lime; 29,964 used 664,920 tons of recommended fertilizers, 70 percent of which was phosphate; 31,560 followed crop rotations, recommended by agents, on 1,423,315 acres; 39,220 farmers grew cover crops, the value of which was estimated at \$713,312.00 on 776,743 acres; 4,194 terraced 55,903 acres of land and valued the improvement at \$571,885.00; 4,338 did gully control work on 26,490 acres; 2,295 farmers produced strip cropping on 22,856 acres and contour farming was practiced on 74,917 acres by 6,361 farmers.

Crop Improvement

The results from the one-variety community cotton improvement work of the past few years are very gratifying. Demonstrations of this kind have been conducted in each of the major cotton growing

counties of the State. Improved strains of DPL cotton have been introduced and the work carried forward so as to keep seed pure.

Introduction and the wide adaptation of Neal Paymaster corn throughout the State by agents during the past 20 years has added approximately \$2,000,000 annually to the value of the State's corn crop.

Better crop practices advocated by the agents, including more careful preparation and cultivation of soil, use of commercial fertilizers, use of better seed, testing of seed before planting, the planting of varieties better adapted to soil and climatic conditions of higher yielding capacity and control of insects and diseases, have been more widely adopted over the State and have contributed to increasing the yields of all crops.

Legume crops, including clovers, alfalfa, lespedeza and soybeans have been greatly increased since the beginning of Extension Work. For example, in 1900 alfalfa was practically unknown throughout the State. At the present time there are approximately 75,000 acres and the acreage is steadily increasing each year. It would be hard to estimate the value of this crop to the State. The hay itself is worth several million dollars annually, not to mention the fact that after the land has been in alfalfa several years the yield of crops following it may be greatly increased.

Lespedeza is the most widely grown hay, pasture and soil building crop grown in the State. More than a million acres are devoted to this crop annually and its estimated value of this crop to the State annually is approximately \$8,000,000.

Another very important crop development has been in the spread of Burley tobacco. Until 1916, Burley tobacco was confined to Greene and Washington counties, and the total production was 2,595,625 pounds which sold for \$439,855.40. At the present time due largely to the work of county agents, Burley tobacco is grown in practically all East and Middle Tennessee counties; a total of about fifty counties in the State. Annual production is now approximately 90,000,000 pounds and the average annual income from the crop is around \$12,000,000.00.

The production of Green Mountain Irish potatoes on the Cumberland Plateau has developed into a large industry as a result of work of county agents in that area. This is the best region for late crop potatoes in the South and the quality is as good as can be secured anywhere.

Poultry and Dairying

Poultry production has increased rapidly. Cash income from poultry and eggs sold annually is estimated by the Crop Reporting Board of the U. S. D. A. to be \$12,000,000 which is many times what it was in 1910.

One of the most pronounced developments in the State has been the growth of the dairy industry. Prior to 1910 there was not a creamery in the State and all butter was made on the farm for local consumption. The first creamery, a cooperative one, was organized in Winchester in 1910. In 1911, it manufactured 41,387 pounds of creamery butter. Now approximately 18,000,000 pounds of creamery butter are made in the State annually. The farm value of all the milk produced annually is estimated at around \$30,000,000.00. The Extension Service has had a leading part in this development. There are many creameries, ice cream plants and cheese factories that have developed as a result of this growth of the dairy industry, not to mention the whole milk business in all the cities of the State.

There are 18,869 registered purebred dairy cattle in the State, which is twice as many as all the purebred livestock, including horses and mules, in the State in 1890. Tennessee is known throughout the United States as the leading Jersey State, and many cows and heifers are sold to dairymen in other states. It is the leading dairy State in the South, and ranks high among the dairy states in the United States.

Rural Home Improvement

In home economics work, considerable stress has been placed on the improvement of homes by means that are simple and inexpensive and which call for no great outlay of cash. In other words, improvements have been encouraged by painting, whitewashing, fixing the fences, getting a good sod around the house, doing a little landscaping and providing such conveniences in the home as could be afforded. Water systems have been encouraged and there has been considerable accomplishment in the installation of water systems. There has also been a tremendous amount of educational work done by agents in the installation and use of electrical appliances in the home in recent years.

In the annual Better Homes Campaigns, which are conducted during February, March and April of each year, thousands of homes have been improved. A total of 67,795 farm homes, in 89 of the

95 counties of the State reported improvements made for convenience, comfort and attractiveness in the 1938 campaign alone. Reports of 1,955 rural community chairmen show that 3,309 homes installed running water. In 1934 only four farm homes out of each hundred in Tennessee had electricity and at present 10 percent of the homes have electricity. Of this increased number, 4,695 installed electricity in 1938. Electric equipment purchased within the past year includes 1,295 water pumps, 3,305 washing machines, 8,022 hand irons, 6,064 refrigerators and 6,989 radios.

Other results reported show 12,025 homes painted, 18,312 roofs improved, and as a part of the better homes safety program 21,925 farm families repaired or replaced broken steps and other home hazards. A total of 45,685 lawns were improved and beautified with trees and shrubs.

Four-H Club Work

An effort was made to increase the enrollment in 4-H club work and to encourage a greater percentage of completions on the part of boys and girls enrolled from year to year. In 1938, 62,012 boys and girls were enrolled in 4-H club work during the year. This was an increase of 4,137 over 1937, and the largest enrollment in the history of club work in the State. Boys carry on demonstrations of improved practice of crops and livestock under the direction of county agents and the girls carry on demonstrations in gardening, poultry raising, home improvement, cooking, sewing, etc. under the direction of home agents.

Cooperative Marketing

Cooperative marketing of farm products has been a major project of the Extension Service for a number of years.

The marketing of wool is the most notable project in this field. The project was started in 1918 and in the twentieth annual series of cooperative sales, which was in spring of 1938, 3,604 producers of 60 counties sold 500,259 pounds of wool for a total of \$113,809.69. This represented an estimated saving to the growers of \$10,005.17 over what they would have otherwise received. The wool was sold through 40 cooperative pools.

In the twenty years that these sales have been conducted a total of 570 sales through which a total of 5,400,952 pounds of wool have been sold. The estimated saving to growers as a result amounts to \$173,055.00.

In 1938 Tennessee agents assisted and otherwise cooperated with 193 cooperative marketing associations having a membership of 19,309 farmers. The associations marketed cooperatively \$3,732,570.48 worth of farm products and purchased cooperatively \$700,615.74 worth of seeds, feeds, fertilizers, crates and other needed materials. Increased profits and savings ranging from 5 to 25 per cent were secured by members of these associations as a result of this cooperative effort.

CONCLUSION

Many other activities of the Extension Service of the foregoing nature could be described, including all phases of rural life, particularly what the home demonstration agents have done in making families more self sustaining and promoting health, comforts and contentment in the farm home with minimum cash expenditures. Space in this publication will not permit, and neither is it necessary. It is enough to say, the foregoing are typical of many. The results of the work are evident throughout the State.

Evidence is everywhere that the College of Agriculture of the University of Tennessee, through its Experiment Stations, graduates of the College, and the Agricultural Extension Service, has made a great contribution to the progress and development of rural life and the State as a whole. The Experiment Station has conducted research on all phases of agriculture; fertilizing of various kinds of crops, the most profitable systems of farming, control of insects and diseases, best varieties of grains, fruits, vegetables, best methods of feeding livestock, control of erosion, and many other phases of farming.

The Agricultural Extension Service, cooperating with the Stations and other branches of the College, has through its staff of agents since 1914, taken the experimental findings and recommendations of the College to the farms and farm homes and demonstrated their worth. It would be difficult to evaluate what this Service has contributed in annual income. It is a cumulative work, the results adding increased income from year to year. In the aggregate, it is many millions of dollars annually.

BUILDING A BETTER TENNESSEE

THROUGH RURAL COMMUNITY IMPROVEMENT



**AGRICULTURAL EXTENSION SERVICE
UNIVERSITY OF TENNESSEE**

By ALMON J. SIMS

BUILDING A BETTER TENNESSEE THROUGH RURAL COMMUNITY IMPROVEMENT

By Almon J. Sims, Extension Editor and Chief
College Department of Information



This is the story of the building of a Better Tennessee through rural community improvement.

It is the story of progress in rural community - betterment in Shady Valley, Leesburg, Buffalo Springs, Boone's Creek, Doe Valley, Holston Institute, Farmington, Barren Plains, Cash Point, Old Zion, Cedar Grove, Elm Hill, Blue Springs and Center Grove—top winners in district contests since the start of the movement in East Tennessee in 1944, and, some 650 other rural communities now well on their way up the ladder of achievement in community improvement.

The eyes of the Nation have been on these communities in recent years because of their progress in better rural living through team work—their ability to meet the challenge of a complex and changing civilization; their pioneer efforts in weaving for America a new rural community pattern.

The Road To Community Survival

While these and some 650 other Tennessee rural communities across the State, in each of the 95 counties, have gone forward setting a new pattern in rural community betterment, many others, not only in Tennessee but in other States across the Nation, are today virtually static or on the road to decay.

Such communities have not yet found the road of adjustment to changing conditions—mechanized farming, proper land use for increased crop and livestock production, super highways, consolidated schools, enlarged and revitalized church programs, electric

servants for the farm; a communication system and airways that have in a decade made the world into one big community.

The purpose of this story is to point the way; sound a call to those communities to arouse themselves to action and a place in the new rural community pattern that is being fashioned by their progressive neighbors—those communities that have caught the broad vision and are making real progress in the development of a more satisfying rural life.

While in many respects it is pioneer effort, the 50,000 farm families in the 650 Tennessee communities are certain that they are on the right road.

Rebirth Of An Old Idea

There is nothing new in the idea of neighbors planning and working together. Our forefathers, the pioneers of the State, found not only protection, but economic, educational, religious and social advantages from cooperative effort.

They explored the land, moved across the country in groups and founded the first communities; worked together in clearing the land, building homes, barns, roads, churches and schools.

In the new land rich in soil, timber and mineral resources, the leaders soon became prosperous and with their prosperity self sufficient and individualistic. For a hundred years effort was centered

Neighbors of Barren Plains, Robertson County, get together to discuss community problems at a dinner prepared by their wives at the community center.



on conquering and exploiting the land, timber and mineral resources of the State for individual gain—the story of all the States.

Early in the 20th Century some rapid changes began to take place. The soil was wearing out, forests were fast being depleted; new land was becoming scarce. The machine age was being ushered in—automobiles, trucks, tractors, super highways, consolidated schools—distances were reduced and community lines expanded. A new way of life, demanding many changes and adjustments was spreading across the nation.

