Maturity

Chapter XVII

Division of Forestry and Range Management.
To understand the growth of the work in forestry at Colorado State College, we must first understand the off-campus interest in forests, and for this understanding a background knowledge is necessary.

Many of Colorado's square miles, particularly those tilted up to form mountains, are forested and Professor J. V. K. Wagar writes that: "Rocky Mountain forests have been important since pioneers first beheld them as dark areas upon mountains marking the end of seemingly interminable plains."

From this point to the present, Colorado forests have filled needs common to all the semiarid western states but unlike, in some particulars, the functions of forests in humid areas.

To the prospector, forests meant fuel and timbers for mines; to the trapper and hunter they meant game; to the stockman, who followed the trapper in point of time they meant shelter for stock; to the farmer first and later to all men in Colorado, forests meant storage of snow without which during the summers there were no crops, no lawns, there was little water for stock, the stock range was poor, and there was not so much as water for domestic use. To the railroads, forests meant ties without which the building of the roads was impossible. To all dwellers in Colorado, forests meant, first, log houses rather than the sod shanties and then sawn lumber for residences.

Game living in forests meant to many a pioneer, necessary food; to the outdoorsman of the nineteen forties this game means sport and a tasty change from the meat sold across counters.

Many a frontiersman, prospector, hunter, or rancher, and the early tourist, bowed to the magnificence of forested mountains and to the austere grandeur of ridges and peaks – Colorado contains more peaks 14,000 feet high than any other State in the Union – rising above timberline. The first Coloradoans took their mountains on foot or on horseback and observed forests first hand; later, both mountains and forests became scenic attractions and beauty became a commercial asset to the State.

The attention, time and training given to Colorado forests has depended upon both the local and the national understanding of the functions of forests.

Historical sketch of the work in the State begins with, "Colorado was the first state in the Union to recognize in the state constitution the need for forestry."¹

The man responsible for constitutional recognition of forestry was Frederick J. Ebert, a naturalized citizen, born in Germany and there trained in forestry; but, though the constitutional provisions made laws providing for the protection of forests possible, in the years immediately following the admission of Colorado to the Union no such laws were passed. Men were too busy mining, threading their way through the mountains bringing cattle into the State and hesitantly trying to grow garden and field crops.

About 1882, without benefit of law, General Palmer and Dr. Bell logged land in the Manitou Park region north of Pike's Peak. They needed ties for the Rio Grande Railroad and, following the practice of the pioneer, they logged what they needed from their own land and possibly from government land.

For this work General Palmer and Dr. Bell built the first road with steel rails built for logging purposes in Colorado. Their locomotive, probably weighing 15 to 25 tons, they hauled with mule teams up Ute Pass on a dirt road.

This job was typical of the pioneer’s matter-of-course use of natural resources and of his ability to overcome obstacles which meant success to men who did things for the first time in a pioneer country; it was typical, too, of early use of forests, though not all appropriations of forests were so justified.

In the early days miners, railroad builders, farmers were wasteful of forests in Colorado, as elsewhere. Public opinion did not demand conservation and, "in some instances, forests were deliberately fired to provide dead, dry poles, or for the convenience of sheep herders, or even to provide a spectacle." Opposed to such waste of the forests was Colonel Edgar T. Ensign of Colorado Springs. In 1884 he wrote a series of articles for the Colorado Springs Gazette in which he advocated forest conservation. At the same time he was active in organizing the Colorado Forestry Association.

\[ W. J. Morrill, "Forestry in Colorado State College" in Barden and Hafen, History of Colorado, 2, 1, 763.\]
A bill providing for a Forest Commissioner became a law April 4, 1885, and Governor Eaton appointed Colonel Ensign to fill the position. No funds had been apportioned for the work, but Colonel Ensign served as Forest Commissioner from 1885 to 1891. Though he received no remuneration, he was untiring, and his knowledge of the subject "... at a time when no forest school existed in the United States and when little forestry literature..." was available was amazing.1

He recognized the indirect value of the forests in regulating water run-off, as well as their economic value in attracting tourists and sportsmen. He called attention to the direct value in furnishing material for our local industries.2

**Forest Reserve Act.** — After Colonel Ensign's resignation, the Colorado State Forestry Association kept interest alive in the State and lent "... its influence to the Forest Reserve Act of 1891 which made possible our National Forestry policy of today."3

With the passage of this measure forest reserves were established, the first of these in Colorado and the second in the United States, being the White River Plateau Reserve of over 1,000,000 acres in Northwestern Colorado. By 1903 reserves aggregating only 3,000,000 acres out of the more than 13,000,000 acres available had been set aside.4

Between 1891 and 1897 funds and men for the administration

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2. Ibid. (p. 36).
3. Ibid. (p. 36).
of forest reserves were not available, and from 1897 to 1905 by far the greater number of the men were untrained and were largely political appointees. Miners, cowmen, surveyors, packers and lumbermen served. Fire protection was much emphasized and men who knew the country and could pack a horse and ride one were available when trained foresters were not.

It was during this period that much of the opposition to the Forest Service developed and the need for trained men was demonstrated. However, such men as R. W. Shellabarger did much to start the work and Colonel W. T. S. May, Henry Michaelson and William R. Kreutzer were conspicuous examples of efficiency and devotion to duty.¹

Civil Service. — In December, 1904, the administration of forests was placed under civil service, and a general overhauling began; but when in the course of two or three years, the force on the whole was much improved, the opposition continued.

Much of the opposition... was due to a feeling on the part of the users... that they did not know what oppressive measures might be taken... sheep grazing was prohibited in most forests. Grazing fees were introduced in 1906, not high, to be sure, but establishing a new precedent. The prospectors and miners were charged a moderate amount for timber not growing on their claims... etc., etc.

In short, a new regime of law and order was administering these millions of acres. It seemed to many that an extraneous government was being imposed upon the West without the consent of the people most affected.²

The people of Colorado had despised and sneered at the Forest Service when it was inefficient; they opposed it from the

² Ibid., p. 773-774.
home ranches to the farthest forest boundary when it first began
to be efficient. On the ranges, at the mines and the sawmills,
hard feeling for the foresters developed. Pioneers had used in
their own way what they wanted of natural resources, and more or
no forest regulation was essential if citizens were to accept for-
est regulation's supervision.

As a member of the Colorado Conservation Commission which
Governor Bucthel had appointed, Professor W. J. Morrill, then of
Colorado College, suggested that the Commission sponsor a bill in
the next General Assembly which would provide for a State Forester.

State Forester is Professor of Forestry. - The bill,
which became a law in 1911, provided that the State Board of Agri-
culture should establish a Department of Forestry, that the Pro-
fessor of Forestry at Colorado Agricultural College should be State
Forester, and a $10,000 appropriation was made for the years 1911
and 1912, "and for each successive biennial period."1

Thus, the College was made, in a measure, responsible
for ironing out some ugly off-the-campus conflicts, for helping to
administer forest reserves, and for training foresters.

While the use of the forests in Colorado was changing from
free-for-all to legal regulations administered by trained civil ser-
vice employees; while the sheep and cattle men were turning from the
practice of defending their respective ranges by the killing and
maiming of animals and murdering men, to learning to use controlled
grazing areas; while public sentiment against setting fires wantonly

or carelessly was developing; while some ideas of game protection
were being promulgated; some effort at Colorado Agricultural Col-
lege was made to train men to administer these new lines.

Forestry on the Campus. — On the campus the work in for-
estry was first offered as part of a course in horticulture. From
1881 to 1890 the following paragraph appears in each catalog:

Forestry is taught by lecture, special attention being
given to such topics as the value of trees and shrubs
for timber and ornament, for hedges, screens, and shel-
ter belts for this state; the best methods of culture,
with a history of varieties, especially such as are
thought worthy of trial in this latitude.

The catalogs from 1887-88 through 1899-1900 continue to
list some weeks of work in forestry as part of horticulture in the
Department of Botany and Horticulture. Professor B. C. Longyear
joined the faculty in 1904 and about 1904-1906 taught a course in
"Tree Botany." Longyear wrote of the best nursery to be found in Western
work.

The report of the Department of Botany, Horticulture and
Entomology to the State Board in 1886 contains a five-page section
on forestry and two additional pages listing the deciduous trees
of Colorado.

In 1904 President W. G. M. Stone of the Colorado Forestry
Association appeared before the State Board of Agriculture to urge
the establishment of a Department of Forestry at the College. The
response of the Board was to apportion $1,200 for a Chair of For-
estry under the Department of Horticulture if the Federal Govern-
ment would pay the salary. 1

When this brought no results, Mr. Stone in 1906 again

appeared before the Board, quoting to support his argument for forestry, a part of an editorial from The Denver Republican:

Trained foresters are scarce. Practical forestry is forging ahead by leaps and bounds, and it is high time we had western trained men for western needs. . . . We must have men trained for forest work, and by all means men trained on our own ground with our own surroundings to meet our own conditions. The next legislature should see to it that the college has an appropriation such as will enable it to go ahead with this work.¹

No doubt the State Board agreed with Mr. Stone and The Denver Republican, but without funds the Department could not be established, and being without funds was chronic with the College.

In 1893 while forestry was receiving a few weeks attention in a class in horticulture, a part of the exhibition which the college sent to the Columbian Exposition in Chicago was a collection of about two dozen pieces of the native trees of Colorado. Among these were: aspen, different cottonwoods, alder, native birch, choke cherry, some evergreens, etc. This collection was returned to the College and became a part of the permanent forestry material together with samples of tropical woods which another exhibitor had given to the College when the exposition closed.²

In 1899 Earl Douglass, then a student at the College went out with Professor Crandall of the Department of Horticulture to survey the timbered areas from Estes Park to the Medicine Bow region. They counted measured acres of stands and determined age and rate of growth of the trees. This survey served as a basis

². E. O. Longyear, Estes Park, Associate Professor of Forestry, C.S.C.
for determining the area later included in the Medicine Bow Forest Reserve. This was, on July 1, 1910, divided and the name Colorado National Forest given to that part of the region in Colorado. On March 28, 1932, President Hoover by Executive order changed the name to Roosevelt National Forest in honor of Theodore Roosevelt who had urged forestry and conservation.

What is believed to be the first ranger short course in the United States was held on the Colorado State College campus from February 16 to March 2, 1907. Dr. Hugh P. Baker, now president of Massachusetts Agricultural College, was in charge and was assisted by other foresters and the College faculty. A similar course, April, 1908, under Fred W. Morrell of the United States Forest Service with about thirty men, largely from Wyoming, attending was another root in the growth of forestry on the campus.

The first forestry short course was an attempt to teach men quickly some of the things of which the State of Colorado was in urgent need. "Western men for western needs" was a common cry, and yet the local miner, cowman or freighter who tried his hand at forestry seldom knew any forestry and was often out of sympathy with the whole idea of the reserves. The better trained Easterner did not know how to handle the people whose use of the reserves was being more or less curtailed and regulated.

The Westerner was an "independent cuss," and before forest reserve employees were under civil service he saw all the disadvantages and none of the advantages of the Forestry Service; when

employees became efficient, he feared a Federal jurisdiction over State rights, and time to adjust to the new ideas was necessary.

The Arboretum.

In co-operation with the United States Bureau of Plant Industry an arboretum of fifty tree species believed to be possibly suited to Colorado conditions was established in 1905 by Professor Wendell Paddock of the Horticulture Department. This was augmented by Professor Longyear until in 1924 it contained 100 species.\(^1\)

Some of these were fine and rare species; others were valuable to the State because, here, over a period of years, we were learning what trees were suited to the Colorado climate.

Eventually someone thought the plot where the trees grew was the only land of the thousands of acres owned by the College which was suited to raspberries. The trees were moved a few hundred feet—not far enough to mean anything to raspberries, but the moving killed most of the trees.

Later the raspberries were dug out to make room for a potato cellar. Because we must widen Laurel Street, the trees were moved again in 1938. This time only a few long-suffering trees survived to form the beginning of another arboretum.

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\(^1\) W. J. Morrill, "Forestry in Colorado, State College," p. 8.
Department of Forestry. — In June of 1909, the Board authorized a full four year course in forestry in the Department of Horticulture which was at this time separated from the Department of Botany. However, Mr. Bennet, in charge of horticulture, was not interested in forestry, and he recommended that Professor B. O. Longyear open the doors of the Department of Botany to forestry. This was done and the Department of Botany and Forestry came into existence.

In 1915 the Department of Forestry, with neither botany nor horticulture to lean upon or to hamper its progress, set up its own camp. Professor Longyear chose to follow the trails of the woodsman, but asked to be an associate professor. Thus, Mr. W. J. Morrill became chairman of the new department and State Forester.

In the Department of Botany and Forestry, two students enrolled for forestry, and only two more — Roy G. Coffin, later on the Chemistry staff, and William O. Edmondson, for many years Extension Forester in Wyoming — signed up before 1916. Hustes Gallagher, 1912, was the first student to graduate in forestry.

Distribution of Trees. — In all the homesteaded areas of Colorado, settlers needed windbreaks, poles, posts and fuel; in the unbroken miles of the dry-land area, wind-blown tumble weeds banked the fences and rolled down the dusty roads, but trees were few. To find the species of trees that could grow under near-drought conditions, Professor Longyear in co-operation with the Federal Forest Service, 1909-1911, grew trees for shelterbelts at the Akron Experiment Station which had been established for testing the growing of trees without irrigation.
By 1915 the Department of Forestry was distributing trees at cost to settlers on the eastern plains, the work preceding the Clarke-McNary Act by nine years.

As a result of these early experiments and later ones, trees have not entirely supplanted tumble weeds in the dryland sections of the State—one still runs no risk even now of being lost in dense forests, but we have a knowledge of the trees adapted to Colorado climate and needs. Basing their remarks on the years of experimenting, Dean J. Lee Deen and Mr. R. B. Ford wrote in "News Notes" in 1944 that the ponderosa pine and Rocky Mountain red cedar are best for non-irrigated sections and next comes the blue spruce.

"The Evergreen Trees of Colorado," a bulletin which is still used by schools, tourists and the United States Forest Service is "The Evergreens of Colorado" first written in 1914 by Professor Longyear who revised the publication in 1925.

**Fence Posts.**

During October, 1911, a timber preserving plant for fence posts was installed on the campus by the State Forester cooperative with the United States Forest Service. This was the first experimental or research project by the newly appointed State Forester. Two hundred and ninety five killed posts of lodgepole pine and Engelmann spruce were treated with water gas tar creosote, or with crude petroleum, by various "open tank" treatments and some by brushing. These were set in college pasture fences and observed periodically during the next twenty five years to determine their longevity, yielding much practical, useful information, especially useful to farmers.

In cooperation with the United States Forest Service plantations of forest trees to form shelter belts were made in 1909 and 1911 on the Akron, Colorado, Experiment Station, antecating the State Forester Law.

In fact the Akron farm was a federal grant of non-irrigable land for the expressed purpose of forest-tree culture without irrigation. In particular, the Ponderosa Pine
has done especially well on this area. In addition, this experimental farm has served more importantly to demonstrate successful non-irrigated agricultural crop practices. \textsuperscript{1}

The State Forester Law of 1911 made possible a more liberal financing of forestry at the College and made the Professor of Forestry, the State Forester.

Fire Control. — Believing that forest protection, especially fire control, was a basic essential, Burton C. Longyear, the first State Forester, in 1912, used some of the State appropriations to finance the organizing of the sheriffs of the forested counties for fire control work.

Under these sheriffs, and deputized by them, \textsuperscript{2} Colorado Forest Service Deputy Sheriffs were appointed. This organization was effected by a cooperative agreement between the United States Forest Service and the State Board of Agriculture.

Purchase of Forest Land. — At the time the State Forester was beginning his work in 1912, Congress passed an act permitting the College to purchase 1600 acres of forest land and prescribing that it should be in non-contiguous tracts of not more than 160 acres each. This land, north and west of Fort Collins was to be used for experimental forestry, range management and high altitude agriculture. The price, \$1.25 an acre, was paid from the State appropriation.

Pingree Park. — In 1914 Forest Lodge was built on one of these tracts in Pingree Park. In 1926 the students built a bunk house; in 1937 they enlarged this; in 1938 they built three four-room faculty cabins; and in 1941, thirteen cabins, each to house four

\textsuperscript{1} W. J. Morrill, "Forestry in Colorado State College," ms. p. 7-8.
\textsuperscript{2} Ibid. ms. p. 36.
students were added to the camp accommodations. The student cabins completed, the bunk house became class rooms and offices.

The Mummy Range, the Continental Divide and the Stormy Peaks guard the comparatively level area, one mile by one and a half miles, of Pingree Park. Virgin forests, a small glacier some miles from the park, a moraine, and cascading mountain streams add up to perfection for a forester, and to some other people. No doubt the trappers and the fur traders of the first half of the nineteenth century knew this little park and its beauty; but it was not until 1867 that the Union Pacific Railroad, having reached the stage station of Cheyenne, and the builders being in need of ties if the building of the railroad were to continue, sent a Scotch lumberjack to hunt timber which they had heard of somewhere to the west.

John W. Pingree, a man standing well over six feet and weighing 225 pounds, in the spring of 1868 began hunting this timber. He established about where the forestry buildings now are a camp of 30 to 40 tie-choppers; and the next year these men floated ties down the river to where the Herring Ranch now is on the Cache la Poudre. From this point the logs were hauled by oxen to Cheyenne or Tie Siding. Teamsters were paid 50 cents a tie and the round trip from the river to Tie Siding and back required seven to ten days.

The men cutting the ties walked the 25 miles between La Porte and Pingree Park; and because of the difficulty of packing in supplies, they lived on such things as flour, salt, sugar, beans, lard and, of course, whiskey. Meat was secured from the surrounding
country, the hunter being an important man at the camp. The first
hunter was too fond of his liquor and was supplanted by Kit Carson.

Another tie camp was established by Mr. Charles E. Penn-
nock who employed about 20 men but he also supplied ties to the
Union Pacific.

"Tie hacks" were paid ten cents a tie and most men could
make 30 or 40 ties a day; but John Pingree with his six feet plus
and his 225 pounds could cut 100.

The men in the tie camps and game animals were not the
only inhabitants of the region. Mr. Pennock tells that one day he
was riding along on a little yellow mule when they topped a ridge
to meet a mountain lion face to face. Both the lion and the mule
stopped for a second, paralyzed with fear; the mule's natural func-
tions returned first. He broke into a bray loud enough and rasping
enough to saw timber. This was apparently too much for the lion's
nerves, and he turned and ran for his life. The mule, his own
nerves so shaken as to make him careless of direction, followed the
lion at a dead run; but the feline soon outdistanced the mule.

By 1870 the tie camps were closed and Pingree Park was
left to the winter snows and the summer sun until the coming of
the foresters.¹

In 1917 there was only one student at Pingree Park to
assimilate the history of the place, nature's grandeur, and a knowl-
dge of forestry; but by 1926 all forestry majors were required to
attend the summer camp and the little park at the foot of the Con-
tinental Divide saw life and action such as the trappers or even
the "tie hacks" had never known.

¹ R. E. Ford, "The Pingree in Pingree Park," The Colorado Forester,
1930, p. 37.
Civil Service Examinations. — After World War I, the work in forestry grew rapidly. College students, School of Agriculture Students (High School), and ex-service men of both School and College crowded the class rooms and the summer camp. In 1927 Professor Morrill recommended a re-organization which would transfer the work of State Forester to the State Land Board and thus leave the Professor of Forestry more free to develop the work on the campus. This, however, was not done until 1933.

The year 1929 marks the first civil service examination given by the National Park Service. Aggie students topping the list of eligibles, so many of them were appointed as rangers and assigned to Yellowstone Park that the old rangers there suggested changing the name to Colorado Aggies National Park.
Crowded Conditions. — Beginning with a high rating on the first civil service examination given by the Park Service in 1929, Aggie foresters for years were the first or among the first selected for positions in western parks.

Though the foresters as well as other groups on the campus were cramped into inadequate space and the faculty was far too limited, the enrollment increased from 56 in 1923 to 255 in 1933. With the organizing of the Civilian Conservation Corps in 1933 and with conservation a national objective, the demand for foresters, trained or even half-trained far exceeded the supply. Among the twenty-four forestry schools of the country, Colorado Aggies ranked eighth, but while the average faculty numbered 6 to 27, the Colorado school had 4. Even with some forestry courses farmed out to other departments, the Aggies foresters had 21 square feet of floor space per student as compared with a national average of 121 square feet. The average enrollment in the other schools was 172, and the Aggie enrollment 230.

Obviously the foresters were in a log jam and headed for a worse one. Professor Morrill recommended the limitation of enrollment, but this was not done at once.

Rocky Mountain Forest and Range Experiment Station. — Teach classes and trying to find space for his students was full-time work for most men, but in 1929 Professor Morrill prepared arguments for the location in this region of Federal Forest and Range Experiment Station. The financial crash delayed proceedings, but
in 1935 the bill was introduced into Congress, passed, and in 1936 the Central Rocky Mountain Forest and Range Experiment Station was located on the campus.

Having this Station at the College was a tremendous advantage to the local students and faculty, but giving the Station men working quarters was a problem. The men of the Department grabbed a class room here and another there, the largest being in the Dining Hall erected during World War I. The office was a cubby-hole next this classroom.

Buildings and Faculty. — However, while the forestry students and faculty were treading on each other's toes, they looked forward to a new building of two stories, the cost to be upward of $50,000. They had the anticipation of the early settler who was moving from a one-room log cabin to a frame house with bay windows in the parlor and scroll work around the porch. In 1936 the new Forestry Building was erected.

Men who were added to the staff in forestry during the thirties and who remained on the campus long enough to make a real contribution are: J. V. K. Wagar, E. W. Nelson, R. J. Preston and J. C. H. Robertson.

The work in game management which Mr. Wagar undertook had an interesting State background. In the early days protection of game was in the hands of God and the politicians. The creditable part of the work of the politicians appears in a series of laws which show the status of game at given dates. Some of these are:
1867 First Game law protecting elk, deer, antelope, mountain sheep, and wild turkey during a uniform season, Jan. 15 – Aug. 15, and establishing a closed season for 2 years on pheasant, quail and prairie chicken. (Palmer, 1912, from whose bulletin most early dates are taken).

1877 10 years closed season on buffalo. (p.17) Office of State Fish Commissioner established March 10.

1885 10 years closed season on mountain sheep.

1887 10 years closed season on mountain goat (JVKW - This needs looking into, to see if records of occurrence exist).

1887 10 years closed season on Colorado buffalo (p.16 - No statement is made as to whether this is a duplication of record or extension of the 1877 law - JVKW).

1891 Hounding deer prohibited, bag limits set, game export limited and state game wardens employed. Colorado office of State Fish Commissioner established March 10, 1877, extended to game (Henshaw, 1913).

1909 "Progress in Game Protection" (1909, p. 5), stated, Antelope fed under the direction of the Game Commissioner of Colorado, were doing well. Sheep were reported to be steadily increasing. (p. 13) Game wardens were listed as 15 salaried and 600 non-salaried.

1921 First series of Game Refuges created.

1937 Colorado Game and Fish Commission created.

1939 First known closed season on Cottontail rabbit.

1940 First open season on doe deer and cow since many years.1

These laws indicate work to be done, and training men to do this work became an important function of the Forestry Division.

Professor Longyear. – The year 1936 marks the retirement of B. O. Longyear, the "grand old man of forestry." His thorough

training in botany, in silviculture, dendrology and wood technology had meant much to forestry students. The fine character of the man had greatly influenced all students and faculty who knew him.

**Range Management.** — In 1936 a Department of Range and Pasture Management was established in the Division of Agriculture; by action of the State Board of Agriculture this was transferred in 1939 to the Division of Forestry.

**Accrediting.** — In 1937 a national rating agency refused to rate the Forestry Department as an "approved school." Some of the reasons were: too many students in proportion to the number on the faculty; inadequate space; many of the books on forestry were in the main library rather than in a library in the Department, etc.

All this meant that funds and men long and often requested by Professor Morrill were forthcoming; limited enrollment and the new building solved the space problem; the Department was separated from the Division of Agriculture and became the Division of Forestry. Dr. J. Lee Deen of the Pennsylvania College became Dean of the Division.

By January 1939, the College work in forestry had been accredited.

**Professor Morrill.** — On July 1, 1940 Professor Morrill, having reached the age of retirement, joined the list of the emeriti. He had been Head of the Department of Forestry for 35 years and had been State Forester from 1915 to 1933. His hand had been a guiding hand in establishing the Federal Forest Service in Colorado and in developing on the campus an outstanding Department of
Forestry. The courses he had established had kept pace with Federal administration and with State needs; he had limited the number of sophomores, had stressed basic preparation as well as professional work, and had repeatedly asked that forestry be made a division. He pioneered in forestry in the old Bureau of Forestry of the United States Department of Agriculture as early as 1903, arose to a Forest-Supervisorship in the United States Forest Service and had taught forestry four years prior to coming to Colorado State College. He was the first to advocate the establishment, through exchange, of the Colorado State Forest. He is a senior member of the Society of American Foresters. While he has contributed several articles to the professional forestry journals, his writing has largely consisted of many short, popular "News Notes", published in the rural press of the State, dealing with local forestry problems.

Foresters and others who recognized quality in a man gathered at a banquet to honor W. J. Morrill when he retired; they presented him with a volume of letters from men who could not be present, letters so full of recognition of the man and his work that today, six years later, Professor Morrill, being a modest man, does not talk about them.

The feeling of the forestry students for the man who, while he had been building a Department of Forestry at Colorado Land-Grant College and had been a determining factor in State forestry theories and practices, had always had time for students, one of whom expressed his appreciation in:  

A few lines dedicated to my old friend and professor—
W. J. Morrill:

Once upon a time
I saw a pine tree
Straight and tall
Which reached above
The forest — and
Towered over all.

A kindly tree so warm
So friendly and so free
It seemed not of the forest—
But of me.

As time goes on and years
Plunge one by one
Into the night —
Memories of the forest wane
But of the tree —
Grow bright.

And even if that tree
Should sometime fall,
To me it still would stand
There — over all.

Bernard L. Flanagan
Forestry — 1920
1940's

Division of Forestry & Range Management

During the years of World War II the halls and classrooms which even in the new Forestry Building had been well filled echoed emptily to the feet of a dozen or two students; the engineers, once the foresters' prized enemies, were gone too; there were no campfires in Pingree Park where the cabins stood silent and deserted. The foresters were reporting back to Dean Deen from the jungles and the deserts, the camps and the air fields of a global war.

In his April, 1945 report to President Green, Dr. Deen wrote:

Of all men who have graduated from this Division since 1912, 55% have been or are now in the World War II military forces.

Of the more recent classes:

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<tr>
<th>Year</th>
<th>Per cent in service</th>
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<tbody>
<tr>
<td>1941</td>
<td>97</td>
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<tr>
<td>1942</td>
<td>100</td>
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<tr>
<td>1943</td>
<td>100</td>
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<td>1944</td>
<td>None eligible</td>
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<td>1945</td>
<td>None eligible</td>
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Of our graduates who are in the military forces, 82% are commissioned officers.

In the fall of 1941 forestry students comprised 17% of the male student population on the Colorado A & M College campus. (From Registrar's Office). Of the men killed in service 27% are from this Division. (From the President's Office).

Almost without exception our boys express themselves quite strongly in their desire for an ultimate return to civilian life. They are preponderantly citizen soldiers and soldiers of combat units rather than rear echelon. It would appear that forestry has something special to contribute in the building of army reserves.
Representative of the students in forestry, in military and civilian life are such men as: Major Leslie Bean who as a civilian made a reputation as a "Paul Bunyan" sort of man in salvaging the timber in New England after the hurricane in 1938; Lieutenant Harold Popham, a pilot during the war, pilot for Raymond Clapper; Victor Pra Siato, Lieutenant in the Navy, first commanded PT boats and later larger ships; Major William Vess was for a time in charge of airplane strip construction, airplane repair depots, sawmills and other such projects at Port Moresby, New Guinea and at other points; First Lieutenant Ted Fillas had charge of several sawmills in Burma which were turning trak and other woods into lumber for army campaigns; Paul Swisher, graduate in Range Management who is prominent in the Colorado Wool Growers' Association and on the State Planning Commission; Allen McCutcheon, Assistant Regional Forester in charge of Range Management, Albuquerque; and Larry Stoddard, Professor of Range Management at Texas A. and M.

On the occasion of the seventy-fifth anniversary commencement, the College granted a Doctor of Science degree to Dean Cochran, Chief of Division of Personnel Management, U. S. Forest Service.
Girls who were forestry majors accepted jobs as fire
lookouts and did the work well.

The departmental work was largely piled on to one man,
and the others turned to occupations equally valuable to forestry
and to the United States. They have been reported.

J. L. Deen has been continued on part time leave with the
American Forestry Association to continue his economic
studies.

Publications: One of several who assisted in the
compilation of "A Finnish-Swedish-
German-English Forest Dictionary."
Society of Finnish Foresters, 1944.
Helsinki, Finland.

R. J. Preston is continuing with the Forest Products Lab-
oratory. We have asked for his return Sept. 1, 1945.

H. R. Price is serving overseas in the army.

J. C. H. Robertson is continuing on part time leave from
the College with the American Forestry Association.

J. V. K. Wagar has continued his back-breaking role of carry-
ing on the bulk of resident instruction and research as well.
Professor Wagar is the national forestry representative on
the Advisory Council on Human Relations of the American Asso-
ciation for the Advancement of Science.¹

The function of this Council is:

...to act as a central advisory and coordinating body
for research into the human relations problems of conserva-
tion and for the promotion of the use of research find-
ings by public agencies in the field of conservation.²

Mr. Wagar had written much in this field and was eminently
fitted to serve on the Council.

On a campus where the normal student body is made up of
three boys to one girl, departments which were 99 or 100% boys could

¹ J. Lee Deen, "Annual Report, Division of Forestry and Range
develop little during World War II, but a few things were accomplished in forestry. In January 1944, a section of Forestry and Game Management was added to the Experiment Station; in April of the same year the Faculty Council approved a major in Forest Recreation and Game Management; in May the Forestry Division provided a short course in game management for game wardens and others interested; in June the Faculty Council approved:

1. A five-year forestry course leading to the degree, Master of Forestry.

2. Forest Recreation and Game Management listed under two options so that students could major in either phase of the work.

Dr. J. Lee Deen is proving an excellent teacher and administrator. He makes good contacts, sees that the men on his staff attend national conventions, has secured adequate secretarial help, equipment and books.

He says he would not have a man on his staff who could not get a job elsewhere; then, though he cannot do all he wishes in raising salaries, he makes the opportunity to do good work so attractive that he keeps nationally known men.
MATURITY

Chapter XVIII.

Division of Home Economics
In 1909 with Charles A. Lory coming in as President, and with Miss Inga M. K. Allison made Professor of Home Economics in 1910, a new order was established in the work which had begun in 1895 as the Course in Domestic Economy. The entertainment feature from this date on seems to have been greatly lessened and the emphasis on scientific training correspondingly increased.

The various names under which the work has been classified are:

1894 - Course in Domestic Economy
1895 - Department of Domestic Economy
1899 - Department of Domestic Science; up to this point the work was sometimes referred to as the ladies course.
1901 - Department of General and Domestic Science
1907 - Department of Domestic Science
1910 - Division of General Science and Home Economics
1914 - Department of Home Economics
1916 - Division of Home Economics

The College Catalog for 1910-1911 which was prepared by Miss Rausch contains a statement of the general purpose of this work at the Colorado Agricultural College was developing for girls. The statement reads:

The course in Home Economics is designed for women who intend to follow household science as a vocation or to direct their own home. In addition to theoretical training, the student who completes this course gains considerable experience in applying the principles underlying the household arts.

With such a start, Miss Allison was free to follow, in her development of the work, the trends she saw as the natural line of growth of her work.

In 1925-1926 an interesting expansion of the work in Home Economics was made at by.

The units of the course are distributed as follows:
31% in required home economic subjects
23% in Related Science
26% in Liberal arts Field
20% in unrestricted electives

That those in charge of home economics were alert to national trends as well as to local needs appears in another major change in courses offered in the department. In 1931-1932 the four major sequences made available were: teaching, related arts, clothing and textiles, and nutrition. The following year a distinct social trend appears in the course, Family and Social Relation, offered by the Department of Economics and Sociology but open to students in home economics. With the increase in emphasis on the social training, there was a reduction in the requirements of English literature and history.

In 1933-1934 another major development in home economics was initiated in the offering of such courses as marketing and large quantity cookery. This work was basic in the preparation of students for dietetic internships in approved hospitals.

The Preschool. — The year 1936 saw the addition of the preschool in the work of the Department of Home Economics. This school was one of Miss Allison's dreams come true. The little building, unattractive enough on the outside, had in turn housed poultry, part of the work in veterinary medicine and some Extension work in botany. But under Miss Allison's magic wand it was relined and redecorated. Now, in addition to an office, it contains child-size lockers, wrap-rooms, dining table and chairs, bathrooms. There is an attractive kitchen where lunches for the children are prepared.

1. Ibid., 1925-1926, p. 39.
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The Preschool. - The year 1936 saw the addition of the preschool on a year round basis with Dr. Bernice Boynton as the first director. This school was one of Miss Allison's dreams come true. The little building, unattractive enough on the outside, had in turn housed poultry, part of the work in veterinary medicine and some Extension work in botany. But under Miss Allison's magic wand it was remodeled, cleaned and redecorated. The building now houses an office, a locker room with child size furnishings, bathroom, kitchen with adjoining dining room, large recreation room and a

1. Ibid., 1925-1926, p. 39.
spacious porch. Bamboo curtains admit light; color and charm dominate the rooms. The extensive shaded play ground provides the varied equipment found in all modern preschools. Here, the year around, under the leadership of Dr. Katherine Miles, children from three to five come to learn to work and play.

In the late thirties the options open to students in Home Economics were majors in: Child Development, Foods and Nutrition, Textiles and Clothing, Related Arts, Vocational Education, Home Management and Economics of the Household. In addition to these sequences, courses specified by the State Board for vocational education were offered for students who wished to qualify as teachers in home economics.

During all the years of the existence of the College many students, both men and women, have made clear their desire for college training which did not lead to graduate study in a specified field or to a specified vocation; in the twenties a course in general science was opened to such students, and 1937-1938 home economics recognized the demand for non-professional training in what was called "a non-professional sequence."

In a paper, "History of Home Economics at the Colorado Agricultural College" written in 1944, Dean Allison presents for the late thirties a statistical comparison of the work in Colorado and other similar colleges:

<table>
<thead>
<tr>
<th>Colorado State College</th>
<th>Average of 21 other Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical subjects</td>
<td>28%</td>
</tr>
<tr>
<td>Related Sciences</td>
<td>32%</td>
</tr>
<tr>
<td>Professional (psychology, etc.) and electives</td>
<td>40%</td>
</tr>
</tbody>
</table>

The great change for the year 1942-1943 was the addition to the Home Economics Division of work in the graduate school. In
home economics this included studies in Food and Nutrition, Textiles, and Child Development. Previous to this time graduate work in home economics had been given in summer school only.

Dear Miss Allison's,

^ Interests, Other than Courses for Girls. — In addition to the changes in curriculum in home economics, Miss Allison took an active interest in raising standards by limiting the number of courses for which a student might register, in a cooking class for boys, in a survey of rural housing, in hot lunches for school children, in exhibits at fairs, in standards for the early high school work in home economics, and in recognition of the College by A.A.U.W.

In 1917 she sponsored a vocational conference for women, the first vocational conference for students on the campus.

When other individuals and institutions were too busy or not interested in standardizing sizes of children's clothing, Miss Allison took an active and definitive part in this movement, and was in a measure, responsible for the fact that these sizes are now rather uniform. Manufacturers of children's garments are now making use of the results of this survey in which Miss Allison co-operated.

Always interested in child development, she participated in organizing many conferences on this subject. An outstanding conference in this series was the Inter-Mountain Conference on Child Development and Parent Education in 1932. Her interest was Miss Alli-

no interest. In recognition of her interest and contribution in the field of nutrition, Miss Allison was in 1924 invited to Associate Membership by the Medical Society of the City and County of Denver. She was the first woman in the United States to be honored by such a membership.

Entering Students. — Miss Allison was much interested in
the qualifications of the graduating seniors in home economics, but she was interested also in these girls when they entered as freshmen. In 1939 she made a study which showed:

Of 117 entering students there are 105 transcripts available. These transcripts show that 68 of the 117 students, or 64.7 per cent, were in the upper third or fourth of their classes in high school. A number were the ranking students in their graduating classes with sixteen ranking as first of all students in their high school classes. The schools from which the students came varied from small high schools up to the Colorado Springs high school which graduated a class of 30. The ranking student in this group was a girl now a freshman in home economics at Colorado State College.

Another fact which Dean Allison considers of importance is that 8 students or 7.7 per cent of the entering class offered from 2 to 4 years of French on entrance; 42 or 43.8 per cent offered 2 or more years of Latin, and 24, or 23 per cent, 2 years of Spanish.

Another grouping concerns chemistry; 62 girls, or 59.7 per cent of the freshmen had taken a unit of chemistry. Only 35 offered any home economics, some only 1 unit; 19 students or 18 per cent offered 2 or more units.

Alumnae. — In 1944 Dean Allison urged to mention a small number of outstanding graduates in home economics, wrote:

A review of the Who's Who in any field reveals the fact that the home maker is almost invariably overlooked. Yet by common agreement her contribution may far surpass that of many public recognition.

In giving mention then to so limited a number it should be stated that these few have been selected because their achievements have been somewhat unusual or in fields not so currently entered by our graduates.

Since so many are teaching in the Secondary Schools of this and other States, space in this issue will not permit of an enumeration. Some of this choice list are holding positions as principals of junior and senior high schools.

Among those teaching in colleges are Mary Bodwell (1931) recently added to the staff of this Division;
Clarice Carpenter (1921) at Northfield, Massachusetts; Louise Kimmel (1931) Nebraska State Teachers College, Wayne, Nebraska; Shirley Newson (1932) Head of Nursery School, University of Wisconsin; Leonora Hansen Zimmerman (1922) is State Supervisor of Homemaking Education, Colorado; Rose Cologne (1926) Field Worker in Parent Education, State Board for Vocational Education, Topeka, Kansas; Estelle Griswold (1919) Trinity University, Waxachie, Texas; Mary Frances Inman (1927) Teacher Training, North Texas State Teachers College; Sara Reed (1925) Arizona Teachers College, Tempe.

Three Alumnae are State Leaders in Extension Work for Women—Mary Collopy (1917), Wyoming; Bertha Boger Wear (1926), Colorado; Veda Strong (1919) New Mexico.

Not less than twenty are in Home Demonstration Work in this and other states.

Of the many who have completed dietetic internships, some have then headed training centers. Among these are Helen Clarke, Gertrude Lauche, Marjorie Ardrey Sewell.

Flora Slocum (1921) while connected with Provident Association of Saint Louis completed her doctorate work at Saint Louis University, with a major in Economics and a minor in Sociology and is now with the Social Security Board at Washington, D. C. /1945, Dean of Home Economics, Colorado Agricultural and Mechanical College./

Elizabeth Beveridge (1929), Head of the Household Appliance Department of the Woman's Home Companion.

Alice Wallden (1935) is a technical member of the Pediatric Laboratory of the University Hospitals of Western Reserve University.

Mary Greenwood (1920), Research Specialist in Home Economics at New Mexico Agricultural Experiment Station.

Amy Nelson (1936) a member of the staff of the Bureau of Home Economics is at work on the Consumer Purchases Study carried on jointly by the Bureau of Home Economics and the Bureau of Labor Statistics.

In store service, and in Home Service with the Utilities are: Katherine Abbott Hillyard (1929), Vera Carter Ault (1918), Naomi Van Horn (1930), Velma Bigler 1935).

Edith Warner (1933) Child Welfare Section of the State Department of Health of Reno, Nevada.
Margaret Prendergast McLean was the graduate in Home Economics to whom, at the Seventy-fifth Anniversary Commencement in 1945, the College awarded an honorary Doctor of Science degree. The work for which Mrs. McLean was internationally recognized was in speech and dramatics.

**State Home Economics Association.** — At a meeting of the Domestic Science Section of the State Teachers Association on November 2, 1916 Miss Merle Kissick of the State Teachers College suggested organizing a State Home Economics Association. At an afternoon meeting the same day Miss Inga M. K. Allison as chairman appointed a committee to make plans for a later meeting. The committee which drew up the constitution and by-laws consisted of Mrs. Ella Henry Borst, Mrs. Rose Koogle, Miss Charlotte E. Carpenter and Mrs. Rose Cole.

The Association was finally organized at the Hotel Metropolis, (Now a part of the Cosmopolitan) December 22, 1917 with the following members: Inga M. K. Allison, Ella Henry Borst, Charlotte E. Carpenter, Rose H. Cole, Mrs. White, Margaret Webster, Clara Peery, Rose M. Koogle, Miriam M. Haynes, Nita Davis Williams, Velma L. Powers.

**Faculty.** — Among the staff members who contributed greatly over many years to the development of the class work in home economics after 1909 was Charlotte E. Carpenter. Miss Carpenter, associated with the work in Home Economics from 1911 to 1939, was known among her co-workers as an invaluable consultant and friend. Her superiors in rank and the newest teacher consulted her. Because
she was non-partisan in any departmental difficulties she earned
the respect of the general faculty; because, through advanced
study, attendance at conventions, and travel she kept up in her
work, she had the respect and friendship of her students. She
was a member of Omicron Nu. Her contribution to the College is
that of a sincere, trained and cultured woman.

One of the present faculty members who has given years of
service to the College is Miss Clara Hatton who has won national
recognition in both graphic art and crafts. One of her wood
engravings has been made a part of a permanent collection in the
Smithsonian; her water colors, etchings and book bindings have
almost equally recognized.

Her personal achievements and her theory that art for
home economic students should not be essentially different from
that for liberal arts majors have raised the art section of the
Division of Home Economics to a recognized level.
MATURE

Chapter XIX

Division of Science and Arts

and

General Departments
Department of Botany

The Department of Botany and Plant Pathology is another of the departments which has so integrated research and teaching that it is difficult for the men of the staff to talk about one as distinct from the other. The research which has to do with the economic diseases and problems of plants, supplies fresh and vital material for use in the classes. Treatment of smut, barberry eradication, peach mosaic, saving the carnation industry—every problem has both a scientific and an economic value, and these values appeal to practical minded students who have a leaning toward plant science.

Head of the Department,

Dr. Durrell outlines the functions of the Department somewhat as follows:

1. Giving to large groups of freshmen an introduction to biological science and a basic scientific viewpoint.

2. Beyond the freshman year, the teaching of plant physiology and pathology in support of other technical departments.

3. Training of professional plant pathologists.

4. Service work such as the identification of diseases of plants, and of weeds.

5. Research.

6. The Department co-operates with the Extension pathologist in carrying research findings to the growers of the State.

A characteristic of those who graduate with a major in plant pathology is their ability to do independent investigations and to think for themselves. Representative of those students are such men and women as Louisa Ames Kanipe who has charge of the seed laboratory
at Oregon State, Bruce J. Thornton who holds a similar position at his alma mater. Messrs. John Baugh, Extension Plant Pathologist, West Virginia Experiment Station; P. A. Davies, Head of Department of Biology, University of Louisville; Jesse Fultz, Associate Professor, Botany, Colorado Agricultural and Mechanical College; Irwin Le Clerc, Plant Pathologist, U.S.D.A., in charge of potato research, Southern States; Donald Bliss, Plant Pathologist, Citrus Experiment Station, Riverside, California; Jesse De France, Professor of Agronomy, State Agricultural College, Provincetown, Rhode Island; Lawrence Stoddard, Head of Range Management, Utah State; and Ruth Ashton Nelson, author of *Flora of the Rocky Mountain National Park*.

Among the faculty members who have remained on the campus ten years or more and as teachers have been outstanding are: L. W. Durrell, Miss Anna Maude Lute, Messrs. Harold D. Harrington, William A. Kreutzer, Edward W. Bodine, Bruce J. Thornton, Junius L. Forsberg, Ernest C. Smith, and A. O. Simonds.

**Department of Chemistry**

The changes which may be said to mark periods in chemistry after 1909 were, first, the division of the work into teaching and research under two separate heads. Dr. William P. Headden who had for some years been head of all the work in chemistry took over the research work and Dr. G. H. Whiteford became head of the teaching. At this time, 1917, both research and teaching were in the old Chemistry Building. In 1942, the two phases of the work were again united. The three faculty, D. W. E. Pugh, Peck, W. W. In December 1921 the interior of this building burned. The walls were left standing and when the structure had been rebuilt, it became Botany. Before the new Chemistry Building could be constructed the classes in chemistry were scattered here and there.
Research work was in the basement of the old building.

The two phases of chemistry, teaching and research, remained under separate heads until 1945 when Dr. W. E. Pyke was placed in charge of both divisions of the work.

Possibly the establishment of strong work in physical chemistry can be said to mark a second period in the growth of the Department of Chemistry. More recently, vitamin chemistry and biochemistry have been added and stressed. Possibly the most significant development in the Department is the study of special problems in chemistry. This has come into existence because of the unusual amount of research work done on the campus by members of the Experiment Station staff.

Faculty. - Faculty members who have long been associated with the Department are Merle Goodwin Payne, Major Roy C. Coffin, C. G. Harry Johnson, Elizabeth Wing, Keith G. Irwin, W. E. Pyke, E. B. Crome, and Paul Frey. These men and women will live in the training they have given students.

Graduates in Chemistry. - Representative of the graduates in chemistry who have done commendable work both in civilian and war time service are:

Margaret E. House (Mrs. M. A. Irwin), Instructor in Nutrition, University of Wisconsin (National Defense Program), Madison, Wisconsin.


Earl C. Lory, Director, Research John C. Oliver Memorial Foundation, St. Margaret Memorial Hospital, Pittsburg, Penn.

Major W. E. Detachment, Brazil.


Hubert Lynn Rinkley, Capt., Medical Corps., U. S. Army.


Irvng Pollock, Chemist, Research Laboratory, Tha Texas Co.,
Glenham, N. Y.
William E. Polson, Chemist for the State Dairy Commissioner
and the State Director of Markets.
Charles O. Scott, Supervisor in Acid Plant, Du Pont Powder
Co., Birmingham, Ala. Now Radio Technician, Great Lakes
Training School, Chicago.
Henry E. Wilson, Acid Area Supervisor, Weldon Springs Ordinance
Plant, Atlas Powder Co.
William Elmer Johnson, Control Chemist, Oklahoma Ordinance
Works, Pryor, Oklahoma.

Department of Economics, Sociology and History.

Early Steps. - In 1921 the Legislature, gently prompted
from "off stage" by President Lory, made an appropriation for estab-
lishing on the Agricultural College campus a Department of Economics
and Sociology. Though this is the only department of the College
provided for by a special act of the Legislature, it did not come
to the campus from the "far blue yonder" without traceable ancestry.

The rural people in Colorado in the seventies and eighties
did not emphasize the economic aspects of marketing, labor, social
classes, or recreation. Farming in Colorado in these decades was
an adventure into the unknown, and the information demanded by farmers
concerned irrigation, cultural practices, and dry land or high
altitude varieties. The recognized economic factors of marketing
produce were a road of a sort, a man, a wagon and a four horse team.
In agricultural areas labor problems were solved man to man; and
though in many a small town, the saloon keeper's wife wore the only
silk dresses, class consciousness seldom split communities. Country
people were without recreation, or they joined in the Fourth of July
community picnic, rode miles on horseback or in a wagon to dance
all night, or the men got drunk. A little later these people,
carrying in the new Colorado the activities of their earlier homes,
established lodges, churches, study clubs, and even occasional public
libraries.
However, though human living on the Colorado ridgepole of the continent and on the lower slopes of the continental roof did not at first necessitate a study of social and economic problems, the faculty at the Agricultural College recognized early that citizens of a democracy must know something of the history and traditions of that democracy, thus, history the last of the three branches to be added to the present Department of Economics, Sociology and History was the first taught.

Early College presidents who were always orators, and powerful speakers from off campus lectured on democracy, duties of citizens, great national leaders, and even on ethics and philosophy. Then came regular classes in these subjects. From 1887 to 1897 Miss Maud Bell was Professor of History, Literature and Modern Languages; from 1899 to 1902 a Department of Sociology and the Constitution existed. Later this was Constitutional History and Law, and here Dr. W. R. Thomas, and early-day newspaper man, a fine citizen and as fine a scholar, taught economics, international and irrigation law. President Aylesworth, 1900-1909, gave a few lectures annually on sociology, and in 1911-1912 Dr. Thomas taught the first course in this subject. Of this course and the teachers, alumni of the first years of the century speak with a note of reverence.

In 1906 various subjects were combined in a Department of History and English of which E. F. Coen became Head in 1918. Only what Mr. L. H. Stimmel calls the tendency of the English Department toward "queer marriages and unexplained divorces" can account for the grouping of subjects in this Department and for the change in name.

Charles F. Davis who had taught physics and chemistry from 1881 until he left the campus in 1886, now returned to the faculty as Professor of History, Irrigation, and Constitutional Law.
Both he and Mr. Coen taught economics and sociology. Professor Davis continued with the Department until his retirement in 1930. Mr. Grant Gordon taught the history from 1930 to 1937.

Thus, while Colorado was developing into an agricultural state, the College, growing with the State in the study of farm production problems, had in addition taught history, economics and sociology.

Economic Distress. — Along with Colorado’s accomplishments in agriculture had come the diseases and the sins of low selling prices for farm produce, high buying prices, and high taxes unevenly distributed.

Before World War I, economic problems had become as important to the farmer as irrigation and the necessity for high altitude varieties of crops; and in the years after the war prices for farm products declined, the number of men losing farms on mortgages increased, the drought hit Colorado, and taxes on rural property soared. President Lory knew from experience the toil and heartbreak of life on a Colorado farm, and as an educator and economist he believed that studies of economic and social problems from the rural angle were essential to the welfare not only of the country people but of the State. He, therefore, moved to secure funds for the establishment on the campus of a department devoted to class and research dealing with social and economic rural problems.
The Department of Economics and Sociology was established
for the purpose of giving instruction in the economics of
agriculture and mechanic arts as represented in farm management,
labor relations, credits and marketing of products and accounting
connected therewith, and in the human relations between rural
and urban communities and the conditions influencing community
betterment. Also for carrying on research and investigations in
economics and sociology as related to agriculture and the in-
dustries, in publishing the results thereof, and for special short
courses and for extension service.

The Department in carrying out the purposes of the law
establishing it, has contributed in generous measure to the welfare
of the State. The results of basic studies have been incorporated
into rural living and into the general life of Colorado. Such studies
include: farm and ranch management, co-operative enterprise, public
finance and taxation, marketing, public health, Federal administration
of range resources—all these received attention, and subject matter
derived from the research was carried over into classes.

Faculty. - Llewelyn A. Moorhouse was made head of the new
department. Workers who early joined the staff and who continued for
many years in the work were: B. F. Coen and Raymond T. Burdick as
associate professors who transferred, respectively from English
and Agronomy, and Miss Emma Griswold, stenographer, who also transferred
from Agronomy. Thomas H. Summers joined the Department in 1922 and David
N. Donaldson in 1928. For a few years R. W. Rockelley was in charge of
the work in sociology.

In 1937 with the addition of history under Dr. Robert G.
Dunbar, the Department became Economics, Sociology and History.

The Department and the Students. - The Department is cog-
nizant of the fact that not all of its duty is research, that it has an old
obligation to train men and women to live in a contemporary world.
Therefore, in classes and out, members of the faculty help students in the organization and development of campus life; students are given opportunities in the social science laboratory and in field trips throughout the State.

This Department thus teaches students certain ways to earn a living; it teaches them something of community living, and it lifts their mental eyes beyond the community and a livelihood to the vision the citizen of a democracy must have, of State, national and international issues.

As of January, 1945, the Department of Economics, Sociology and History listed as representative of its majors active in World War II, the following:

Burton D. Seeley, Commander USNR.
Harris T. Guard, Instructor in Mathematics, West Point.
Alexander Eagle, Major, 104th Inf Div., Germany.
Grace A. Henderson, with the Red Cross in England.
Martha Scott Trimble, Lt. (jg) WAVES, Florida.
Alfred R. Westfall, Jr., Capt. in the Army in England.
Ralph Westfall, Capt. in the Army, So. Pacific.

Representative graduates in the Department of Economics, Sociology and History are:

Robert J. Tingley, Agriculturist, Holly Sugar Co., Hamilton City, Cal.
Tivis E. Wilkins, Head of Land Acquisition Division, Soil Conservation Service, Washington, D. C.
Richard M. Bourne, Associate Professor, Department of Economics, University of Nebraska, Lincoln, Nebraska.
Ben Gwirts, Owner North Park Hay Co., Fort Collins, Colo.

The work of the Department as a section of the Experiment Station appears in Part II.
Department of English and Modern Languages

Only what L. H. Stimmel calls the tendency of the English Department toward "queer marriages and unexplained divorces" can account for the grouping of subjects in this Department or for its changes in name. In 1906, B. F. Coen was Head of English and Philosophy; by 1911 there was a Department of English and History. Literature did not join hands with composition until 1913.

Alfred Westfall, coming to the campus in 1913, was made Head of the Department of English and History in 1921 when Professor B. F. Coen transferred to the Department of Economics and Sociology. Mr. Westfall had served an apprenticeship as coach of debating and instructor in oratory. Under his leadership the work has developed along three main lines: composition and creative writing, literature, and speech and dramatics. History was transferred to the Department of Economics and Sociology.

Kettle, who had long been known and loved as Head of Modern Languages was added to the Department of English. The Misses Ruth Edwards and Nina Watts had stood at Miss Kettle's right hand and had helped to build the Department of Modern Language. For a year, after Miss Kettle's retirement, Miss Watts served as Acting Head of the Department.

The members of the Department of English have always been willing to sponsor student activities such as: The Collierian, The Scribblers Club, forensics, and Drama Club, journalistic clubs, and other things such as the International Club which are not strictly activities related to the work in English.

Until 1926 a major in English was offered; and two of the students who graduated with this major were
students who graduated with this major are: Dr. Campton Bell, Chairman, Division of Fine Arts, University of Denver and Mrs. Wendell M. Nelson (Dorothy Spencer) who has been active in the New York State Department of Education and in this connection helped to write the course of study in English for high schools in that State. Faculty members who were associated with the Department of English for ten years or longer are Alfred Westfall, Mrs. Sarah Lindsay Schmidt, Misses Alice Curtis and Ruth Jocelyn Wattles, and Messrs. Lester H. Stimmel and William Bjornstad. The Department, having always been housed in Old Main, has not had attractive quarters, and the odor of history about the place is often mistaken for poor ventilation. However, alumni find their way back to the rooms where, as students they had practiced debates, had rehearsed plays and built stage sets, and where until the Student Union was erected, they wrote The Collegian and the Silver Spruce.

For some years the English Department was known as a department that wrote as well as taught English. Alfred Westfall was the author of American Shakespearian Criticism; Alice Bertha Curtis published Children of the Prairie; Sarah Lindsay Schmidt wrote New Land and Ruth Jocelyn Wattles was co-author of Desert Wife. After leaving the Department Mrs. Schmidt published Ranching on Eagle Eye, The Secret of Silver Peak and Shadow Over Winding Rock and The Hurricane Mystery; and Miss Curtis, after retiring from teaching, wrote Winter on the Prairie and has another manuscript in the hands of the publishers.
Mrs. Sarah Lindsey Schmidt, Misses Alice Curtis and Ruth Jocelyn Wattles, and Messrs. Lester A. Stimmel and William Bjornstad. The Department having always been housed in Old Main, has not had attractive quarters, and the odor of history about the place is often mistaken for poor ventilation. However, alumni find their way back to the rooms where, as students they had practiced debates, had rehearsed plays and built stage sets, and where until the Student Union was erected, they wrote The Collegian and the Silver Spruce.

Department of Mathematics

With Andrew G. Clark becoming Head of Mathematics in 1942 there has been a strong emphasis in classes on theoretical and applied statistics. Because of the great demand for statistical study in many of the Experiment Station projects, Mr. Clark and Harris Guard of the Mathematics faculty often assist on such problems.

The general curriculum of the Department compares favorably with that of Departments of Mathematics in the best technical institutions of the country. Faculty members who have served ten years or more are Harry W. Williams, Harris Guard, Leslie M. Madison, and Andrew G. Clark. Though the institution has not in the past offered a major in mathematics, many are the alumni, both in civilian and military work, who have blessed the names of these teachers. As the members of the Department look forward to offering a major in mathematics, they find that no new courses will have to be added; they have been teaching the necessary work for some years.

Stewart Lincoln Macdonald for many years Head of the Department of Mathematics and Astronomy, and as honest and able a Scotsman as ever came to the campus, began his work as an instructor back in
the days when E. O. Aylesworth was President of the College. In addition to his interest in mathematics, Mr. MacDonald was an astronomer of some note and recognized as an authority in this region. He was for many years on the faculty Building Committee and was manager of student activities from the organization of the Associated Students in 1917, to 1941. As a teacher he believed strongly in giving attention to individual students and, because he held himself and his staff to this practice, he was the friend as well as the leader of the hundreds of men and women who sat in the mathematics class rooms.

The Music Conservatory and the Department of Music

Early Development. — Before 1900 music was on the College program only occasionally. From 1883 to 1886 Ella Silcott was listed in the catalogue as instructor in music and gave private voice lessons; there were no classes; in 1894 D. D. Gage came up from Denver two days a week to instruct the students in music. Occasionally members of the faculty helped in musical courses, Mr. Harry Orth, the florist at the greenhouse, being one of those most interested in this work.

In 1899 President Ingersoll mentioned in his report to the Governor the necessity for musical advantages on the campus, but the cost and the difficulty of securing teachers adequately trained in music education prevented the organizing of the work.

From 1901 to 1903 Frank H. Crosby was director of music. He first organized the College Cadet Band and took it, the orchestra and glee clubs for their first trips through the State. In 1905 the C.A.C. Military Band of thirty pieces was directed by H. M. Giller. The drum majors were Harvey Riddell and Lynn Kennedy. At this time George E. Toomey directed a glee club and a male quartet and Mrs. W. H. Olin
had charge of a ladies glee club. (For an account of the College Band, see Student Life, 1899-1909).

Gossip still whispers the off-the-record story that a very promising Commercial Department was discontinued in 1906 for three reasons: Some men on the faculty were jealous of the rapid growth of "commercial;" and a faction of the Board was almost exclusively interested in agriculture; and the wife of one member of the Board thought girls should not work in offices, and the same lady wanted her daughter to study music. Whether Dame Gossip knows the causes, records that the Commercial Department was discontinued and music was officially listed in the catalog.

In the early years of the century the students met in groups of five at twenty-five cents per pupil for instruction in history, theory of music and harmony. There was instruction in band, orchestral instruments and piano, the charge for the use of the piano being $1 a month. A beginners class in sight reading, "both ladies and gentlemen welcome", was organized and was popular.

The objectives of this new work in music were:

The home is only half a circle without music. The country home particularly stands in need of music. It must furnish its own recreation and inspiration during certain periods of the year owing to road conditions. The weariness or loneliness of country life has no antidote to compare with music.

In June, 1907, the work in music was put on a new basis. A Conservatory of Music under Alexander Emlie was organized. Mr. Emlie had been trained at the Boston Conservatory of Music; his wife taught piano, and these two were assisted by instructors in piano, and theory, voice, public school music, and sight reading.

1. The State Agricultural College Catalogue and Prospectus 1906-7 p. 103.
The Conservatory. - At this time the financial arrangement under which the Conservatory was established was that the College should furnish Mr. Emslie with a building in which to work, but his entire budget was derived from fees which he assessed and collected.

The first temporary quarters for the conservatory were in the new Civil and Irrigation Engineering Building. When the Domestic Science Department moved into Guggenheim in 1910, the Conservatory of Music took over the Old Domestic Science Building and music has remained in these quarters.

The school under Director Emslie started with six pupils; a year later there were eighty-five; by 1910 there were 150 and at the end of twenty years there were 265.

On Tuesday, December 8, a Fort Collins audience had for the first time the opportunity to hear an oratorio, a creation by Joseph Hayden, presented by the students of Colorado Agricultural College (Colorado State College) Conservatory of Music. It was given in the Old Main auditorium by a chorus of eighty voices, with Mr. Emslie directing. The solo parts were done by: soprano—Miss Nina McCandless; tenor—Matthew Auld; bass—Thane E. Schreman; alto—Mrs. B. A. Gage.

Other musical treats which the Conservatory under Mr. Emslie's direction offered to music lovers of Fort Collins were: The opera, "Bohemian Girl"; the opera, "Martha"; the "Overture to Poet and Peasant"; the opera, "Chimes of Normandie"; and the opera, "Erminie". In fact

... from 1917 to 1927 the conservatory presented each year some outstanding work in opera or oratorio and also gave numerous student recitals as well as glee club concerts.

2. Ibid.
Fort Collins music lovers made occasions of the oratorios and operas. A niece of Dean Virginia H. Corbett, tells that these nights were truly "an evening at the theatre." Men and women wore their best clothes and often dined at the restaurants. Genevieve adds that to her the beauty of the costumes, the lights, and most of all, the music have never been surpassed. The performers seemed wonderful beings from another world: Preston Mruphy, now with the Allied forces in Europe, could not be one and the same man in "Chimes of Normandy" and on Fort Collins streets—such was the way in which Fort Collins children first learned something of the magic of opera.

During this period, too, the College musical organizations frequently toured the State.

In 1914 the first Bachelor of Music degree was granted by the College. Mr. Emileuie, leaving the College in 1937, had been greatly influential in developing in Fort Collins an appreciation of music, especially some of the best choral music.

The forerunner of Upsilon Chapter of Delta Omicron was established on the campus May 8, 1928; this was the McDowell Club.

After World War I a movement to emphasize instrumental music study swept the public schools of the United States, and every school, no matter how small, had its band and orchestra, directed by skilled musicians. Soon the performing ability of these groups was equal or superior to that of most college and university organizations, and this stressed the need for better music training at the higher levels.
Department of Music.

On Sept. 1, 1937, the new Department of Music replaced the Conservatory of Music. Gregory Bueche, former director of instrumental music in the Fort Collins public schools, was made head of the Music Department. Mr. Bueche had had nine years of experience teaching music in Colorado public school. Three years he had spent in Lamar, Colorado, during which time both his vocal and instrumental organizations won top honors in state competition. He came to the Fort Collins public schools in 1931 as director of instrumental music. After three years of development, his symphonic high school band was the only class A band to receive a superior rating in the state music contest of 1934. During the following years the Fort Collins school musical organizations repeatedly secured the classification of superior in state contests.

The other members of the faculty were Paul Gavert, vocal teacher and director of choir and chorus, Willard Laing, teacher of piano and theory, Robert Gross, teacher of stringed instruments. Gavert is now on military leave serving as a 2nd Lieutenant in the air corps in England. Laing is also on military leave and is a Warrant Officer, directing an army band. Gross is a member of the faculty of Colorado College in Colorado Springs.

The primary objective of the new music program was to contribute as a service department for the general student body by offering the opportunity of participation in musical organizations such as military band, orchestra, choir, and chorus. The second objective was to provide specialized training in theory and applied music for those students who chose music as their profession. And finally, the third objective was to train those students who desired to minor in music, and also in a limited way to offer musical instruction to residents of Fort Collins and vicinity, who were not regularly enrolled College students.1

That the new Department grew rapidly is indicated by Mr. Bueche's report to President Iory on November 22, 1937.

He said:

There are a great number of students taking part in band, orchestra or glee club. The symphonic band has a membership of 92, orchestra 43, boys' glee club 50, girls' glee club 58.

In 1938 twenty-six registered as music majors; in 1939 there were fifty. In the new department the band became a symphonic band and for the first time girls were members. An A Capella Choir was developed; the orchestra was stressed; and wind and string ensembles became a part of the program.

In 1940 several of the men students were members of the 157th Infantry Band, and when the National Guard was mobilized these men were sworn into the service of their country. The music majors in this group were Wilbur Black, Clarence Brown, Chester Griffith and John Van Winkle.

On May 27, 1940 President Lory conferred the first Bachelor of Music degree on students graduated from the new Department of Music. The students were Gene De Voe, Ardis Marlott, Lavina Zabel and Dana Peiterson.

Included in the group of Music majors who have become successful teachers of band and orchestra are:

William Adam
Robert Barnes
Leo Meyer
Richard Kemp
Ruthe Mercer
Dana Peiterson
Bill Munsell
Roberta Hiner

An outstanding representative of the old Conservatory of Music is Georgia Graves.

Her name has become well known in almost every state. She has given three successful Town Hall recitals, in New York...; and has appeared as soloist in Carnegie Hall with the New York Oratorio Society; as well as 57 times on the great stage of Radio City Music Hall in a scene from the opera "Samson and Dalila".¹

¹. Concert Management Willard Matthews.
During World War II, Mr. Bueche, though often much
discouraged as he saw his carefully nurtured program slipping
back, was at the same time often amazed at the number of students
who somehow managed to include music in their college training.

Physical Education for Men

In the years between 1920 and World War II, dates for
an Aggie athletic record book are: ¹

1909 - The Rocky Mountain Faculty Conference was formed with
S. L. MacDonal representative for Aggies.

1915 - Aggies won their first Rocky Mountain Championship,
with no games lost. They scored 243 points against
their opponents 31.

1916 - Aggies again won the Rocky Mountain Championship.

1919 - Aggies again won the Rocky Mountain Championship,
winning all games except the Thanksgiving game with C.C.

1920 - Aggies again won the Rocky Mountain Championship.

1925 - Aggies won the championship, with 8 victories and no
defeats. They played a post-season game with Hawaii U.
there, but lost 41 to 0.

1927 - Aggies won the championship. Coach Hughes developed the
Million Dollar Play. "Ham" Wagner became line coach.

1931 - "Red" White made honorable mention on the All-
America team.

1938 - The Mountain States Intercollegiate Athletic Association
was formed, consisting of Brigham Young U., Colorado
State, Colorado U., Denver, U., Utah State College,
Utah U., and Wyoming U.

1941 - Colorado State, by beating a strong B.Y.U. team in its
final game, ended the season as one of the strongest
teams in the Conference.

1942 - Coach Hughes resigned as coach after 31 years of coaching
at Colorado State. Julius Wagner stepped into his place.

Other dates which indicate what the boys were doing in
athletics in the 20 years after 1920 follow:

¹ List supplied by Coach Harry Hughes.
Gymnastics:
1927 - Coach Joe Tobiska was the first gymnastics coach. From 1927 until 1942, when gymnastics was dropped for the duration of the war, Tobiska's teams won 11 championships in this minor sport out of 14 years of coaching.

Wrestling:
1920 - Colorado State had their first wrestling team.
1927 - Coach "Hans" Wagner began his coaching at Colorado State. In his 16 years of coaching, he has won 14 conference championships, the only two years he didn't win were 1927 and 1936.
1940 - Eugene Grenard won the 175 pound weight in the National Collegiate Wrestling meet at the U. of Illinois.

Swimming:
1926 - The first swimming team was formed.
1931 - 1935 - Colorado State won the Championship.
1940 - 1941 - Colorado State won the Championship.