Education Spread To Farms and Homes

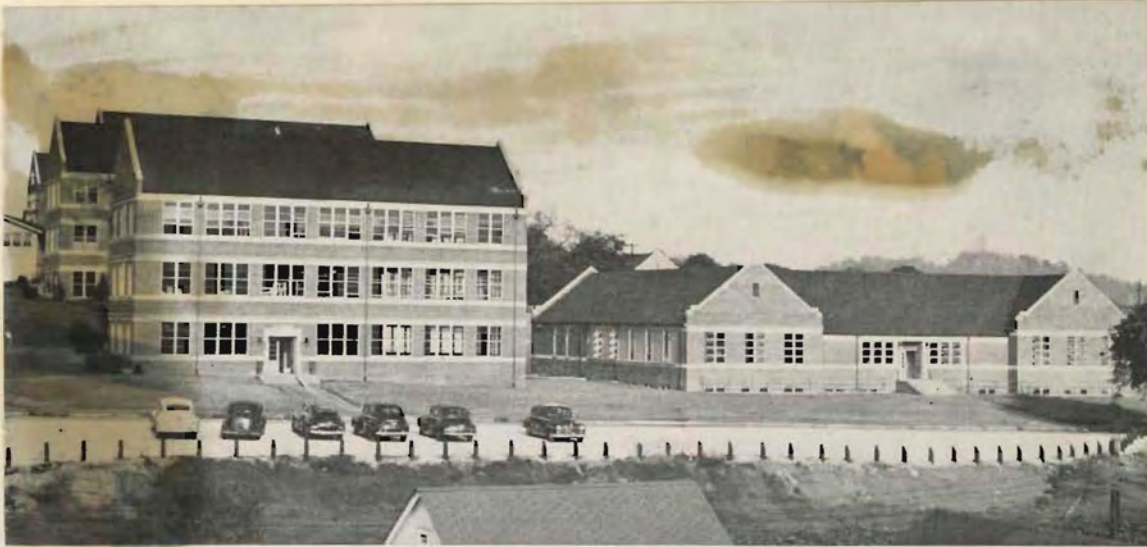
Far-sighted leaders saw these changes coming and in an effort to meet the situation, colleges for training of leaders in the agricultural field were established in the various States with the aid of the Federal Government. Experiment Stations to carry on research on the problems of agriculture—soil improvement, new and better crops, improved breeds of livestock were set up in the States in the same way.

In 1914 the Smith-Lever Act of Congress established the Co-operative Extension Service of the U. S. Department of Agriculture, the State Colleges of Agriculture and the counties, for the employment of county farm and home agents to teach and demonstrate to farmers and their families, on their farms in their homes, better methods of farming and homemaking.

At first the work was conducted largely on an individual basis; gradually shifting to groups—4-H Clubs, home demonstration clubs, crop and livestock production and marketing groups, community meetings and other organizations, which stimulated community interest and action.

The Agricultural Extension Service of the University of Tennessee has a long record of sponsorship of community as well as other types of organizations for the benefit of rural people—farmers, homemakers and rural youth. Many of these, such as the Tennessee Home Food Supply Program and the Community Victory Committee Organization, were powerful factors in aiding rural families during the depression





The University of Tennessee College of Agriculture aids rural community development through Agricultural Extension Service agents in each County.

years and in concerted farm action for victory in two world wars.

Extension and community leadership experience gained in these programs, laid a solid foundation for the evolvement and development of the present State-wide community betterment program.

Extension Fostered Pioneer Work

Pioneer work in Community organization was fostered by the Agricultural Extension Service in Tennessee as early as 1916. For the most part these early community groups were loosely organized and their activities were chiefly social and instructional in nature. They served the purpose, however, of bringing the people of the community together for discussion of improved farm and home practices by the county Extension agents. In the minds of most people, at that time, this was the chief purpose of the meetings.

With advent of good roads, automobiles, trucks, the radio and consolidated schools, the horizon of many rural families was broadened and they, for a time, turned their attention away from the problems of their immediate neighborhoods. As a result, most of these early, loosely organized community groups faded out of existence to be replaced in some counties by a new type, closely knit organization with definite objectives and well defined plans of action, aimed at solution of community problems.

Under the impetus of rapidly changing agricultural conditions and problems, brought on by the depression of the early 1930's, followed by World War II, this new type of organization spread rapidly throughout the State to provide the framework for the



County Home Demonstration Agents assist rural homemakers with their problems in their homes and in community groups.

present Community Improvement Contest program, now functioning in each of the 95 counties of the State.

Some counties have only a few communities organized, in others all the communities are not only organized but are federated into a county council for county-wide planning and advancement.

Extension - TVA Demonstration Program

In 1937 the new type of community organization in Tennessee began to take form in the joint University of Tennessee-Tennessee Valley Authority Extension Test Demonstration Program, which included both individual farm and area or community wide demonstrations.

The heart of this program was inclusion of both the farm and home, all activities and enterprises, into a farm-home unit improvement demonstration, a type of demonstration never before widely used.



County agents take the latest scientific information to farmers on their farms and in community groups.

In this program the farm family established definite improvement goals for both the farm and the home for a period of several years. The Community Improvement program is merely an expansion of this central idea to the community level, with all the families of the community pooling their efforts in behalf of worthwhile community projects and improvements.

Thus the program was built around a definite plan of work and established improvement goals, based on farm-home and community surveys. In the beginning these demonstrations were limited to counties in the Tennessee Valley watershed involving counties in seven states. In that respect it was a regional program, involving parts of several states, the Land-Grant Colleges and Extension Services of those States, in a Valley wide, farm-home-community betterment program.

The form of organization was flexible enough to meet the varying agricultural situations and had sufficient scope to fit the needs of the individual farms and homes as well as the community as a



Business men of the towns join hands with the business men of the farms on field-day tours to observe and discuss progress in community betterment.

whole—the first real effort at program planning for both the farm and home as a unit as well as on a community basis.

The war which brought the people closer together in community and neighborhood groups, added impetus to this movement. Achievements of test-demonstration farmers, resulting from a planned program of land use and good farm management practices, and the activities of the demonstration communities soon was attracting wide attention not only from other rural communities, but from business and civic groups in the town and cities.

Civic Groups Take Notice

In 1943 civic and business groups of Knoxville called a meeting with leaders of the University of Tennessee and the Tennessee Valley Authority to discuss ways in which they could cooperate in encouraging a rural community betterment program in all counties in East Tennessee under the leadership of the Agricultural Extension Service of the University.

It was decided that a contest with a number of attractive prizes to generate friendly rivalry and enthusiasm was the added spur needed to start communities throughout the area working on community improvement programs that would have area-wide influence.

While there was some sentiment for individual awards to farmers and homemakers for outstanding accomplishment, the general feeling of the group was the force of community effort in this

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type of program would be much more effective in interesting and influencing a large number of people in the movement.

The Birth Of a Movement

The outcome of these discussions was the inauguration of a new type of program that has now assumed the proportions of a "movement." Because of the magnitude of the undertaking it was thought best to invite the participation of all civic and business groups.

The committee sponsoring the program in the Knoxville trade area from the beginning has consisted of two representatives each from the Knoxville Chamber of Commerce, The Junior Chamber of Commerce, the Tourists Bureau, the Tennessee Valley Agricultural and Industrial Fair, the Exchange Club, the Optimist Club, the Rotary Club, the Kiwanis Club, the Civitan Club, and the Lions Club, working in cooperation with the Agricultural Extension Service of the University of Tennessee.

The sponsoring committee raised money by subscription from business organizations and individuals for the purpose of awarding prizes to farm communities making the greatest progress in improving community conditions during the contest year.

The contest was to be carried out on a county basis, some one or more organizations in each county of the area acting as sponsor. The county sponsor, with the co-operation of the County Agent and the Home Demonstration Agent, was to organize as many farm communities as possible for entry in the contest.

Thus in early 1944 the first East Tennessee Community Improvement Contest, with a prize list of 16 awards totaling \$2,225.00 offered by Knoxville civic and business groups, was announced. The contest was conducted under the leadership of county Extension farm and home agents. Awards to communities accomplishing the most in community betterment during the year were made at a dinner provided by the civic clubs of Knoxville in December at which leaders of the competing community clubs were honored guests.

This general organization pattern has been followed in other areas to which the program has spread.

Based on Community Desires and Needs

With no charter or grandiose plan for ideal community action handed down to them by outside experts, the communities started to work.

Newspapers, civic and business groups of the towns and cities of the area supported the movement with publicity and local county prizes.

Thus from the start, it was a program for community betterment, based on the desires and needs of the communities, as they themselves saw them, with cash prizes as a spur to action; a unique effort in fashioning a pattern for community self-analysis and long range community planning and development, based on the belief that no lasting community improvement can come without community effort.

All Groups Represented

In setting up the program in a community every effort was made to see that the organization was made up of representatives of all interest groups and organization in the community—the church, school, parent-teacher groups, home demonstration clubs, 4-H Clubs, FFA, young farmers and homemakers; production, breed and marketing groups; etc., so that a truly coordinated community program, representing all the interests of the community might be developed.

As the program began to function, committees, headed by leaders of known interest and ability were named to guide the various projects and activities.

The purpose of the program was to assist rural communities in making the best use of their existing resources, soil, climate and location and in discovering new sources—crop and livestock enterprises—of income for more abundant living—social, economic and spiritual.

Early in the development of the program it was determined that it must be based on local interest if any real benefit was to come from the program; help could be provided by outside sources but interest must come from the people within the community.

A few interested leaders to spark the movement and serve as a rallying nucleus to arouse the interest and cooperation of others in the community was found essential to getting the program started. No rural community can build better than it knows. Here county Extension agents and specialists from the State Extension Service and other leaders had a real part in bringing before the community as a guide the framework of successfully developed programs in other communities.

Communities are encouraged to make a survey of their needs and problems in which only information that will help improve the community is sought.



Community leaders, representing all groups interested in community betterment, plan a definite program, based on community desires and needs.

Uniform Contest Goals

Each contest area is working toward the same objectives, community-betterment through development of better homes on better farms, for better rural living. Improvements in every phase of rural life are considered in the selection of winners. Scoring is based on 1000 points, divided as follows:

Home Food Supply—Production and conservation and use of adequate amounts of the right kinds of foods to provide a balanced diet for the family.
200 Points

Sound System of Farming—Development and improvement of a sound system of farming through use of good soil improvement, crop and livestock practices.
200 Points

Home and Farm Improvement—Development and improvement of appearance, convenience and comfort of home and farm.
200 Points

Community Development—Community Organization and Development, embracing social, economic, educational, religious and other activities of the community.
400 Points

Elimination contests are held at the county level, with local civic organizations sponsoring the county competitions. Top place winners in the county contests compete in the area contests for achievement awards ranging from \$1,000 for top place down to \$25. Final awards are made at an area-wide dinner, at which representatives



1. Production, conservation and use of adequate amounts of the right kinds of foods to provide a balanced diet for the family.

Community Improvement

2. Development and improvement of a sound system of farming through use of good soil, crop and livestock practices.





3. Development and improvement of appearance, convenience and comfort of the home for happier living.

Goals For Better Living

4. Community organization, embracing educational, social, religious, economic and all other worth while activities of the community.





Such conveniences as ample storage space and closets are not overlooked.

from each county, as guests of the area sponsors, are invited to describe their improvement program. Thus the business men and women of farm and home get better acquainted with the business men of the city; and each group comes to realize more forcefully how closely its prosperity is linked to the prosperity of the other.

The list of improvements made in any one community is much too long to set forth here. It runs from painting mail boxes to seeding permanent pastures; from home conveniences to adjustments in farm operations; from gardens to development of health programs; from better livestock to better use of the land to community recreation projects

and school and church improvements. Multiply this by the number of competing communities in the state, and the result is something of which everyone can be proud.

Varied Improvements Have Resulted

In every contesting community stress is laid upon both minor and major improvements. It is impossible to enumerate the number of school and church buildings and grounds that have been improved, conveniences and furnishings bought for homes; school lunch programs assisted; acres of land terraced or fertilized; water systems installed, homes painted, grounds improved; the improvement of livestock, pastures and crop yields because of better methods and practices. In each community, there are outstanding projects.

For example:

A number of communities have started health programs under which clinics are held; all children are brought in for examinations,

and needed corrective or preventive measures adopted. First aid courses are given; some have built and equipped commu-



The living room, the center of the home, receives special attention.

nity hospitals. One secured telephone service for some 30 to 40 families and hauled hundreds of loads of chert for roads. Others have secured electric service for hundreds of families.

Organized communities in several counties formed a County Council of Community Clubs to work on problems too big for individual communities to handle.

Community fire-fighting groups to save homes, barns and forests, community buildings to serve as social centers with well equipped playgrounds, ball clubs, sponsored educational tours to other states, the National Capitol and other points of interest, are some of the other unusual accomplishments resulting from community action.

These and many others are representative of permanent gains made in every community. It is such action that proves that sound systems of farming, comfortable and convenient homes, attention to community welfare; church, schools, health and recreational needs can be achieved by any community which works together for the common good.



A Ripple Becomes a Mighty Wave

The achievement of Tennessee communities under this improvement program is an excellent example of what can be accomplished when people are inspired to pool their efforts for community betterment. Each

Production, conservation and storage of adequate food supplies receives careful consideration.





Farmers of the Community study their problems. Here they are studying types of beef cattle.

year additional communities are catching the spirit.

In 1949 the number had grown to 650 communities involving 250,000 rural people in Tennessee. Thus a ripple has become a mighty wave, spreading not only to every county in Tennessee, but to other States with achievement awards, sponsored by district and local civic and business groups, amounting to some \$20,000.00.

In 1944, 64 communities in 16 East Tennessee counties, with 10 civic and service organizations of Knoxville sponsoring achievement awards, launched into untried waters a new type of community-betterment program. In 1949, 173 communities in 22 counties in the area were enrolled in the program.

In 1945, the Farmers Club of the Nashville Chamber of Commerce inaugurated a similar program in Middle Tennessee. One hundred and twenty communities in 22 counties participated that year. In 1949, 253 communities in 37 counties were enrolled.

In 1946 the movement spread to the Chattanooga area in lower East Tennessee with an achievement awards list sponsored by 14 civic groups of Chattanooga. Forty communities in 11 Tennessee counties and two in Georgia participated. In 1949 the movement had spread to 83 communities in the three States—Tennessee 60; Alabama, 2; and Georgia, 21.

In 1948 the movement spread to West Tennessee, which had been covered by the widely known Plant-To-Prosper and Live-At-Home Contests, sponsored by the Memphis Commercial Appeal, in cooperation with the Agricultural Extension Service of Tennessee, Mississippi, Arkansas and Missouri, on an individual farm-home basis for 15 years.

Even here in the land of large plantations, cotton, and many tenants, the community-betterment idea gripped the imagination of the people immediately, under the achievement awards sponsorship of Jackson Civic Clubs, and business groups. Starting in 1948 with 110 communities in the 21 counties of the District the movement spread to 129 communities in the 21 counties in 1949.

The Spirit Of The Plan Is Catching

The Atlanta Chamber of Commerce, in cooperation with the Georgia Extension Service, began in 1947 the sponsorship of a similar program in Georgia and the Extension Services in North Carolina, Alabama, Virginia and Kentucky, and several other states are carrying on community-betterment programs this year, based on the Tennessee pattern.

Catching the spirit of the movement, Hiwassee College, Madisonville, Tennessee, a training school for rural ministers of the Methodist Church has developed a seminar for the training of ministers and lay church workers of all denominations in the field of rural community life in which all aspects—social, economic, and spiritual—are studied in their proper relationships to community development.

The Hiwassee College community, with the support of Dr. A. H. Rapking, director of rural and community life development programs for the college, has been an active participant in the East Tennessee Community Improvement Contests since its beginning in 1944.

The interest of this college and the rural ministers it is training, is having a potent influence in the advancement of the community-betterment program. Evidence of this is found in the many communities where local ministers and church lay leaders are taking a leading part in betterment programs.



The young people, through their 4-H, Y F & H, F F A, and F H A Clubs have an important place and interest in community improvement.



Modern conveniences and arrangement of the kitchen, the workshop of the home, contribute to the happiness of the family.



The rural church, center of the religious life of the community, is recognized as one of the most powerful influences in the community betterment movement.

Extension and community leaders in Tennessee recognized from the beginning the importance of the rural church in the movement. The church, next to the family has the special responsibility of leadership of the religious life of the community. It was also recognized that without proper use of the land and other resources of the community there can be no effective religious program.

Thus, from the beginning, it was recognized that the key to a community-betterment program rested on the problem of bringing about a better understanding of the relationships of people, the schools and other agencies and the churches to the basic factors involved in the right use of the land and other natural resources of the community for better living.

It was determined that the objective would be not to duplicate the work of existing agencies, groups or organizations within a community, but simply to help them all get together, coordinate their activities and pool their strength for more extensive and effective result:

The purpose, to serve all the interests of the community.

The aim, to encourage in every way the development of a better community life, to achieve spiritual as well as social and economic progress.

With these goals the Tennessee Community-betterment program has grown from a mere ripple to a mighty wave that has swept across Tennessee to lap over boundaries into other states and other lands.

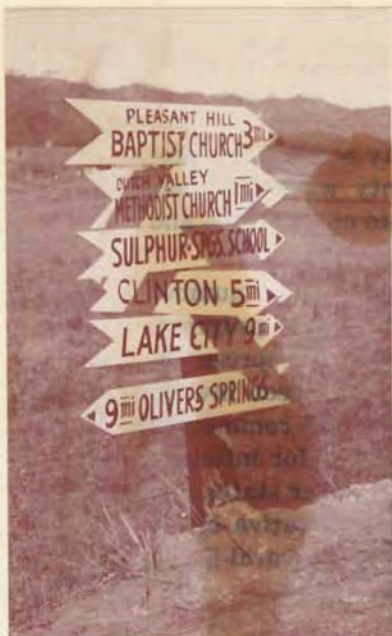
Numerous leaders and groups from many states and a number of foreign countries have visited the State to study the program. Scores of local community leaders and groups as well as representatives of the Extension Service of the University have been invited to other states to explain the plan to state, county and community groups, both rural and urban. Hundreds of requests for information on the movement are received from leaders in other states and many foreign countries annually, all of which is indicative of its significance in the development of a new community-rural-living pattern for America.

Encourages Better Town-Country Relationships

While primarily a program centered around rural community interests and activities, the sponsorship of achievement awards by urban groups, at district wide harvest dinners, with the social intercourse between town and country people, fills a long felt need for

Farm names, attractively displayed, add distinction, individuality and pride of ownership.





some logical and natural medium for promoting better relationships and understanding between urban and rural groups.

It is to the interest of the farmer that town and city leaders have an understanding of his problems as well as interest in maintaining a prosperous town as a market for the products of his farm.

It is to the interest of the town leader to understand that a prosperous main street in town depends on prosperous farms and progressive rural communities at the end of the main street.

While there are many and varied benefits to be derived from the Tennessee Program for community-betterment, including the achievement awards, which serve as a spur to action, there are two that are outstanding.

First, the increased interest of farm families for community action on community problems and sound systems of farm and home management for better rural living.

Second, a better understanding and a closer relationship between rural and urban groups.

Rooted in the farm-home community-unit-demonstration idea of the Land-Grant Colleges of the Tennessee Valley States and Tennessee Valley Authority, working on a joint program for better rural living in the area, the Tennessee Community Improvement Program envisions new hope for better rural living and rural-urban relationships for America and the world.

Federal Reserve Bank Takes Notice

The Federal Reserve Bank of Atlanta devoted a major part of the September 1949 issue of its magazine, *Monthly Review*, to an article by Earle L. Rauber on the Tennessee Community Improvement Program.

Mr. Rauber, director of Research for the Bank, who spent some time in the State studying the program wrote in his article:

"Any organization that is interested in giving expression to the American businessman's innate idealism by building around itself a more stable, a more prosperous, and a more productive farming area would do well to consider the adoption of such a program. Let its representatives go to Knoxville, Nashville, Atlanta, Chattanooga,

or Jackson and hear with their own ears the story of what has already been accomplished. Let them see with their own eyes the working of a movement that may never rate even a footnote in a textbook on economics, but which may yet do more for the farmer than many a more grandiose scheme. There they may catch a vision of what could be accomplished in their own trade area. They may even be able to imagine what rural life in America might be like if this program were adopted throughout the length and breadth of the whole United States . . .

"The objectives of the program are nothing new. They are things that have for years, been striven for by the Extension Service and by business and civic groups in their various agricultural programs. The method of achieving these objectives, moreover, is simple, and indeed, almost naive—the calling forth of action by means of contests and prizes. In spite of the obviousness of its objectives and the simplicity of its methods, however, this plan has 'caught on' where others have failed to do so. In a relatively short time it has brought about an amazing transformation in many communities, a result that would have been achieved under other plans only after years of patient and laborious effort, if at all . . .

"Seeing Is Believing"

"The most convincing proof of the value of the community improvement program in raising the level of living in farm communities can be gained only through personal observation. One must actually see the difference that exists between a typical unorganized community and one in which a community improvement club is active . . .

"Driving down a country road . . . one comes, perhaps, upon a farm community the like of which can be found by the thousands throughout the country . . .

Richer, rolling fields, stretching away to the distant hills are adding prosperity, beauty and contentment to the Tennessee countryside, under the impetus of the community improvement program



"You drive on, and by-and-by come to another community. At the boundary of the community you are greeted by a freshly painted roadside sign reading "Welcome to Milton Community." All roads are plainly marked and mail boxes are painted and neatly lettered. You pass a well-kept cemetery with a newly graded and graveled circular drive . . . Pratically every house in view is gleaming white and the grass in the front yards is well cut. Unsightly fences have been removed from the roadside and the shoulders of the road have been graded and grassed. The fields stretching off to either side are all well cared for . . . The road is wide and free of trash . . .

"A farmer standing in the midst of a newly plowed field is complimented on the condition of his land and home.

"How much of this would you have done if it had not been for the community club?" he is asked. "If it were not for the club I would not be here at all.

"I was fixing to buy a place somewhere else. But when I saw how everybody here was working for each other, I decided that this is the kind of a place I want to live and bring up my children. I wanted to stay in Milton." . . .

"This, however does not quite answer the question. "You seem to be farming your land pretty efficiently. Wouldn't you have done just as well by the land even if there had been no community club?" "I guess I would have done some things," he replies, "but nothing like what I'm doing now. I didn't want mine to be a drag-tail farm when everyone else was improving theirs." The attitude of this farmer is probably as good a summary as any of what goes on inside the people of an organized community; and what goes on inside them is reflected in what goes on outside."

Facts and Figures

While many of the important benefits of the Tennessee Community Improvement Program are intangible in character, its value can be reduced to figures for those who have a love for statistics.

The Farmers Club of the Nashville Chamber of Commerce, sponsors of the Middle Tennessee Community Improvement Program, has made an effort to measure the progress of the program in statistical terms. The summary on the next page shows accomplishments in Middle Tennessee Communities in 1948 as compared with 1947.