Baseball:
1904-1905 - Colorado State won their first championship.
1923 - Aggies again won the baseball championship.

Track:
1894 - The first track meet in which Aggies participated was held.
1897-1918 - Aggies won the State Championship both years.
1932-1933 - In the National Meet in Chicago, Chester Cruikshank won second in the hammer throw, Harvey won third in the two mile run.

With the building of the gymnasium and field house in 1925, all men were required to engage in some form of physical training, and basketball for boys became one of the most popular sports on the campus. Track and tennis were always among those things that the boys enjoyed, though these were definitely minor sports.

Asked to name outstanding athletes who have been notably successful since leaving the College, the staff of the Department of Physical Education for Men wrote to former Aggie athletes and asked their opinions. In addition, Coach Hughes wrote to a few individuals representing each year since 1910. The replies listed nearly 150 alumni and ex-Aggies who made athletic history and who, since leaving the campus, have brought honor and respect to their Alma Mater.
Limited space forbids the use of the entire list and selecting a few has a beginning but no end. For example, one cannot mention Joe Ballard and omit Milton Allen, Floyd Cress and Ed DeVelbiss. If we name Charles Brennan, we automatically think of his football teammates, William Nye and Paul Sweitzer; such names as Kenneth Hyde and Bernie Williams recall Julius Wagner and Santistevan; if we think of Ervin Hinds, we must add the names of Oscar Herigstad and Earl McMichael, and if we point to the outstanding athletic record of Lynn Pitcher, we recall his equally outstanding teammates—Glenn Ament, Carl Brown, Earl Lory, and Fay Rankin. So the list at once is too long to include.

Physical Education for Women

The building of Ammons Hall in 1921–1922 cut off the new era in physical training for girls from the past years as decisively as a slice of bread is cut from a loaf. The arrival of Miss Elizabeth Forbes as head of the work for girls almost coincided with the erection of the new building. Truly the physical education for girls was beginning a new era. Miss Forbes was well trained, was a good organizer, was interested not only in physical exercise but also in helping girls to develop into well-rounded, poised women. Selected dates and events for a girl's memory book are:

1922–1923

Women's Athletic Association organized May 3, 1922.
First Splash Party, November 13, 1922.
Contributed $35 from football shakers to Student Loan Fund.

1923–1924

W.A.A. Orchestra started, October 24, 1923.
Adopted green block letter "A" as official 800 point award, January 23, 1924.

1. List supplied by Elizabeth Forbes
Sadie Morrison and Miss Forbes delegates to 4th National Conference held at Berkeley, California, April 9-12, 1924.
Local W.A.A. accepted as chapter of national A.C.A.C.W.—April, 1924.
First Birthday Party (House Party) at Lory-Hi, May 9-10, 1924.

1924-1925

First sweater awarded to Sadie Morrison.
Mary Gwynn sent as official delegate to 4th Midwestern Conference A.C.A.C.W. Hilda Mathias also attended at own expense.
First Intercollegiate Play Day at University of Colorado.

1925-1926

Voted a gold star to be placed on "A" for each additional 300 points beyond 1000 points for sweater.
"A" Club officially organized, December 9, 1925.
First general election of A.W.S., Y.W.C.A., and W.A.A. held on same day in spring.
Hostess for first time for Intercollegiate Play Day in May.

1926-1927

"Snappy Thirty" came under sponsorship of W.A.A., December 8, 1926.
Marjorie Mayer and Dot Gier delegates to 5th National A.C.A.C.W.
Conference at Ithaca, N.Y., April 21-24, 1927.
Archery started as W.A.A. sport.

1927-1928

Folk Dancing placed on basis of other sports (April 4, 1928).
Verna Hinds and Ursa Bodwell delegates to 5th Central Sectional Conference of A.C.A.C.W., at University of Ohio, Columbus, April 26-28, 1928.

1928-1929

Voted to buy furniture for Mezzanine in Ammons Hall.

1929-1930

 Joined Women's Division of the National Amateur Athletic Federation. Changed official sweater from old gold to white with gold background for "A", January 15, 1930.
First Annual Banquet (Washington's Birthday Theme) February 26, 1930

1930-1931

Elizabeth Hinds and Emma Wise delegates to 6th Central Sectional A.C.A.C.W. Conference held at Univ. of Wisconsin, Madison, April 22-25, 1931.
First Larimer County High School Play Day, May 16, 1931.
First Inter-Sorority Tennis Tournament.
"Snappy Thirty" became "Spurs"—Spring, 1931.
1931-1932

First "Gym Jamboree" held in Men's Gym, March 26, 1932. W.A.A. Float "Sports" wins 1st prize in organization division of College Day Parade.

1932-1933

Fall Aggie-Wyoming Hockey get-together at Aggies (7-1 Aggies) Gamma Phi Beta awarded Inter-Sorority Tennis Trophy.

1933-1934

Minor Sports added to W.A.A. sport program. "Pleasure Isle" presented as a dance demonstration in Old Main. College Day Float in form of a loving cup.

1934-1935

First Intercollegiate Hockey Play Day held at Aggies, October 20, 1934. Sadie Boyd, Catherine Longmore and Miss Prout delegates to 7th South Central Athletic Conference College Women held at Emporia, Kansas, February 18-21, 1935. First Water Pageant "The Light Princess".

1935-1936


1936-1937


1937-1938

Miss Appleby spent Nov. 12 & 13 coaching and lecturing on hockey as guest of W.A.A. Champs Midwest District (14 states) National Intercollegiate Telegraphic Archery Tournament. Eva Degney, Betty Pinkerton, Peggy Cooper and Miss Parks delegates to South Central Sectional Conference AFCW held at University of Oklahoma, Norman, May 3-5, 1938.

1938-1939

Modern Dance Club organized. Runner-Up, Midwest District National Intercollegiate Telegraphic Archery Tournament.

1940-1941

Hostess for Intercollegiate Dance Symposium.
Doris Erickson, Mildred Stover, Maxine, Ruth Banks and Mrs. Kent, delegates to 9th South Central Sectional Conference AFCW, March 20-22, 1941, University of New Mexico, Albuquerque.

1941-1942

Freshman Representative added to W.A.A. Board.
Red Cross Sewing Project (made 90 girls' wool skirts).
Made one crocheted and one knitted afghan for Red Cross.
Jean Stewart Allard and Jean Heoloit, delegates to 10th National Conference AFCW held at Wellesley College, Mass., April, 1942.

1942-1943

Red Cross First Aid class given under sponsorship of W.A.A. by Mrs. Kent.
Archery given up because Field House being used as Army Mess.
XRCYZRS - Physical Fitness Exercises used by volunteers.
$18.50 War Bond (Series F) purchased with $3.00 College Day Float prize plus 10¢ assessment on each W.A.A. member.
Contributed $15.00 from locker fines toward Aggie Bond.

1943-1945

Tumbling and archery again on W.A.A. program of sports.
16th Banquet ("W.A.A. Comes of Age") - twenty-first anniversary celebration commemorating twenty-one years since receiving national charter A.C.A.C.W. (April, 1924) held February 8, 1945.

So great an interest have the students taken in sports and in physical training in general that even so prosaic a thing as a statistical list assumes life, and inspires lively visits that begin with, "I remember when..." and always include friendly and respectful reference to Elizabeth Forbes, Harry Hughes, Julius Wagner, and G. W. "Tommy" Tompkins. These faculty members have aided students to build fine bodies, they have developed standards of fair play, of good sportsmanship and of co-operation on a team.
Among the faculty members who have served many years as teachers of physics are: Miss Mable A. Hoyt and Messrs. Fred G. Person, Frank P. Goeder and Dorsey F. Richardson. When Professor Person retired in 1938, Dr. Louis F. Weber came to the campus as Head of the Department of Physics. Mr. Goeder as the only one of the old timers now on the staff can speak for all, in his enthusiastic approval of the new work in the Department.

One of the newer tendencies is the cooperation of the physiologists with the botanists and others interested in research on such problems as ring rot of potatoes.

Another of the important new trends in the Department grew out of work done by Virgil E. Bottom during World War II. Mr. Bottom worked with the Signal Corps on the making of piezo-electric crystals. One of the problems in this work which baffled scientists for a time was that when some of the crystals were stored in England and later taken out of storage, they did not operate properly. It was Mr. Bottom's research which finally determined exactly what should be done so that the crystals could be stored and later used for the precise purpose for which they were designed.

Back on the campus Mr. Bottom is to give half time to the campus and half time to the Signal Corps. Unquestionably his studies, and other important research problems will bring to the campus both graduate and undergraduate students who are interested in physics.

The Department is further strengthened by extensive and valuable new equipment which makes it possible for the physiologists to revolutionize all the work they offer.
The Western Electric Company, realizing the value of pure science, has made large gifts for work in electronics; other equipment has come from the Denver Ordnance Plant.

While in the past, students could elect enough work in physics so that they had a major in that subject, now the Department is looking forward to offering one of the strongest majors on the campus. Dr. Weber is particularly interested in the fields of pure science, but is not neglecting applied science.
GENERAL DEPARTMENTS

Library

and

Military Science and Tactics
Two departments on the campus which have never been placed in a division are Military Science and Tactics and the Library.

**Military Science and Tactics**

In the issue of *The Rocky Mountain Collegian* for December 21, 1916 we find:

A senior unit of the Reserve Officers Training Corps seems assured for the college, and its organization will be started at once. . .

Under a recent act of congress, members of the training corps are to receive pay during the time of instruction, as well as when they are in the reserve. . .

The issue of *The Collegian* for March 6, 1919 states:

The establishing of a unit of Field Artillery at C.A.C. next fall is now a thing of certainty. This means that the Colorado Agricultural College has been designated along with such institutions as Yale, Harvard, Princeton, Cornell, the University of Kansas and Iowa State College for the training of a special military unit. It means that a complete battery of field artillery will be placed here, including latest types of guns, tractors, caissons, motor trucks, 96 head of horses and other equipment and that a complete course in military tactics as applied to field artillery will be given by U. S. army officers. . .

The field artillery will be horse drawn and motorized. . .

In 1919 Lieutenant Colonel William C. Harrison, Commandant reported that the physical training of the student body during the fall had been placed in charge of the military department. During September, October and November all the training was held outdoors and consisted principally of mass athletics along with general lines of the army work of that period. With the coming of winter in December the outdoor work was impossible and Colonel Harrison was recommending the construction of an armory.

Frequently during the twenties the work in Military Science and Tactics brought to the campus the War Department...
citation of "a distinguished college." However, the work was not all for boys. In the late twenties a pistol squad, under Captain MacKelvey, in which girls were included, was organized. Challenges for pistol team contests came from Oregon Aggies, Princeton University, University of Missouri, New Mexico Military Institute and Purdue University. Since about 1927 the pistol squad has been, off and on, a strong and interested group.

In 1918 another activity for girls was organized in connection with "military." Beginning on that date, one girl was selected annually as a regimental sponsor and one girl as a sponsor for each battalion and battery, respectively.

During the early thirties there was a strong movement on the campus led by the Dean of Women, Mrs. Lucy Adams, to do away with the training in military science or to reduce greatly the credits offered for this work. Those who believed in the military training succeeded in keeping it as part of the curriculum and as required training for all physically fit male students, but credits in this field were materially reduced.

The Department of Military Science and Tactics had charge during World War II of the military training programs on the campus. This work was under Colonel Walter P. Winton who was Commandant from 1940 to April, 1945. For the military training programs of this period see the section World War II.

The part played by the men trained at the College in Military Science and Tactics is illustrated by a story told by a faculty member. A Denver man said with a bit of a sneer to Mr. X., "You Aggies aren't doing so much in football this year."
Instantly Mr. X. replied, "We're too busy winning the war. Hadn't you heard?"

The Denver man nodded appreciatively. "I guess you're right," he admitted. (For names of men in armed forces, see Appendix.)

Library 1909-1915

**Working Conditions in the Library.** - When Mr. Joseph F. Daniels resigned in 1910, Miss Charlotte A. Baker, who had come to the College in 1906, became librarian. With two assistants, the Misses Ida Walker and Arlene Diltz, she cared for the 30,000 books and 26,000 pamphlets then in the library.

From the first, Miss Baker struggled to improve both the physical conditions of the library and its resources. She pointed out that icy steps were dangerous to life and limb; that in a periodical room with a hygienic maximum seating capacity of 17 the College was allowing 30 students to work; in the reference room which could be adequately ventilated for 25 students was still pointing out that the librarian's office had no ventilation and was poorly lighted. Emphasizing the un-hygienic working conditions she wrote in one of her reports, "I feel that we ought to consider the human animal as much as we do Carmen or any other blooded beast." Carmen was the herd stallion at the Government horse breeding station.

The physical conditions in the library were improved somewhat when in 1915 an addition to the building was erected, but in 1917-1918 the College enrollment increased 25% and the use of the library increased 54%, so the conditions were still not ideal.

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The Library in World Wars I and II - During World War I students in the S.A.T.C. were required to be in the library when not in class. (This was the old library building which now houses the Health Service.) Every boy had to sign up when he entered the building and twice a day a member of the library staff took the list around and asked each man to check his name. In the basement a hostess room was arranged in the fall of 1918 but was little used before the armistice was signed on November 11.

In September, 1943 with an Army Specialized Training Unit of 500 men on the campus, the large reading room in the new library became a study hall for the army trainees. However, cadet officers, not the library staff, checked attendance and supervised discipline. Again a room in the library was opened for a lounge, and this time Mrs. Bertha Whitney, who had been for some years hostess in the Student Union, was hostess, confidant and friend of the boys in uniform.

The New Building. - In the spring of 1928, 18 men, 6 women and 2 trucks moved the library in seven and one half days from the old building into the new one. Careful planning and a library assistant acting as overseer in each building made the record moving time possible. However, with everyone on the campus devoutly thankful for the new building, it was not at first ideal. While the old building had been hot and poorly ventilated, it was impossible to get the temperature of the reading rooms in the new quarters up to 65°. Daily for several weeks a man from the office of the building superintendent remained in the library for several hours each day (wearing his overcoat) but could not locate the difficulty. At last President Lory walked in one day, demanded
that the front be removed from one of the Univents and found that the contractors had never placed motors in the Univents. After this the rooms were comfortable.

**Bibliographical Center** - In 1934, because of the lack of limited library resources in the Rocky Mountain area, Dr. Malcolm G. Wyer of the Denver Public Library sponsored the establishment of a bibliographical center in Denver. At this time, 1934, Miss Baker sent to Dr. Wyer a list of documents "in the early numbers of the congressional serial set, and of the periodical holdings in this library."

About 1937 the faculty council voted that the College library should take an active part in the work of the bibliographical center. As in other libraries of the region, all author cards in the card catalog were photographed, and from these cards a union catalog was made. This union catalog, available at the bibliographical center, was a great step forward in library service for the Rocky Mountain Region.

**Miss Baker's Off-campus Interests.** - Serving as librarian at the Colorado Agricultural College, Miss Baker did not limit her attention to the institution. As a member of the Colorado Library Commission, she visited many small libraries in the State and, finding that those in charge of these libraries knew very little library science, she established for them summer school courses at the College. In 1918 there were more in her classes than in any other department on the campus. While she was training these librarians, she also put the resources of the College library at the service of small schools and libraries. She worked constantly for better State library laws and better State-wide service.
Miss Baker, retiring in 1936, could look back on 30 years of service. Under her direction the library had grown from 30,000 to 83,000 volumes. The staff had grown from 2 members and 2 student assistants to 9 members and 16 student assistants. The student body had increased more than 600. She had been for nearly a third of a century one of the truly educational influences in both the college and the State.

Mr. James G. Hodgson, who became librarian September 1, 1936, had been librarian of the International Institute of Agriculture at Rome.

**President Lory's Gift to the Library.** – Scarcely had Mr. Hodgson become librarian when President Lory gave to the College library his salary for work as chairman of the Federal Reclamation Repayment Commission. The money was distributed as follows:

- For books on Irrigation and Related Subjects $1,000
- For books on Engineering 200
- For books on Home Economics 200
- For books on Science 200
- For books on Veterinary Medicine 200
- For books on Vocational Education 200
- For books on Music 50

Later President Lory gave an additional $200 for books on Forestry.

**Growth of the Library.** – With nearly 100,000 pieces being loaned during the year, the circulation of the library reached its maximum in 1937-1938. By 1940 a junior librarian was giving half time to the establishment of a departmental library for the Division of Veterinary Medicine. The work not being satisfactory, it was temporarily dropped but resumed July, 1943. During the war a similar librarian was appointed to establish a library for the Division of Forestry and Range Management.

By 1939 the work in the graduate school had so increased that the librarian and a reference librarian gave much of their time
during summer sessions to assisting graduate students with theses and bibliographies. This meant that the students found more material, arranged it according to a uniform plan, and thus the theses became more valuable.

**Work of the Librarians of Colorado Colleges and Universities.** - The organization called the Librarians of Colorado Colleges and Universities was established in 1940. One of the first of its major projects was a study of the holdings of libraries of the Rocky Mountain Region with a view to avoiding unnecessary duplication of expensive and little used but essential serial and reference sets. This study led to a "Union List of Serials of Colorado and Wyoming." Mr. Hodgson has been very active in making this study and was also a member of the committee which began a survey of co-operative cataloging. For this project the committee found that before the work could be completed, several preliminary studies were necessary; some graduate students from schools of library science are now engaged in making these studies.

Now, 1945, the library ranks well with other libraries of its type. Because of the quantity of research done by Station employees on the post-doctoral level, the library has been built up to meet the demands of this type of work. The collections are, therefore, of the university, rather than of the college grade, and the library is listed with those of: the University of Chicago, Iowa State, Columbia, Pennsylvania State, the University of Michigan, Michigan State College, and Dartmouth College.
Maturity

Chapter XX

Division of Veterinary Medicine
Beginnings. — In 1907 Messrs. Charles A. Lory and George H. Glover appeared before the State Board asking for the establishment of two departments: Electrical Engineering and Veterinary Medicine. In 1908 Dr. Glover was head of a department with a staff of five men; in 1909 Mr. Lory was made President of the College.

Both men were ambitious, far-seeing, and had a knowledge of Colorado and its needs; one was to establish and develop one of the best veterinary schools in the United States; the other was to gear the College into the economy of Colorado and guide it to a recognized place among Land-Grant Colleges.

In the second decade before the end of the nineteenth century Dr. Glover began inspecting Texas Longhorns at the Colorado boundary on the old Chisholm Trail; in the second decade of the twentieth century the Longhorn was a curiosity in Colorado. Herefords, Shorthorns and Angus cattle now grazed on the old ranges. While the Longhorns never saw a feedlot, the work of College agronomists, animal husbandmen and pioneer farmers and stockmen had made the fattening of both cattle and sheep in Colorado profitable. True, some animals were still shipped to the corn belt for final fattening; but sugar beet pulp, Colorado corn, cotton seed cake, beet factory molasses and other feeds had made feedlot fattening an important industry in Colorado even in the first decade of the twentieth century.

Dr. Glover, the veterinarian who had stopped the Longhorns at the Colorado line, made Head of the Department of Veterinary Medicine, knew well that the horses and mules, which were the motive power of the day, and cattle and sheep in feed lots made veterinarians a necessity.
Honors. — In 1910 Dr. Glover, new as he was in his academic position, was elected to the presidency of the American Veterinary Medical Association. Aggie faculty men moved fast in those days, but aggressiveness was not limited to the faculty. The veterinary graduates of 1910, a group known on the campus for good brains and good citizenship, inaugurated in their department a much-needed reform, the honor system. Though they could not enforce this on the entire campus, the veterinary students who first planned it and their successors have made it the most cherished tradition of the Veterinary Division. Even veterinarians are human and there have been those who fall by the wayside, but the honor system is still a matter of pride in the selected group who strive for a degree in veterinary medicine.

In 1913, four years instead of three were first required for the degree of D.V.M.

Faculty. — In these early years Dr. Harry E. Kingman who in later years became an authority on the diseases of breeding cattle was impressing upon his students that "Skill is the flower that grows upon the hard, rough stock of routine." Dr. W. A. Whitehouse who became head of the work in anatomy in 1912 was the second son of an English earl. About the time Dr. Glover entered college, Mr. Whitehouse was raising horses in Wyoming, and he and others of his temperament and profession met annually in Cheyenne for a series of contests, particularly horse racing. The keenest competition was in a race in which each owner rode his own horse; winning was a coveted but expensive honor as the winner had to keep the prize, a silver
loving cup, filled with liquor for the remainder of the meet.

The panic of 1893 made indulging in this and other privileges which came high impossible, but no doubt it was this meet which is the foundation of the Frontier Days.

Realizing that his finances were slipping, Dr. Whitehouse, who had spent some years at Oxford, enrolled at the Ontario Veterinary College and earned a degree there; in 1909 and 1910 he received degrees at the Colorado Land-Grant College and in 1912 became a member of the faculty.

World War I took from the Department of Veterinary Medicine Drs. W. A. Whitehouse, Floyd Cross and E. E. Sakins. The first two of these were officers in the famous Battery A of the 148th Field Artillery. Dr. Whitehouse, separated from the Battery before it left for France, became a member of the Veterinary Corps of the army. After the war he earned a degree at Oxford and in 1919 returned to the Aggie campus, but the prohibition amendment caused him to limit his stay to two years. He is now (1945) Head of the Glasgow Veterinary College.

Dr. Cross, returning from France in 1919, has held many positions on the Veterinary staff. In 1945 he was Head of the Department of Pathology and Bacteriology and also was Extension Veterinarian. As a scientist, he is known for his study of the diseases of feeding lambs, a field in which the College is famous. In World War II he was Chairman of the local Draft Board and also of the State Procurement and Assignment Committee for Veterinarians.

Another famous member of the Veterinary staff is Dr. W. H. Feldman who came to the College in 1917. In studying tumors of lower
animals, he developed microphotography to such a point that in 1926 he was awarded a master's degree for his work. In 1927, he received an appointment as research pathologist with the Mayo Foundation for Medical Education and Research, "where he has become the best-known of Colorado State graduates in the field of pathological research." On the seventy-fifth birthday of the College, February 11, 1945, he was awarded the degree of Doctor of Science.

Dr. Feldman's scientific publications number in the hundreds, and he is widely known for his research "on the newer drugs for the treatment of tuberculosis. . ."etude.

That veterinarians at the College have not been narrow in their interests is shown by the fact that Dr. Feldman directed the band for ten years and was followed in the position by Dr. R. F. Bourne who also served ten years.

The period of World War I marked the closing of many private veterinary schools and the opening or rapid growth of those with State financial resources back of them. Kansas City Veterinary College was one of those that closed, and Dr. R. F. Bourne who had taught histology and physiology at that institution joined the faculty at Colorado Agricultural College. He at once became one of the most respected and popular teachers and later became Professor of Veterinary Physiology.

Up to 1918 all the veterinary work had been in one department, but in that year I. E. Newsom was put in charge of a new Department of Pathology and Bacteriology.

2. Ibid.
Another man who has become famous on the veterinary staff is Dr. James Farquharson who was employed in 1921 to teach anatomy. He has contributed to the department amazing energy, a strong determination to succeed and a rich vocabulary. These qualities have made him nationally known as a surgeon and have earned him the reward of election to the presidency of American Veterinary Medical Association. He is the second man on the Aggie faculty to hold this position, Dr. Glover, elected in 1910, being the first. At present (1945) Dr. Farquharson is head of Department of Surgery and Clinics.

In 1921 the veterinarians moved their quarters. In order that Ammons Hall might be erected, that site was cleared of the barns used by the veterinary students and faculty and the new Veterinary Hospital was built west of the Administration Building. At that time plans included an office and a laboratory building near the hospital but these plans could not be carried out for nearly twenty years. Barracks which had been constructed for World War I stood west of the athletic field. These were left vacant in 1918, and into one of the buildings the veterinary laboratory and lecture classes moved, but in January 1927 the building was destroyed by fire. Since the fire started during the noon hour and the wind was very high, no contents were saved; all records and equipment were burned. For a year and a half the veterinarians used the first floor of the Civil Engineering building and then moved back to the building which now houses the Health Service. This had at one time been the library and it was in this basement that Dr. Glover had at first housed some classes.
Five Years for a Degree. — In 1932 the Department of Veterinary Medicine began requiring a pre-veterinary year for entrance to the professional course. Even in spite of this the number of those wishing to enter the school was greater than could be accommodated, and in 1935 the enrollment was limited to forty. These forty have always been selected from States which have no veterinary schools and from States west of the Mississippi River. Such popularity of veterinary education is in considerable contrast to the situation prevailing in the early history of the department. Immediately after World War I with nearly 3,000 veterinarians released from military service and the agricultural depression beginning in the early twenties, the number of veterinary students dropped amazingly. In the drought years of the thirties large numbers of cattle were slaughtered and this too seemed to make veterinarians an unnecessary luxury. Because at times the very existence of the Colorado Veterinary School was threatened, Dr. Glover went forth into the land and talked to high school students who always found his personality and his dry humor so convincing that an increased enrollment followed his visits.

Women graduates in veterinary medicine have included Evelyn Hermann Keagy who finished the course in 1932. Her father, Dr. A. A. Hermann was a 1910 graduate of the institution.

World War II, because it called so many men into armed services, opened the way for women in veterinary medicine, and in 1945 two girls were enrolled in the junior and two in the freshman class.

Division of Veterinary Medicine, Dean Newson. — In 1933 resident instruction was officially organized in divisions, and Dr.
Glover became Dean of Veterinary Medicine. In this year also he
retired and Dr. I. E. Newsom was elected to this position. Later
Dr. Newsom became Vice-president of the College and still holds both
positions. Dr. Glover recalls that when he lured Ernest Newsom from
a dairy farm near Parker, Colorado, he was an unpromising awkward
boy. However, he very soon demonstrated his ability and his ambi-
tion and became a great source of pride to Dr. Glover. Upon his
graduation in 1904 he was made an assistant in the veterinary de-
partment. In 1906 he received the degree of D.V.S. from the San
Francisco Veterinary College and later he earned the same degree
at the Kansas City Veterinary College. Returning to Colorado he
has served continuously as a member of the teaching faculty and of
the Experiment Station Staff. He is an authority in the field of
pathology and bacteriology, having given much study to livestock
losses on the stock range and in feedlots. His contributions have
been an important factor in the solution of problems that have saved
the livestock men of western States thousands of dollars, particu-
larly in the sheep feeding industry.

Dr. Newsom has been constantly active in the work of the
American Veterinary Medical Association and has held important com-
mittee assignments, one of which was the chairmanship of the Execu-
tive Board. His associates believe that had it not been for a
serious illness in 1938, he would have been made president of A.V.M.A.

Dr. Newsom has been equally active in the United States
Livestock Sanitary Association and the Colorado Veterinary Medical
Society. He is a prominent Mason and has served as Grand Master of
the Lodge in 1927-1928.
From 1939-1941 he was Acting Director of the Experiment Station. In 1941 he was elected Vice-president of the College and for several months that year during an illness of President Green he acted as president.

In 1941 in recognition of his contribution to science, his fine citizenship and devotion to public good, the University of Colorado conferred upon him the degree of Doctor of Science.

**World War II Period.** — Up to March 1944, 601 students had been graduated from the College with the degree of Ph.D. of Veterinary Medicine. Though facilities were limited, the veterinary work has attained an enviable reputation, not for the number but for the quality of its graduates. Asked to mention outstanding graduates Dean Newsom replied that probably veterinarians in practice should be equally recognized with those in conspicuous positions, but he was persuaded to mention Dr. I. A. Merchant (1924) who is Professor of Veterinary Hygiene at Iowa State College and the author of a textbook on Bacteriology. Illinois University awarded Dr. Merchant the title of Doctor of Public Health. Dean Newsom mentioned also Dr. A. N. McGregor, inspector in charge, at Bureau of Animal Husbandry, Chicago. This is the most responsible position in veterinary service in the nation. Dr. G. W. Shepherd is a close runner-up, holding a similar position in the St. Louis Meat Inspection Station.

Dr. G. A. Boyd is head of the meat inspection service in California; Dr. Frank Mathews, an employee of the Texas Experiment Station, is well known for his work on poisonous plants and Dr. W. S. Shahan and Dr. Clyde Bean are known in the United States Bureau of Animal Industry. Dr. Elwood Nye was for many years in the army and held
the rank of Colonel, and in March 1946 returned to the College as associate professor in the Department of Pathology and Bacteriology.

During World War II more than 125 Aggie veterinarians were serving their country in responsible army positions. Dr. R. W. Davis was in India; and Dr. H. W. Johnson in China. Both were serving as instructors. Enlisting in the service a little late were William Howarth, ambulatory clinicship, and Dr. August Zancanella.

In the summer of 1942 the veterinary school together with most other divisions of the College was placed on a year round program, and the veterinary students who were eligible were commissioned in the Medical Administrative Corps, but were on inactive duty and allowed to remain in school. In July 1943 they were made privates first class, "put into uniform, assigned to active duty but still continued in their professional course."1

Maturity

Chapter XXI

Division of Vocational Education and Guidance
When the Smith-Hughes Act was introduced in Congress it promised such an expansion of vocational education as President Lory had scarcely dared dream about back in the days when Elias Ammons was betting him he couldn't drag 200 pupils from under the culverts to register in the School of Agriculture and when Fort Lewis was not much more than leaky roofs, broken water mains and rubble. The Smith-Hughes Act, violently opposed in Congress, probably would have gone down to defeat had not Charles A. Lory kept the Land-Grant Colleges in line and fighting for it. With this backing, it became a law in 1917. It provided money

... for the purpose of cooperating with the States in paying the salaries of teachers, supervisors, and directors of agricultural subjects, and teachers of trade, home economics, and industrial subjects, and in the preparation of teachers. ...  

The Smith-Hughes Act approved by President Wilson February 23, 1917 has remained almost unchanged for more than a quarter of a century. Other acts have increased the Federal funds given the States for vocational education and have broadened the training provided for in the original law.

The General Assembly of Colorado in April 1917 accepted the provisions of the National Vocational Education Law, and, since the State Board of Agriculture had demonstrated an interest in vocational training, this Board was named as the Colorado State Board for Vocational Education. Professor C. G. Sargent became the State Director of Vocational Education and Colorado Agricultural College.

was designated to train vocational teachers.

From this point the vocational work was a mushroom growth. High schools opened vocational courses and demanded teachers. Courses in teacher training on the College campus grew with the demand for trained teachers. Prominent among these courses was student teaching, and Miss Margaret Durward became the first supervisor of student teaching at the College. She was also the first person in charge of the Placement Bureau.

Miss Durward was another member of the faculty who gave her life as one of the key stones in the building of the College. She saw far into needs and into the future of Colorado, but above all she was beloved by the students.

Many an alumnus echoes the sentiment of Ed Divelbiss who said, "The College to me was Harry Hughes and Miss Durward. From them in college I learned what I have needed after college."

Charles A. Prosser and Charles R. Allen. — While the first agricultural and cooking and sewing clubs for boys and girls were being organized in Colorado, while the first school buses in the State were gathering children in the mountain valleys and on the plains, while the first courses in education were appearing on the campus, a national movement in vocational education was in the making. Many States and many men contributed to this, but Charles R. Allen and Charles A. Prosser were the men, who, tremendously influential in the Nation-wide movement, were equally influential in swinging Colorado Agricultural College into a position of leadership in this movement.
Charles R. Allen was of the New Bedford Allens, a Mayflower family that had been whalers for generations. Charles R. was one of the first class of three to graduate in chemical engineering at M. I. T. He first worked with the Boston Metropolitan Sewage District, and, wearying of this, taught physics and chemistry for twenty years at New Bedford.

At the end of this fifth of a century of teaching he wanted a new view of his job and appeared before his superintendent to say, "In my left hand coat pocket I have a request for a year's leave of absence; in my right hand pocket is my resignation. Which will you have?"

The superintendent chose the request for leave, and Allen attending Harvard for a year, studied under Paul Hanus. At the end of the year a committee of the Harvard faculty waited upon Mr. Allen to ask him if he would accept a M. A. Degree.

Accepting the degree, Mr. Allen returned to New Bedford and built up a trade school. David Snedden was Commissioner of Education for Massachusetts, and about 1911 Charles A. Prosser became Mr. Snedden's assistant. Mr. Prosser heard about Allen's school, visited it and made Allen State Supervisor of Trade and Industrial Education. Mr. Prosser became Secretary of the Society for the Promotion of Vocational Education, was the author of the Smith-Hughes Act and the first Director of the Federal Board for Vocational Education.

When World War I began, one of the jobs thrown at Mr. Prosser was the quick thorough training of men to build a fleet,
so he lent Allen to the Emergency Fleet Corporation to train ship builders.

Mr. Allen gathered about him selected men to train as leaders. He lived, ate and studied with these men, and, since they were studying ship construction and using ship terms, they called each other by such names as cabin boy, mess steward, and Mr. Allen became "Skipper" Allen.

After this the "Skipper" was chief Educational Consultant for the Federal Board of Vocational Education. He was the father of the application of the use of engineering thinking to the training of men in industry. He took the formula M + T + R, M being manual skill, T being technical knowledge and R being effort, and analysed it with such questions as, what is manual skill? He stated three basic needs: a properly selected group of learners, functional content, and a properly qualified instructor. To these three basic principles he added the conference method.

The Summer Session. — Professor George T. Avery, of the Department of Rural and Vocational Education became Director of the Summer Session of Colorado Agricultural College in 1919 and continued in this position until his retirement in 1942. Dr. Avery at once began emphasizing in the catalog the need for teachers of vocational agriculture, home economics, trade and industries. At last the summer session was on its way to becoming unique.