Family Food Supply	1947	1948	Percent Change
Families growing 75 percent or more of their food supply (no.)	6,264	6,536	+ 4.3
Families having gardens at least 9 mos. of year (no.)	4,749	5,330	+ 12.2
Food canned (qts.)	1,976,602	1,961,329	- .8
Food frozen (lbs.)	410,759	694,129	+ 69.0
Families have two or more milk cows (no.)	6,342	6,132	- 3.3
Developing and Improving Sound Systems of Farming			
Lime used (tons)	84,201	73,574	- 12.6
Terraces constructed (feet)	1,440,826	1,417,952	- 1.6
Fertilizer on row crops (tons)	12,576	18,420	+ 46.5
Fertilizer on soil-conserving crops, small grains (tons)	18,319	19,800	+ 8.1
Acres seeded to alfalfa	5,172	7,900	+ 52.7
Acres seeded to red clover	6,588	10,007	+ 51.9
Acres of permanent pasture seeded	25,132	35,297	+ 40.4
Acres of pasture clipped	39,592	49,093	+ 24.0
Small grain harvested (bus.)	740,533	1,072,391	+ 44.8
Cover crops seeded, including small grains (acres)	60,643	106,433	+ 75.5
All hay (tons)	108,077	154,515	+ 43.0
Corn harvested:			
Open pollinated (bus.)	1,299,904	1,334,667	+ 2.7
Hybrid (bus.)	1,427,824	2,321,623	+ 62.6
Tobacco harvested (lbs.)	8,479,150	7,442,337	- 12.2
Cotton harvested (bales)	6,153	6,698	+ 8.9
Green manure crops turned (acres)	25,775	33,768	+ 31.0
Beef cattle kept (no.)	30,601	35,772	+ 16.9
Dairy cows kept (no.)	26,073	31,057	+ 19.1
Hogs raised (no.)	86,226	105,267	+ 22.0
Lambs raised (no.)	20,228	22,504	+ 11.3
Chickens raised (no.)	618,520	667,878	+ 8.0
New fence built (rods)	224,018	310,531	+ 38.6
Amount spent for farm machinery	\$1,432,465	\$2,880,508	+101.1
Improving Convenience of Farm and Home			
Families installing running water (no.)	514	748	+ 45.5
Families installing bathrooms (no.)	274	464	+ 69.3
Families installing electricity (no.)	1,030	2,142	+108.0
Amount spent for:			
Building and repairs	\$2,085,038	\$3,734,077	+ 79.1
Electrical appliances	\$ 760,940	\$1,109,932	+ 45.9
Furniture and furnishings	\$ 542,434	\$1,325,165	+144.3
Community Planning, Organization, etc.			
Individuals taking part in church and Sunday School	22,234	24,603	+ 10.7
Number taking part in general civic and community work	16,832	20,177	+ 19.9

Encourages Self Help and Leadership

"In a time when it is all too easy to look to government or to someone else for support, the community improvement program teaches people to do things for themselves and to take pride in their own accomplishments. In an age when different economic groups tend to look upon each other as enemies, this program brings farmers and businessmen together as friends and neighbors. In the democratic formulation and execution of community projects, people discover their dependence upon each other and the productiveness of teamwork and mutual aid. Unsuspected qualities of leadership are revealed within the community and a field of action is provided for their exercise . . .

Gives Strength For Economic Storms

"When a community sits down to plan its program for a year or more ahead, it must necessarily learn to put first things first, it must discriminate between what is for the long-run and permanent good of the community and what is of only passing importance . . .

"Despite its phenomenal success wherever it has been tried, the farm community improvement program just described is certainly no panacea for agriculture. It is no solution for many of the serious problems of readjustment that undoubtedly face agriculture in the years to come. The position of the farmer in our economic society, like that of everyone else, is pretty much at the mercy of the winds sweeping through the markets of the world except as these are tempered by governmental action. His destiny is not entirely in his own hands.

"Nevertheless, there is always a margin within which the individual and the community can determine whether they shall live better or worse. The community improvement program operates to keep the quality of life in farm communities at the upper rather than at the lower edge of this margin. Regardless of the economic weather, therefore, a community will always be better off organized than unorganized. Its power of resistance to adverse conditions will be greater, and its recuperative power will also be stronger."

From: Association of Land-Grant Colleges and Universities
Press Coverage Committee - 1951

Background Information

WHAT ARE THE LAND-GRANT COLLEGES AND UNIVERSITIES?

The early American institutions maintained chiefly the classical and professional curricula. They made only slight adaptations to the needs of a pioneer people. A study of such fields as agriculture and the mechanical arts was beneath their academic dignity.

By the middle of the nineteenth century the mild protest against this exclusively classical type of college had grown into a widespread agitation. Agricultural societies in many states were insisting that there must be colleges where agriculture could be studied. The already-established colleges and universities remained largely uninfluenced, however, by this agitation. Hence during the 1850's the Congress debated the issue and finally passed the Morrill Act in 1859. President Buchanan vetoed it partly on the ground that it was in violation of the traditional policy of the Federal Government, which had up to that time left the control of education to the states. In 1862 the Morrill Act was again passed and was signed by President Lincoln.

The federal support provided for in the initial Morrill Act was the income from public lands (30,000 acres or the equivalent in scrip for each representative and senator in Congress), which was made available to each state. The state was expected to contribute to the maintenance of its land-grant institution as well as to provide its campus and buildings.

The fundamental purpose of the Morrill Act was to insure the development in each state of at least one college adapted to the educational needs of the agricultural and industrial classes. Without too much regard for the academic traditions which largely controlled the colleges and universities of the time, these new institutions, which came to be known as land-grant colleges and universities, were to afford a type of education that would foster the development of agriculture and the mechanical arts.

From this modest beginning the Federal Government has expanded its contributions to the land-grant colleges and universities. Recognizing the need for research as a basis for developing agriculture, the Congress passed the Hatch Act of 1887 setting up in the land-grant institutions the system of agricultural experiment stations. In 1890 the second Morrill Act and in 1907 the Nelson amendment were passed supplementing by direct appropriation the income from the land grants for instruction. In 1914 the Smith-Lever Act was passed establishing the system of cooperative extension services to bring to adults the benefits of current developments in the field of agriculture.

Thus over a period of little more than half a century these institutions, designed to foster a program of education suited to the needs of the agricultural and industrial classes, had been established on a foundation of research and extended from the youth on the campus to the adult population throughout the rural areas of the state.

What Are the Land-Grant
Colleges and Universities?—Page 2

Throughout recent decades numerous acts have been passed expanding the scope and increasing the support of all three aspects of the land-grant programs--research, campus instruction, and extension education. Now, in addition to the income from the original land grants, the appropriations of federal funds to aid the states in the maintenance of the land-grant institutions amount to more than \$40,000,000 annually. Of this total the amounts for the year ending June 30, 1948, were: for campus instruction, \$5,030,000; for experiment stations, \$8,950,807; and for extension education, \$27,462,804.

Today the U. S. Office of Education lists 69 land-grant institutions, including 17 separate Negro land-grant schools. Enrollment in land-grant institutions runs about one-fifth of the total in U. S. education and one-fourth of the total in four-year colleges and universities. The Association of Land-Grant Colleges and Universities includes 53 of the land-grant institutions.

Research and teaching in the land-grant schools is not limited to agriculture and engineering. The fields of arts and sciences, veterinary medicine and home economics are included in their programs.

It is not easy, in so brief a space, to appraise the services of these land-grant institutions. They have broadened the base of higher education, bringing it within the interest and attainment of vastly larger numbers of people than would otherwise have been reached. They have spread widely the concept that higher education is something in which all the people have a stake.

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(Most of this review was taken from Bulletin 1949, No. 8, "Statistics of Land-Grant Colleges and Universities," issued by the Office of Education of the Federal Security Agency.)

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Section 9.

HISTORY AND DEVELOPMENT OF LAND-GRANT COLLEGES, INCLUDING
THE ORGANIZATION, DEVELOPMENT AND PHILOSOPHY OF THE
THREE BRANCHES OF THE STATE COLLEGES OF AGRICULTURE,
RESEARCH, RESIDENT TEACHING AND EXTENSION

Prepared by A. J. Sims, Extension Editor and Chief, Department of Information,
College of Agriculture, University of Tennessee, for Presentation and
Group Discussion, Home and Community Service Departments, Tennessee
Farm Bureau Conference, Columbia, Tennessee, June 18, 1947

The first Morrill Act, creating the system of Land-Grant Colleges of Agriculture and Mechanic Arts was passed by Congress and approved by President Lincoln, July 2, 1862.

It was the third of three Agricultural Acts of far-reaching significance passed by the same Congress, namely the Act creating the United States Department of Agriculture, approved May 15, 1862, by President Lincoln; and the National Homestead Act of April 10, 1862, under which any citizen over 21 years of age was entitled to a homestead of 160 acres of the public domain by complying with certain rules.

The first Morrill Land-Grant College Act, (origin of grants-of-aid) granted to each of the States an amount of public land equal to 30,000 acres for each Senator and Representative it had in Congress, or the equivalent in land script, proceeds from the sale of which were to be used for the endowment, support, and maintenance of at least one college where the leading subjects would be branches of learning related to agriculture and the mechanic arts.

The second Morrill Land-Grant College Act of Congress, August 30, 1890, provided further endowments for more precisely specified educational purposes, and also authorizing the establishment of colleges for Negroes in States or Territories where a distinction of race and color is made in the admission of students.

In March 1907, Congress passed the so-called Nelson Amendment to the Land-Grant Act, appropriating \$25,000 to colleges of agriculture and mechanic arts with

the provision that a portion of the funds might be used for the training of teachers of elementary agriculture.

The primary function of these colleges at first was that of giving resident instruction in the branches of knowledge related to agriculture and the mechanic arts. Establishment of these colleges under provision of the Act by most Southern States was delayed until the Seventies by conditions following the Civil War.

Iowa was the first State to accept the Grant, September 11, 1862, followed by Vermont on October 29, and Connecticut December 24 of that year. Fourteen States accepted it in 1863 and by 1870, 36 States had taken advantage of the Act.

Tennessee accepted the Grant in 1869, as will be discussed in more detail later.

STATE AGRICULTURAL EXPERIMENT STATIONS

The Land-Grant Colleges thus established soon discovered that but limited information on agriculture was available for teaching to students. The need for research and experimentation to discover additional facts was recognized. However, some States provided for agricultural experiment stations as necessary adjuncts to their colleges of agriculture as in Tennessee, which was one of the first of five States in the Nation to establish experiment station work, same being developed out of a combined school of agriculture, horticulture and botany in 1869, the year the Land-Grant was accepted.

In 1887, the National Congress acted on urgent representations from the States and passed the Hatch Act creating, and aiding in financing, an agricultural experiment station for each State as departments of the Land-Grant Colleges. The \$15,000 then made available annually to each Station was doubled by the Adams Act of 1906, the resulting \$30,000 was trebled by the Purnell Act of 1925.

It was the intent that these Experiment Stations should attempt to discover the facts urgently needed by the colleges in training agricultural leaders and in helping farmers to improve their practices.

The Adams Act was for the same general purposes as the Hatch Act, but emphasizing original researches or experiments.

The Purnell Act providing a total of \$60,000 to each State, emphasizes economic and social research and permits expenditures of 10 percent for buildings and land.

The Bankhead-Jones Law of 1935 provided for a government allotment of \$5,000,000 for agricultural research, further development of cooperative agricultural Extension work, and more complete endowment and support of Land-Grant Colleges; 60 percent of the funds being allotted to State Experiment Stations; and 40 percent to the Secretary of Agriculture, to be allotted to the States in an amount which bears the same ratio to the total amount to be allotted as the rural population of the State bears to the rural population ... of all States. To receive these funds each State must show an expenditure from State funds of equal amounts for agricultural investigation. These funds are to be used for "research into laws and principles underlying basic problems of agriculture in its broadest aspects."