In 1923 Charles R., "Skipper," Allen, first taught in the summer session and until his death in 1939 he was a regular and leading member of the summer staff. Charles Allen Prosser,
possibly the only man who ranked ahead of "Skipper" Allen in all phases of vocational education, joined the College summer staff in 1928.

The "Skipper" used to say that he thought Colorado Agricultural College offered him a better opportunity than any other school in the country "to spread the gospel of effective trade and industrial education."

The top men and women in the vocational fields agreed with the Skipper, and the College summer session became known as the national training ground in vocational education.

In 1923 George Henry was added to the Mechanical Engineering resident staff and took charge of the industrial arts phase of vocational education; in 1926 Dr. Maudie Williamson came to the campus as the first full time teacher trainer in vocational home economics, a position which she still holds.

Others on the Faculty. — Others who gave vocational education at the Land-Grant College of Colorado a national reputation were:

In Trades and Industries:

*Dr. Charles R. Allen
Dr. Charles A. Prosser
L. E. Travers
George S. Sanders

Consultant for Office of Education
Director William Hood Dunwoody Industrial Institute
Personnel Director, Los Angeles Public Schools
On leave U. S. Office of Education to produce instructional material for Air Service Command — Wright Field, Dayton, Ohio

*George P. Hambrecht
Director of Vocational and Adult Education for Wisconsin

I. G. A. Schmidt, "Department of Vocational Education and Guidance" ms. p. 16.
Walter Cooper Western Agent, Trade and Industrial Education, Washington, D. C.
Herb Heilig Director of Appleton Vocational Schools and now Grand Secretary to Sigma Phi Epsilon Fraternity.
Reed M. Bass Director of David Rankin School of Trades, St. Louis, Missouri.
Clyde A. Bowman Dean of Industrial Education Division, Stout Institute.
Thomas Quigley Teacher Trainer in Trade and Industrial Education, Georgia Institute of Technology.
Harry A. Tiemann State Director of Vocational Education in Colorado.
C. L. Wetzel State Supervisor of I teacher training for Missouri - on leave now to conduct War Production Board training program in four mid-western states.
Frank Cushman Chief of Trade and Industrial Education Services Washington, D. C.
Jerry R. Hawke Assistant Chief, Trade and Industrial Education Services, Washington, D. C.
R. F. Jarvis Director of Alabama School of Trades, Gadsden, Alabama.

In Vocational Homemaking Education:

Mrs. Kate Kinyon, Director of Home Economics, Denver.
Helen Burnham, Author of books on home economics for boys.
Rowan Elliff, of the University of Nebraska.
Mary V. Helman, Director of Guidance, Orange, New Jersey.
Winifred Hazen, State Director of Parent Education, Utah.
Ran Van Horn, U. S. Office of Education.
Eva Waller Scully, State Supervisor of Arizona.
Hazel Thompson, State Supervisor of Kansas.
Dr. Ada Hart Arlitt, University of Cincinnati,
Elizabeth Riner, Director of Home Economics, Omaha.
Mrs. Jean Bloom, State Department of Vocational Education, Colorado.

1. List prepared in 1944.
* Deceased.
Vocational Education in Agriculture.

A few of the outstanding men that have taught classes in vocational educational agriculture in the summer session of Colorado State College.

Dr. Harry E. Bradford, Teacher Trainer, University of Nebraska.
Dr. C. S. Anderson, Pennsylvania State College.
Dr. A. W. Nolan, Teacher Trainer, University of Illinois.
Dr. Roy Davenport, Teacher Trainer, Louisiana State University.
Dr. C. R. Humphreys, Teacher Trainer, Utah State College.
Louis M. Sasman, State Supervisor, Wisconsin.
Lester B. Pollom, State Supervisor, Kansas.
J. B. Perky, State Director and Supervisor, Oklahoma.
L. D. Klemmedson, State Director and Supervisor, Arizona.

The results reported in vocational education are, in contrast to those reported by many other departments, results of teaching rather than findings in Experiment Station projects. Teachers of vocational agriculture report that in many years the net earnings of the boys in the vocational agriculture classes in high schools in Colorado have amounted to $100,000. In 1944 a few of the men who earned degrees in vocational agriculture at the College were:


... three of the nine men supervising the Federal program in Vocational Education in Agriculture in the United States Office of Education are: W. Arthur Ross, Elmer J. Johnson and W. W. Elam.

1. G. A. Schmidt, "Vocational Education in Agriculture." ms.
2. Ibid.
All over the Nation, a high percentage of men in supervisory positions and in teaching of vocational agriculture studied or completed their work at the Colorado Land-Grant College. In home economics education, the graduates of the Colorado Land-Grant College/supervisory positions in 15 States and Puerto Rico. "They have had teacher training positions in 17 States and Puerto Rico; they have served in a professional capacity in technical colleges in different states, Hawaii, and Puerto Rico."¹

A few of the outstanding alumnae in vocational homemaking education:

- **Edith Harwood**
- **Mary Gillespie**
- **Eva Waller Scully**
- **Gertrude Roskie**
- **Carmelina Capo**
- **Kate Williams**
- **Lenolilah Gandy**
- **May Dubois**
- **Myra Bowell**
- **Rose Cologne**
- **Avis Talcott Wells**
- **Pauline Winkler**
- **Shirley Newsom**
- **Iva Caldwell**
- **Edith Craig**

  Supervisor of Montana,
  State Supervisor of New Mexico,
  State Supervisor in Arizona,
  Assistant Supervisor in Oregon,
  Supervisor of Home Economics in Puerto Rico,
  Assistant State Supervisor in Arkansas,
  Head of Home Economics Department,
  Langston University, Langston, Oklahoma,
  Teacher Trainer, Oregon State College,
  Director of Child Development, North Texas State Teachers College,
  Pennsylvania State College,
  Director of Vocational School, Providence, Rhode Island,
  Dean of Girls, Grant High School, Denver, Colorado,
  University of Iowa,
  Supervisor of Migratory Camps, Texas,
  Supervisor of Home Economics Indian Schools, New Mexico.

**Graduates in Trade and Industrial Education.**

As early as July, 1941, vocational men throughout the nation were called upon to institute defense training programs. During this period more than a million operators were taken from the relief roles, trained and placed in production jobs. Following the entrance of America into the war, training efforts were trippled and significantly expanded.

today (December, 1943) over 8 million men and women have been trained or retrained to take their place in some phase of War production. Colorado State College can be proud of the number of T & I graduates that are responsible for a major part of this training program. More than nine C. S. C. graduates are directing the program from the national level. Twenty-three states are relying on our graduates to do the administrative and directive work, while the classrooms of vocational schools are controlled by hundreds of teachers that are taking, or have taken, work in the Vocational Division.1

Among the graduates who have earned degrees in the guidance and personnel work in vocational education are:

Mary Frances Inman. At present in the Teacher Training Department of the University of Minnesota. She was supervisor of student teaching in Colorado, area supervisor of homemaking teachers in Texas, teacher trainer in North Texas State Teachers College.

May Dubois. At present assistant professor of education, Oregon State College. Formerly supervising teacher in Colorado and at the present time is assistant teacher trainer at Oregon State College in charge of supervision of student teaching.

Ruby Clark. Formerly supervisor of student teaching in Colorado. At present, itinerant teacher trainer and supervisor of student teaching for the State Teachers College at De Kalb, Illinois.

Rose Cologne. Formerly supervisor of student teaching in Nevada. Later itinerant teacher in adult work, particularly parent education, in Kansas. At present, in charge of child development and parent education, Pennsylvania State College.

Lucile Fee. Formerly supervisor of student teaching in Colorado and now assistant state supervisor of homemaking education in Colorado.

Leonora Zimmerman. Formerly supervisor of student teaching in Colorado and now state supervisor of homemaking education in Colorado. For one year she was regional supervisor of women's work under the National Youth Administration.

Shirley Newsom. Instructor in pre-school, University of Hawai'i. Later held the same position at Merrill-Palmer School in Detroit. At present she is on the faculty of the Child Care Institute, Iowa University.¹

Campus Attitude. - The development on the campus of vocational education under the Smith-Hughes Act was not without growing pains, violent growing pains. The Vocational Education Act of 1917 created a great and immediate demand for high school teachers of vocational subjects; it also carried the provision that each State vocational board should establish a minimum number of years of on-the-job experience for men who were candidates for degrees in trade and industry. The Colorado Board for Vocational Education set five years as this minimum, and this was approved by the Federal Board for Vocational Education.

This ruling meant that those who appeared for the teacher training courses were shop men very few of whom had completed high school. They, therefore, did not have college entrance requirements.

The men were given some college credits toward a B. S. degree for their shop experience. Many of the faculty strongly and constantly opposed this on the ground that the College in granting degrees on such a basis was lowering standards.

When these men accepted teaching positions in high schools and found that promotions and salary increases were based on, not a bachelor's degree, but on a master's, back they came to the campus to earn an M.S.

¹ Maude Williamson, "Guidance and Personnel Section of the Division of Vocational Education and Guidance," ms.
If there had been faculty division on the policy of
granting the B.S. to men who had not completed their high school
work, the question of granting the M.S. to such men brought fac-
culty members to council meetings ready to cut the academic and
educational threats of the opposition. (See Annual Report)

In 1946 with ex-service men who did not complete high
school doing as good or better college work than high school
graduates, the policy of granting degrees to men without the
high school entrance credits is not questioned.

**Recent Activities.** - During the thirties and early forties,
the phases of subject matter stressed in the Division of Education
and Guidance were: distributive occupations, guidance and counsel-
ing, trades and industries, vocational agriculture and vocational
home economics.¹

In 1937 James A. McCain introduced as an annual feature
in vocational guidance the Senior Job Conference. Such a confer-
ence included a talk on letters of application for jobs, a play
showing how not to make a personal application, a style show of
men's and women's clothes for business, and talks by high ranking
persons in agriculture, home economics, economics and sociology,
ingineering and chemistry, and forestry. In the days of the de-
pression, these conferences meant much to seniors going out into
a world crowded with the unemployed.

¹ When Dr. Avery was retired in June, 1947, the Depart-
ment of Rural and Vocational Education became the Division of Voca-
tional Education and Guidance with James A. McCain as Dean. In

¹ January 1, 1946, this division was dissolved and the depart-
ments reported directly to the President, not to a dean.
In 1940 Mr. James A. McCain was made Dean of the newly organized Division of Student Personnel and in 1942 this work was combined with Vocational Education and the Division of Vocational Education and Guidance, under Dean McCain, was established.

**Historical Background.** - From 1906 to 1912 Mr. James W. Lawrence was known as Dean of the Faculty; in 1911 Mr. S. Arthur Johnson was temporarily appointed to this position and his appointment was made permanent in 1912. He served in this position until 1925.

Through all the years such faculty members as Dean Johnson, Dean Virginia Corbett, Miss Margaret Durward and others had been sought by students who were in need of advice; a more formal step in aiding students was the organizing in 1928 of an orientation program for freshmen. Under this program freshmen arrived on the campus a few days early, these days being devoted to special tests, lectures and registration. This plan has continued to the present. In December 1933 the State Board of Agriculture abolished the title Dean of Faculty and substituted Dean of Men. The Dean of Men had in his charge the supervising of living and social arrangements of the men students, some supervision of fraternity life, the assisting of students in securing employment, some minor disciplinary cases and the supervision of extra curricular activities.

When Dean S. Arthur Johnson retired in 1935, Dr. Floyd Cross of the Division of Veterinary Medicine became Dean of Student Relations. Dr. Cross returned to full time work in veterinary medicine in 1940.

The Division of Vocational Education and Guidance as
established in 1942 enlarged the work done in securing positions for graduating students, in freshman and sophomore counseling, and in student employment and housing.

In stressing guidance and counseling, Dean McCain invited such outstanding men as Dr. E. G. Williamson of Minnesota and Dr. Robert Bush of the American Council of Education to come to the campus to talk to students.

Under the Division of Vocational Education and Guidance are the following departments: Distributive Occupations, Trades and Industries, Vocational Agriculture, Vocational Homemaking, Non Vocational Education and Psychology. Majors were offered during the regular school year only in Distributive Occupations and in Trades and Industries.

When Dr. Avery was retired in June, 1942, the Department of Rural and Vocational Education became the Division of Vocational Education and Guidance with James A. McCain as Dean. In
the fall of 1942 when Dean McCain was called to the navy, Dr. Thomas O. Marshall became Acting Dean and Director of the Summer Session.

This division has never offered during the regular college year courses leading to degrees; it offers work which students majoring in another field may take to qualify for the State High School Teachers' Certificate and it offers the special training required for teachers of vocational subjects in high schools.

In the summer session, the Division of Vocational Education and Guidance offers courses leading to both a bachelor's and a master's degree in Distributive Education, Industrial Arts Education, and Trade and Industrial Education; and leading to a Master's degree in Agricultural Education, Guidance and Counseling, and Home Making Education.¹

On December 1, 1944 Herbert Heilig, who had been a member of the summer session staff since 1926, came to the College as Director of Vocational Education.

Tribute

Dr. Charles A. Prosser, Director of the Dunwoody Industrial Institute of Minneapolis, speaking at a vocational education conference held in honor of the seventy-fifth anniversary of the founding of the College said in part:

No story of the achievements of the Smith-Hughes schools would be complete that failed to describe their record in World War II. In the four years from July 1, 1940 to July 1, 1944, they gave vital pre-employment war training to more than 2,580,000 workers; to more than 3,970,000 supplementary war production workers; to more than 3,000,000 food production workers—a total of almost ten million.²

Maturity

Chapter XXII

Graduate Work.
Graduate Work

The Committee on Advanced Degrees first appeared in the catalog of 1908-1909. It was composed of L. C. Carpenter, J. W. Lawrence, W. R. Thomas and W. P. Headden. Professor Carpenter was a world-famous irrigation engineer, head of the Department of Civil and Irrigation Engineering and Director of the Agricultural Experiment Station. Professor Lawrence was a member of the first faculty and head of the Department of Mechanical Engineering. W. R. Thomas was a former editor of the Denver Rocky Mountain News and a teacher of political economy, and Dr. W. P. Headden carried a Ph.D. from a German university, was head of the Chemistry Department, and was chiefly interested in research.

Professor Carpenter left the Institution in 1910 and was succeeded as chairman by Dr. Headden. On the death of Professor Thomas the name of Alvin Kezer appeared on the committee in 1915. In the following year the committee was increased to five by the addition of Inga M. K. Allison, head of the Home Economics Department, and Dr. I. E. Newsome, who became Dean of the Graduate School in 1917.

In the catalog of 1920-1921, Dr. C. P. Gillette, Director of the Experiment Station, as chairman, and Dr. E. P. Sandsten, horticulturist, with Dr. Newsom, constituted the committee. In 1929 these men resigned in protest over the recognition of certain men in Trade and Industrial Education as candidates for advanced degrees; they were succeeded by Dr. Charles A. Lory, President of the College, Dr. Gillette, Director of the Station, and S. Arthur Johnson, Dean of the Faculty. This committee continued, with Professor B. F. Coen as secretary, until 1934 when the names of
Dr. Newsom, Dr. George T. Avery, Director of the Summer School and Head of the Department of Vocational Education, and Professor Kezer appear. The following year S. J. McCracken, registrar, was made secretary, and this committee remained practically intact until the Graduate School was organized in the summer of 1941. The Graduate Council, composed of the Dean of the Graduate School, the President of the College, and the deans of the divisions, with Mr. McCracken as secretary, then replaced the Graduate Committee.

The first master's degree was conferred on Burt C. Buffum in 1893 who had received his bachelor's degree three years earlier. He was appointed Professor of Agriculture at the Colorado Agricultural College in 1900. He became Professor of Agriculture and Director of the Agricultural Experiment Station at the University of Wyoming in 1903, and served with distinction in this position for many years, severing his connection to head a large seed-growing concern at Worland, in the same State. Here he continued until his health broke some years later. He died in Denver in March, 1944.

The second master's degree was given to Frank Beach in 1895, his study being on soil moisture. The third was conferred on Clarence V. Benson in 1896 for a study on "Priority of Water Rights for Irrigation in the Arid West". Thus it was that the college continued to lay the foundation for the high position it held for years in the broad field of irrigation and reclamation.

The fourth degree was an honorary one granted to Grace Espy Patton, who was librarian as well as instructor, and who later as State Superintendent of Public Instruction made a...
place for herself in the educational life of Colorado.

In 1898 an earned degree was given to William R. Fairfield who spent most of his later life as Director of the Dominion Experimental Farm at Lethbridge, Alberta, Canada.

Between 1893 and 1922 only 21 master's degrees were conferred. Beginning with the latter year the effect of the passage of the Vocational Education Act and the development of the summer school for teachers meant an increase in the number of advanced degrees until the peak of 43 in 1939. The degree of Master of Arts in Education first appeared in the early twenties. Nearly all of these were in the vocational education field, the science departments rarely furnishing more than three in any one year. Recently there has been a tendency to grant the degree of Master of Education to those who finish in the educational field, and reserve the Master of Science for those who do their work in the science departments. Thus we see the cleavage between the research degree and the so-called professional degree which is given to those who take a more general program of professional improvement not built around intensive study of a particular problem.

Honorary Degrees. — According to the alumni directory, published in 1928, seven honorary degrees, had been granted up to that time; 3 M.S., 1 M.A. and 3 B.S. The records in the registrar's office add one additional honorary master's degree given in 1930 and none since that time. Because several of these early degrees were conferred on regular members of the faculty, it is not easy to determine whether they were earned or merely represented an attempt on the part of the institution to raise itself by its own boot-straps. In the last 20 years there has been a strong
current of criticism that has prevented the bestowal of honorary degrees on faculty members. In 1925 the Committee on Advanced Degrees recommended, and the Faculty Council approved, that no one above the grade of assistant professor might become a candidate for a higher degree.

The present standards for granting advanced degrees have been a process of growth in the United States. S. E. Epler in the Journal of the Association of Collegiate Registrars, says that

Yale's first honorary degree (M.D.) was given in absentia to an Englishman in appreciation of a gift of books estimated in value at 16 pounds, and Ex-President John Q. Adams, himself a holder of an L.L.D. from Harvard, strenuously opposed a similar award to his rival, President Andrew Jackson. Invited to be present at the ceremonies he refused, and made the following comment in his diary: 'As myself an affectionate child of our Alma Mater, I would not be present to witness her disgrace in conferring her highest literary honors upon a barbarian who could not write a sentence of grammar and could hardly spell his own name.'

Dean Newsom comments that

It may be surmised that the record of Colorado State, while not unimpeachable, is as clean in respect to honorary degrees as is that of any other collegiate institutions in the country.

Trade and Industrial Education. — The problem precipitated by the passage of the National Vocational Education Act was just as far-reaching and controversial as the old contention between the proponents of classical and technical education and the more recent one on whether the Land-Grant institutions should be agricultural or state colleges. 3

Teachers of agriculture and home economics under the Vocational Education Act fitted into the established program because there were already college graduates and thoroughly grounded in college traditions.

The teachers in trade and industry, however, under the terms of the law must have had five years of trade experience, and this usually meant that they had little or no college training. As soon as they were added to the high school staffs they at once came under the restrictions of position and salary based

1. Quoted by I. E. Newsom, "Graduate Work," 400
2. I. E. Newsom, "Graduate Work," 400
upon college degrees. The colleges were flooded with applications from these mature men who were highly competent in their fields but felt the need of a college degree.

It may be truthfully said that the Colorado State College took the lead in offering these men the advantage of a college education on favorable terms. Sparked by such able pioneers in the trade and industrial field as Dr. Charles A. Prosser, and Dr. C. R. Allen, who were also members of the original Federal Board for Vocational Education, the summer school at Fort Collins became the educational center for this enthusiastic group. The controversy in the faculty was over the question of how much credit was to be allowed for experience. Since these men were mature and leaders in their vocation, the College went to considerable extreme in this direction and thus brought onto itself the severest criticism from educational leaders throughout the country. This reaction can be only likened in intensity to that which many institutions received for liberality in the granting of honorary degrees.

While this was not essentially a graduate problem, it had its repercussions in the graduate committee. The trade and industrial men armed with their bachelor’s degrees immediately applied for graduate work. The committee, being composed of technical men, did not feel that these new applicants were sufficiently grounded in the basic sciences to be acceptable candidates for the master’s degree. These discordant views caused the resignation of at least one graduate committee.

The net result of all this was that gradually the credits for trade experience toward the bachelor’s degree was restricted until they no longer created opposition in the faculty, and the men were accepted by the graduate committee on the same basis as other college men.

Looking back from this safe distance, it must be admitted that many of the leaders in the trade and industrial field today got their formal education at Colorado State, and the College may well take pride in the fact that it was the pioneer in this branch of education and that these men hold its degrees.¹

¹ I am indebted to Dr. I. E. Newsom, Dean of the Division of Veterinary Medicine and of the Graduate School for the material on the Graduate School.
Chapter XXIII

The Three Horsemen:

Depression, Drought, and Politics
In the latter half of the twenties Colorado entered upon a period dominated by the three horsemen: depression, drought, and politics—and not the least of these was politics.

Affecting the farmer, three of the chief phases of the depression were falling prices of his produce, rising living costs, and drought.

The Farmer's Income - In 1925 Colorado farmers received an average of $1.41 a bushel for wheat. This dropped annually to $0.96 in 1929 and to $0.33 in 1931. Not until 1936 did the price again reach one dollar. The average selling price of corn, $0.98 in 1925 dropped in 1927, rose slightly in the next two years and then dropped to an average low of $0.28 in 1932; in 1934 it was $0.97 but it then dropped and was not again as high as $0.71 until 1941. Under such conditions the farmer felt as he did when he dreamed he was falling, but this drop in his income was no dream; it was the real thing.

And while his income dropped, the prices he paid remained high. By 1929 what he bought cost nine cents more on the dollar than what he sold; by June, 1932 his dollar was worth $0.48.

Between 1921 and 1933 a million and a quarter farm families, about twenty percent of those in the United States lost their farms; the same percentage held in Colorado.

Drought. - The farmer, reaching with one hand to pull prices he paid down to his level, with the other hand tried to drag prices he received out of the bottomless pit, and never had two hands did meet. While he was thus precariously off balance, another

2. T. H. Summers, Interview.
3. Ibid.
disaster came upon him. This was drought. No rain in spring, summer, and fall, and little snow in the winter spelled disaster in Colorado.

Farmers tried to improve their condition by wild speculation in stocks and securities and this added impetus to the drive toward the crash of 1929.

The water supply being insufficient, the yield per acre of winter wheat in 1930 was 10.5 bushels. This dropped to 2.6 bushels in 1933 and remained around two and three bushels per acre until it rose to 6.2 bushels in 1936, to 8.7 in 1937 and 11.4 in 1938.1

Taxation in Colorado. - As though his declining income during the twenties and early thirties to reduce the farmer to destitution, taxes were rising. Since he had low selling prices and scant yields on one end of his teeter-totter and no weight on the other end to hold down taxes, they tilted alarmingly toward the sky. In the early twenties, buying, building, expanding were rampant. Such projects had to be paid for, and, therefore, taxes mounted rapidly. In 1928 the Standing Committee of the Colorado State Grange reported that over the nation farm taxes had increased 235 percent in the years from 1913 to 1928: in Colorado an Agricultural College Extension study reported an average property tax increase of 221 percent between 1913 and 1927;2 for the same period assessed valuation of intangibles showed no increase.

The whole tax system of Colorado was at fault. As Dr. E. R. A. Seligman, the leading tax authority in Colorado, said in 1916, "There is not a single tax expert in the entire country who approves of the system as it is provided by law in Colorado. It is under modern conditions, impossible to secure fiscal justice under that system."

Real estate in Colorado bore the heavy burden of both local and State taxes. Mr. A. Gayle WalDROP, using a table taken from the Fourteenth Annual Report of the State Tax Commission, indicated the percentages of the total Colorado tax paid on different forms of property.

<table>
<thead>
<tr>
<th>Property</th>
<th>1912</th>
<th>1925</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land and Improvements</td>
<td>21.27</td>
<td>32.22</td>
</tr>
<tr>
<td>Metalliferous Mining Properties</td>
<td>4.27</td>
<td>1.50</td>
</tr>
<tr>
<td>Live Stock</td>
<td>4.26</td>
<td>3.05</td>
</tr>
<tr>
<td>Timber, Coal, and Oil Properties</td>
<td>1.98</td>
<td>1.86</td>
</tr>
<tr>
<td>Town and City Lots and Improvements</td>
<td>40.00</td>
<td>31.06</td>
</tr>
<tr>
<td>Corporations Assessed by Tax Commission</td>
<td>14.44</td>
<td>14.76</td>
</tr>
<tr>
<td>Merchandise</td>
<td>3.95</td>
<td>5.26</td>
</tr>
<tr>
<td>Manufactures</td>
<td>1.83</td>
<td>2.49</td>
</tr>
<tr>
<td>Bank Stock</td>
<td>1.84</td>
<td>1.52</td>
</tr>
<tr>
<td>Money, Credits and Accounts</td>
<td>0.97</td>
<td>1.15</td>
</tr>
<tr>
<td>Miscellaneous (Less exemptions)</td>
<td>6.19</td>
<td>5.03</td>
</tr>
</tbody>
</table>

These figures are an incomplete picture of the tax situation in Colorado, but they do show two basic factors—the tremendous increase in taxes and the inequality of distribution. Rural people were under the heavy end of the seriously unbalanced tax load, and the Colorado Agricultural College through the Extension Service

2. Ibid., p 235
was in close touch with men who found the prices of what they had to sell going down and the prices of what they had to buy going up, in touch with those men who paid an unjustly large proportion of city, county and State taxes and were losing their farms on tax sales or mortgages.

Prior to 1913, tax assessments were in general on the basis of about one third the valuation of property; commencing in 1913 a full cost valuation was for a time the basis. This rose to a high in 1920, declined from 1920 to 1924, then rose annually to the end of the decade. In 1930 another serious decline set in. As total State valuations changed, counties could do what they had done twenty years earlier--raise the mill levy; maximum mill levies for State purposes, fixed in the constitution and by law, could not rise indefinitely. Consequently, though taxes were burdensome, the State had difficulty in financing its continuously rising expenditures.

**Tax Reform Movements.** - Tax reform followed two general lines: one, bitter, sometimes blind attacks by guerillas with a view to destroying tax-supported phases of living. These individuals were overburdened taxpayers who in spite of tremendous effort, were losing their all; or they were men—and women—inspired by financial interests which were fearful of reform.

The other group attacking the tax problems was made up of economic experts who studied with a view to devising a more equitable tax system. One of the first moves of the College to assist in improving the tax situation was a study made by the Extension Service under Director Roud McCann. This study revealed the fact that tax payer leagues were formed when taxes had increased four to six fold. With sporadic and violent exceptions, farmers and farm
organizations supported the economists.

President Lory's Policy. — Knowing well that studying taxation and recommending changes meant fighting a hornet's nest, President Lory insisted that the College make a beach-head landing. A guiding principle of Dr. Lory's entire administration was that a College giving great service could exist only in a prosperous State; he believed that his position as President of the Agricultural College laid upon him duties to the State as well as to the College, and men who worked most closely with him say he never fought narrowly for the institution at the expense of the commonwealth.

Knowing that tax reform might mean opposition of powerful interests and the misunderstanding of hundreds of tax payers, and knowing the dirty possibilities arising in both lines of opposition, an influential friend urged President Lory to keep hands off.

"Why do you fool with the damned tax situation?" he urged. "You've been at the College many years; you've made a good reputation. The institution has developed and has a good standing. Why not let this tax thing alone?"

To this Dr. Lory replied, "If the Institution is to serve the people, and the tax system is not good, isn't it the Institution's duty to study taxes as well as animal diseases?"

"I'm concerned about you personally," the friend argued. "Why don't you stop? You'll suffer for it."

President Lory's answer was characteristic. "I'm
reaching the end of my period. Isn't it better for me to take the rap than to leave it for a new man who faces all the difficulties a new man must face?"

As a group, the State Board of Agriculture approved the President's stand.

On the campus some men from the first saw only the ill-effects accruing to the College if it engaged in tax studies, and as the fight progressed and the poison of near-sighted or unjust accusation was poured on the Institution, they were more convinced that the College should hunt a hole and stay in it until the tax hurricane had blown over.

President Lory's reply to the arguments of these men was, "I feel if the Institution is not permitted to study poor government and recommend improvements just as it studies poor farm management and recommends improvements, then the days of democracy are numbered."

Following his convictions with regard to the function of a Land-Grant College in a democracy and regard to its duty to the State, President Lory led the way into the tax studies, and other Colorado institutions of higher learning followed his leadership. All working together, the institutions assigned fields of study. In general, the Agricultural College was to investigate taxation in rural areas and for the support of rural schools; Teachers College had the field of general school taxes; the University took municipal and industrial taxes, and the School of Mines the taxation of mines and mining products.
Findings were published in newspaper and magazine articles, in reports and in bulletins.

The School of Mines could not free a man from other duties sufficiently to permit him to make large contributions to the general taxation studies. However, Mines did report to the other institutions that the tax Colorado needed for mines was a severance tax, but it would be impossible to sell this idea to the mining corporations, many of them out of the State.

The other institutions worked valiantly and published fearlessly. Several men at the Agricultural College gave part time to the tax studies, but G. S. Klemmedson began his work in 1927 and was chief investigator. As 1937 he had written twenty-eight bulletins and reports on phases of the Colorado tax situation. Most of this was published by the Experiment Station. Titles selected at random are:

- Outline of Colorado Tax Laws for Farmers
- Colorado Tax Facts
- Constitution By-Laws and Certificate of Incorporation for Local Taxpayers Associations
- Education and the Tax System
- Highway Utilization and Finances in Colorado
- Report on Agricultural Resources in Colorado

Such titles indicate the scope and depth of Mr. Klemmedson's work, but he did not limit himself to this form of publishing tax information; President Lory in talking to men in the fields and shops often found them reaching into their pockets for newspaper clippings of short items by Mr. Klemmedson. These were specific and readable.
When President Emeritus Charles A. Lory thinks back now to the days of the tax fight, he comments, "Mr. Klemmedson was the kind of officer a fighting general needs. He was fearless, dead sure of his facts and never had to retract."

Mr. W. B. Mooney, Executive Secretary of the Colorado Education Association, who was in the midst of the efforts to reconstruct the tax system of Colorado says:

The taxation studies are one of the finest things the College ever did. Klemmedson as a citizen and as a professor was the most outstanding member of the College faculty. He was fearless and he knew his field. The College will live, if it lives, primarily because of the work of G. S. Klemmedson and the stalwartness of Charlie Lory. ¹

The courage and devotion to duty of these two men lifted them head and shoulders above their fellows—and made them targets to shoot at. Men and women who represented the great financial interests, and the tax payer who saw in the destruction of schools and colleges a way to reduce taxes became sharp-shooters and attacked from behind every bush and out in the open. President Lory, carrying the ball, as so often happened, for all the Colorado institutions of higher learning, made political enemies but moved forward on the line he had set for himself.

In December 1936, Governor-elect Teller Ammons requested Mr. Klemmedson's services "in compiling the budget and in legislative work in regard to revenue, taxes, irrigation, and other agricultural and economic problems."² The State Board of

¹ W. B. Mooney, Interview.
² St. Bd. of Ag., Minutes, Dec. 9, 1936.
Agriculture granted the request, but some delay in transferring Mr. Klemmedson ensued because he was being paid from Purnell funds and arrangements as to his salary and some other points had to be worked out. He served as requested by Governor Ammons for some weeks of the winter of 1936–1937, but he was not by nature a tactful man, and his deep interest in economic problems made him even less diplomatic. He made enemies both on and off the campus and in 1938 resigned to accept a position with the Bureau of Agricultural Economics.1

The interest of the Institutions of higher learning was not only in taxation in general; they advocated specific remedies for specific ills.

The Income Tax and Old Age Pension. - In 1932, 1933 and 1934 the pressure for economy was terrific. Leaders of tax leagues were yelling that fifty percent of taxes went to schools. They meant fifty percent of property taxes, but that was not what some said. Many saw as the only corrective, a great curtailing of educational activities.

In 1935, Governor Johnson vetoed a bill for an income tax, his objections being that an income tax in Colorado was unconstitutional. This made a constitutional amendment the next order of business.

At this time there was a five mill county tax to provide funds to meet the provisions of the minimum salary law, and the Colorado Education Association together with the institutions of higher learning advocated among other things the taxing of in-

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and an income tax, the latter to replace the five mill tax for minimum salaries.

On the same ballot with the Income Tax Amendment to the Constitution was the Old Age Pension Amendment. Both passed, and the latter was self-executing in that it earmarked certain taxes to go to the payment of pensions. Some of these were old taxes which had largely made up the general fund and had provided aid to the blind, aid to dependent children, and some other ends. Some were new taxes assessed on the broader basis tax experts had advocated.

With the Income Tax Amendment a part of the constitution, in 1937 the legislative fight began over using the income tax as a replacement of the school five mill levy to meet the requirements of the minimum salary law. Those opposing the replacement feature knew that if a large measure of income tax funds went to schools there would be no end to the income tax because there is no end to schools; they knew, too, that if collections from the income tax were allowed to accumulate in the general fund, the tax being not a replacement but "just another tax," the repeal of the income tax could be only a matter of time.

The 1945 Legislature, finding many schools without teachers, was somewhat more conscious of the needs of schools than other Legislatures since 1937; but in general those opposed to the replacement feature advocated to secure the passage of the Income Tax
Amendment have had their way, and Colorado takes care of its aged, but millions accumulate in the general fund, and the State neglects its rural children.

The income tax in not being largely used for rural schools failed in its main purpose. In other particulars the tax studies were not a blanket reform of economic and political ills; neither could they change human nature. Candidates for assessor still could use as election propaganda the promise to lower property valuations and therefore taxes, and voters still could elect such candidates. Again, on this basis, the old cycle begins to repeat itself. Property valuations go down, county tax rates go up; State levies cannot be raised, and soon around the circle. However, though the tax studies did not clean all the dirty corners of Colorado's disorderly house of taxation, they were the foundation for essential reforms. They led to a better distribution and a broader basis of taxation. They made possible the income tax and the levying, for example, of a tax on, not the capital value of intangibles which could easily be hidden, but on the income from intangibles. Such taxes meant relief to overburdened property owners, especially land owners. The tax studies resulted, too, in an accumulation of information for the use of such organizations as the State Planning Commission and the Better Government Association.
In 1931 Governor W. H. Adams advocated in his inaugural address the repeal of continuing appropriations.

Though the amount fluctuated with tax collections and property valuations, the continuing mill levies had from its early years yielded to the Agriculture College its most certain budget for operating expenses. During his first ten years in office, President Lory had only too often seen biennial appropriations vanish as completely as does a mirage, and in those years the continuing mill levies and the first continuing appropriations had nourished the only spots of growth in deserts of withered plans.

Not only had Colorado used the mill levy and continuing appropriations to finance State projects, but the Legislature had also resorted to "offset" Federal funds. A continuing appropriation provided money to match the Smith-Lever Extension fund in 1915; in 1929 the same type of appropriation, specified as first class, matched Capper-Ketcham funds; in 1917, with an increase in 1919, the Legislature employed the tried and true continuing appropriation to offset Federal money for vocational education.

A biennial appropriation, a liberal one, was usually a beautiful and hope-inspiring mirage on the

2. Ibid., 1929, pp. 618-619.
3. Ibid., 1917, pp. 536-537.
4. Compiled Laws of Colorado, 1921, Section 8141.
horizon for eighteen or twenty months of a biennium and then it winked out. It had been a third class appropriation, and there was no money to pay these. Sometimes a tree or lake of the mirage materialized in the payment of part of the appropriation, but mirages are uncertain things with which to build.

Whether the biennial-appropriation mirages vanished completely or left behind them a residue of cash, plans based on them were uncertain. Carefully selected and organized staffs resigned, and the projects they were to carry died of uncertainty and slow starvation under the mirage regime.

Not only on the campus had biennial appropriations proved a lame system of financing. In 1907 and in the four legislative sessions following, the Legislature, in order to remedy unsatisfactory conditions in certain State services, added these services to the duties of technical men at the institutions of higher learning. At the Agricultural College the Head of the Department of Entomology became State Entomologist; the Head of the Department of Forestry and the Head of the Department of Animal Husbandry were respectively, State Forester and State Dairy Commissioner. The State Geologist and State Chemist were men at the University. Continuing appropriations were the life blood of all of these services, except the work of the geologist. Thus, as legislators said, it was possible "to keep these men on the job and away from the legislature lobbying for their appropriations."
When biennial appropriations had failed to finance the State Fair, highway improvement, stock inspection, Western State College, the Fort Lewis School, and Adams State, the legislature had provided a mill levy for each. Later the legislature changed the highway levy to a continuing tax on gasoline.

Knowing the pattern of Colorado's system of financing institutions and services, President Lory saw in the proposal to return to the use of biennial instead of continuing appropriations, a substitution of the old mirages for cash, and he led the fight against repeal and won it in 1931; but a strong feeling in the State and even on the State Board of Agriculture that the legislature should have a firmer grip on State funds made a return to the biennial appropriations inevitable.

In the legislative session of 1933 Representative Morris and Senator Rumbaugh sponsored bills repealing the continuing appropriations for Agricultural Extension, Apiary Inspection, Dairy Commission, the State Entomologist, State Forester, State Horticulturist, Registrations and Certification of Seeds, and for Vocational Training, and all the bills passed. Senators Warren and Headlee sponsored other bills making biennial appropriations for all except the State Forester. Thus, most of the continuing appropriations for Colorado Institutions of higher learning changed to biennial appropriations and under the new system, with State finances as a whole in a better condition, amounts appropriated—and paid—have generally equalled or exceeded those made available under
continuing scheme.

Previous to the decade of the thirties President Lory and Democratic governors had worked together harmoniously. Governor Elias Ammons and Governor Gunter, both Democrats, had been outstanding in working with Dr. Lory and the State Board of Agriculture in building an Agricultural College to serve Colorado; after President Lory and a Democratic State government had accomplished more than when the State administration was Republican. However, the differences between Governor "Billy" Adams and the President started a chain of political repercussions.

In 1931 the President wrote that the fight against repealing the appropriations had involved us in partisan politics which we had formerly avoided. In this he spoke of the moment, but he was unknowingly prophetic.

Until the very last the fight between Governor Adams, who favored repeal of continuing appropriations, and President Lory was open and friendly, but the final vote in the Legislature in 1931 which defeated the repeal measures for that year was handled in such a way as to seem a slap at the Governor. In planning the strategy of this final vote, President Lory had no part, but, because of his earlier activity against the repeal measures, Governor Adams blamed the President.

From this point, until late in the thirties, with the national situation and campus alignment contributing, politics, local, State and National, became a complicating, often a deciding factor in College administration.

1. President, Charles A. Lory, "Report to the State Board of Ag," February 21, 1931.
Politics as Usual

Dr. Gillette's retirement as Director of the Experiment Station opened the way for ugly developments on the campus. For over a year the members of the Board cast monthly ballots for two men and always the vote was a tie. Finally Dr. Emil P. Sandsten was elected by a majority of one vote. From this point the situation on the campus was in some respects parallel to the Carlyle-Aylesworth feud from about 1904 to 1909. Some Board and faculty members were allied against the President. Meetings of the Board with a faculty member or two present were held at a faculty home, a hotel, or in the attic of a building on the campus.

Any institution is hampered when members of the governing board are appointed by the Governor of the State to "get" the president, or when the campus political opposition to the President is called together in Denver by an off-campus leader, given a good dinner and then cautioned in some such words as, "You can probably force Lory to resign from the presidency, but if he does resign and appears before the State as a martyr candidate for governor, he'll be elected. Then where will you boys be?"

Such stories were scarcely a matter of record, but they hung over the campus like the smoke from a forest fire, and blurred campus policies. In this smoke, leaders, unable to see ahead, stumbled and lost momentum.
Another phase of the political situation appeared in 1933 when President Lory was called before a Senate committee to account for funds he had invested to form the backlog for retirement annuities for faculty members too old to profit by attempting to build up an annuity in the Teachers Insurance and Annuity Association of America.

President Lory was told privately at the beginning of the Legislative committee questioning that the whole thing was a farce, but, before the committee, he was subjected to police court methods. The prosecutors tried to prove that he had misappropriated funds. College people and Fort Collins townspeople, indignant at the accusation and resentful of the political motives which prompted it, crowded into the room where the Senate committee conducted the final hearing. The weight of their numbers and their very obvious backing of President Lory considerably modified the tone of the proceedings. President Lory was declared completely innocent of any misappropriation of funds, and, though the instigators of the investigation did not declare this verdict on the floor of the Senate, friends of the College and of its President did report the decision.

"When sorrows come, they come not single spies
But in battalions."

In 1931, the year of the repeal of the continuing appropriations and the year of the Senate investigation, President Lory's mother died; and 1935 Mrs. Lory was critically ill for weeks, and two other relatives who were members of the Lory household passed on.
In making it a part of their strategy to attack President Lory during these tragic weeks of illness and death in his home, politicians, both on the campus and off, revealed some of their less noble moments.

Some members of the faculty who stood for the President lost their positions, some sought positions where their work would not be so handicapped by politics. The accrediting difficulties which some departments experienced in the thirties are directly traceable to the fact that the President and the Board were not working in harmony. The forward movement of the leaders of the institution was lost in a welter of personal recrimination and contention.
Maturity

Chapter XXIV

President Green and World War II
Charles A. Lory became President Emeritus and Roy M. Green became President of the College in 1940. In 1941 we were at war, and President Green first became well known in the State for his personal contributions and as the administrator of the services rendered by the College. The scope and variety of the new President's interests are suggested by naming a few of the committees on which he served. These were:

Committee to Work Out Progressive Program for Post-war Era in Colorado—appointed by Governor John C. Vivian December 17, 1944.

Post-war Committee of the Fort Collins Chamber of Commerce—November, 1943.

Executive Committee of the Rocky Mountain Radio Council—January 24, 1944.

Chairman of the Committee on What Professions Desire From Humanities and How They Expect to Get it. (Regional Conference on the Humanities in American Institutions)—1943.

Committee on Post-war Agricultural Policy of the Association of Land-Grant Colleges and Universities—1944.

Committee on Preservation of Phosphate Deposits and Their National Use, Association of Land-Grant Colleges and Universities—1941.

Member of the Board of Directors, National Western Stock Show—April 9, 1942.

**War Training Programs.**—Making the College a center for the training of men destined for service in the army, President Green brought to the campus such programs as:

Army Air Force Clerical School November 1942 to December 1943, 800 men at a time, a total of 2600 or 2700.

A.S.T.P., Army Specialized Training Program.

I. S.T.A.R., program for screening trainees for the army, 500, maximum. May to the fall of 1943.

II. A.S.T.P. Basic Engineering, 500 maximum.
III. A.S.T.P., Veterinary. All the men in the Veterinary Division were transferred to the army but allowed to remain in school to complete their training.


A devoted and hard-working faculty made these programs a success.

Phases of the war effort in which faculty members, and Extension contributed largely were: the State Nutrition Council of Colorado, the War Food Committee, the Veterans and the County Advisory Committee and the Larimer County Selective Service Board.

**State Nutrition Council of Colorado.** In 1941 the State Nutrition Council of Colorado was established with Dean Inga M. K. Allison, Professor R. T. Burdick, Dr. Elizabeth Dyar, and Miss Inez Eckblad of the College among the members, Miss Allison being responsible for much of the organizing work which made the Council an operating concern.

The concrete objectives were:

1. To acquaint the people of Colorado with the nutrition yard stick.

2. To help as many as possible to apply the nutrition yard stick.¹

The yard stick was:

**Minimum Daily Allowance**

**MILK**
- Children, 1½ to 2 pints
- Adults, 1 pint
Cheese allowed for part of milk

**EGGS**
- Three or four a week

**LEAN MEAT, POULTRY or FISH**
- One serving

VEGETABLES
Leafy, yellow, or green
One serving
Two other vegetables
FRUIT
Orange, Grapefruit or Tomato
One serving
One other fruit
BUTTER
or substitute with Vitamin A
BREAD and CEREAL
Whole grain or enriched
Two servings
OTHER FOODS
As desired

Check Each Day's Food

In carrying out its program the Colorado Nutrition Council was responsible for two outstanding projects: (1) a survey of the eating habits of fourth grade children in nineteen counties of the State, and (2) a survey "made at the request of the State Board of Health for the General Interim Committee of the Thirty-Fourth General Assembly" of the "quality, adequacy, and nutritional value of food served on typical days" at such State institutions as: the State Home for Deaf and Blind, Industrial School for Girls, Soldiers and the Sailors Home.

On this institutional survey Dr. Elizabeth Dyar took an active part.

The survey of fourth grade eating habits became an important piece of evidence in support of the school lunch program and was the basis for several Extension projects in nutrition.

War Food Committee. – During World War II there was set up in each State a committee to advise what the State could do year by year in food production. In Colorado this committee was composed for most of the three years, 1943, 1944, 1945 of a repre-

2. Ibid., "Foreword".
sentative of Triple A, the State Statistician, a member of the
Bureau of Agricultural Economics of the U.S.D.A., a man from
the Extension Service and one from the Experiment Station.
Professor Raymond T. Burdick, representing the Station was
chairman. About 40 experts served as counsellors.

This committee recommended to the War Food Admini-
stration in Washington what Colorado could do next year in food
production. For example, 1944 the Government asked Colorado
for 1,000,000 acres of beans; the committee said 500,000 acres
and this was accepted. Triple A took the matter up with the
farmers and the 500,000 acres were produced.

In 1943 the Government asked Colorado to produce
100,000 acres of sugar beets; the committee recommended 175,000
acres. However, the Government was so slow in giving the "go"
signal that the larger acreage was not produced.

All in all, the War Food Committee did much to keep
Colorado's agriculture on a sound basis. 1

The Veterans and the County Advisory Committee. —
Before the end of World War II the United States Department of
Agriculture assigned to the Extension Service the task of
organizing on the county level advisory committees to assist
the returning veteran. The two functions of the committees
were:
(1) help the veteran decide if he really wanted to farm. (2)
help the veteran who decided to farm to find the kind of farm
he was interested in and then to assist him in getting work on
such a farm, or in renting or buying it.

1. Interview with R. T. Burdick.
The county agent organizes the county advisory committee. He selects for members successful farmers who represent different types of farming in the county, representatives of Farm Security, representatives of loan associations, an outstanding banker, and the Smith-Hughes supervisor of vocational agriculture.

Selective Service. - On the Selective Service Board of Larimer County, Dr. Floyd Cross continued the outstanding service he had started in World War I.

Faculty Members in Service. - The students, men and women, who entered the armed services, were joined by members of the faculty of every department and of every phase of work on the campus. As reported by the Secretary of the State Board of Agriculture in September 1945 these members of the faculty were:

Faculty members who were in service and who have returned:
George Beche, Department of Horticulture
William E. Bjornstad, Department of English
Leslie Madison, Department of Mathematics; he and Lora McDonald were the first two faculty members to enter service, their leaves becoming effective January 24, 1941.
Another faculty member, James A. McClellan, Division of Vocational Education and Guidance has been discharged from service but is not returning here.

Faculty members who are yet in service:
Rodney Bertramson, Department of Agronomy
Gilbert L. Betts, Division of Vocational Education and Guidance
E. Avery Rice, Extension Service
John C. Clevenger, Public Relations Officer
Frank E. Davis, Department of English
Robert W. Davis, Department of Veterinary Medicine
Robert G. Dunbar, Department of Economics, Sociology and History
Willard C. Eddy, Department of English
Maurice L. Elder, Department of Physical Education
Robert Eslick, Department of Agronomy
Paul Gavert, Department of Music
Harris T. Guard, Department of Mathematics
Duane Hartschorn, Medical Director of Student Health Service
F. C. Hausenbuilser, Department of Animal Husbandry (only faculty member wounded in action in this war)
A. Allen Heildebrecht, Department of Animal Husbandry
Harry W. Johnson, Department of Veterinary Surgery
Frank J. Kapel, Department of Forestry
Millard M. Laing, Department of Music
Warren R. Leonard, Department of Agronomy
Lora E. McDonald, Department of Mathematics
H. R. Price, Department of Forestry
Marvin Russell, Experiment Station Editor
Howard H. Stoneker, Department of Animal Husbandry
Martha Trimble, Department of English and Modern Languages
Max Tyler, Department of Pathology and Bacteriology
Nina Watts, Department of English and Modern Languages
Ralph M. Welhing, Department of Agronomy
Robert S. Whitney, Department of Agronomy
E. S. Willgus, Department of Poultry Husbandry
E. E. Williams, Department of Animal Husbandry
Donald V. Zander, Department of Pathology and Bacteriology
W. A. Howarth, Division of Veterinary Medicine, discontinued his employment before entering service.

County Extension Agents in service:
Donald W. Acott, Extension Agent Sedgwick County
H. F. Alishouse, Extension Agent Yuma County
John P. Bee, Extension Agent Phillips County
Clayton A. Bishop, Extension Agent Weld County
Allen H. Bostwick, Extension Agent Teller County
Jack N. French, Extension Agent Prowers County
David Greenwald, Extension Agent Alamosa County
James P. Hartman, Extension Agent Montrose County
Charles W. McIlvaine, Extension Agent Gunnison County
David G. Rice, Extension Agent Elbert County

Two other members of the Extension Service who entered military service but did not return to the institution are George H. Henderson, District Extension Agent, and Jeanne Warner, Assistant State 4-H Club Leader.

One member of the faculty of the Fort Lewis Branch, Arthur Woinat has been discharged from service. Another faculty member from Fort Lewis who is yet in service is Vice Dean C. W. McLain.

A new member of the faculty, Phil D. Collins, Department of English, has been associated in the army with Willard O. Eddy.

H. Q. VanDyke, veterans counselor, is another recently discharged from service. Elwood C. Nye, Department of Pathology and Bacteriology was retired from the army. Marjorie D. Wintersteen, Department of Physical Education, was in the navy until recently.

Many other faculty members assisted in the war effort in civilian capacity, some directly in research and administrative work at request of the Government, and other work in war industries. Among those who have returned from work of this kind are:
Fred B. Beatty, Department of Electrical Engineering
Virgil E. Bottom, Department of Physics
Carl Chinburg, Department of Electrical Engineering
N. A. Christensen, Dean of the Division of Engineering
Andrew G. Clark, Head of the Department of Mathematics
Adrian Legault, Department of Civil Engineering
Charles F. Metz, Department of Chemistry
J. H. Scofield, Department of Mechanical Engineering
R. J. Preston, Department of Forestry
Maurice James, Department of Zoology

Post-War Developments. - World War II ended, President Green could turn his attention to plans and policies which had been interrupted by the war and to new lines of action.

Financing the College. - Early in his administration, prompted by studies of duplication at Colorado Institutions of Higher Learning, Dr. Green gave attention to the function of the College not only as a Land-Grant and therefore a technical school but as the Land-Grant College in Colorado. He saw the need of the landed industries of the State for the services which the academic program, the Station and Extension could render and determined to stress such phases of the College work as forestry, veterinary medicine, processing as committed with rural occupations, rural banking, marketing, and vocational educations.

Basing his conclusion on recent accrediting difficulties and on the recommendations of accrediting agencies, President Green channelled money and thought to the building up of the Division of Science and Arts. To accomplish results in this field and in those phases of work contributing largely to rural needs, nearly 50% of the budget between 1940-1941 and 1945-1946 was devoted to veterinary medicine, science and arts, animal husbandry, and vocational education.

Physical Plant. - In 1945, the College was, as usual, growing out of its clothes, the clothes being the buildings necessary to house the work. The Division of Veterinary Medicine, in order to keep up to standard and admit even a limited increase in its number of students had to have more hospital space; the Departments of Chemistry, Forestry and Home Economics were crowding
out onto their own back steps and finding the steps entirely inadequate; the library was using some of its best rooms for essential storage; the student health service was inadequately housed; an auditorium was a necessity, and the heating plant could not be counted on for permanent and adequate service.

Housing. - These were the building needs of the regular College work, but, taking precedence over all of these, was the need for housing of students and faculty. Married students demanded apartments; single students clamored for rooms, and faculty members were driven to redecorating and living in best workers' cottages.

Scarcity of material and labor handicapped the housing program; but, though construction lagged behind demands, prefabricated houses, dormitories and quonset huts were planned.

The Station and the Extension Service. - Before the war, President Green had been interested in developing greater co-ordination of the Division of Agriculture, the Agricultural Experiment Station and the Extension Service. After the war, with the President's encouragement, these groups made considerable progress toward a working agreement that made it possible for each to supplement the services offered by the others. One phase of this co-operation is that the same rural advisory committees are to be consulted by the research and the Extension workers. The appointment of an Associate Director of the Station, Dr. H. S. Wilgos, is a link in the co-operation and a step toward making the administration of the Stations more flexible.

Utilization of Agricultural Products. - Looking ahead to the time when again there is a surplus of agricultural products,
President Green and the Station workers gave attention to processing and to the utilization of by-products in industry, the goal being to develop new demands for agricultural products. In all the Station work the tendency is toward more emphasis on research and less on demonstration.

Financing Research. - Nationally and in Colorado, legislators prefer to hold a tight control over appropriations and therefore in voting the appropriations, they specify for what purposes the money is to be used; research men and administrators of such funds, knowing that research can be more conclusive and far-reaching if the financing if somewhat flexible, prefer some freedom in the use of money designated for experimental purposes. In the Colorado Agricultural Experiment Station, both types of financing are in use; both State funds and money given by a commercial concern for study of a particular project are at times strictly limited as to purpose, and, again, there may exist considerable leeway with regard to the use of such funds.

New Research. - A new phase of research on the campus after the war was that originated to meet the needs of the army and navy, the work of Virgil Bottom in Physics being an example. President Green expects this type of work to develop into an extensive research program in the general science and arts fields.

Conclusion

And now, in 1945, even with our eyes fixed on the closing of a world war, we pause and look back 75 years and see determined men from Larimer County forcing a bill to establish an agricul-
tural college through the Legislature of Colorado Territory, a Territory that existed because of mining. We lift our hats to the men who built the claim shanty, to those who sponsored the "Punkin Bill", to the men who have served on the State Board of Agriculture, to those who followed the institute circuits and rode the demonstration trains, to those who furthered boys' and girls' clubs, to members of the Grange who consistently and loyally supported the College, and to the students who formed, through the years, self-starting, self-organizing, thinking student bodies.

These men and women have seen green fields replace mine dumps as characteristic of Colorado, and many gave the work of their lives that these changes might be!

We bow to those who made our history and turn for a glance at the College as men outside the institution see it.

Speaking on the occasion of the seventy-fifth anniversary of the founding of the Colorado Land-Grant College, President J. L. Morrill of the University of Wyoming said, in part:

Only the land-grant movement among the three or four great streams of influence which have shaped American higher
education, was strictly native and indigenous. It is America's unique contribution to the whole tradition of higher learning in the Western world. Its test will be a test of our democracy itself.

President Milton S. Eisenhower of Kansas State College, congratulating the Colorado State College said:

Here at Colorado A and M, having reached the respectable age of 75 years, you can look backward to glorious service to democracy as you plan an equally useful future. Your institution has helped bury superstition, bigotry and prejudice, and has helped establish scientific truth. You have given farmers the means of lowering production costs, improving varieties, widening markets, overcoming the physical hazards of production. You have helped the consumers achieve better health and fuller, longer lives. You have helped the housewife overcome drudgery and develop true values in home life. You have helped industries establish themselves and progress. Contemptuous of the notion that higher education is only for the select few, you have made sound education available to the masses. As contemplated by the organic Act of the Land-Grant Colleges, you have provided both a liberal and practical education to ever-increasing numbers. You have helped the United States grow from a frontier country to a modern industrial nation, the most powerful on earth. You have helped prepare the nation for war, if war should come, and now, in the most destructive war of history, you are helping the nation to win...

There are new, terribly tough problems ahead. You will tackle those problems with the same resolve and by the same careful, discriminating, scientific methods that have characterized your labors of the past. And just as you have met every test of the past three-quarters of a century, so too will you meet completely the supreme tests of the years to come.

On the seventy-fifth birthday of the College, President Roy M. Green was, characteristically, thinking of the future. He said:

Observance of the seventy-fifth anniversary of the founding of the Colorado Agricultural and Mechanical College is just commencement time for the Institution. We have only begun to gather force for the forward moving influence this Institution can have in the life of the State and its people...

Our achievements as a College to date are only a start in our realistic building for a better tomorrow.

1. Speech. Seventy-fifth Anniversary of the Founding of the Colorado Land-Grant College.

THE EXPERIMENT STATION

Chapter XXV

Before 1888.
Chapter One

Beginnings of Experimental Work
in Agriculture, 1877-1888

Changing Colorado from an area that was fit only for cow pasture and mining to a predominantly agricultural State was at first a fight between man on one hand and, on the other, sage brush, Russian thistle, cactus, prairie dogs, lack of water and an unknown climate. Later, injurious insects and plant diseases entered the conflict on the side of the prairie dog and his environment; but by the time diseases and insects had become heavy reinforcements for environment, trained horticulturists, entomologists, botanists, and others were ready to join the forces of the farmer.

Colorado in 1888. - In 1870 establishing an Agricultural College in a territory that was known for mines and only for mines seemed to most men absurd. Though the population of Colorado was more than doubled in the years 1870 to 1880, only men of courage and vision, men who forced "Alford's Punkin Bill" through the first State Legislature in 1877 saw underneath the mining and road building which dominated the State, the possibility of agriculture. The sponsors of the "Punkin Bill" knew the quiet men along the creek bottoms who were growing wheat and vegetables and were planting orchards. These quiet men were not the forgotten men; they had never been known and so could not be forgotten.

If we turn Klieg lights and moving picture cameras on Colorado in the seventies and eighties, the film will show an amazing background for the first experimental work in agriculture, work that was compounded more of need and vision than of accomplishment.

In 1877 N. C. Alford of Larimer County spent a night urging Jim Carlisle of Pueblo to vote for "An Act to Establish a State
Board of Agriculture and to Define Its Duties," (Alford's Punkin Bill). Mr. Alford needed that one vote. Without it the bill would not pass; all money available for State schools might be assigned to the School of Mines, and the Agricultural College might cease to exist even on paper and as a "farm."

When, as dawn came, Mr. Calisle agreed to vote for the bill, he made the one remark that gives him a place in history. He said, "I feel as if it was throwing money away, for you can never make Colorado an agricultural State. It is fit only for cow pasture and mining." Ironically, the very bill he so grudgingly voted for made provision for agricultural research.

Between 1850 and 1900 every decade brought a spectacular bonanza mining strike in Colorado. Mines and rumors of mines first increased Colorado's population, but some men who came to Colorado to "strike it rich" went broke mining and turned to industries related to mining. "In 1880 there were at Leadville eleven or twelve operating smelters, several ore buying firms and four stamp mills;"¹ in the eighties and nineties smelters for the reduction of silver and gold ores were built in Silverton, Lake City, Golden, Garfield, Maysville, Poncha Springs, Rico, Durango, Denver and Pueblo.

In a sense, the first industrial by-product of mining was the Colorado Fuel and Iron Company, called at first the Colorado Coal and Iron Company. This company, opened in Pueblo in 1880, in 1882 rolled fifty-eight tons of steel rails, the first produced in Colorado; these were used for the Silverton extension of the Denver and Rio Grande Railroad.

Roads. - The early prospectors "hopped it," but when a strike was made and men rushed in to the new location, horses and vehicles came into use as soon as they could be obtained and roads of a sort had been developed by use. All the roads led, not to Rome, but to the mines. With thousands of men swarming over the hills around Central City, Leadville, Creede, Telluride and Cripple Creek, food and such supplies as clothing, tobacco and whiskey were packed or hauled in, and soon ore was hauled out.

Crockett tells of one method of hauling:

Hauling ores in hides is a very novel contrivance being used by mining companies, whose mines are situated up on the sides of the mountains. Where the snow is deep, the ores are hauled down in drags. The drags consist of a green ox hide. The ore is first sewed up in sacks of 100 lbs. each, then placed on the hide, which has loops around the edge, and when fifteen of these sacks are in position, a rope is run through the loops in the hide, the edges drawn close together, then a mule or horse is hitched to the head portion of the hide—with the hair outwards—and a brake to the tail. The brake is of iron, shaped like a horse-shoe, with teeth that drag through the snow, holding back.1

The rich finds in Central City were in 1858 and 1859.

By June of 1859 when Horace Greeley addressed the miners at the Gregory diggings, a fair road, so says a writer in The Mines Of Colorado, had been built.2

...the first hill-road over which in places twenty yoke of oxen were required to climb, without dragging anything worth mentioning, perhaps a wagon containing a sack of flour.

Railroads were built as fast as possible; but before the railroad was completed to a new camp, often transportation was by rail to the end of the line, by team from ten to a hundred miles, then perhaps by pack animals, and at the last each miner put his supplies on a burro or shouldered his own bacon and beans, his pick

and shovel, gold pan, and blankets.

In the '70's long distance freighting was at its height. Toll roads were still much in evidence, for the discovery of new mineralized districts demanded long wagon hauls to remote places.

After the big strike in the Leadville district in 1879, three wagon roads were constructed into that camp, and over those 5,000 to 7,000 men were engaged in hauling freight, and it was said the men hauling on the Ute Pass Road used 12,000 mules and horses.

In southwestern Colorado, Otto Mears, packer, freighter, road-builder, "The Pathfinder of the San Juan", built toll roads. He built the road from Saguache to Nathrop over Poncha Pass in 1867, from Sauache to Lake City over Cochetopa Pass; over Poncha and Marshall to Gunnison. His most famous road, and possibly the most scenic in Colorado, from Ouray to Silverton, made useless the one trail in the State on which the old timers had walked and led their saddle horses. Toward the end of Mears' building career he was responsible for the road from Durango to Fort Lewis, a road often used by Colorado Agricultural College people. Most of the Mears roads led to mining country, but mines needed railroads.

At first Denver and Golden were the two points considered as the terminus of the Kansas Pacific Railroad; Golden, because nearer the mines, had the preference; but Denver, through local initiative, built the Denver Pacific which joined the Union Pacific at Cheyenne. Denver was then on a coast to coast railroad and the shipping point into and out of Colorado; but other railroads were built by other companies, always to reach the mines. The Colorado Central built a narrow gauge road from Golden to Black Hawk in 1872.

2. Ibid., 2:834.
and on to Central City in 1878 and to Georgetown in 1877. Another company built from Georgetown to Silver Plume, and a standard guage line was completed from Golden to Longmont in 1873 and on to Cheyenne in 1877.

In the early '80's while actual construction work on roads was at its height, numerous surveys were made which, with those previously completed, resulted in a net work of located lines occupying almost every practicable canyon and pass in the mountains south and west of Denver. Records and data of these extensive surveys covering thousands of miles of lines run have always served as a sort of encyclopaedia of topographical information of the Colorado Rockies. It is estimated that there were no less than 500 surveyors in the field at the time investigations were at their height.1

To make a haul pay, the railroad, or the freighter with a six mule team had to have a load both ways. They hauled ore or concentrate from the mines and hauled food and other supplies in. Everything considered, the development of Colorado depended on mines and roads, and the people were necessarily road conscious.

Ex-Governor Elias Ammons, speaking in 1924 said,

..originally we had elected road-overseers locally... and it was considered so important in the old days that on election days I have myself witnessed the trading of votes for road-overseer for votes for the president of the United States.2

A few close-ups of sections of Colorado complete the moving picture view of the State in the eighties.

(In Larimer County) there was scant reason to encourage early settlers in the hope of being able to raise fruits... Raspberries, blackberries, dewberries and sometimes strawberries died out during the winter... Apple trees successful in other states failed here... Bartlett pears and peach trees took one good breath of winter and gave up the ghost.3

To Vickers in 1881 Colorado was as much a mining state as it ever had been. He writes:

2. Ex-Governor Elias M. Ammons, Speech to Denver Lion's Club on fiftieth anniversary of his arrival in Colorado.
It is the habit of some travelers to assert that Colorado cannot sustain a large population because her agricultural resources are limited. The force of this argument is hard to discover. Mining districts rarely embrace agricultural advantages too, and, in the East, it is not expected that a mining population shall supply itself with the necessaries of life. So long as Colorado can draw easily and cheaply upon Kansas and Nebraska for her lack of grain and other agricultural products, there is no reason why she may not support a population equal to the New England average. Her gold and silver will buy anything and everything the East has for sale, and she would still be a great and prosperous State, if she did not raise half enough wheat for her population.

However, the panorama of the State included the Greeley colonists, who had a thousand shade trees on their streets as early as 1874; they were getting land into cultivation and struggling with irrigation. In the eighties there were farms on the Arkansas, on the Platte and on creeks that did not attain the dignity of rivers.

The first cattle were driven into the Valley of the North Fork (of the Gunnison) in October, 1881. Beginning what was later the town of Paonia, Samuel Wade in 1881 established a general store in a dugout. The same winter he hauled apple, pear, peach, and apricot trees across Black Mesa on sleds and built fires near them at night to keep them from freezing.

Gunnison was not famous as the center of a farming district, as an educational center, nor as a fisherman's dream come true; it was a roaring town of a few grocery stores, hardware stores, assay offices, meat markets, etc., but particularly, of saloons. In one of these, "Fat Jack's Place," the proprietor, with some vague religious feeling about observing the Sabbath, required the orchestra to play only sacred music on Sunday.

1. (The) Greeley Tribune, Feb. 4, 1874, p. 2
3. Ibid. 4:69-70.
It was by no means an uncommon sight to see sundry couples cavorting about on the floor of a Sabbath evening, the "ladies" bedecked and bespangled in brief and extravagantly decollete dresses, with their sturdy companions, garbed in a miner's costume of khaki, or the smart outfit of a successful gambler, or perchance the outfit of a cowboy—buckskin breeches with wide fringes running down the legs, pants stuck in boots, spurs on their high-heeled footwear, blue flannel shirt, red bandanna tied loosely about the neck with the knot at the back, a wide-brimmed hat covering their usually unkempt hair, and a brace of six-guns strapped to their hips. These were the sort of patrons who celebrated every evening, Sunday included, at which time they tripped the "light fantastic toe" to the strains of such good old hymns as "Jesus Lover of My Soul" or "The Beautiful Gate Ajar."

Gunnison was probably no worse than any other frontier Colorado town, but it so happened that in the first nine months after I arrived (Oct. 20, 1881) there had been no less than six shootings and murders, all of which ended fatally, one lynching and one legal hanging.1

Denver, the capital of Colorado, certainly could not have been called the Paris of the West, and its interest in agriculture was apparently no more in evidence than was its culture and sophistication.

Denver was an interesting city in 1878. People of every station in life jostled each other on its plank sidewalks, crowded its dingy little horse-cars. . . . The town was "wide open." . . . Papo and games of chance were played openly in every saloon; . . . There were Yankee and English capitalists, professional men, miners, prospectors, mechanics, gamblers, cowboys, railroad laborers, Mexicans and Chinese. The Chinese manned the saloons, ran the restaurants, washed the clothes and solved the servant-girl problem; everywhere was youth and young manhood, and gray-haired men and women were seldom seen.