FEDERAL-STATE AGRICULTURAL EXTENSION SERVICES

After the Agricultural Experiment Stations had been at work discovering and publishing new agricultural knowledge for a quarter of a century, it became apparent that there was no adequate agency for carrying these facts to the men and women on the farms. Bulletins and circulars had been distributed, lectures given, and farmers' institutes and short courses held, but the general feeling was that only the leading farmers were being reached.

In the early 1900's American agriculture stood on the threshold of great social and economic changes. These years saw the coming of the automobile, great industrial expansion, increased immigration, greater exploitation of western lands. The agricultural laboratories and colleges had accumulated a great body of scientific knowledge, but it was not reaching the masses of farm people.

In 1904 the Department of Agriculture began to establish a system of demonstration farms in the South under the direction of Dr. Seaman A. Knapp to demonstrate the best methods of growing cotton under boll weevil conditions. The purpose was to show the application of new methods and materials on farms, under actual conditions of practical operation. This was done in the belief that more farmers would become acquainted with farm demonstrations, and influenced by them, than had been reached by the earlier methods. As the idea spread through the counties and communities of the South, the results were so successful that the public became convinced of the value of this method of teaching which was known as Farmers' Cooperative Demonstration Work. In the meantime, similar work had been started in the northern States.

The various States soon began to ask for a National Agricultural Extension system. Accordingly, in 1914, the Congress passed the Smith-Lever Act, providing for a cooperative Federal-State Agricultural Extension Service, under Federal supervision, and requiring that most of the Federal funds be matched, dollar for dollar, by the States, their counties, and local sources. Additional funds have been applied in several supplementary Acts. Following passage of Smith-Lever Act, Farm Management and Farmers' Cooperative Demonstration Work then being carried on by the Bureau of Plant Industry of the U. S. Department of Agriculture, independent of the Land-Grant Colleges, was discontinued.

In the Smith-Lever Agricultural Extension Act, the farmers and the Nation gave recognition to the principle that Extension education was to be the chief instrument for effectuating agricultural democracy. It provided for the cooperating of the Land-Grant Colleges and the United States Department of Agriculture "to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same." And it specified further "That Cooperative Agricultural Extension Work shall consist of the giving of instruction and practical demonstra-

tions in agriculture and home economics to persons not attending or resident in said colleges in the several communities and imparting to such persons information on said subject through field demonstrations, publications and otherwise."

The Federal Government appropriated funds to carry out the purposes of the Smith-Lever Act which, however, had to be matched by an equal sum appropriated by the Legislature of the State in question, or provided by the State, county, college, local authority, or individual contribution from within each State for maintenance of the work. Federal funds were granted to the States in the proportion which the rural population of each State bore to the total population of all the States.

The Capper-Ketcham Act of 1928 provided funds to be used for agricultural Extension work; the bill requiring that at least 80 percent of all appropriations under the Act be utilized for payment of salaries of Extension agents in counties and, for the first time, recognized the important junior work with boys and girls.

Section 21 of the Bankhead-Jones Act of 1935 providing an ultimate final appropriation of \$12,000,000 annually to be allotted to the several States under the same terms and under the same conditions as the Smith-Lever Act, except that \$980,000 shall be paid to the several States and Hawaii in equal shares and the remainder shall be paid to the States in proportion that the farm population of each bears to the total population of the several States, no offset of State money being required.

On June 6, 1945, An Act amending the Bankhead-Jones Act of 1935 was passed by the Congress for the further development of agricultural Extension work as contemplated by the Smith-Lever Act.

The States and local agencies have contributed funds more than double the amounts required by the matching provision of the Federal Extension Acts, and the Service has proved its worth most fully, not only for the original purposes, but also in helping to meet the much more extensive and complex agricultural problems arising

from the World War of 1917-18, the agricultural depression of 1921, and the general depression of 1930, and World War II.

These are the basic Acts providing grants-of-aid by the Federal Government for the establishment and support of Land-Grant Colleges for resident teaching and research in Agriculture and Mechanic Arts and Agricultural Extension Work.

A SINGLE UNIT OF SERVICE TO FARM PEOPLE

Thus these three divisions which are typical of the Land-Grant Colleges form a single unit of service. The Experiment Station, by providing new knowledge, enriches the resident teaching and the Extension Service. The two latter disseminate the results of research. At the same time, the Extension organization, with its principal contacts throughout the State, aids both the Station and resident instruction divisions in bringing their work into direct relation with the needs of the people. When we credit to the institutions as a whole the material gains from a discovery of the Experiment Station, we recognize of course, that except for the resident instruction and Extension divisions the benefit of the discovery might never have been put into general use.

The first great task of the Land-Grant Colleges was the development of science and its application in agriculture and industry. The science first taught in the Land-Grant College was of the most objective and practical kind. These early beginnings led to larger and more intensified applications of science, producing cumulative results, which in turn gave fresh momentum to the movement, resulting in the passage of the Hatch Experiment Station Act of 1887.

In the meantime, to supplement instruction on the campus and research in the Experiment Stations, the task of taking education directly to the people was undertaken by the U. S. Department of Agriculture and the Land-Grant Colleges under the Smith-Lever Act of 1914. Thus the date 1914, takes its place with the year 1887, when the Hatch Act inaugurated the Experiment Stations, and the year 1862, when the Land-Grant Colleges themselves were initiated as the epoch-making dates in the progress of the Land-Grant institutions,

The spirit of the Land-Grant institutions is also that of progress in teaching as well as in research and Extension. The institutions that first opened their doors to women on the same basis as men, that first introduced home economics, that first gave room for vocational training, and that worked out for themselves means of making agricultural and industrial arts effective elements of a college curriculum, have continued to progress in educational methods and procedures.

In their distinctive fields the Land-Grant institutions have not only applied the newest discoveries in science to technical specialties, but through an interchange of specialized training have brought the benefits of business technique to agriculture, engineering, and homemaking, on the one hand, and the invigorating forces of technology to the help of business administration and the social sciences on the other.

A modern State College or University, imbued with the Land-Grant spirit of Service is —

First of all, a repository of the world's stock of knowledge so far as it is possible to bring it together in available form and so far as means are at hand for the purpose.

Second, it is a research institution, provided with specialists and equipment for adding to this stock of knowledge as widely as would be profitable in the development of the State and as fast as resources will permit.

Third, it is a source of information on which any man may draw freely and at will.

Fourth, it is a meeting place where specialists and citizens may discuss difficult problems and lay plans for the further development of the State.

Fifth, it is a teaching institution because such a repository of knowledge and agency for the advancement of civilization is of necessity an ideal place for the education of young men and women who take the preparation for life as a serious matter. The teaching service of such an institution will always, therefore, be a

prominent part of its work, the student being the best means to the end of an ever-advancing civilization.

Sixth, it maintains in many lines a cooperative Extensive Service for technical assistance outside the campus.

There is, in addition, a phase of the work of the Land-Grant College quite removed from agriculture, the mechanic arts or any other industrial occupation. I refer, of course, to the training in military science and tactics. And what shall be said about that, for it is by law part of the spirit of the Land-Grant Act?

Tradition has it that the only amendment made by Congress to the wording of the bill as drawn by the friends of industrial education was to insert the words, "and including military tactics" in the list of things to be taught.

BACK GROUND OF THE LAND-GRANT COLLEGE MOVEMENT

To fully appreciate the significance of the Land-Grant College movement, it is necessary to briefly review conditions that prevailed at the time as well as some of the events leading up to its establishment in 1862.

It is well to remember that it was not a popular movement in the sense that it sprang up over the country like flowers in the spring time.

First, The Land-Grant Colleges represent, not only the first, but the greatest attempt ever made to launch a vast and far-flung educational system that would make higher education available to the masses.

In this respect the establishment of the Land-Grant College was a distinct break with tradition. It was the founding of a new system of education. Up until that time the English pattern of education had been followed in America, under the concept, higher education was strictly traditional and classical. It had no relation to resources of the country, or to the occupations and objectives of the great mass of people. It was also the first Nation-wide movement ever organized in any known Government in the interest of higher education, which definitely included as its basic interests the products of the earth, namely Agriculture, Mining and other allied resources.

Dr. Eugene Davenport, former Dean of the College of Agriculture, University of Illinois, said in an address before the 45th Annual Convention of the Association of Land-Grant Colleges in 1931:

"I came into personal contact with the spirit of the Land-Grant College only 13 years after passage of the Land-Grant Act and have been with it most of the time since, watching its influence grow and spread. We called it the 'New Education' in those early days as distinct from the traditional. In our enthusiasm we called it practical and useful as distinct from the classical and useless. For what good is it when a man can say 'I am hungry' in six languages, but cannot earn his own bread and butter." ✓

After the passage of the Morrill Act in 1862, one provision of the Law required that the land grants should be accepted by the legislatures of the several states and that these legislatures should locate the colleges of agriculture. The location of these institutions aroused widespread interest and eventually became more or less of a National controversy.

It must be remembered that in connection with this whole controversy, the provisions of the Morrill Act itself had much to do with the decision as to whether the colleges of agriculture should be institutions of general culture or more specifically technical colleges. The provisions of the law clearly were permissive in respect to all the subjects taught in literary colleges. However, the law was specific in stating the leading object should be instruction in agriculture and the mechanic arts. It must also be remembered that all the leading educators in 1862 were graduates of literary colleges. They thought of education in terms of classical, mathematical, and humanistic subjects. They had no experience with or sympathy for education in agriculture and mechanic arts given for the purpose of improving the ability of farmers and mechanics. So in the Nation as a whole we find colleges of agriculture and mechanic arts organized and administered as separate or independent colleges and almost an equal or larger number associated with State Universities, such as we have in the University of Tennessee.

In view of the present progress and development of the Land-Grant Colleges of the United States, it is difficult for the present generation to realize the early struggles and difficulties surrounding this development. An unprejudiced view of the early history of these institutions shows clearly that their growth and development was a continuous struggle against substantial odds. They represent in the beginning a revolution in college education.

To get a clear picture of the conception of the Land-Grant College movement, its history and development, it is necessary to review the history and development of agriculture itself in America.

It must be remembered that conditions in America during the early part of the century in which the Land-Grant College System was founded were largely those of a frontier country. The great mass of people were uneducated and provincial. They generally knew little about science or the applications of scientific knowledge. New discoveries, inventions and untried methods were confronted with superstitions and skepticism.

American agriculture in Colonial days, and much of it for some time thereafter, was self-sufficing. The farm grew all its own food, it grew and manufactured the materials for its own clothing, and it built its own shelters.

Until after the beginning of the Nineteenth Century, farming was done in much the same way as it has been done since the dawn of history. The turning of the soil was done with a wooden implement but little improved over that of the days of the Pharaohs. Seed was still scattered by hand. Reaping was still done with a curved hand-swung blade, whether in the form of the one-hand reaping hook or the two-hand scythe. Grain was still threshed or beaten out with the primitive flail. Only in the matter of the crude plowing and harrowing did the muscle of the horse or the ox relieve the labor of man.

In the 75 years before the Civil War of 1860, more agricultural progress was made than in all previous history. America acquired and conquered a Continent equal to that of Europe, increasing its area 266 percent. Its population multi-

plied nearly eight times, from 4,000,000 to 31,500,000. Trails, roads, turnpikes, steamboats, canals, railroads, and the telegraph were developed.

Agricultural societies were established from 1785 onward, farmers' clubs created (800 by 1831), and State Departments of Agriculture brought into being. Fairs and expositions grew from the casual showing of well-bred sheep in 1796 to local agricultural fairs in 1804; county fairs in 1810, and participation in the first international exposition in 1851.

Agricultural teaching grew from a single chair in Columbia University in 1792, through a series of short-lived local schools beginning in 1823, to agricultural colleges, of which five developed between 1854 and 1860.

EARLY ATTITUDES TOWARD AGRICULTURE

In general, practically all of the progress and improvement in agriculture which had just been recited was accomplished by the farmers of America themselves, without official assistance. Many Government officials, however, gave much assistance in their capacity as private citizens. At the very beginnings of our National existence, a movement was started to organize a National Agricultural Society under Federal auspices. This was recommended by Adams in 1776 and by Washington from 1789 onward.

The Genesee Farmer, now the Country Gentleman, one of the oldest agricultural journals in the world, being founded in 1831, is an early issue advocated the teaching of agriculture, both as a science and an art.

"If taught, however, so as to do any permanent good, it must be practically and not by books only. It should be by the management of a farm - connected with a truly agricultural school."

President Taylor in 1849 and President Fillmore in 1851 recommended to Congress the creation of government machinery to promote agriculture. From 1825 to 1861, the National Convention of Agricultural Societies and other organizations and individuals repeatedly recommended to the Congress that a National Department of Agriculture be established.

Nothing could be accomplished during this period, however, partly because of the turmoil in the public mind over the slavery issue, partly because the Southern States, dominantly agricultural, were opposed to any extension of Federal power, and partly because many farmers still were skeptical of the value of "book larnin."

In the meantime, the need for some Federal agricultural agency was increasing steadily. New diseases and insect pests of crops and livestock had been introduced from abroad. Thicker rural settlements allowed more rapid spread of pests from farm to farm and the coming of the railroads permitted more rapid spread from area to area. Settling of new western areas brought need for new and adapted crops and cropping methods. Economic problems also became intensified as commercial agriculture developed.

Thus the Federal Government began to recognize the National status of Agriculture almost in spite of itself. In 1827, consular agents abroad were asked to collect and send to America foreign seeds and plants that might be useful to this country. No means, however, were provided for the proper care and distribution of these seeds. Not long after the Patent Office was established its Commissioner, Henry Ellsworth, took it upon himself to collect and distribute these. In 1839 Congress for the first time appropriated money for the distribution of seeds and the collection of agricultural statistics. These appropriations were rapidly increased, and the agricultural services of the Patent Office gradually extended until the Department of Agriculture was established in 1862.

Abraham Lincoln in his first message to Congress, urged the establishment of a Department of Agriculture. When he signed the Acts establishing a Department of Agriculture, and providing for a Nation-wide system of Land-Grant Colleges he brought to a successful conclusion a long struggle to raise agriculture and agricultural education to the plane of recognized National concern and unity.

Where once one section of the country pitted its interests against those of another, today the Nation's Agriculture is united, and corn, cotton, wheat, and cattle growers work together toward National solutions of their problems.

The Land-Grant Colleges and the U. S. Department of Agriculture were the creation of the same popular demands. They were intended to serve closely related purposes, and to supplement each other in the service of the same public interests. They are of the closest kinship.

The passage of the Acts by Congress creating the Land-Grant Colleges and the Department of Agriculture in the midst of the stress of Civil War when for nearly 70 years the Congress had refused to make any permanent provision for Agriculture is significant.

For a number of years Agricultural and Congressional leaders of Northern States had been favorable to such legislation.

With an increasing number of men removed from agriculture for military service the Congress felt an increasing need for agencies to stimulate food production. Many Southern Agricultural and Congressional leaders who had opposed such legislation as tending to expand the power of the Federal Government were no longer in the National Congress.

Dr. W. O. Thompson, able President of Ohio State University, in an address on the Spirit of the Land-Grant College at the 45th Annual Convention of the Association of Land-Grant Colleges in 1931 said:

"It may well be noted here that one of the fundamental reasons for passing the Land-Grant Act was National Defense. It is doubtful whether it could have passed but for the aid of those members of Congress who stressed the idea of National Defense on all occasions. This point of view found support in the theory that productive soil and a prosperous agriculture were important elements in National strength and stability."

THE SPIRIT OF THE LAND-GRANT COLLEGES

These historical details indicate the growing accumulation of needs upon which the Land-Grant Colleges and the Department of Agriculture were established. They came on the crest of a long, irresistible ground swell of public sentiment,

Those who are philosophically inclined or historically minded will observe the pattern of development; first, individuals took up the cause; then societies of private individuals; these enlisted support first from the States, and finally from the Federal Government. This chain of cause and events reveals the growing national unity of the varied states and sections of this country. It discloses the tendency which is as old as our country for the people to demand federal action when individual, local and state efforts prove inadequate.

The Land-Grant College Act was an application of America's faith in progress and in education. It served eventually to establish a great and unique system of schools of higher education throughout the whole United States. It advanced the cause of enlightenment among a pioneer people who were as truly pioneers in the field of popular education as in any other sense.

It is not too much to say that through the Morrill Act of 1862, and subsequent acts, Congress has wrought a revolution in American education. "The old educational ideals.....have slowly given way to the far broader ideals for a system of public education suited to the needs alike of workers, business men, homemakers, technicians, and professionals. The new education, while retaining the high moral and ethical ideals of the old, combines, with these substantial training in doing the things of everyday life."

THE FIELD OF SERVICE OF THE LAND-GRANT INSTITUTIONS

The people to be served by the new institutions determined the field of study to be offered. The "industrial classes" as named in the Morrill Act, obviously included all classes of people except those already provided with professional training for the ministry, medicine, or the law. For the first time in history all these classes of people -- farmers, artisans, merchants, bankers, technicians,

scientists, homemakers, engineers — were to be provided with the opportunity for higher education on the same basis as the clergymen, physicians, and lawyers. The new type of college fulfilled the needs and aspirations of the common people. It offered equal opportunity to all. It limited the level of achievement, as well as opportunity, by no standard of wealth, privilege, or patronage.

The peculiar field of service occupied by the Land-Grant institutions as clearly recognized today and as contemplated in the organic act, is that of a "liberal and practical education of the industrial classes in the several pursuits and professions of life." It is the field of applied science. This field includes agriculture and all that pertains to the soil and production from it; engineering, and the principles and appliances that relate to the use of natural power and machinery; mining and mineral resources; forestry and forest products; business, banking, and the administrative procedures of commerce, home economics and the family as a factor in society; and the broad foundation of the arts and science that is essential to good citizenship. It is the field that offers the greatest opportunity and imposes a great responsibility.

The range of interest of the Land-Grant Colleges of today covers not only the entire field of Agriculture and relations with the Federal Government and the farm organizations but also every other field of interest of any type of educational institution.

In this connection, the Land-Grant Colleges have been directly concerned and actively associated in an educational way with farm organizations and all Federal and State laws enacted for the benefit of Agriculture and rural life in general.

Since 1933 a number of action agencies for the benefit of farmers have been created by Acts of Congress, such as the AAA, FSA, SCS, REA, TVA, etc. The Land-Grant Colleges, through its research and Extension Services in particular, cooperates with all of these in an educational way in making their service and benefits available to farm people.

It might also be added here that Farm organizations, the Farm Bureau in particular, have been a powerful influence in the creation and development of many of these agencies which have rendered a wide service to farm people, particularly during the late depression and World War II.

Although of uniform origin, the different Land-Grant institutions at first had little in common. They were isolated from one another by distances that in those days were truly formidable. They had radically different conditions to meet, and consequent varying needs of their constituents to serve. For more than a quarter of a century there was no bond of union among them. Until the organization of the Association of Land-Grant Colleges in 1887, they were without any organized agency through which to promote their interests or to interpret their mission to the public. Yet in spite of all these obstacles, they steadily developed a solidarity all their own. Many unifying factors assisted in this development. They were all founded by common agencies -- National and State. They all had a common objective; a distinct field of service.

The foregoing, briefly and rather inadequately outlined, indicate the background for the determination of the spirit and objectives of the Land-Grant institutions.

THE LAND-GRANT COLLEGE SYSTEM IN TENNESSEE

The University of Tennessee, founded in Knoxville as Blount College in 1794, received a charter from the Territorial Legislature of the Territory South of the Ohio River on September 10, 1794.

On April 6, 1806, Congress endowed the College with a grant of 50,000 acres of public land and State Legislature, on October 26, 1807, established the East Tennessee College and provided that it should absorb Blount College.

In 1840 the name was changed by the State Legislature to East Tennessee University. During the Civil War the University suspended operations and the buildings were used first by Confederates and then by National troops for a hospital and barracks.

The University was reopened in 1866, and in 1869 it was designated by the State Legislature as the Land-Grant College of the State under the Morrill Act of Congress of 1862.

The original College Farm consisting of 100 acres around Morgan Hall, where the College is now located at Knoxville was purchased in 1869, and the Experiment Station was developed out of a combined School of Agriculture, horticulture and botany. In 1879 the Legislature changed the name to the University of Tennessee and the Experiment Station was established as a distinct department of the University with a director in 1882.

In 1887 the Station was reorganized under the Hatch Experiment Station Act of Congress and Dr. Charles W. Dabney, president of the University, was named director.

In 1903 the State Legislature made its first direct appropriation to the University for Experiment Station work, thus supplementing funds from the Hatch Act.

In 1907 Madison County provided funds for purchase of land for an Experimental farm at Jackson and in 1913 the Station Farm at Knoxville was enlarged by funds provided by Knox County. In 1917 State Legislature provided funds for the establishment of a branch Station at Columbia. Sub-stations have since been established at

Clarksville, Springfield, Crossville and Greeneville and a Junior College of Agriculture with a College Farm is located at Martin. These branch and sub-stations were developed to carry on experimental work in crop and livestock and soil problems peculiar to the areas in which they are located.

All of the major enterprises, crops, livestock, horticulture, soils, entomology, economics and publications are represented by departments in the College, Experiment Stations and Extension. Staff members of the three branches and departments work closely in the planning and development of information for use in resident teaching, Extension Work in the counties and research studies, etc., conducted at the various Experiment Station Farms.

In 1943, the Director of Extension was named Dean of the College of Agriculture as well as Director of Extension Work. In 1946 the Dean of the College was made Director of Experiment Stations, thus for the first time bringing the three branches of the College, resident teaching, research and Extension under one head, with Vice-directors in charge of each division.

Extension work is now carried on in each of the 95 counties by county farm and home agents. In some counties one or more assistant agents are employed for special work, such as 4-H Club Work, Soil Conservation or Test Demonstration Work, in cooperation with the TVA.

Prior to the Smith-Lever Act of 1914, the University of Tennessee had conducted Extension Work in agriculture through short courses, tours and farmers' institutes.

Farmers Cooperative Demonstration Work which started in Texas in 1904 under direction of Dr. Seaman A. Knapp of the Bureau of Plant Industry, U. S. Department of Agriculture, spread to Tennessee in 1909 and was conducted independently of the University of Tennessee by the U. S. Department of Agriculture in cooperation with the various counties, until passage of the Smith-Lever Act in 1914, at which time that work was merged with the newly created Division of Extension of the College of Agriculture, University of Tennessee, July 1, 1914.