The broad-brimmed cowboys' and miners' hats were worn universally because a Derby branded a man as a tenderfoot, and no one was suffered to wear a silk hat unless he were a preacher, lawyer, doctor or gambler. Larimer Street was the fashionable shopping district; that is where Daniels and Fisher, and Joslin, had their stores—and they had fine goods; on that street was Charplott's the "swell" hotel of the period. A few small business concerns had opened up on Lawrence Street; there was not a building in Denver of over three stories; the fashionable residence district was lower Fourteenth Street around Stout, although some had ventured as far out in the country as Broadway, but what was a long way off at that time; the markets were full of wild game, such as venison, buffalo and bear meat, quail and prairie chickens. Henry C. Brown, who afterwards bui

the Brown Palace Hotel, had a carpenter shop about where his hotel is now, and he kept a cow. One day he needed feed for it, so he ordered some of a down-town feed store, but was told that they would not make delivery that far out in the country."

The State Board of Agriculture and Experimental Work in Agriculture

More than a beginning in agriculture, men snarling over crops and water, a few communities planting trees and farming, mines and mining men, cattle, wide open spaces where roads were building and wider open towns! This was Colorado in the seventies and early eighties.

Mules, horses, oxen, miners, freighters, cowboys, road builders, smelter hands and office men had to eat. Back of the spectacle of mines, and roads, and making the development of mines and the building of roads possible were hay and grain for stock and "grub" on the table when the whistle blew. All this meant agriculture, and "Alford's Punkin Bill," its passage secured by the vote of a man who did not believe in it, opened the way for experimental work of a sort in mile-high, semiarid, mine-dominated Colorado.

The Act Establishing the State Board of Agriculture. - It was the "Punkin Bill," which enacted into a law in 1877, provided that the State Board of Agriculture should make a

The "Punkin Bill" provided also that:

Agricultural operations on the farm shall be carried on experimentally.

Second: - The manner of preparation of the soil for the various crops, methods of seeding or planting, kind and variety of seed used, the quantity per acre, the manner of cultivation and harvesting.

Third: - The mode of irrigating the crops embracing the manner of applying the water, the time of day when applied, the number of applications to each crop, with specified results as to its action.

Fifth: - The time and manner of preparation of the soil, sowing, planting, cultivating and harvesting, and a general statement of the weather, and its influence upon the several crops.

Sixth: - The kinds of manure or fertilizers used, the time and manner of application and the several results.

The State Board's First Experiments. To put these provisions of the "Punkin Bill" into operation, the members of the State Board of Agriculture had not so much as one employee. They, themselves, could plant, irrigate and harvest; they could keep records of their own work, or perhaps of their neighbors' work. Everything in the new State had to be trial and error, with the result being not merely a record on a sheet of paper; a failure meant a lessened food supply for a family.

It was decided at a meeting of the State Board of Agriculture, September 11, 1877 that John Armor buy a barrel of walnuts and plant them on the College "farm" in rows ten feet apart each way. An entry in an old account book kept by W. F. Watrous, President of the Board reveals that on January 27, 1878, Mr. Watrous paid Mr. Armor $6.35 for the barrel of walnuts but no one knows where the walnuts

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3. Wherever the term State Board is used, the Colorado State Board of Agriculture is indicated.
were planted; they did not survive.

In February 1878 the Board set aside $200.00 for starting a nursery of "fruit, shade and ornamental trees on the College farm." Mr. Watrous, President of the Board, set out 10,000 "root grafts and ornamental trees at two cents each," and for his work had the use of the Claim Shanty for a year.
Methods of gathering agricultural statistics have proceeded in Colorado from the impossible to the impractical, to the practical. In 1876 the members of the State Board of Agriculture recognized the need for statistics and at their meeting on December 26 ruled that each man was "to procure the number of bushels of each kind of grain raised in his district and the cost per acre and to transmit the same to the secretary who was to arrange under proper heads and file."

In August 1879, the members of the Board showed again that they knew the meaning of crop failure and recognized the need for information relative to agriculture in Colorado. They agreed to divide among themselves the "new and desirable kinds of wheat and one-half the seed corn which have been grown on the College farm experimentally the past season." This wheat and corn was then to be distributed "to prominent farmers in their respective districts," each recipient to agree to give the variety a thorough test and report back. The report was to include the following "items in the order listed:"

- Kind of soil and its preparation
- Date of sowing
- Weight of seed per acre
- Mode of cultivation
- Date and number of times irrigated
- Date of blossoming
- Date of harvest
- Yield in pounds per acre
- General remarks

In February 1879, a committee of the Board was appointed "to select some one to conduct the farm experimentally during the present year." A farm manager was probably first selected; but in the summer of 1879 the first faculty came to the campus, and A. E. Blunt, the first Professor of Practical Agriculture became head of the experimental work.

1. St. Bd. of Ag. Minutes, (Mistake in date in record book but probably Aug. 1879) 1:26
2. Ibid.
The Faculty and Experimental Work

Before 1888

Agronomy. - In 1879 A. E. Blount came to the assistance of the Board; in 1882 Charles Lee Ingersoll became the second President of the College. He brought to the campus James Cassidy, the first trained horticulturist and Elwood Head, the first civil engineer. These men—Ingersoll, Blount, Cassidy, Head—underwrote agricultural "experiment" or research at the Land Grant College of Colorado. Before the Experiment Station was established they took long steps leading to such information as that in News Notes for February 1, 1945:

Farmers in irrigated sections of Colorado will obtain highest yields when they grow adapted corn hybrids... report Jasper J. French, Dr. D. W. Robertson and Herman Fauber.

Applying nitrogen to peach orchards increased yields in all tests conducted on the Western Slope, report Dr. L. R. Bryant and Robert Gardner... tests were made in cooperation with the Mesa County Research Committee...

How very far scientists and farmers of the eighties were from having the information for such specific statements! But, two thirds of a century ago, the tremendous need for crops adapted to Colorado's five life zones, all of the seven generally recognized except the Artic and the Tropic, prompted Professor Blunt to carry such a program in one year of testing;

- 343 different wheats
- 30 varieties of barley
- 47 varieties of oats
- 19 varieties of rye
- 133 strains of corn
- 70 strains of beans
- 37 strains of beets
- miscellaneous other crops

2. Eighth Annual Report, St. Bd. of Ag., 1885-1886, pp. 31-32.
If all the trees and shrubs planted in the early days on what is now the campus had survived, the place would be a forest; but many from low-altitude, humid States died. Probably the walnut trees now growing east of Ammons Hall are the earliest trees planted which still survive. Professor Blount, during his years on the campus kept a diary and so on March 12, 1906, he could, by reference to his diary, write exactly to Mr. R. Q. Tenney that he, Mr. Tenney, gave Professor Blount on November 10, 1880:

... a bag of black walnuts and a bag of shell barks which I planted in four rows S. E. of the College Building (old Main). As this was the first donation made to the College for experimental purposes I remember to have taken much interest in their growth and success. In the fall of 1881, I think, but a few of the black walnuts, and more than a foot's growth of which I planted out northwest of the College Building and west of the then brick barn (now the chemical laboratory). 1

Dr. George H. Glover who was on the campus as a student at the time the trees were planted and transplanted states that when the trees were moved they were planted where they now are, east of Ammons.

Not only these walnuts were thriving in 1880. A reporter (probably also the editor and publisher) for the local newspaper visited Professor Blount in his office in 1881 and was enthusiastic about the seventy-five varieties of wheat—"a part of the professor's two years labor on the farm." 2 In the spring of 1881 the reporter is

2. The Express. Sept. 16, 1880. If the St. Bd. of Ag. Minutes are accurate, Prof. Blount had been appointed in Sept. 1879, but some unknown person had "conducted the farm experimentally in the summer of 1879."
even more enthusiastic.

The forage plants including vetches, rape seed, spurry, lupin, teasles, sanfoin, and teosinte, which have been tested will be experimented with. All the leading grasses will be tested. The fibrous plants, such as ramie, jute, hemp, flax, etc., also various kinds of forest and fruit trees. Walnuts, hickory and pecan nuts will be planted. All vegetable and edible plants. Professor Blount will try cultivation of cranberries in the swail back of the College.

In 1881, the College catalog summarized the development of the campus and the experimental work theron:

Farm and Grounds

The College farm includes 240 acres, most of which is under cultivation, the work being chiefly experimental, and including the culture of trees, small fruits, cereals, garden vegetables, etc. The trees under successful cultivation include the standard varieties of the apple, pear, plum, and cherry, and of forest trees—the ash, box elder, chestnut, elm, locust, maple and willow. The small fruits are represented by blackberries, currants, gooseberries, grapes, raspberries and strawberries.

The floral Department is an interesting and attractive feature of the College. The grounds adjoining the building have been terraced and grassed, and adorned with the choicest varieties of shrubbery and flowers. The farm has been surveyed by an experienced landscape gardener, with a view to the irrigation of its highest portions, its division into fields and parks, and the setting of fruit and forest trees.

Professor Blount was a modest man, given more to doing his work than to advertising it; but his patience, his industry and his desire to find or develop varieties adapted to the Mile-High State were monumental. A regeneration of his Defiance wheat was used almost exclusively as an irrigated in Colorado for twenty years;

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1. Ibid., May 7, 1881.
2. Calendar of St. Ag. College of Colo. (Catalog) 1881, p. 17.
3. Catalog, 1881, p. 17.
some of his wheats went to Australia where William Farrer used them in crosses. One of the crosses returned to California and is grown there today. Mr. Blount developed "specific crops that added materially to the wealth of the State later on."  

Though Mr. A. E. Blount's methods were not those of today and his "inaccuracy in sowing corn and wheat" led to his resignation in 1890, the Year Book of the U. S. Department of Agriculture, 1936 recognized him as a pioneer in American plant breeding.  

Horticulture. — James Cassidy, the first trained horticulturist on the campus reported for the year 1885-1886 that he did considerable work with vegetables and small fruits. For example in 1885-1886 he reported that experimental work for the year comprised: work with garden vegetables and small fruits; experiments with orchard fruits with emphasis on observations of growing habits; a study of insects injurious to vegetation and of means of extermination of them; a report on forestry with additions to the list of Colorado trees and shrubs; a comparative test of three varieties of potato, and other experiments with grasses, insects and forage.  

1. Alvin Kezer, "A History of the Colorado Experiment Station," ms. p. 3  
2. State Board Minutes, 2:165, June 5, 1890  
Mr. Cassidy thought at one time tobacco should become one of the leading crops of Colorado, and he gave considerable time to growing "the weed"; but members of the W. C. T. U. and the Grange protested that a tax-supported college should neither develop nor advocate a crop deleterious to health and morals. Added to these objections was the scientific one that the high salt content in the soil tended to produce undesirable qualities in the tobacco.

The story is told that at one time the College men entertained a committee of legislators and as the last gesture in gracious hospitality served cigars made of home-grown tobacco, but "several of Colorado's best legislative lights became violently ill from smoking the vile product." This incident had its effect in "outlawing Lady Nicotine from the Centennial State's agricultural landscape."¹

Faculty men, determined to prevent boys from indulging in the bad habit of smoking and equally determined to keep the cigars for faculty use, guarded the dwindling supply. Only the most alert and adept student could steal some for himself—and he now insists that they were excellent.

Tobacco or no tobacco, men of the Grange and of the Colorado Horticultural Society recognized the value of Professor Cassidy's findings and knew that when he died in 1889, the State and the College had lost a good man. He is buried in Grand View Cemetery at Fort Collins. For years after Mr. Cassidy's death, Mrs. Brose, wife of his assistant, saying, "They have so many flowers at the College, but no one ever remembers Mr. Cassidy," took flowers to his grave on Decoration Day.

¹ A story told to James R. Miller.
Irrigation and the College. - Joining President Ingersoll and Professors Blount and Cassidy in agricultural conferences in the President's office in Old Main was Elwood Mead. Truly there were mental giants in those days! Physically, Mead was the smallest of the four, but slight, blond, always friendly, he was the one destined to become world famous.

Water is essential for raising crops in any State; but in Colorado men turn on water with a shovel, and in the Cache la Poudre Valley in the eighties men were learning some of the first principles of how to apply water to land, how to measure water, how to allot measured quantities to individuals, and how to make laws governing the complicated practices of irrigation.

Farmers not engineers, were the first to become involved in the complexities of turning on water with a shovel, and the farmers' practices and their difficulties posed the problems which engineers were later called in to help solve.
Irrigation and the College. — Irrigation was not a new thing in the world; it was not even an unknown practice in Colorado when the Greeley colonists in Weld County and the Agricultural colonists in Larimer County began to develop a world-famous laboratory; but Italy and India, and even Arizona, New Mexico and Utah, were too far away for the colonists to examine. Then, too, the early irrigation projects around Trinidad, Colorado and those in Utah yielded little information.

If any place ever needed irrigation, it was the land selected for the Union Colony. Lewis Stimson, grandson of Bryant LaGrange, who was for years a member of the State Board of Agriculture, tells that his grandfather and grandmother, aged respectively 19 and 17 when they came to Greeley, went for a walk the first Sunday after their arrival; when the young wife's feet were so full of cactus thorns she could not walk, her husband could scarcely find a place free of cactus where he could kneel down to try to extract the thorns.

"That country looked worse than any other dry land section anywhere ever looked," Mr. Stimson insists, "and I think I am safe in saying that not a person stayed there who could get away."

This was Weld County; and Larimer, in which the College was located, was much the same sort of country. Both are in the Cache la Poudre Valley, of which David Boyd wrote that in this valley

... what may be termed American methods and devices for diverting and applying water to the fields have grown up, and the success attained has stimulated attempts elsewhere throughout the western third of the United States. The same relations that Colorado holds to the rest of the arid region is borne

1. Interview, Lewis Stimson.
by the Cache la Poudre Valley to the State of Colorado...its history may be said to epitomize the record of strength and successes throughout the States.¹

In the seventies no one in Colorado knew how much water was needed to make crops or how much was in the rivers; few laws were in existence in the United States to control the use of water for irrigation; and no one knew how to construct irrigation canals, how to measure water, or even how to establish the belief that it was right to divert water from a stream and use it on land miles from the stream.

The people of Greeley could not wait to study these things in a leisurely fashion. They did not ask for Federal or State aid. If they were to keep from starving to death, they had to build ditches, now, the first year they were on the land, the second year, and so on. They took water from the river; and, since at first no one else claimed the same water, no one at first opposed them.

Starting from "scratch," the Greeley people had no idea how big ditches should be, or what extensive ditches would cost.

In The Star of Empire published by the National Land Company, of which W. W. Byers was manager for Colorado, we were told that the cost for a farm would range from $50 to $200. We have seen that Mr. Greeley, in his Cooper Institute speech, said, 'A little water goes a great deal farther than people generally suppose. In California they use much more than is necessary.'²

Mr. Meeker said at one time, "The cost of irrigation is

¹David Boyd, Irrigation Near Greeley Colorado, p. 9.
²Quoted by David Boyd, A History of Greeley and the Union Colony, p. 59.
perhaps equal to fencing, and is a work that is to be extended from
year to year.\[1\]

Since the cost of fencing was anything but a fixed and known
item, the same under all circumstances, this statement could scarcely
have been more indefinite, but this the colonists had to learn by
experience.

Though irrigation ditches had been built and put in opera-
tion in Costillo and Conejos Counties in the fifties, and others
were built later, most of them were scarcely more than plow furrows,
and about these ditches, customs and laws to govern an elaborate
irrigation system had not developed.

The building of large canals demanded a knowledge which even
the engineers, and certainly the water users, did not have. The
Union colonists in 1870 put in some 200 acres of crops and constructed
a ditch to carry water to these and to the town lots in Greeley.\[2\]
The construction of this canal was in charge of McDonald,
an engineer,

... who had had experience constructing ditches in the moun-
tains for mining purposes. He ran the ditch along the notched
edge of a bluff, he had it make angles as sharp as the teeth
of a saw, allowing no curving or rounding off of the sharp
points.\[3\]

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Of course, later these sharp curves had to be cut through or rounded. E. S. Nettleton, another engineer, followed McDonald's plan in laying out Number Two, and "much work had to be done over again in partly straightening the lines." Having learned, apparently, from his own mistakes, E. S. Nettleton, when he had charge of the construction of the Larimer and Weld Canal, established his reputation as an irrigation engineer.

The Greeley people at first had undisputed use of most of the water in the Poudre; but the Lake Company took out a canal and the Agricultural Colony at Fort Collins was established in 1873, the leaders being Greeley men. Of course the Fort Collins group built a canal which came out of the river above the Greeley canal. The summer of 1874 being dry, before the Greeley crops were made, the river was dry at the head of the Number Three Canal. Water was so scarce that even the lawns, trees and small fruits in Greeley were in danger.

Delegates from Fort Collins and Greeley gathered at the Eaton or Whitney school house which stood near the present site of Windsor, because the Fort Collins canal came out of the Poudre higher up the river than the Greeley ditch, Fort Collins people had the advantage and were disposed to keep it.

The Greeley Tribune of July 22, 1874 and the Colorado Sun of those days later give detailed accounts of the meeting at which the question as to whether early use to water established a right to it, and many others were discussed.

1. Ibid., p. 63.
2. Both names appear in the records.
David Boyd, in telling the story of the discussion implies that the meeting almost broke up in a pitched battle, but the newspapers make no reference to fireworks.

In the end the Fort Collins people agreed to let water go down the river for Greeley, but a general rainstorm saved the Greeley crops and eased, but did not lessen the determination of water users to secure legislation. "...looking towards a distribution of the waters of the State in harmony with the principle of priority appropriation."^2

When irrigation was in this stage of development, a man could irrigate with either a shovel or a gun, and he often had more water on his land when he used the gun.

Before laws could be passed, a concept of water as property had to be accepted. The settlers in Colorado came from humid states where "the common law or doctrine of riparian rights" was in use. This "limits use of water to the occupier of lands along the stream and requires that the use of water shall not materially diminish its flow."^3

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1. Ibid., p. 120.
2. Ibid., pp. 120-121.
The development of irrigation is not merely the result of a succession of victories over physical or material obstacles. In our country these form but a part—and, unfortunately, often a relatively small part—of the difficulties encountered by the irrigator. By far the most vexatious and expensive impediment to be removed have been those arising from the inapplicability of our laws and customs to the conditions prevailing within the arid region. Every instinct acquired through generations of life in a humid country seems to rebel against the methods of the irrigator, and every tradition of law is in direct opposition to the proper employment of the natural waters. These instincts and traditions have had to be laboriously demolished, usually after severe struggle, and the series of contests appear a never-ending one.  

Was a man to acquire a right to water and to how much water? How was running water to be measured? These were questions of great social and economic significance.

An example of the effort to measure water and of one individual's right to water is that of a man who sank a fifty gallon keg in the bank of the main canal to divert his share of the water into his ditch. He got all there was in the main canal and maintained he had a right to it, until other men told him, "There is no law to make you quit that, but there are plenty of cottonwood trees and we've got ropes." The fifty gallon keg was removed.

in developing. One step in establishing this was the definition stated in the State constitution adopted in 1876 of priority. It reads:

Sec. 6. The right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied. Priority of appropriation shall give the better right as between those using the waters for the same purpose; but when the waters of any natural stream are not sufficient for the service of all those desiring the use of the same, those using the water for domestic purposes shall have the preference over those claiming for any other purpose, and those using the water for agricultural purposes shall have preference over those using the same for manufacturing purposes.¹

This definition of priority was only one of the factors necessary in developing the concept of a water right as property, and the situation with regard to water rapidly became more and more unsatisfactory in many sections of the State. In December, 1878, an irrigation conference was called to meet in Denver. Some communities sent no representatives: but "Boulder, St. Vrain, and the Poudre were there in force."² Some opposed all legislation as too expensive. The meeting was hectic and violent with some strong Western words exchanged. One man said all farmers were fools, another tried to bully the committee into standing against all legislation and was told, "You make your motion if you have one to make, and otherwise sit down, and if you don't sit, I'll call an officer."³ B. S. La Grange, who had become a member of

¹The Constitution of the State of Colorado", adopted in Convention, March 14, 1876, p. 43 of Bulletin in C.S.C. Library, No. c/c76
²David Boyd, History of Gresley and the Union Colony of Colorado, p.121
³Ibid.
the first State Board of Agriculture a year before this, attended
this meeting and the chairman was David Boyd who was also on the
State Board from 1881 to 1886, inclusive.

A committee, with David Boyd as chairman, was finally
elected to draft a bill, which, when it became a law in 1879
settled some questions. In 1881 another law amending some of the
provisions of the 1879 law and was passed, "...providing for
the adjudications by the courts of priority of rights, and amounts
of appropriations of water taken from all public waters of the
State." 1

Under the 1879 law the people on the Poudre and in
some other districts appointed referees and began at once to
collect evidence as to the size of ditches and the rights of
each water user. These efforts continued under the 1881 law,
but difficulties increased as work progressed. Some of the
referees were trained men; others were not. The law required
that the quantity of water appropriated to each man be measured
in cubic feet per second, but ditch owners did not know what
cubic feet per second meant. The difficulty of assigning a
priority based on the length of time a man had used a certain
definite quantity of water was increased by the fact that no
one knew how much water flowed in the ditches when they were
first constructed; and no one knew when successive enlargement had
been made or exactly what the capacity was of a given ditch after
such enlargement.

The best evidence available, when in the eighties engin-
eers were trying to determine priorities, showed, for example, that
in 1870 enough water was being taken from the Cache la Poudre to ir-
rigate 41,250 acres; actually not more than a thousand acres were in

1 Colorado, State Engineers' Report, 1881-3 P. 21
cultivation at that date.\textsuperscript{1} With only such evidence, assigning a
definite quantity of water to a man on the basis that "the first
in time is the first in right" was difficult.

Bad as the situation was in the Poudre district, it was
worse in other sections. In the St. Vrain district
...old settlers' claims seem to have been allowed to run
riot. Up to the first day of April, 1879, 308.58 feet were
awarded, while the greatest discharge of that stream for
1888 was less than 500 feet per second, while the average for
June of that year was...only 200 feet. But the Boulder
district is still worse, since, for April first, 1870,
there were claimed 2,234 feet...the combined average of both
streams for June, 1888, was only 430 feet.\textsuperscript{2}

Elwood Mead came to the College in 1882 and in 1883 E. S.
Netleton became State Engineer. Mr. Nettleton began at once to
attempt to solve some of the irrigation problems, and he drafted
Mr. Mead to assist.

When men fought and killed to obtain water to irrigate, a
way of measuring water so that each man might be assigned a just
share was an urgent need, and Elwood Mead studied measuring water,
and canal construction./storage. He was thrown almost literally and
physically into the complicated problems of irrigation as they
were developing in the Poudre Valley.

The law required the State engineer "to make careful measure-
ments and calculations of the maximum and minimum flow in cubic
feet per second...commencing with the streams most used for

\textsuperscript{1}David Boyd, \textit{History of Greeley and the Union Colony of Colorado},
p. 124;

\textsuperscript{2}Ibid., p.126.
irrigation. On the Big Thompson and the Poudre "...a straight length of the river was dressed, so that gaugings and ratings could be made of the amount of discharge" of the rivers; but after a season of keeping records of the Poudre, the channel was found to have changed so much the records were useless.

Thereupon a proposition was made to the ditch owners of the Cache la Poudre, viz: that they furnish the necessary funds to build a gauging station...with the enterprise characteristic of the energetic settlers of this irrigation district, they promptly responded to the above propositions, and by an assessment on themselves...they raised the money to construct a measuring flume and gauge house at an expense of about $1,650.2

Another difficulty on the Poudre was that the Fteley current meter, the type then in common use, "...proved entirely too delicate for the rough torrents, filled with drift of all sorts in which it was necessary to use it," and Mr. Nettleton designed the Colorado meter, which was used.3

Another reform which Mr. Nettleton urged was the establishing of an accepted terminology. He wrote that:

Although the inch method of measuring has been in use since the first irrigation in the State, yet scarcely two people measure it alike, or understand what an inch of water really is; and many a good citizen has inadvertently subjected himself to the penalties of the law...The referees in some Water Districts, in making up their findings have experienced much difficulty in reducing to one unit of measure the various statements of water appropriators,

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1E. S. Nettleton, State Engineer's Report, 1883-1884, pp. 6-7.
2Ibid., p. 6.
3Ibid., p. 8.
and this office has experienced a like difficulty. 1 Mr. Nettleton recommended that cubic feet per second of time be "...substituted for the inch system, which measures water through boxes of impracticable dimensions unsuited to the modern practice of irrigation." 2

Still struggling with measuring water, Elwood Mead wrote in 1885

...ditch in District No. 6 has a decree for 6480 customary inches running on a grade of eight feet to a mile. In this case 'customary inches' means the number of square inches in the cross section. 3

Determining how much water there was in a stream, learning how to measure it, establishing priorities and a uniform terminology were only a few of the unknowns encountered by farmers and engineers. The building of reservoirs, the duty of water, amount of water needed on specific crops and the time when it should be turned on the land, etc., were constant and growing problems.

The study of all the physical, human and legal problems of turning on water with a shovel became the breath of Elwood Mead's life, but he was most interested in regulations and laws to govern the use of water. The beautiful lake back of Boulder Dam was named Mead in honor of the great builder.

1. E.S. Nettleton, State Engineer's Report for 1883-1884, p. 53.
2. Ibid., p. 53.
In 1888 Elwood Mead left Colorado Agricultural College to go to Wyoming and write the irrigation code for that territory. (Wyoming was not yet a State). He was Chief of Irrigation and Drainage Investigation, United States Department of Agriculture, 1897 - 1907, and was twice professor at the University of California. Taking with him George C. Krentzer, an alumnus of Colorado Agricultural College, Mr. Mead served in Australia as Chairman of the State Rivers and Water Supply Commission of Victoria, 1907-1915; from 1915 to 1919 he was Consulting Engineer, U. S. Department of Interior; and from 1915 to 1923 when he was for the second time on the faculty at the University of California, he was also Chairman of the State Land Resettlement Board. From 1924 until his death in 1936 he was United States Commissioner of Reclamation.

A few of the storage dams built entirely or in large part while Mr. Mead was Commissioner are: Stewart Mountain, Boulder, Stony Gorge, Taylor Park, American Falls, Gibson, Guernsey, Thief Valley, Agency Valley, Guyhee, Hyrum, Pilot Butte No. 1, Pilot Butte No. 2, and Pilot Butte No. 3. ¹

¹ Bureau of Reclamation, Dams and Control Works.
THE EXPERIMENT STATION

Chapter XXVI

The Hatch Act
In 1887, a decade after Jim Carlisle said, "Colorado is fit only for cow pasture and mining", Messrs. Ingersoll, Blount, Cassidy and Mead, great as were their efforts, were very far from knowing all the answers to the agricultural unknowns of Colorado's varieties of altitude, soil and rainfall. Yet they welcomed the Hatch Act which, provided for experiment stations as departments of Land-Grant Colleges.

The Colorado legislature, some of them "dirt" farmers, joined the College men in urging the passage of the Hatch Act. This Act in its first form was signed March 2, 1887; the State bill accepting the federal legislation became a law April 4, 1887. Another Federal law, signed February 1888, was necessary to make the Hatch funds available.

The Hatch Act did not specifically provide substations; the Colorado law of 1887 provided for the station at the College and for four others—one each in El Paso, Bent and Delta counties, and one in the San Luis Valley—all to be financed by Hatch Act funds.

The Board of Agriculture acted to comply with the State law. The first off-campus farmers' institute had been held in Del Norte in December 1879; in February 1888 the Board met in the same town, organized the Experiment Station, selected land for a substation and turned the heads of their team toward the Arkansas Valley where they were to acquire land for another substation.

Of the three major decisions made by the State Board of Agriculture at Del Norte in 1888, two were unsatisfactory as bases of operations and were changed before the beginning of the new century. The plan for financing substations caused considerable difficulty; making the President of the College the Director of the Stations meant harmony and efficiency only so long as Charles Lee Ingersoll held both positions; the plan of Station work made at Del Norte con-
Substations.— In all, counting the home station at the College and the short-lived grass station near the same town, fourteen experiment stations have existed for longer or shorter periods of time, respectively, in Colorado.

The Hatch Act provided $15,000 annually for each State, large or small. In Colorado there were counties nearly the size of Rhode Island, and this spread of square miles in itself made more than one experiment station a necessity. Men in Colorado could not borrow information from surrounding states; agriculture in other semi-arid, mountain States was equally new. Coloradoans in 1888 had no shackles, no traditions, no precedents; they had full liberty to learn to adapt themselves to Colorado as an environment, or to learn to adapt this environment to man's needs. They could enjoy the dry bracing air, in which vegetation died unless man turned on water, they could learn that irrigation problems were not the same in the San Luis and the Grand Valleys and that drainage was sometimes as essential as more water; they could enjoy the scenic grandeur and amazing variety of plains and mountains—and learn that agricultural research findings at 4000 feet elevation were of little value at 8000 feet, and that mountains, unexcelled in grandeur in North America, were a factor impossible to ignore in transportation and marketing.

The State Board of Agriculture in 1888 knew Colorado's extent of square miles and knew that the climatic variations were as

extension centers for research and tried to finance both the home station and the substations from Hatch Act funds. Under this system no station had money enough for its work. In fact, from each station's point of view, results were about as satisfactory as those obtained in shearing a pig—more squeal than wool.
Financing difficulties increased because as time passed, Federal authorities were less and less favorable to the use of Hatch Act funds for substations, and in 1895 Dr. A. C. True of the Office of Experiment Stations, Washington, D. C., made a careful examination of the home station in Fort Collins and reported in part,

"...I should say that you have undertaken in the aggregate too much of what I should call farm work. ...About two-fifths of the money you have to spend goes into the work of your outlying farms and I should judge that the work was... the ordinary farm operations... Such work may be of value to these localities, but I can see that there is danger that in the course of a few years those experiments will have practically come to an end... A great State like Colorado needs more than one Experiment Station... I don't think that Congress in passing the Hatch Act ever intended to supply a State like Colorado with all the stations it needs. ..."

Dr. True, admitted that a state the size of Colorado with great variations in altitude, rainfall and soil needed more than one experiment stations, but he insisted that State funds must care for the substations. Both the Colorado Legislature and the State Board of Agriculture had some difficulty in following Dr. True's directive, but eventually the State Board discontinued the San Luis Valley and Divide substations, kept 40 acres at Rocky Ford and all of the station at Cheyenne Wells. Since 1899 "all substations, with the exception of the Akron Field Station and the Greeley Potato Station, have been supported entirely from state appropriations."2

Thus before 1900, one of the major plans made in 1888, that for establishing and financing experiment stations, was changed.

Should the same man be both president and director? - The second policy adopted in 1888 and changed before 1900 was the policy of giving the presidency of the College and the directorship of the Station to one man.

Having done excellent work both as President and as Director, President Ingersoll left Colorado Agricultural College in 1891. In 1892 Alston Ellis became President and Walter J. Quick was Director. Mr. Quick was competent, but when President Ellis, wishing to become Director, made it clear to the Board that if he were Director, an annual saving of some $750 was possible, Mr. Quick was ousted. President Ellis then served as both President and Director of the Station until 1899.

In 1899 the Board, dissatisfied with Mr. Ellis in both capacities, requested advice from Dr. True and, following this advice, placed the College and the Station under separate men. Louis C. Carpenter, at that time Professor of Irrigation Engineering, was made Director of the Experiment Station.

The third major policy determined at Del Norte in 1888, the Station plan of work, continued in operation with but minor changes until the beginning of the new century.
The management of the Experiment Station was given to an Executing Committee of three members of the State Board of Agriculture, the first men to serve being Messrs. John J. Ryan, W. F. Watrous and George Wyman. Charles Lee Ingersoll, President of the College was made Director of the Station; and Frank J. Annis, Secretary-treasurer of the Board served as Secretary for the Station.

The work was organized under five men, three of whom had one assistant each:

1. Agriculturist — — — — — — — — — — — — — A. E. Blount
   Assistant — — — — — — — — — — — — — — R. H. McDowell

2. Botanist and horticulturist James Cassidy
   Assistant — — — — — — — — — — — — — — C. M. Brose

3. Chemist — — — — — — — — — — — — — — David O'Brien
   Assistant — — — — — — — — — — — — — — Louis A. Coffin

4. Meteorologist and
   Irrigation Engineer — — — — — — — — Louis C. Carpenter

5. Veterinarian — — — — — — William McEachran

H. R. Griffin was in charge of the San Luis Valley Station,
and Frank Watrous established the one in Bent County.

Station Plan of Work — In the light of the present development of agriculture in Colorado, the plans and policies of the year 1888 are interesting.

Agriculture Section

1. Testing for soil variations;
2. Testing for various tame grasses and clovers;
3. Growing clover for farm use;
4. Growing various cereals, forage plants and vegetables for seed distribution;
5. Growing "Pride of the North" corn for seed distribution;
6. An experiment in tile drainage;
7. Growing oats for use;
8. Plant 100 hop sets for a test hop yard;
9. To follow the policy of reporting only tests of vitality of seeds from outdoor trials;
10. To be allowed to use all or any deceptions or solutions of chemicals that may from time to time be suggested for the purpose of subduing rust, smut, mildew, or other growths deleterious to the various crops grown on the farm;
11. By constantly attempting to improve the grain and
other plants cultivated by selection and to correct
nomenclature as rapidly and as far as possible so
that none but seeds and plants true to name be sent
from the College;
12. To otherwise conduct the farm as necessary to pro-
duce hay and pasture necessary for the keep of stock
upon the farm.1

Horticulture Section

Scientific Experiments:

1. The observation, study and classification of the
weeds of the state;
2. The observation and study of the injurious insects
of the year and the application and remedy for
their destruction;
3. The fertilization and cross fertilization of useful
plants with the view of the recognition of improved
varieties;
4. The observation and study of the leafy growth,
hardiness and availability of fruits and forest
trees grown in Colorado.1

Popular Experiments:

1. Experiments in the culture and curing of one acre
of Havana leaf tobacco and the production of
Colorado grown seed;
2. Continuation in the experiments of culture of
peppermint and distillation;
3. Experiments in the culture of improved varieties
of potatoes;
4. Experiments in bee keeping;
5. Subirrigation, small scale.1

Chemical Section

1. Make chemical analyses as follows:

1. Fertilizers
   a. Phosphate
   b. Guano
   c. Gypsum
2. Artesian water. Water for towns and cities;
   water in other places.
3. Directions for sampling;
   a. Water
   b. Fertilizers
   c. Soils
   d. Food stuffs
   e. Rain fall


1. I am indebted to President, Emeritus Charles A. Lory for much of
this summary of the early plans of the Stations.
No work performed without pay except that of public interest. The results of all analyses to be published if decided by the Council.