Thus were the three functions of the Land-Grant College system -- resident teaching, research and Extension -- brought together as one Service to Tennessee farmers and their families.

From these beginnings, the laws, concepts and objectives set forth, the Land-Grant College system has come to occupy a position of exceptional influence and popularity in our modern life. In its reliance upon scientific research; the training of students to prepare them for specific and practical service; its comprehensive program of adult education of a kind which is directly usable by the farmer and his family; its direct relation to Government; its interest in the common affairs of life; its great contributions to the conservation of our natural resources; its recognized leadership in the progress, development, and permanent improvement of the rural population; and indirectly, but certainly, no less, its contribution to the broader purpose of the public welfare, the Land-Grant College is exceptional and unique among educational institutions of the world.

Running through all these laws of expressing the will of the people are two or three common purposes. One purpose is to bring about a stable farm income. Another is to conserve our basic resources, the soil and the plants and animals that draw their life from the soil and in turn nourish us. Another is to promote efficient production, marketing, and use of farm products. A fourth national purpose is to make the tenure of farm families more secure, and to keep open the gateway of opportunity to become free holding farmers.

Section 10.

OUTLINE OF DEVELOPMENT OF AGRICULTURAL EDUCATION AND EXTENSION WORK
THROUGH THE LAND GRANT COLLEGE

*I. O. SCHAUB

Individuals must have an incentive to change practices - desire for increased income - better standard of living - keeping up with Jones'.

You must start from where people are, not from some idealistic level - providing by grant to low income groups funds and equipment to raise standard above highest income group. Failed - forced installations of bath tubs - used for coal storage - demonstration using carrots failed where carrots not grown or relished.

Each step of progress rests on previous steps - stairway or ladder. Beginning goes back beyond recorded history - Who discovered principal of wheel?

APPLIED SCIENCE OF RECENT ORIGIN

Progress made only by application of accumulated knowledge - progress of primitive man extremely slow, based primarily on experience of individual. Later group experience - Science as we know it of recent origin. Basis of commercial fertilizer laid in 1840. Mendel's law of heredity only fifty years old. Vitamins discovered in last 25 years.

First research workers conception of the unknown may be likened to a small dark disc to be cleared - As center of darkness was cleared, area of darkness increased in geometrical ratio - every new discovery broadens the field of the unknown.

Director Extension in North Carolina 1924 - 1950
Dean of Agriculture, N. C. State College 1926 - 1945
Acting Director, N. C. Agricultural Experiment Station 1937 - 1940
Field Agent Southern States Extension Service 1918 - 1924

Humanity is like the Greek God Sisyphus who was sentenced to forever roll a stone uphill - if he did not continue to push the stone upward it would crush him -- Man sentenced to roll back ignorance or starve. Half of the world population now has progressed through discovery and conquest of new countries and new sources of food and raw materials. Now no new worlds to conquer, only salvation is increased research and application of science to multiplicity of problems.

Review of history of Agricultural Education should help us become more efficient - Begin with our Colonial period --

EARLY DEVELOPMENTS

Forefathers brought skills from Europe - many skilled artisans - raised crops, livestock, made furniture, tools, soap, spun, wove, tailored, tanned, milled, baked, etc. Found fertile soils, new crops, new climate and conditions. Learned some new practices from Indians. Knew many hows, but little of whys. Cleared new land, wore it out, moved on to new fields - in time no new lands to clear - realized had to adopt new methods.

Some profited by own experience and observation - endeavored to get benefit of others - transportation slow and uncertain - correspondence with other colonists and friends in Europe.

Organization of Agricultural Societies - Philadelphia 1785. Charleston, S. C. same year. Many others followed during next few years.

Agricultural papers few and limited circulation. Only 36 by 1950 - 11 of these in New York.

Forerunner of our livestock shows and expositions began 1807. Elkanah Watson tied two imported Merino sheep under elm tree on public square, Pittsfield, Mass. - attracted so much attention he followed with other livestock - grew into County,

State and National Fairs. First showing of women's handiwork at Fair in 1813.

SCHOOLS AND COLLEGES PATTERNED AFTER EUROPE

Educational system, colleges and secondary schools patterned after European system - designed for training for Ministry, Law and Doctors - less than 10% engaged in professions. No institutions to train 90% for farming, mechanics, merchants, etc.

With growth of democracy came increased demand for education of masses for better living - old institutions resisted change.

Following Revolution disposition of vast areas west of Alleghanies gained attention - Congress 1780 passed resolution that western territory be disposed of for benefit of all - 1785 passed Ordinance reserving Sec. 16 in each township for maintenance of public schools - not fully realized then, but established precedent of using public lands for public education. However, outside New England free public schools not generally adopted until about 1840.

As demand for training head and hand simultaneously, colleges gradually offered classes in natural sciences and manual training. Wake Forest (Baptist) and Davidson (Presbyterian) were chartered as manual training institutions - similar courses in older and new institutions prior to about 1850. Practically all failed for lack of financial support and opposition of classical professors - advocates of manual training argued students needed exercise - work largely on farm - little or no pay - main lasting effect was establishment of gymnastics in schools and modern athletics.

FIRST CONGRESSIONAL RECOGNITION

Congress made first appropriation - \$1,000 - for promoting Agriculture 1839. Patent office for distributing information and seeds - Department of Agriculture created by Congress in 1862.

Lack of financial support, local and State, caused leaders to turn to Federal Aid. Funds derived from sale of public domain offered greatest possibility.

Perhaps first petition by Alden Partridge of Vermont - requested 40 million- Object to establish new or remodel old institutions - study to include mathematics, chemistry, physics, natural history, civil engineering, political economy including Agriculture manufacturies and Commerce - no action taken.

Turner, Illinois, advocated Land-Grant to establish in each State an Industrial University to meet needs of farmers, mechanics and merchants - held that society divided into two classes - professional and industrial. Professional had ample colleges - Industrial practically none. His efforts led finally to establishing University of Illinois.

Thomas G. Clemson, Son-in-law, John C. Calhoun of S. C., diplomat in Europe during 1840's observed developments there in instruction in Agriculture and Technology. On return to U. S. he settled on a farm in Maryland. Through his efforts and others, Maryland Agricultural College established in 1856 - Later Clemson, S. C. became a monument to his efforts.

Michigan, Iowa and New York established Agricultural Colleges prior to 1860 - stage now set for National legislation.

LAND GRANT FOR COLLEGES

Justin S. Morrill born 1810 in Vermont, son of blacksmith and farmer, attended school in one room red school house - two terms in academics - left school to go into mercantile business - worked in store. First year \$45., Second year \$75.- at 24 became partner with friend, Judge Harris. Business proposed and in 1848 he bought a farm and retired to manage it. 1844 he became interested in politics - member Whig - afterward Republican party. Elected to Congress 1856.

First year he introduced a resolution directing Agricultural Committee to investigate expediency establishing Agricultural schools similar to West Point and Naval Academy. Objected to by Mr. Keitt of S. C. - killed.

Next year, 1857 he introduced first land-grant bill - contained essential features of later bills - opposed by nearly all Southern Representatives as unconstitutional. States Rights - Referred to Com. Public Lands - After 4 months reported unfavorable by Chairman Cobb of Alabama. Minority report by Walbridge of Michigan - On motion to postpone consideration Morrill had opportunity to make a speech - offset argument of unconstitutionality pointing out way had been found under constitution to promote and protect Commerce. Tariff - Educate Army and Naval Officers. Immense Land-Grants to railroads - protect literary labor, copyright - encourage inventors, Patents--but withheld encouragement to Agriculture. Great demand by farmers - "Let us have such colleges as may rightfully claim the authority of teachers to announce facts and fix laws, and to scatter broadcast that knowledge which will prove useful in building up a great Nation". Miners and Mechanics should also have the means to acquire culture, skill and efficiency. -- Literary colleges need not fear competition as they would move in different sphere.

"Power of Congress to dispose of the public lands is plain, absolute and unlimited" - In 1827, Kentucky was granted lands for deaf and dumb asylum - supported by Buchanan and Polk, then in House. Much parliamentary maneuvering finally passed House 105 to 100. Senate 25-22. Most opposition from Southern Democrats - Vetoed by Buchanan - Grounds - Extravagant and deplete Treasury - Impolitic in that it would encourage States to rely on Federal Government for Aid to which not entitled - Injurious to New States by forcing down price of land - Insufficient because Federal Government had no power to force compliance - Unjust because injury to established institutions - Unconstitutional because no grant of power to Federal Government to expend public money for benefit of people in various states.

(Another Morrill Speech quoted in Lockmiller's History of North Carolina State College)

Following veto, Turner and others continued work for measure - contacted Lincoln and Douglass - Both promised to sign measure if elected.

Election Lincoln and Southern Secession completely changed complexion of Congress - Republicans came in power.

Dec. 1861, Morrill reintroduced bill in House - Referred to Public Lands Com. - Adverse report without explanation-

Wade, Ohio introduced bill in Senate May 1862 - Public Lands Com. reported favorably - passed 32 to 7.

Morrill succeeded getting House vote on Senate Bill without referral to Com. Passed 90 to 25.

Provisions Morrill Act 1862 granted to States 30,000 acres public land for each Senator and Congressman - States without public land given land-Scrip- Must be sold to individuals who could make land entries.

Receipts to be invested in perpetual endowment not less than 5% - Income for teaching subjects Related to Agriculture and Mechanic Arts - 10% with approval of State Legislature, might be used to purchase land - None for construction or repairs to buildings - States must accept provisions within two years - Later (1864) extended two years - States in rebellion not eligible - Funds diminished or lost must be replaced - Could establish one or more institutions.

Intent of Act

Immediately questions arose regarding intent - spirit and letter of Act - Many suggestions, theories, schemes proposed by educators, enthusiasts, cranks, associations, legislators, - wide variations in States resulted in many proposals - Some wanted one situation some several - manual labor and trade schools separate, or combined - Wide interpretation in several States -

some added to University - some established new university, some one College, some two.

Morrill stated - wished bill broad enough so States could use to best advantage - did not intend them to be just Agricultural Schools - Clerk responsible for title of Bill - Wanted schools of Science, but of College grade - Did not object to being part of classical College provided Science was given prominence - wanted "useful sciences" taught so as not to draw students away from business pursuits.

Students of congressional debate question whether Morrill had too clearly in mind just what such institutions should teach - seemed to evade specific questions - spent more time on constitutionality - At least one reviewer suggest motive was more political than educational - He had been criticized for tariff bill he introduced - clearly, his vision from educational standpoint grew and broadened during his 40 years in Congress.

Disposition of Land and Scrip

States had two years to accept Act - Iowa first - Others followed rapidly. Southern States being in rebellion not eligible - Morrill Amendment 1864 extended period two years - N. C. Accepted in 1866.

Disposition of land and scrip varied widely - scarcely a State sometime in some way not in default - some delayed investing - some invested at less than 5% - used principal and income illegally - N. C., S. C. and Illinois lost all - Most States restored at least principal - By 1923, 10,928,295 acres received by States - Total accumulated from sale \$17,416,000.

North Carolina received Scrip 1866 - Held one year account low market .50 (fifty cents) acre.