II. Analysis with other departments:

1. Water
2. Soils
3. Sugar beets for percent of sugar
4. Sorghums for percent of sugar
5. Grasses for nutritive value
6. Other forage plants
7. Varied cuttings of alfalfa for nutritive value for food.

Meteorology and Irrigation Section

I. Meteorology. The daily observations to contain the following continuous records:

1. Direction and velocity of wind
2. Temperature of the air
3. Hours of sunshine
4. Rate and amount of rainfall
5. Rate and amount of evaporation from water surface
6. Pressure of atmosphere.

II. Tri-daily observations:

1. Humidity of air
2. Temperature of dew point
3. Temperature of water surface
4. Temperature of soil
5. Sunshine temperature

III. Terrestrial Radiation (Observation of minimum temperature of the ground at night). In connection with these observations the investigation of the following special features of our climate:

1. Influence of west winds in increasing temperature and accelerating evaporation.
2. The difference between the humidity and temperature of the air on the unirrigated plains and over irrigated fields.
3. The rate and amount of cooling of the earth and lower strata of the atmosphere at night.

Special Observations Relating to Irrigation

I. Soil Temperatures

a. To notice the extent of the soil is cooled by irrigation and subsequent evaporation.
b. Difference, if any, between temperature of unirrigated and irrigated fields.
II. Evaporation

a. Occasional observations of the temperature in the reservoir, in the canal, in the lateral and of the whole flowing over the irrigated field.

b. Observation of loss from reservoir, from evaporation alone and from evaporation and percolation combined.

c. Evaporation from the soil surface.

Irrigation Experiments:

I. Duty of Water. The observations on the duty of water to record the day irrigation begins and ends, the amount used each month and the total volume for each month in the year. (The portion of the record which shows the volume for each month is especially valuable for comparison with proportionate discharge of our streams for that month and gives us a basis on which to estimate the value and importance of storage reservoirs to furnish water for late irrigation.)

II. Study of Distribution from Canals. The object of this study is to enable the station to furnish definite information on the following topics:

a. The accuracy and efficiency of some of the measuring devices in common use.

b. To call attention to their deficiencies where such exist, whether of principle involved, construction or location.

The work to consist of the measurements of the form and size of these distributing works, measurement or computation of their discharges and collection of information as to the volume intended to be delivered, and the area and kind of crop watered therefrom.¹

As this information is greatly needed, I wish to devote the greater portion of the vacation to its accumulation and the experiments in water measurement necessary to verify the computations.

III. Experiments in Subirrigation in Connection with Horticulture Department.

From the vantage of present agricultural development in Colorado, one is impressed by the basic importance of the investigations outlined in this plan of work and by the knowledge, foresight and courage of the men proposing it. While the plan is for the year 1886, with changes it remained the outline and directive of Station work until 1900.¹
THE EXPERIMENT STATION

Chapter XXVII.

The Field Crops and the Range
Establishing the Department of Agronomy at the Colorado Agricultural College was one of the events that marked the end of an old order and the beginning of a new regime, but the Department was not established without difficulty in finding a chairman. "A woman with a past is no wife for a man with a future," and a campus conflict which ended in 1909 caused many men to regard the College in this questionable light. Several members of the faculty resigned, and only with the greatest difficulty could the Board persuade high class men, who necessarily had a bit of the gambler in them, to come to the campus. Alvin Kezer, Head of the Department of Soils at the University of Nebraska, was one of these. At this time, 1909, agronomy and animal husbandry were made departments in the Division of Agriculture and Mr. Kezer became Head of the Department of Agronomy.

When Mr. Kezer joined the Colorado Agricultural College faculty in 1909 the College had been open thirty years, 1879 to 1909; in the next thirty years, 1909 to 1939, Mr. Kezer and his associates built much of the stock pile of field crop information which Jim Morrison, Ruth Prout and a hundred other Extension people, and radio men Rex Brown and Hal Renollet use daily with no consciousness that there were days when ignorance of Colorado brought down on the College men the sneer of "book learning." This same stock pile of agronomic facts went far toward making possible the great increases in Colorado crops of the World War II years.

One of the research programs begun before Alvin Kezer came to the College and continued during most of his years as head of agronomic work was the study of sugar beets.

Sugar Beets — The early work on sugar beets was done before Professor Kezer came to the campus, but has continued throughout
the years he has been Head of Agronomy; but the farmers were interested in beets before the College was more than a law and a farm.

Back in 1876 Peter Magnes remarked:

If we had beet sugar factories in Colorado similar to the flour mills scattered around, so that farmers could raise beets and draw them to the mill and get them manufactured the same as we get grain manufactured into flour and meal, I imagine that Colorado farmers would produce more gold than all the miners in the mountains.¹

It was of men like Peter Magnes that Elwood Head was thinking when he said the pioneer farmers of Colorado were men of "exceptional enterprise", and, as men on the land had been the first to attempt irrigation, it was they who, without waiting for the Agricultural College or the Experiment Station, first grew sugar beets in the State. Talk about growing the beets in Colorado began about 1866² and increased in volume and insistence as men raised a few acres of beets here and there, attempted to establish factories, to provide bounties for growers, etc.

With the Station a going concern but limping a bit because of inadequate funds, sugar beets were planted at Del Norte, at Rocky Ford and on the home experimental farm.

A tradition in the Brose family indicates that Assistant Horticulturist C. Max Brose, a native of Saxony in Germany, wrote to his father for beet seed and planted it at the College. If this were done, no record of it can be found.

However, on April 15, 1883 Mr. Brose planted four varieties of seed sent to the College by the United States Department of Agriculture. The seventh Station Bulletin summarized the findings based on this planting and gave considerable encouragement to men interested

¹ Peter Magnes, Rocky Mountain News 1876.
in growing sugar beets.

Mr. N. R. McCreery, consulting agriculturist, The Great Western Sugar Company, comments on the result of the April 15, 1888 planting:

The date of planting was good, but it is noted that the seed was planted in rows three feet apart. They must have had good farmers at the College even in those days. The high tonnage and low sugar content would indicate that perhaps seed of half-sugar varieties had been furnished. This is further borne out by the fact that only one of the varieties used that first year found its way into commercial use later.

Mr. McCreery comments that

The success of the experimental work under the direction of the College proved so conclusively the adaptability of the sugar beet to the climate and conditions of Colorado that by January, 1891 the College could make the following statement:

...we believe it has been established that the soil and climate of Colorado are favorable to the production of sugar beets and they can be successfully and profitably raised to the advantage of both of the farmer and the manufacturer.

The seventh bulletin published by the Experiment Station was "Potatoes and Sugar Beets" by James Cassidy and David O'Brine, 1888. Because in those days there was no Department of Agronomy, work in the general field of agriculture was assigned to any qualified man; and, James Cassidy, a horticulturist and David O'Brine, a chemist, were the two who had general supervision of this study of sugar beets.

Beginning early, work on sugar beets has been an almost continuous Station program and has been an important factor in making sugar beets one of the big income crops of Colorado farmers.

Toward the end of the century, H. H. Griffin irrigating beets on the Experiment Station land at Rocky Ford, urged men from Utah who were interested in establishing a beet sugar factory to...
look over the Fort Collins section. The Utah men laughed and left
Mr. Griffin to his irrigating and to continue his planting of beets.

Through the nineties planting sugar beets was one of the
regular Station projects in both plains and mountain regions and Mr.
McCreery pays tribute

* * * to the early Experiment Station men for careful
observations and common sense conclusions, for even after
the experience of forty-five years of commercial beet
growing their findings stand unfuted and can still be
read and followed with profit.¹

Mr. Steinel says:

The experimental work done by the Colorado station covered
every phase of production during those years, including
type of soil, time of planting, time of plowing, sub-soiling,
distance between rows, distance between plants in the row,
quantity of seed, germination, cultivation, thinning,
number of irrigations, varieties, tonnage, sugar percentages,
ripening dates, fertilizing, freezing of beets, feeding of
by-products, effects of alkali, size of beets, loss in
topping, cost of growing and topping. In fact, there is
absolutely no phase of the industry appertaining to the
farm that was not listed, tried and reported on for the
benefit of the early beet growers of Colorado.²

Mr. McCreery points to another effect of the College ex-
periments; he says these "had a great deal to do with influencing
capital to build the necessary factories for processing the crop and
in providing the farmers with information as to the cultural prac-
tices necessary to grow the crop successfully."³

The first sugar factory was erected in Grand Junction in
1899, and others followed rapidly. Paralleling the establishing of the
factories in the early years of the twentieth century, the College
Department of Agriculture, which at that time included both agronomy
and animal husbandry; began demonstrating the value of beet pulp in
fattening livestock. (See animal husbandry)

¹ McCreery, op. cit. p. 2.
² Alvin T. Steinel and D. W. Working, Collaborator, History of
Agriculture in Colorado, p. 299.
³ McCreery, op. cit., p. 2
Through the years the College continued to work on its own initiative or in co-operation with the United States Department of Agriculture on various phases of growing and harvesting sugar beets. The work included:

Tests with commercial fertilizers and feed-lot manure, tests to determine the best spacing for maximum yields, irrigation experiments on the proper application and use of irrigation water, and in more recent years in the development of mechanized equipment for eliminating the problem of hand labor.¹

The study of mechanized equipment continues to the present under E. M. Mervine, Station Agent at the College, but a Federal employee.

Not for a season did the farmers of Colorado cease their efforts to learn the why and how of growing beets with a high sugar content. Some farmers co-operated with the Experiment Station; more worked independently; the sugar companies established research programs.

¹ W. E. McGregor, "The College and the Beet Sugar Industry," ms. p. 3. Ibid., p. 3.
Dry Land - Though the work with sugar beets was of tremendous importance in the early years of the life of the Experiment Station, it was not the only phase of agricultural research.

In 1893 the Kansas Pacific Railroad officials, interested in learning crops and cultural practices best suited to eastern Colorado plains, granted to the State Board of Agriculture a quarter section of land near Cheyenne Wells, and there in 1894 the State Board located a third experimental substation. J. E. Payne at the Cheyenne Wells Station from 1896 to 1904, and J. W. Adams who took over the Station land on a rental basis from 1910 to 1911, learned the hard way much that was of value to dry land farmers.

Apparently in the nineties men had forgotten that the Plains of Eastern Colorado had supported buffalo by the thousand, and later, cattle in equal numbers. Being industrious men, many of the dry land, plains farmers cultivated the land thoroughly only to be starved out by drought. Mr. Payne noted that after the bad drought years of the early nineties, some settlers began raising stock and found the business profitable. He foresaw dairying as successful in that area because of "free range, cheap rough feed and inexpensive warm stables." He recommended, too, home gardens and fruit trees, and had his advice in all been followed we might never have had an Eastern Colorado dust bowl. J. W. Adams following J. E. Payne at Cheyenne Wells demonstrated the value of certain sorghums and was the first man in Colorado to use contours and terraces to control wind and erosion. Trees being rare in his section, Mr. Adams experimented with soils as building materials and proved that certain of those

available were suitable for adobe bricks. In the years of World War I he pointed out the folly of plowing eastern Colorado land to plant wheat and could have said, "I told you so" when dust bowls developed after the plowing had been done.

Though the findings at Cheyenne Wells did not make the wind in that region stop blowing, clear out the Russian thistles, or bargain with the rain gods for showers, establishing this substation did mean the testing of some non-irrigated varieties, the development of some cultural methods, and it made Colorado the first State in the Union to declare an interest in dry farming.

Messrs. Payne and Adams could not change the dry land areas of Eastern Colorado, but they did much in showing men how to live in dry land areas.

U. S. Dry Land Field Station at Akron — In 1907 the people of Akron subscribed $3,000 and petitioned the State Board of Agriculture to establish an experiment station near their town. With this money the Federal Government purchased 66 acres of land; and Congress gave the State Board 160 acres immediately north of the Government tract, the condition of the gift being "said land to used for forestry experimental purposes, and if not so used for a period of five years to revert to the Government of the United States." Agronomic rather than forestry experiments predominated on this land over a period of years when non-irrigated farming Colorado was growing rapidly. From 1914 to 1927 the dry land acreage in farms increased 270 per cent; between 1909 and 1924 the number of bushels of corn harvested on non-irrigated land increased 180 per cent, wheat 390

Alvin Kees, "Colorado Agricultural Experiment Station," ms. p. 15-16.
John A. Widtsoe, Dry Farming, A System of Agriculture, p. 566.
Theodore Roosevelt, Proclamation, Aug. 5, 1907. ms. Copy in Division of Forestry files.
per cent; and the 11,971 acres in sorghums in 1909 became 214,519 in 1924. 1 From 1912 to 1927 the improved highways in dry land counties increased 100 per cent; a hundred thousand trees a year were planted; 149 consolidated schools were established, and forty-six schools by 1926 were teaching vocational agriculture.

Responding to the needs of the rapidly growing dry land areas, the Agronomy Department of the College and the Akron Field Station working together released Brunder oats and Club Mariout barley. Both of these add to the probability that Eastern Colorado farmers will have crops to show for a season’s work. 2

Grain and dual purpose sorghums tested at Akron are now a part of the crop program in northern and central Colorado. In Akron, too, Keser, Briggs and Shantz did important work on crops in relation to soil moisture.

Alfalfa.—Beginning his work at the Arkansas Valley Station in 1895-1896 and returning to that station for the years 1903 to 1927, Philo K. Blim was studying agronomic and horticultural unknowns in Colorado before Professor Keser came to the campus and worked with Mr. Keser for 18 years. Mr. Blim’s chief contribution in field crops, a contribution which has meant much to Colorado’s farmers and stock feeders was the discovery of two types of alfalfa: the northern with crowns below the surface of the ground and the southern with crowns above the surface. Mr. Blim improved the hardy strain, which other men at the Experiment Station further tested and improved and now recommend as Meeker Baltic.

1. "Progress in Non-Irrigated Farming in Colorado", U. S. Census. (A mimeographed statement attached to Prof. Keser’s letter to Mr. Dodd dated Oct. 6, 1926. See in file under Experiment Station.)
2. D. W. Robertson, "Contributions of the Experiment Station to the Agriculture of the State". ms. p. 4-5.
Corn. — While Mr. Dilm was developing an alfalfa that was one of the best of stock feeds, agronomic research in other sections of the State was evolving corn as a standard crop.

In 1909, Senator Drake said, "I never feed corn grown in northern Colorado," and others who fed sheep agreed with him; but in 1923 Mr. Drake said, "Sound corn in carload lots grown in the northeastern section of the State? Sure, I buy it regularly," and Mr. Drake and other men who held his views with regard to corn grown in Colorado made Larimer County for years the top county in the United States in number of lambs fattened.

The College agronomists had early begun to develop a corn suited to Colorado but had soon given more time to testing hybrid strains from other states. In order to protect Colorado growers the Department of Agronomy, having determined which strains were best suited to the Centennial State, persuaded hybrid seed growers from other states to send in only these strains.

By 1941 the hybrid corn had increased the corn yield in Colorado about three million bushels,¹ and the trains going east no longer carried animals to be fattened in the corn belt; the corn belt has been brought to the animals.

Wheat. — In 1909 with 20 varieties of wheat being grown in Eastern Colorado, the wheat that went to the Kansas City and Omaha markets was such a mixture that buyers, without so much as looking at it, priced it at five to 15 cents a bushel less than wheats from other sections. To beat such a game, Colorado growers who had a good wheat or a single variety billed it from points in western Kansas where varieties were kept separate.

¹ Alvin Kezer, "The History of the Agronomy Department," ms. p. 11.
In a few years, thanks to the College agronomists, the
farmers in Eastern Colorado no longer needed to borrow the "Duke's
Mixture" label from tobacco; the wheat grown in Eastern Colorado ranked
with the best from other states.

Mr. Kezer's policy from the first was to secure the best
varieties of field crops, developed locally or imported, for Colorado.
The varieties of wheat are an example. Defiance wheat from the nine-
teen-ties to World War I was almost the only irrigated spring wheat grown
in Colorado; and Texas people, true to the tradition of southern bis-
quit, liked the floury but Defiance wheat, when shoved into other
markets during World War I and mixed with other wheats, was docked in
price. The Department of Agronomy called Marquis wheat to the atten-
don of farmers. This replaced Defiance for a few years but was sub-
ject to black stem rust. The Department then suggested Komer but this
was much resembled Kots, a poor wheat which was often mislabeled Komer.
In 1939 the Department brought in to Colorado several carloads of
Thatcher wheat which has not yet been given the test of time, but in
1944 when black stem rust severely damaged other wheats, Thatcher in
the same localities produced in such measure as to indicate that re-
turns to farmers in Colorado would have been at least $1,400,000 greater
had the irrigated acres of wheat all been Thatcher.

In 1945 the Station was still trying to produce a rust-
resistant variety of wheat, but Dr. D. W. Robertson, with the true
scientist's caution, would not say when such a variety might be ready
for planting.

Barley and Tribi barley, introduced by the Department in 1925,
added greatly to farmers incomes; Club Mariout and Flynn, barley,
brought into the State, went far toward crowding out Russian thistle
on dry land; but these immigrants are giving way to Beecher and Lico,
barleys produced by College agronomists. Developed by the Department of Agronomy and the Akron Field Station, Brunker oats enlisted with the occupation troops engaged in taking over by peaceful penetration the prairie dog and sunflower acres of dry land. In Bulletin 303, Dr. W. Robertson and Alvin Kezer reported on Colessa barley, a barley that fought as a feed crop on the high altitude flank of the crop army and field pea tests at Fort Lewis, approximately a mile and a half above sea level, indicated the yield of varieties at high altitudes.

Still developing barleys, Professors Kezer and Robertson reported in Press Bulletin 67 on "A New Smooth Awned Barley for Irrigated Counties of Northeastern Colorado."

These men and others determined the best dates for planting corn in Colorado; Messrs. L. J. Briggs and Homer Shantz at Akron did the classical work "on crops in relation to soil moisture."¹

More technical bulletins recording the work of the Colorado Station are: "The Effect of Lethal The Heterozygous Condition on Barley Development" by D. W. Robertson; "Comparison of Methods for Estimating Phosphorous in Alkaline Soils" by Messrs. A. D. Hockensmith, Robert Gardner and James Goodwin. This marked the testing of soil fertility on a more accurate and more fundamental basis. "Nitric Nitrogen in Soils of the Arkansas Valley" by Robert Gardner, Alvin Kezer and J. C. Ward entirely upset the theory that Colorado soils were slowly being ruined by excess nitrogen. In "The Use of Sugar Beet Petioles as Indicators of Soil Fertility Needs" Messrs. Robert Gardner and D. W. Robertson gave "a new and highly sensitive method to use in the study of fertility needs."²

¹ D. W. Robertson, "Contributions of the Experiment Station to the Agriculture of the State." ³¹ ²   ³
"Soil Blowing and Its Control in Colorado" shows Messrs. J. F. Brandon and Alvin Kezer in conflict with wind and erosion. "Slick Spots in Western Colorado Soils" by Robert Gardner, R. S. Whitney and Alvin Kezer contained fundamental information which enabled farmers to treat "slick spots" in Western Colorado in such a way as to make them productive. "Survival of Several Alfalfa Varieties Seeded on Irrigated Land Infested With Bacterial Wilt" by A. M. Weihing, D. W. Robertson, and Otto Coleman "gave the basis for breeding work to create wilt resistant varieties."

The scientists worked to produce a non-poisonous Sudan grass; they studied unproductive subsoils, the dates of seeding winter wheat, and the sugar beet requirements of nitrogen. "Pasture and Forage Crops for Irrigated Areas in Colorado" by D. W. Robertson, R. M. Weihing and T. G. Stewart presented the findings of years of study of grasses, legumes and pasture mixtures and would have delighted the soul of C. W. Brose who had studied grasses the hard way.

**Pit Silos, Terracing and Contours.** - Along with crops and shelter belts, Station workers demonstrated pit silos for the first time in Colorado, and men, puny men fighting nature with his terracing and contour work stays the age-old washing of arroyos.

Developing agronomic crops had not been done entirely by farmers and the College agronomists. Chemists, bacteriologists, and other scientists had assisted.
In 1893 Dr. William Parker Headden came to the College as Professor of Chemistry and Geology; from 1917 to 1928 he added to his title, Chemist for the Experiment Station, and from 1928 to 1932 he gave all of his time to the Station.

At one time a group of faculty men on an Extension trip at the end of a long, cold day gathered around a hot stove in a small hotel in northwestern Colorado. A stranger entered, glanced at the men from the College and then asked them if they were from the Agricultural College. Upon receiving an affirmative reply, the stranger asked, "Do you know Dr. Headden?"

"Yes," "Of course," "Certainly" chorused the faculty men.

"Do you know the sort of man you have for a colleague?"

the stranger continued. "In Europe we regard him as in a class with Curie and Rutherford."

"By whatever standards he is measured," Professor Alvin Kezer writes, "Headden must be considered one of Colorado's great."

Beginning in 1885, before he came to the College, and continuing during all his years on the campus Dr. Headden was writing technical articles and bulletins. The total number of such publications in well over a hundred. His chief lines of investigation were problems in mineralogy, soils and some agronomic crops. However, he also gave time to some other projects.

and tantalite from the Black Hills of South Dakota," "A Study of the 
Formation of the Alloys of Tin and Iron with Description of Some New 
Alloys."

At the College his first bulletin, No. 35 was "Alfalfa," 
1896. In 1897 a bulletin on sugar beets and one on alfalfa came from 
his pen and in 1898 he again wrote on beets. He continued his studies 
of these two important crops and in 1904 wrote his first bulletin on 
Colorado Hays, and Fodder: Alfalfa, Timothy, Native Hay, Corn, Sorghum, 
Salt Bush; Digestive Experiments. His contributions, based on studies 
extending over a period of years, to the knowledge of hays, fodders and 
sugar beets in Colorado were frequently basic principles in the devel-
opedm of Colorado agriculture and in the development of forage and pas-
ture for livestock.

Dr. Headden's study of soils in Colorado was his third line 
of interest. He wrote his first article on excessive nitrates in soils 
of Colorado in 1909 and in 1910 he published Bulletin No. 160 "Nitrates 
In the Soil - An Explanation of the So-called Brown Spots." Altogether 
between 1909 and 1923, he published 12 articles and bulletins on one or 
another phase of the nitrate problem. His studies led him to the con-
clusion that certain "brown" or "slack" spots or areas could not produce vege-
tation because of a concentration of nitrates in these spots. He be-
lieved that the nitrate situation was becoming worse and would destroy 
irrigated agriculture in Colorado.

Later investigations by Messrs. Alvin Kezer and Robert Gar-
der showed that nitrates were only a part of the salts in the "brown" 
spots; they corroborated the statements that vegetation would not grow 
on the salt spots, but they did not see in these spots a menace to 
Colorado irrigated agriculture. Messrs. Kezer and Gardner believed
that the concentration of salts in a particular area was due to an
impervious layer of subsoil. Irrigation water dissolved the salts in
the soil, then because the water could not move through the soil and
drain away in the usual manner, it evaporated and left the concentrat-
on of salts. With quantities of organic matter mixed with the soil,
followed by heavy irrigation, normal movement of the water was restored
many of
and the "brown" spots upon which nothing would grow became productive
soil.

Between 1885 when Dr. Headden began publishing technical
articles and 1930, he wrote more than 100 technical bulletins and arti-
cles, these in addition to the annual reports of the Chemistry Section
of the Experiment Station. In every field in which he studied and
wrote, he made valuable contributions to the knowledge men need if
they are to earn a living on Colorado land.

Joseph W. Tobiska became Dr. Headden's chief assistant in
1920, and Earl Douglass joined the staff of the Chemistry Section of
the Station in 1920. After the death of Dr. Headden, these men and
others continued work of the section in studies of methods of curing
and vitamin content of alfalfa, on causes of "yellow-berry" in wheat,
on drinking water and proper supply of water for livestock, etc., and other problems.

The Chemistry Section has co-operated with Animal Investi-
gations on feeding projects, with Horticulture on potatoes, greenhouse
soil, and plant studies, with Pathology and Bacteriology on timber
milkvetch poisoning, etc., etc.

July 1, 1945 Dr. W. E. Pyke became Head of the Department
of Chemistry and of the Chemistry Section of the Experiment Station.
Dr. Pyke's plans for research in the Chemistry Section follow two gen-
eral lines:
(a) The study of Colorado products, such as cherries, peaches, melons and their by-products with a view to increasing their industrial value;

(b) Studies in Chemistry should assist in projects conducted by the field and operating sections of the Station. These studies have to do with food for animals and for human beings, vitamins, hormones, insecticides, etc.
BACTERIOLOGY

Alfalfa. — 1908 saw the establishment of a Bacteriology Section of the Experiment Station with Walter C. Sackett in charge. Dr. Sackett's first work was the isolation of the causal organism of Sackett's Bacterial Blight, a disease of alfalfa first reported by Wendell Paddock. This disease is generally and almost continuously present; "In years when frosts break the bark of alfalfa plants the disease gains entrance."¹ The northern types of the plant are more resistant to this organism than are the southern, but in years of late spring frosts the disease is widely spread. Messrs. Sackett, Blinn and Kezer showed that after late frosts, cutting the alfalfa early checked the spread of the disease, and prevented injury to the next crop, but no cure has been found.

Blight of Pears, Raspberries, Peas, etc. — Dr. Sackett's work on crops included studies of blight in pears, red raspberries, field and garden peas, work on bean diseases, and, after a preliminary study with Professor Alvin Kezer, the isolation of the causal organism of "alfalfa wilt".² In 1928 this wilt killed one fourth to one third of the crop in Boulder, Larimer and Weld Counties. In the early years of his work Dr. Sackett published a series of studies on the fixation on nitrogen in Colorado soils.

Denver Water Supply, Greenhouse Soils. — He made a study of the Denver city water supply, showed that honey might be a carrier of intestinal disease, and showed greenhouse men how to keep their "bench" and "flat" soils free of disease.

Dr. Sackett resigned in 1933, and Bacteriology was added to the Pathology Section of the Experiment Station. Pathology and Bacteriology Section has continued work to the present.

¹ Alvin Kezer, "Colorado Agricultural Experiment Station" ms. p. 29.
² Ibid., p. 27.
Range and Pasture Management

Southern Studies. - On the early maps, Colorado was shown as a part of the Great American Desert. By 1888 the desert itself was becoming a mirage, but Mr. Carlisle's observation that the State "was fit only for cow pasture and mining" was still, in general, true. (Mines and the Texas steer made an agricultural experiment station look small and of little value.)

The wind still stirred the half dried grass on the plains; the sun cooked the odor out of square miles of sagebrush; the prairie dog, that dweller in uninhabited places, barked by his burrow; and in many a mountain valley the coyote howling at the stars disturbed no one.

However, pioneers were in every section of the State. Men living in sod houses or log cabins were planting field crops and trying small fruits and orchards in the Arkansas, Grand and San Luis Valleys; by 1900 two waves of settlers had starved out on the dry lands of Eastern Colorado. In southern, western and eastern Colorado cattle were still more profitable than field crops, and responding to the need of the range industry, James Cassidy of Horticulture and Botany and David O'Brien of Chemistry made a study of grasses. Their bulletin, published in 1890, "Some Colorado Grasses and Their Chemical Analysis" earned national and international recognition.

In 1890, too, a grass experiment station, federally financed, existed briefly on the farm of S. H. Birdshall near Fort Collins; but, of more use to the livestock men was the work of C. Max Brose, Assistant in Horticulture who afoot, horseback, with a team and a rickety old wagon, collected mountain and plains grasses where there were roads of a sort and no roads. Mr. Brose had been educated in agriculture in Germany, but he was a pioneer in Colorado and willing to work the pioneer way.
Beginning in the early twenties Botany and Animal Husbandry co-operating, conducted studies in range and pasture management. Fifty or more grasses from all over the world were tested under Colorado conditions; Melvin S. Morris made a vegetative map of Colorado Mesas. Durrell and Morris made chain and compass, and botanical surveys of the North Park hay meadows.

Mr. Nelson at first initiated studies of:

1. Artificial Revegetation of Depleted Range and Abandoned Crop Lands.
4. Range Resources Surveys in Washington County.

Later research in range and pasture management included studies in deferred and rotation grazing, and seasonal-conservative grazing, on the value of certain native and certain foreign grasses, on "winter fat;" on phosphorus, silica and selenium compounds in grasses, on reseedings and on depth of planting pasture grasses.

On August 16, 1935 a co-operative agreement was signed with the Federal Forest Service which provided for the location at the College of the Rocky Mountain Forest and Range Experiment Station.

This group of men, with whom the College men have co-operated closely, has made highly valuable contributions to the world's knowledge of the forest and range.
\textbf{Animal Investigations.} — In 1909 the Department of Agriculture was broken up into the Departments of Agronomy, Animal Husbandry, Farm Mechanics and Dairy. George E. Morton was made Head of the Department of Animal Husbandry and was in charge of Animal Investigations when that work was made a section of the Experiment Station.

However, long before there was a Department of Animal Husbandry or an Animal Investigations Section of the Experiment Sections, men on the faculty, Extension and Station employees were studying domestic animals and publishing some findings.

It was a slow change, a fifty year change from the Texas Longhorn with never a dollar's worth of feed but what he could get on the range put inside him to the time when 150,000 cattle and a million sheep fattened in the feed lots of Colorado. Longhorns went to market "grass fat", and, later, when sheep, cattle, and hogs were sent to the corn belt for fattening, Colorado farms were thickly dotted with stacks of hay for which there was little sale even at three dollars a ton; a feedlot industry had not developed in Colorado.

J. E. Payne on the substation at Cheyenne Wells in the nineties advocated stock raising on land which had once supported buffalo by the thousands. In 1895, Wells W. Cooke published the first of the Colorado Station bulletins on lamb feeding and followed in 1886 with "Cattle Feeding in Colorado". It was at this time that most of the 700,000 cattle in Colorado roamed the ranges, were shipped to the corn belt for fattening, or never saw a feed lot before they became beefsteak.

Not only the wheels of time, but motor vehicles made one
made one of the interesting projects of the first of the century unnecessary. In 1903 Barton C. Aylesworth, President of the College; Eugene Grubb, member of the State Board of Agriculture; and W. L. Carlyle, Head of Agriculture, went to Washington as a committee to persuade Congress to apportion money, an apportionment separate and distinct and in addition to regular Station funds, for a project in horse breeding at Colorado Agricultural College. The amount apportioned to start the project which was in co-operation with the United States Department of Agriculture, was $25,000.00.

James Wilson signed the agreement for the Department of Agriculture, and the fact that W. L. Carlyle, not the President of the College, signed for the institution reveals much of the campus political situation at that time.

Forty acres of what we now call the Agronomy Farm were set aside for the horse breeding. Barns were built, men employed, horses purchased. The animals reared were beautiful, high-spirited carriage horses.

At one time a buyer of one of these horses appeared in President Lory's office, groaning at the mouth and profane. He swore the Station had sold him an "outlaw." He had tried to "whip break" the creature and the horse fought back.

"Now as one horse trader to another," President Lory is reported to have said, "do you think you have a kick coming?"

The buyer grinned and the two men parted friends.

However, the spirit and beauty of the horses could not enable them to compete with motor vehicles, and in 1919, because carriage horses were not needed, the breeding project was discontinued. The animals and personnel were moved to Wyoming.
The Beet Sugar and Livestock Industries. - The beet sugar industry established in Colorado in the first years of the twentieth century motivated the revolution in the stock industry. The beet sugar factories opened were: Grand Junction 1899, Rocky Ford 1900, Sugar City and Loveland 1901, Greeley and Eaton 1902, Fort Collins, Windsor and Longmont 1903,1 Sterling, Lamar and Holly 1905, and Brush, Fort Morgan, Swink and Las Animas 1906.2 Others followed until by 1926 twenty factories had been established in the State.

In the nineties, while Station men were studying sugar beet raising, they were also publishing the advantages of alfalfa as a stock feed. With the establishing of the sugar factories came the Station bulletins on feeding beet pulp, but alfalfa was not forgotten. The first of the bulletins on using beets or beet pulp as feed was No. 73, "Part I Feeding Value of the Beet Pulp. Part II Feeding Beet Pulp and Sugar Beets to Cows." This was by B. C. Buffman and C. J. Griffith, 1902. Others who published before 1909 on feeding livestock were: H. H. Griffin, W. L. Carlyle, and F. C. Watrous. They discussed such topics as: "Beet Pulp and Sugar Beets for Fattening Hogs", "Home Grown Grains vs. Corn for Fattening Hogs", and "Feeding Beet Pulp to Lambs".

In 1909, when Animal Husbandry became a department, with George E. Morton in charge, Mr. Morton at once began a series of feeding experiments. Bulletin 167 dealt in part with rations for lambs and 188 with "Ration Experiments with Swine." Mr. Morton was

1. N. H. McCrery, "The College and the Beet Sugar Industry" ms. p. 3.
2. E. J. Maynard, "History of Colorado Experiment Station Participation in Development of State's Principal Livestock Industry" ms. p. 3.
trying to help farmers to see that fattening stock in Colorado was both possible and profitable.