Feb. 1867 Legislature transferred Scrip to University Board of Trustees authorizing them to sell - August 1867 Board contracted to sell all Scrip to G.F. Lewis & Co. of Detroit at fifty-cents per acre - same meeting

voted 10% receipts (\$13,500) to pay off debts - illegal - nothing done about it. Reconstruction Legislature 1868 appointed new Board Trustees - Immediately tried void contract with Lewis - Grounds Lewis knew of plan to use money illegally - spent over \$500, but failed - Within next two years received \$135,000 from Lewis - Board ordered Treasury to invest in U. S. Bonds - Eight days later rescinded order and authorized purchase N. C. Bonds - Purchased \$240,000 N. C. Railroad bonds for \$120,000 - Short time bonds became worthless - whole investment lost.

Subsequently new legislature elected new Board including number on Board prior 1868 - New Board memorialized Legislature 1875 to authorize issue perpetual Certificate of Indebtedness to University bearing interest at 6% on \$125,000 - After much parliamentary jockeying bill finally passed House by one majority - First annual State appropriation to University - Act required University to teach Agriculture and Engineering - Board organized College of Agriculture and one for Engineering - Few students enrolled - none graduated - Farm leaders led by L. K. Polk not satisfied with Courses - 1887 succeeded getting Legislature establish A. & M. College at Raleigh and transfer land scrip funds to new institution.

Problems of New Land Grant Institutions-

What and how to teach - Science as applied to Agriculture not then organized - Investigators had not directed much attention to problems of crop and livestock production - Practically no text books - Many teachers came from Medical and Veterinary professions - Chemistry and Botany just emerging as applied sciences - Idea was to train Hand along with head - but how - Practically all required several hours per day manual labor - sometimes paid .03 to .08 per hour.

Iowa 1870 stated purpose "To make proficient in the sciences which underlie the various branches of industry and by manual labor to produce

experts in all its various applications to the operation of the garden, farm and workshop".

Work idea as training continued until about 1900. How to teach application of Science to Agriculture was real problem - Roberts, Iowa describes his methods (p. 155, True's History of Agricultural Education) Bessey, Nebraska - (True p. 133).

Old institutions had condescending attitude - Mass. graduated first class 1871. Boating then leading form athletics - "Aggies" beat Harvard making record for three miles - This gave Agricultural College standing as real College - State gave appropriation \$50,000 to pay debts and increased endowment to \$350,000.

Home Economics

Women admitted to Land-Grant Colleges - Kansas, 1865 - Minn., 1868 -- Iowa, 1869 - Illinois and Michigan 1870. Between 1870 - 80 practical instruction in cooking and sewing started in Iowa and Kansas - some lectures on Chemistry of food and nutrition.

Course of Domestic Science, Illinois, 1875

First year - 1. Chemistry, Trigonometry, Drawing (British Authors).

2. Chemistry, Designing and Drawing (American Authors).

3. Chemistry, designing and drawing, Rhetoric.

Second Year- 1. Botany, Physiology, German or English Classics.

2. Food and dietetics (simple ailments), Botany and Green house, German or English Classics.

3. Food and Dietetics (compound ailments) and Principals of Cooking, Zoology, German or English Classics.

Third year - 1. Domestic hygiene, Ancient History, French or German.

2. Physics, Medieval History, German or French.

3. Physics or Landscape Gardening, Modern History, German or French.

- Fourth year-
1. Household Aesthetics, Mental Science, History of Civilization.
 2. Household Science, Constitutional History, Logic.
 3. Domestic Economy, Uses of Society, etc., Political Economy, Home Architecture, Graduating Thesis or Oration or Essay.

Farmers Institutes developed soon after Colleges established - continued for fifty years.

EXPERIMENT STATIONS

By early 1870 Colleges began discussing need for research - Connecticut established first Station 1877 - N. C. two months later -- were outgrowth largely of demand by farmers for fertilizer control - Chemists largely first Directors - Were graduates German Universities and patterned work after German Stations - Congress passed Hatch Act 1887 - Gave each State \$15,000 for Station in Land-Grant institutions. Work of Stations largely control work and simple testing for 20 years - Fundamental research stimulated by Adams Act 1906 - \$15,000 to each State.

Development of Agricultural Extension

Beginning about 1900 - Farmers institutes continued - Published bulletins - Corn and livestock judging schools - Agricultural trains, lectures, correspondence.

In 1892 boll weevil crossed from Mexico - 10 years later had covered large part of cotton territory in Texas - Resulted in farm and business failures and general economic depression. Called on Congress for aid - 1903 appropriated \$250,000 to combat boll weevil - half assigned to Bureau Entomology, half to Plant Industry Department rented and operated farms as demonstrations - Farmers generally failed to accept recommendations - Human nature - "If I had the money like government could farm too successfully"-

Seaman A. Knapp, Founder of demonstration work as now known, enters fight against weevil - Born New York 1833, son of physician - After graduation

from College taught several years then moved to Iowa 1866 - Settled on farm - Raised general crops, hogs and beef cattle - Member breeders association - founded Western Stock Journal - Met James Wilson, later Sec. Agriculture - 1879 became Professor of Agriculture at Iowa State College - later served one year as President.

1886 went to southwest Louisiana in charge development large land area - Farming very poorly done - Prospective settlers refused to purchase - Offered very special terms to one settler for each township to practice his recommendations and serve as demonstrators - So successful thousands of farmers from central west purchased land and prospered - Knapp then stated, "We then learned the philosophy and power of agricultural demonstration" - "What a man hears he may doubt, what he sees he may doubt, what he does he can not doubt" - Knapp's activities largely responsible for large rice production that area now.

Sec. Wilson, sent Knapp to Orient to investigate rice production - Later worked with Bureau Plant Industry - Established number demonstration farms along gulf to show value to diversification by adding other crops to cotton - This experience confirmed his idea that farmers generally would not change practices by observing farms operated at Government expense - Must be done by farmers on own farms and conditions.

1903 - Discussed program with businessmen and farmers Tyrell, Texas. Businessmen provided \$1000.00 to guarantee farmers against loss - Walter C. Porter, farmer, volunteered - Made success on about 70 acres - Reported made \$700.00 more than would have made by old practices.

Fall 1903, Wilson and Galloway visited Texas - Observed demonstration at Tyrell - Assigned Knapp \$40,000.00 of boll weevil appropriation - Established headquarters Houston - February 1904 employed several men to work along railroads - Arranged demonstrations at towns along lines - During 1904 put on

20 agents in Texas, 3 in Louisiana, 1 in Arkansas. That year held 1000 meetings, 7000 farmers agreed demonstrate - Work expanded to Mississippi and Oklahoma 1905 - November 1906 first county agent W. C. Stallings appointed, Smith County, Texas.

1906, Knapp's work came attention General Education Board - Agreed finance work ahead of boll weevil - Federal funds limited to boll weevil area- Knapp's idea as demonstrations proved value, community and county funds would be contributed - Ultimate result "teaching of Agriculture and Domestic Arts would become an accepted feature of rural education".

By 1908 work had spread to all Southern States - First Agents almost entirely farmers - Agricultural College graduates not available - paid \$75 per month. They furnished horse and buggy.

BOYS' CORN CLUBS

From beginning few boys conducted demonstrations - 1907 corn club organized by School Superintendent, W. H. Smith, Miss. - 1908 several clubs organized other Counties and States - 1909, Knapp undertook systematic organization and charged Agents with supervision. - First agreement with Colleges N. C. 1909 - Each boy to grow one acre corn and keep record - parents to agree crop belonged to boy - large yields reported - prizes, badges, trips, short courses, etc., - 1909 four boys got trip to Washington - Beginning National 4-H Camp.

GIRLS' TOMATO CLUBS

Some girls in Corn Clubs - 1910 Miss Marie Cromer, rural teacher, organized Girls' Tomato Club in South Carolina - grew 1/10 acres tomatoes - could not sell all tomatoes green - led to canning - soup mixtures, etc. Knapp promoted idea other states with help General Education Board 1911 - mostly tied with schools - work very popular - By 1914 and first World War grew into

work with women - gardening, cooking, butter making, sewing, fly screens, fireless cookers -

Similar demonstration work done in Northern States beginning about 1906 - called Farm Management.

Much jealousy between colleges and demonstration work by U. S. Dept. - First agreement after Club Work (1909) with South Carolina 1912.

About 1907 Colleges began thinking about Federal appropriations - First bill 1909 - \$10,000 to each state and one cent per capita to be offset by state.

Same time National Society for Industrial Education and American Federation of Labor supported by Farmers Union and Grange pushing bill for Vocational education. Much jockeying and pressure on Congress 1912 - election went democratic. Hoke Smith, Georgia and A. F. Lever, South Carolina became Chairmen important committees - 1913 Conferences representatives Land-Grant Colleges, Secretary Houston of Agriculture with Smith and Lever, agreed on Cooperative Extension work - Vocational bill sidetracked by resolution of Congress appointing a Commission to study idea - Finally passed 1917.

SMITH - LEVER ACT

Smith-Lever Bill passed 1914 - Took change political party - Democratic to Republican pass Land-Grant Bill 1862 - Republican to Democratic pass Extension -

Discussion of Bill - At first principal of cooperation strongly opposed - Fear Federal domination - Some in Demonstration opposed bill - Fear State domination. (Martin's letter to Hudson). Distribution to States - \$10,000 to each State plus \$500,000 per year for seven years basis rural population - Cummings, Iowa wanted allotment on basis cultivated land - Attempt made provide specifically to negroes - Agreed to leave to States to designate Agricultural

College to administer work.

Object of Bill - "Aid in diffusing among the people of United States useful and practical informations on subjects relating to Agriculture and Home Economics and to encourage application of same".

Defined - "Agricultural Extension Work shall consist of giving instruction and practical demonstrations in Agriculture and Home Economics to persons not attending or resident in said Colleges and imparting to such persons information on said subjects through field demonstrations, publications and otherwise".

MEMORANDUM OF UNDERSTANDING

After passage of Smith-Lever Act, Colleges and Dept. signed memorandum agreeing-

1. Colleges would set up administrative division for management and conduct of all Agricultural Extension Work.
2. Administer all funds through such division coming from Congress, State or other Sources.
3. Cooperate with Department of Agriculture.

Department agreed -

1. Set up Agency in Department to administer all Extension Work of Department.
2. Handle all Extension work of Department through Extension division in College.

Both Agreed - All work would be done cooperatively.

Plans of Work and Programs originate in institution and approved by Department.

World Wars stimulated need for food and feed production - special funds assigned to increase personnel - some reduction personnel after World War I.

COLLEGE TRAINED MEN REPLACE FARMERS AS AGENTS

After World War I farmers increased demand for technical aid - States rapidly increased number specialists - During period 1920 - 30 - Colleges graduated more men in Agriculture and women in Home Economics - The graduates replaced old agents - Colleges adopted policy requiring new workers to have four years college work.

NEW FEDERAL APPROPRIATIONS

Capper-Ketcham Act 1928 - For further development Agr. Extension - \$20,000 without offset - Remainder to be offset - 80% to be spent in Counties - Men and women to be employed in fair and just proportions - Total \$1,490,000.

BANKHEAD - JONES ACT - 1935

Appropriated \$12,000,000 apportioned on basis farm population and without offset.

BANKHEAD - FLANNAGAN ACT - 1945

\$4,410,000 to be offset and apportioned on basis farm population.

Depression 1932 treated new crisis - New Deal Agencies - AAA, Soil Conservation, Farm Security Administration, etc, called Action Agencies - Extension helped establish these Agencies on State and County level - Administered such programs, especially, A. A. A., several years - Action Agencies got over into educational field - some still over - Violation of Memorandum of Understanding.