In 1919 E. J. Maynard became associated with the Experiment Station in Animal Investigations. Messrs. Maynard, Morton, C. J. Bray, B. W. Fairbanks and H. H. Smith accomplished so much that the Colorado Experiment Station... took the lead in determining the value and most effective use of these feeds [beet by-products] and is today recognized as an outstanding authority on the beet by-products as livestock feeds.¹

In the order named, H. B. Osland, R. C. Tomm and W. E. Connell followed Mr. Maynard in Animal Investigations, and all devoted considerable time to problems of feeding.

Demonstrations at the College of the results of feeding experiments, begun early, still continue to be one of the most effective ways of passing on to feeders the findings of the scientists.

(Use photo of lamb feeders)

Some of the later bulletins which contained findings based on the feeding projects were:


Their findings of the investigators continued to indicate that "no combinations of feeds available... could produce as efficient results as those which contained an appreciable amount of beet by-products."²

¹ E. J. Maynard, "History of Colorado Experiment Station Participation in Development of State's Principal Livestock Feeding Industry," ms. p. 2.
² Ibid., p. 3.
Thus, stock feeding and the sugar beet industries marching along together, have crossed the picturesque Texas Longhorn out of Colorado and into history. The men at the College and at the Akron Field Station have given Bossy, Mary's lamb and woolies, and the porkers a diet as studied as that of an actor eating to "look the part."

Dr. Charles H. Kick, who followed George E. Marton as Head of the Department of Animal Husbandry, put more emphasis on research but did not under stress the practical demonstrations which were of immediate use to stock men. Dr. Lloyd E. Washburn has continued the pure science line of work in studies of nutrition. For example, he is delving into the science of nutrition in an effort to discover why a certain ration, according to present knowledge considered as excellent, shows deficiencies when fed to certain farm animals. In another study he recently found that feeding measured quantities of Protomone to sheep meant a definite increase in wool growth. A third project revealed that certain calves which their owners believed were getting too much molybdenum in their water, were, instead, lacking in phosphorus in their diet.¹

H. E. Osland and Ronald Tom in charge of Animal Husbandry for short periods both emphasized the feeding tests supplemented by animal breeding experiments. Sherman S. Wheeler, present head of animal investigations has outlined a masterful long-time program dealing with breed improvement for Herefords, Shorthorns, and cross breed sheep.

¹. Interview.
Chapter XXVII

Insects and Plant Diseases Versus Horticulturists, Plant Pathologists, Entomologists, and Seed Analysts.

The Fruit Crops Bring Problems
Horticulture

Fruit.—By the time the Colorado Experiment Station was established in 1888, horticultural crops as well as field crops were growing on some land where once the most prolific crop had been sunflowers or sage brush. Most pioneer farmers first planted more of field crops than of fruit and vegetables, but some gave particular attention to the horticultural crops. In the sixties some orchards and small fruit had been planted and in the seventies and eighties the trial and error method of finding varieties adapted to northern, southern and western Colorado was meeting with some success. In Fremont County, planting in the sixties, were such men as Jesse Frazier and Captain F. R. Rockfellow, the latter a member of the State Board of Agriculture, 1896-1910; in Larimer County in the seventies and eighties representative horticulturists W. F. Watrous, first President of the State Board of Agriculture; Joseph S. McClelland, member of the Board, 1893-1896, and Charles Pennock; on the Western Slope in the eighties W. E. Pabor, Charles W. Steele, Elam Blair, William Bombardner, S. A. Wade and N. S. Coburn were among the most hopeful and determined of the horticulturists.

Samuel A. Wade was hauling fruit trees across Black Mesa in 1881-1882 and building fires around them at night to keep them from freezing. In the spring of 1882 Enos Hotchkiss set out fruit trees near what is now the town of Hotchkiss.

In October 1885

the first fruit and vegetable show was held under the auspices of the recently organized Delta County Board of the State Horticultural Society. At this exhibition the newly plowed soil of the North Fork Valley gave one of the most unusual displays ever witnessed. — There were squashes weighing 150 pounds each, pumpkins only slightly smaller, thirty-pound beets, potatoes measuring fourteen inches in length and weighing four pounds each. There were numerous varieties of apple,
peaches, and small fruits entirely free from any kind of pest. The North Fork Valley seemed destined for fame as an agricultural Utopia.

The fertile uncorrupted soil and young trees were at their best. Apple trees commonly bore from twenty to thirty bushels of apples in one season, many bearing forty boxes. One acre of pear trees at the average price netted the grower $1,000. Peach trees began producing at the early age of two years and in three years were carrying a full crop, nowhere excelled in flavor or quantity. Charles H. Underwood of Paonia, Civil War veteran, raised 945 bushels of potatoes on one acre of land, six selected potatoes weighing sixty pounds, and one of these establishing the official world’s record of eleven pounds.1

Along the North Fork of the Gunnison, fruit grew amazingly. At first the growers sold to peddlers who hauled to the mining camps of Ouray, Telluride, Rico, Red Mountain, Silverton, and Saw Pit, but by the end of the century with commission men trying to buy the fruit 2 as many as 65 fruit-laden wagons in a row came to be a common sight on the road to Delta,1 the nearest railroad point. This "wagon era" continued from 1899 to 1902.

The height of the North Fork fruit boom was 1906-1909. Pests were finding their way to this Western Slope Garden of Eden, and in 1912 a freeze killed most of the fruit trees.3 However, in 1911 men paid $3,500 an acre for peach land, or bought a ranch at $1,000 an acre and sold it in two weeks at $1,200 an acre.4 Such were the beginnings and the biggest horticultural boom which formed the source material of problems thrust upon the first three horticulturists at the College.

About the time Sam Wade was hauling his trees across Black Mesa, President Ingersoll was inviting James Cassidy to join the College faculty. C. S. Crandall, 1899 to 1900, and Wendell Paddock, 1900 to 1909 followed Mr. Cassidy.

2 Ibid., p. 93.
3 Ibid., p. 98.
4 Ibid., p. 97.
The Western Slope fruit region held surprises for both farmers and scientists. The book cliff formation meant a surprisingly warm climate for so high an altitude; both an insufficient water supply and poor drainage were problems, and no one knew how soil that had been almost without water for centuries would react to irrigation.

The Eastern Slope orchards, having been planted earlier than those on the North Fork of the Gunnison, were attacked earlier by insects and disease, but by the end of the first decade of the new century most of the fruit in the State was under attack. That the problems were not serious in the nineties is indicated by the fact that from 1892 to 1902 the Station published only six bulletins having to do with fruit pests and fruit diseases, but between 1903 and 1910 the number of such bulletins rose to 14.

A bulletin which was one of the most important of the publications of the first decade of the century was, "Top-working Fruit Trees" by O. E. Whipple. This gave to orchardists, valuable information on care of trees, on disease and on insect control.

On one of the early and most serious pest problems, codling moth, horticulturists worked with entomologists. (See State Entomologist)

Between 1910 and the twenties men from the Experiment Station at Fort Collins studied Western Slope problems, but a substation at Austin meant getting the work closer to the community where it was needed. This substation was established in 1922-1923 as a training farm for service men of World War I. In 1930-1932 experimental projects were initiated, the station has continuously reported new fruit information to Western Slope farmers.

Mr. Ferris W. Green in charge at Austin in his published reports made available to orchardists information on pruning, spray residue removal, cover crops, orchard management, and "better methods of
handling, packing and storing of fruits. A

While demonstrating cover crops and cultural practices, he took time to build and put into operation one of the first apple washing machines which is still in use, and placing himself among the first in the United States, he began in 1929 to defuzz peaches.

Mr. Green tries out new varieties of apples, pears, grapes, and tomatoes, etc., and is trying to develop a cherry that will produce in the lower humidity, higher temperatures and shallower soil of the Austin section.

In his spare moments he devised an "exploder" to scare birds from his early cherries and got the laugh of the season when a College and a Federal man fell flat on their faces at the first crack out of the thing. They thought it was a machine gun.

Dry Land Orchards. — Not all of the early study of fruit was of Western Slope difficulties. The Cheyenne Wells substation was inadequately and intermittently financed, and operations were handicapped by uncertainty and lack of money, but James E. Payne and J. W. Adams at the Eastern Colorado Station did much to show that orchards were possible on dry land, and, contributing to the growth of the fruit industry in the State as a whole, Wendell Paddock, D. B. Whipple and others recommended in the first decade of the century cultural practices, varieties, irrigation methods, means of controlling diseases and pests, etc.

Survey of Small Fruits. — During Dr. E. P. Sandsten’s first years as Head of Horticulture he made surveys of the small fruits of Colorado and published a fruit survey which listed “all fruit farms in Mesa County with varieties, soil problems, insect and disease pests with their methods of control.” 2 This and other such surveys indicated

2. Ibid., p. 3.
The field of cultivated potatoes in Colorado was one of the first in the United States, as the State Horticulturalist, who was by law the Professor of Horticulture, was one of the first in law the Professor of Horticulture to inaugurate a seed certification program, which has greatly increased the field of cultivated potatoes in Colorado.

In 1916, with funds appropriated by the Department of Agriculture of the State of Colorado, the potato industry through the field of cultivated potatoes in Colorado was established. The field of cultivated potatoes in Colorado has been a potato specialist. He has conducted a seed improvement program with stressed the elimination of potato diseases, and conducting variety tests. In the first 10 years, the Department of Horticulture participated in the potato industry through the elimination of potato diseases, and conducting variety tests.

By 1906, the Department of Horticulture has been a potato specialist. He has conducted a seed improvement program with stressed the elimination of potato diseases, and conducting variety tests. In the first 10 years, the Department of Horticulture participated in the potato industry through the elimination of potato diseases, and conducting variety tests.

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In 1939 this program was transferred to the Extension Division.

1916 saw the establishment of this Colorado Potato Station at Greeley. Here the Bureau of Plant Industry of the U.S.D.A. and the Colorado Experiment Station study the breeding of new disease-resistant varieties, cultural and irrigation problems.

C. H. Metzger, potato specialist, 1928-1935 had much to do with the development of high yielding varieties, information on how to grow them and with the seed certification program.

At the Avon substation, established in 1924, the potato foundation seed program was for a time carried on; but, when the Avon farm was sold in 1939, the potato work was transferred to Center in the San Luis Valley.

A. M. Binkley summarizes the recent work of the Station on potatoes:

The most valuable contributions to potato production in Colorado in recent years have been the study on the control of bacterial ring rot in potatoes, the breeding program out of which have come new strains and new varieties of potatoes, the work on potato nutrition, which includes the study of the effect of copper, iron and manganese sulphate and other trace elements on grade quality and cooking quality, and the effect of commercial fertilizers on yields, rotation studies, cultural practices and storage investigation.¹

**High Altitude Vegetables.** - In the years 1913 to 1919 vegetable production, other than potatoes, in the Mile-High State became commercially important. Though before this, men knew the "second mile up" in Colorado was forested, they had not realized that the growing of vegetables was possible in this second mile above sea level.

Until 1918 much of the horticultural emphasis was on fruit, but 1918 became historically important as the date because when the

¹ A. M. Binkley, op. cit., p. 5-6.
² I want to thank J. Lee Deen for this phrase. He used in the title of an article in "American Forester" June, 1945. p. 284.
Station began research on high altitude varieties of vegetables and cultural practices that would produce the best results. R. A. McGinty's "Vegetable Growing in Colorado" began the publications on this topic and was important in encouraging the production of second-mile-up lettuce, potatoes, cauliflower, peas, etc. The acreage in lettuce, for example, increased from 222 acres in 1919 to 6,000 in 1920, and most of this was above 7,000 feet.¹

Though most of the early horticultural emphasis had been on fruit, P. K. Blim saved the cantaloupe crop in the Arkansas Valley in the first decade of this century. His rust-resistant variety "goes down in the early history of plant pathology as one of the earliest disease resistant varieties ever produced in the field of crop production."²

Other varieties are now used, but Mr. Blim's variety saved the crop forty years ago.

Recent Lines of Work. — The years 1928 to 1935 were years of work on vegetable crops — beans, onions, etc. These studies were not only a continuation of the "second mile-up" experiments but also of varieties suited to that portion of Colorado only three and four thousand feet above sea level. In studying possible new crops L. E. Evans, C. A. Coral and C. E. Gnadinger studied the possibility of producing pyrethrum for insecticides. The work of Mr. Evans led to the establishment of a commercial company to grow pyrethrum near Pagosa Springs.

After 1935 the new lines of work in horticulture were marketing and ornamental horticulture, the latter dealing particularly with the commercial aspects. The work on flowers was particularly

². A. M. Binkley, "Partial History of Horticultural Department". ms. p.6
tied up with the $6,500,000 greenhouse industry of the State.

These new lines together with the continuation of the fruit and vegetable work constituted the Station program in horticulture after 1935. Summary. — Mr. Binkley summarizes the Experiment Station work of the Department of Horticulture from 1890 to 1928 as largely of the educational and extension types; from 1928 to 1935 attempts were made to do as much work as possible on substations in order to bring operations near the growers, to test crops developed at the main station, and to gain the support of growers for a strong research program. Since 1935, Mr. Binkley, as Head of Horticulture has encouraged a trend toward technical research, and, as a result the department has gained national recognition in this phase of work. Growers as always strongly support the research program.

Though still giving time and study to potatoes, other vegetables and fruit, in 1935 the Horticulture Section of the Experiment Station began stressing research in floriculture and ornamental horticulture.

Dr. Emil P. Sandsten was Head of the Department of Horticulture and of the Horticulture Section of the Experiment Station from 1913 to 1935. Since 1935 Professor A. M. Binkley in these positions has given considerably more emphasis than at any previous time in the history of horticulture at the College of technical research.
Dr. Clarence Preston Gillette who came to the College in
at once became interested in State problems as well as in classes. His
first bulletins were:
No. 15 "Two Insect Pests (Codling Moth + Grape leaf hopper)." 1891
No. 19 "Observations on Injurious Insects," 1892
No. 24 "A Few Common Insect Pests," 1893
No. 31 "A Preliminary List of Hemiptera of Colorado," 1895
by C. F. Gillette and Carl F. Baker
No. 38 "Sheep Scab, A Few Insect Enemies of the
Orchard." 1897
No. 43 I. Colorado Lepidoptera. II A Few New Species
of Deltocephalus and Athysanus from Colo-
rado. III A List of Original Types, etc.
in Collection 1898
No. 47 "Colorado's Worst Insect Pests and Their
Remedies." 1898
No. 71 "Insects and Insecticides," 1902

In 1907 a State law created the office of State Entomologist
and provided that the entomologist at the Agricultural College should
also be State Entomologist. Dr. C. F. Gillette held this position
from 1907 to 1931, and Dr. George W. List served in this capacity
from 1931 to 1937. In 1937 the State government was reorganized and
the office of State Entomologist was moved to Denver. However, Dr.
C. R. Jones held the position, ex officio for another two years.

On July 1, 1910 Dr. Gillette became Director of the Colorado
Agricultural Experiment Station. He retained also the position of
Head of the Department of Entomology and Zoology and that of State
Entomologist. Dr. List, beginning in 1913, was the chief deputy in
the State office and also was often on the Experiment Station staff.

This close tie-up in entomology personnel makes it difficult
to assign research accomplishments to the Colorado Agricultural Ex-
periment Station or to the State Entomologist. Dr. George W. List
says that while the office of State Entomologist was at the College
practically all of the extension activities in
pest control and much of the research work, especially
as it is related to the control of insects and rodents, was carried on through this organization (State office) in close cooperation and coordination with the work of the College and the Experiment Station.1

In general, Dr. List adds, from 1915 to 1937 the Station provided funds for systematic work and the building of the insect collection; funds for the economic work came from the office of State Entomologist.

**Insect Collection.** - Since Colorado was a new region, almost every insect the scientists met was a stranger. This meant much study of insect fauna and of injurious species which suddenly attained dangerous numbers. The collecting, classifying and studying of habits and life cycles began with the arrival of C. P. Gillette in 1891 and continued until in 1945 the collection contains 185,000 pinned specimens, including paratype specimens of 200 species described as new from Colorado.2

(Use photo of tent camp of collection)

Only enthusiasts could make the aphid or plant louse collection what it is today. "That was the finest plant louse I ever saw," Mr. Luther C. Bragg, one of the early collectors often gloated. He searched for the plant lice "on foot, then by means of a slow old horse and spring wagon loaned by the Meteorology Department, then a bicycle, then a motorcycle and finally an automobile purchased by himself."3

Collecting trips were as a rule at the expense of the collectors, but even so when Mr. Bragg left the institution, Miss Miriam Palmer, realizing that he had not covered Colorado's second mile above sea level, undertook to search the high altitudes. She joined the Mountain Club, acted as leader for summer school trips - anything to

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3. Miriam A. Palmer wrote the story of the plant louse collecting.
transportation into the mountains. Miss Palmer tells of some of her experiences and of an outstanding bit of luck:

On a few occasions a College automobile, or more exactly a Model T. Ford, was assigned. To use these vehicles proved a way of living dangerously. On one expedition the car failed to negotiate the hills of Stove Prairie and the night had to be spent at a ranch house till the engine had been worked over sufficiently. Two students had been taken along for driver and collector and a lady friend for chaperone. The failure to return as scheduled caused alarm and a search party consisting of Dr. Gillette and C. L. Corkins arrived the next day in time to find us on our way home down Rist Canon.

Another Model T Ford expedition was to Grand Lake. The start had to be made about 4 a.m. and the person who had turned in the car the previous night left it without lights, brakes, or horn action. With a student driver and two members of the Home Economics Department the expedition was made over the Fall River road following the first snow of the season! Though there had been highway trouble early in the morning the sun melted the snow so we rode gayly through and the next evening returned just at early dusk to a garage in Loveland where the lights could be repaired. Because of the efficiency of the driver and fool's luck, the trip was made without mishap.

At the first College Day picnic I collected a lady-beetle (*Adalia arrectans* Crotch) which lead to an interesting study of heredity in color pattern. The first batch of eggs laid by this beetle produced 8 progeny of which 4 resembled the mother, yellow-bronze with black spots and 4 were black with red spots. This was very surprising and several other egg batches were reared with the same result. This study involved the breeding of ladybeetles for three seasons and settled the hereditary behavior of certain color patterns in five so-called species. The publication of the work attracted the attention of a worker on this problem in England who, when visiting Canada, made a trip here to study the specimens. Efforts in England and Germany had been unsuccessful in discovering the hereditary relation of the patterns because of the fact that these insects are only one-brocketed in a season in those countries, while in Colorado several generations will be produced and it was possible to bring many over the winter alive to produce still more generations in the following season. Thus, we have a long enough line of genealogy to determine the law followed in the inheritance of the patterns. Workers in Russia have now succeeded in getting the same results and conclusions as in the Colorado work.1

The aphid collection is now one of the finest in the world, and Dr. Gillette, during his period of work, received world-wide recognition as an authority on aphids. After his retirement, Miss Miriam Palmer who had worked with Dr. Gillette constantly, continued the studies and now ranks in reputation with her famous chief.

Dr. Gillette founded the work on aphids and with the help of L. C. Bragg built up the major part of the collection.

He specialized on economic aspects, made many observations on economic phases of life history and host plant habits, especially on orchard lice. These data together with results of experiments with insecticides he applied on control of the pests.

He described, as sole author, 26 new species, as senior author, 79 more species, making 105 new species in all.

He discovered complete life cycles for several species, finding the alternate host plants on which the lice live at different times of the year.

Literature on aphids when Dr. Gillette began his work was in a primitive and chaotic condition, we did much to bring order out of chaos and put the work on a more scientific basis.

Miss Palmer, during Dr. Gillette’s study of aphids was called the delineator. She made drawings in color of plant lice “as a reference record in the determination of species.” Seventy-two drawings, thirty-four species “all but five of the species previously undescribed have been published in color,” as have also seventy-eight drawings of other species. “Unpublished drawings of aphids in color comprise 196 species” and “black and white drawings of insects of all kinds number 1451 published and 80 still unpublished.”

(See a reproduction of one of Miss Palmer’s plates).

2. Ibid. p. 2.
State Entomologist

Since 1907 the State Entomologist in Colorado has been the general in command of the human army fighting injurious insects. The general, his officers, enlisted men and intelligence service wage annual battles with such flying and crawling things as grasshoppers, leaf hoppers, cynipid gall formers, himiptera, aphids, ants and others in countless legions. The strategists among the farmers and entomologists have learned the ancestry and the attack habits of many of the creatures, but still the insect hordes can make sneak, surprise attacks and can make crops look as if an atomic bomb had been dropped.

Grasshoppers and alfalfa webworm in pest proportions fight in squadrons and only efficient intelligence service and scientific strategy prevent one generation from taking up where the ancestors died.

Grasshoppers. - In the fable of the grasshopper and the ant, the grasshopper took time out from his summer's playing and singing only to deride the smug and shrewish ant for its industry in storing food for winter. Such grasshoppers live only in fables. At least, if hoppers do not store food for winter, their crop-distraying appetites menace the farmer's desire to fill barns and granaries. Entomologist, Corkins and later Frank Cowan, in general charge, enlisted with the farmers to make life a brief span for these insects.

In 1914 Dr. C. R. Jones built the first mechanical bait mixer; next he suggested mixing sawdust with the bran or other poison-carrying substance. C. L. Corkins developed sodium arsenite as a poison and W. L. Burnett directed the preparation of containers of this substance which he expressed to any part of the State on a moment's notice. Though other poisons had replaced this by 1933, the College in 1945 receives requests for the sodium arsenite.

In 1931 grasshoppers were the chief insect enemy in twenty-one
counties. Where control work was not done, the crop loss ran to 100%. County pest inspectors, field men and county agents led the counter attack.

In 1931 and 1932 eight of the eastern counties organized grasshopper pest districts which included 1,267,000 acres but left outside the organized districts at least an equal number of acres. The estimated crop saving in the organized districts was well over one and a quarter million dollars. Sam McCampbell sent a heavy gun into the fight against grasshoppers when in 1936 he developed a mechanical bait spreader which served as a model in the next two years for more than a thousand machines. This was before the days of dusting fields from an airplane.

The year 1937 saw one of the biggest battles between man and grasshopper. Men of the National Guard, the State Highway, the Forest Service, the Civilian Conservation Service and the Civilian Conservation Corps saved nine million dollars worth of crops but like some human depredators of World War II the grasshopper was slow to admit defeat.

**Alfalfa Webworm.** The sudden necessity for such battles kept farmers and scientists constantly "alerted". Though tremendous firing power went into the fight against the grasshoppers in 1931 and 1932, reserve forces — large ones — met and defeated the alfalfa webworm when it devastated the smiling fields of the Eastern Slope. The Pearl Harbor attack was in 1941; but the webworms in 1932 made the heaviest advance on record, almost totally destroyed the spring seeding of alfalfa in the northeastern counties of the State, making necessary the spraying of thousands of acres of sugar beets, causing the abandoning of 8 to 10,000 acres and greatly reduced the yield in the remaining fields.
Not satisfied with the devastation in the alfalfa and sugar beet fields, the webworms attacked the truck gardens. Knowing well the life cycle of the webworm, the entomologists went among the truck growers in the Denver public market forecasting the flight of the moths and explaining control measures; but the scientists trusted not entirely to word of mouth; they used circular letters, newspaper articles, radio talks and public gatherings.

Both grasshoppers and webworms, defeated in their suicide attacks, were forced, at least temporarily, into unconditional surrender.

Codling Moth. - A new fruit region is seldom troubled by injurious insects, but as the years slip from horizon to horizon over the orchards, the pests creep in. Often the orchardist, blinded by the yellow sun of summer, cannot see what has come upon him. The Western Slope fruit section followed this pattern of development. While men were hauling peaches in long wagon trains from Paonia to Delta and sleeping in their wagons as the horses found their way back in the choking clouds of dust, codling moth was creeping into the apple orchards.

When the moth first invaded the orchards and when entomologists named the creature, orchardists and real estate men rose in wrath.

"Go", they roared. "Beat it. You don't know moth when you see it. You're only trying to run down the values of our land." Men who had sold apple orchards for $1,000 an acre and men who had paid that joined in self-protective refusal to admit that so serious a pest as codling moth was attacking the apples.

Time proved the entomologists and the horticulturists who were working together in a study of the orchards to be right, but time and more time was required to learn that the spray mixture that killed
codling moth in the East did not injure the creature in Western Slope orchards. Much stronger spray more frequently applied was necessary and William P. Yetter, J. H. Newton and others developed "a method of timing moth spray application through the use of fermenting bait traps." The method in now generally used in apple and pear sections throughout the world. The chemically treated codling moth band and the use of codling moth ovicide were developed in the Western Slope fight between scientists and the moth.

But the scientists and the fruit growers learned not only the spray which would kill the moth and how to apply it, they learned other sprays and other treatments for still other pests and diseases. And scientists and orchardists learned co-operation.

"I look like Tugboat Annie when I drive the spray cart," one woman laughed in the fall of 1944. She was the valiant wife of a valiant husband, he an alumnus of Colorado Agricultural College. Both were long past the age of retirement; but they were fighting the battle of the Homefront while their sons were in the armed forces. Not knowingly would the woman admit the work was far too hard; but, still with a laugh to cover her weariness, she told with what tremendous relief a week earlier she had received a telephone message from the watch-dog scientist in the valley to the effect that the last scheduled spraying could be omitted. So the orchardists and the scientists work together.

County and Community Planning. — However, even with growers and scientists co-operating, the number of apple trees in Colorado declined from 1,777,737 in 1920 to 993,186 in 1930, and to 522,506 in 1940.  

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2. Ibid.
To counteract this continuing decrease in number of apple trees, Mr. Charles Drage suggests help from a new coalition which men have formed in their effort to force nature to produce as men will. He suggests that county and community horticultural planning committees should know and recommend those varieties which will do best in each locality. Hobbyists, private agencies and the Colorado Experiment Station have made this information available,¹ and the raising of apples in Colorado may come again into its own.

County and community planning committees are a far cry from the days when each man who wanted to raise some fruit did his own guessing as to varieties.

Science is winning the battle with the bugs, but—

Other Insects. — The vigor and variety of insects means never a dull moment for entomologists. The tarnished plant bug can ruin hundreds of carloads of peaches in a season; the San Jose scale and the cherry fruit worm, recognized offenders, were joined in the twenties by a pest new to science, the cherry curculio. He was defeated by a Ph.D. dissertation.

Apiary. — Under Wesley Foster, 1913–1920, Newton Boggs 1921–1924, and R. G. Richmond, 1924–1937, studied diseases of bees were greatly reduced and studies were made of the relation of bees to pollination of certain seed crops, especially red clover. Mr. Richmond, working on the heating of honey to prevent crystallization pointed out the possibility of using creamery equipment and so reducing injury to the honey through caramelization.

Rodent Control. — W. L. Burnett, was largely responsible for the poisoning of prairie dogs, ground squirrels, etc. Millions of acres of land organized into pest districts were nearly cleared of these rodents.

¹ Ibid., p. 3.
Pages 547, 548
549 deleted.
The Department of Botany originated at many such departments at Land-Grant Institutions. C. S. Crandall from 1889 to 1899 was Professor of Horticulture and Botany. He was followed by Professor Wendell Paddock who in turn was followed by W. W. Robbins assisted by B. O. Longyear. At this time the department was separated from Horticulture and Forestry with which it had been associated. Dr. Robbins left in 1919 and the department was without a head for a year when Dr. A. K. Peitersen was appointed to the position. Following his death in 1923 Dr. L. W. Durrell was made head of the Department and the name was changed to the Department of Botany and Plant Pathology, as the major botanical problems of the State are those of plant diseases.

Stinking Smut in Wheat. — When Dr. L. W. Durrell came to the campus as Head of the Department of the Department of Botany in 1924, he was a recognized authority on corn and on resistance of oats to rust; but when he came to Colorado stinking smut in wheat had reached epidemic proportions. He knew that in Australia copper carbonate had been used to treat this condition; he knew, too, that it had not been tried on an extensive scale. However, the wheat growers were losing some $3,000,000 per year from stinking smut and something had to be done. As he, Ernest A. Lungren and Waldo Kidder in a Model T Ford drove along the dusty roads between the wheat fields of Eastern Colorado, they could smell the stinking smut in the fields it was so plentiful. Sampling of many fields showed 65% smutted heads.

Other men who joined in the fight were Messrs. William J.

1. Records of these dates disagree.
Henderson E. W. Bodine. These men traveled through Eastern Colorado with a small wheat treating machine, made from a keg which was bolted to the running board of the car. In two weeks time they talked to 8,000 wheat growers, showing them how to prevent smut.

Since that time the smut, except in isolated instances where treatments are neglected, shows scarcely a trace. Bulletin No. 333 "Seed Treatments for Stinking Smut of Wheat" by E. A. Lungren and L. W. Durrell and Bulletin No. 334 "Smut of Colorado Grains" by L. W. Durrell record much of the work on smuts.

Smut in Oats and Seedling Blight of Corn. - William J. Henderson studied smut in oats and sorghum with the result that 95% of the oat acreage and 80% of the sorghum planted is treated seed. Mr. Henderson worked also on seedling blight of corn, and convinced men to treat about 50% of seed planted and made possible a 1% increase in yield.

Barberry. - Ernest A. Lungren, United States Department of Agriculture, in cooperation with the Department and Section of Botany and Plant Pathology fought the barberry and so kept the loss from black stems to a minimum. Bulletin 315, "Barberry Eradication and Sources of Black Stem Rust in Colorado" by L. W. Durrell and E. A. Lungren, 1927, records some of the work and the results of the barberry program.

Plant Pathology, Carnations. - "In the western states," Dr. Durrell remarks, "we are still pioneering. It is not unusual to encounter six diseases new to this section in a year." He and Erwin LeGlerg had scarcely finished working on adobe storage houses for onions in the Arkansas Valley when Denver carnation growers were
calling for help. At that time the carnation industry amounted to about $4,000,000 annually and root rot was taking some 25% of the crop.

Knowing the diseased condition to be the result of the action of a soil fungus, Dr. Durrell and E. J. Starkey put into practice methods of sanitation. Mr. Lee Holberg, a prominent grower, cooperated in every way in this study with the result that good control was effected and great financial saving resulted.

Plant Pathology, Soil Fungi, XXX. — Dr. Erwin LeClerc studying soil fungi made the first findings in this field in the western states. Drs. LeClerc and Durrell examined root rot of onions in the Arkansas Valley and made recommendations as to temperature and ventilation while the onions were in storage, and Dr. Krueitzer's recommendations on pink root of onions and E. W. Bodine's on purple blotch cleared up some of the complex onion disease problems.

Studies having a particularly high economic value were also made by the Botany staff on potato ring rot, late blight, tomato canker, tomato collar rot, XXX.

Bacterial Ring Rot of Potatoes. — In 1934 ring rot on potatoes suddenly appeared in the Olathe section. Carloads of potatoes from that district rotted before arrival at their eastern destination. In fine co-operation Dr. Krueitzer, Mr. Henderson and the men in Horticulture and Extension pooled their information, and they recommended control measures which did much to save the potato industry of Colorado.

Knowing that the disease could be spread by a cutting knife, William J. Henderson invented a rotary cutter, half of which was in
a disinfecting solution while the other half cut the potato. In one section of the State, growers assumed that the cutter was simply to speed operations, and they omitted the disinfecting solution; the result was they lost the crop.

**Late Blight of Potatoes.** - Bacterial ring rot of potatoes had ceased to be dramatic when in 1942 late blight of potatoes, an old disease but new in Colorado, appeared. Here again research was necessary. Though years of experience in eastern States had taught us much about the disease, Dr. Kreutzer's work showed that the spores go all over the field in irrigation water. The remedy was to dump copper sulphate in the water. The destruction of piles of cull potatoes from which the disease spread was also effective in combatting it.

**Peach Mosaic.** - In 1931 peach mosaic appeared in the Western Slope orchards. The program of eradication was planned by Messrs. Durrell and Bodine of the Department of Botany in co-operation with the State Entomologist, Dr. Gillette. Later the United States Bureau of Entomology and Plant Quarantine carried on the quarantine and eradication.

Rather than force destruction of diseased trees as was done in California and incur litigation, Mr. Bodine visited each of the 500 odd growers in the district and in nearly every case received splendid co-operation. At first the disease was a mystery but Mr. Bodine proved it to be a virus. Dr. Lee Hutchings of U.S.D.A. was also working on the disease in Texas and published his results definitely establishing the cause. It is of interest that Drs. Hutchings, Bodine, Durrell and List joined forces, co-operating throughout the years of study so that Colorado had the advantage of all information.
in the United States to use in combatting peach mosaic.

In the beginning only seven diseased trees were found and the grower owning them was asked to destroy them, as there is no spray or other remedy for control. He failed to do this and the next year their number had increased to 31; still no removal. The third year the number had increased to over six thousand. An eradication program was then instituted and the diseased trees removed. Eradication of diseased trees has continued as the only means of preventing destruction of the Western Slope peach orchards.

Dr. Edward W. Bodine, studying the complex peach mosaic problem, discovered that certain trees were "typhoid Marys", hidden carriers; he showed, too, that the disease was not one virus but a complex of more than one. Continuing his work, Dr. Bodine cleared up the prevalent confusion with other virus diseases as those on apricot, and the persistent confusion with so-called yellows or chlorosis caused by soil conditions. His work now is the most outstanding in the United States on virus diseases of stone fruits.

Dr. A. O. Simonds added to the peach mosaic work by discovering a chemical test for the diseased trees.

New diseases of peach have made their appearance over the years and constant vigilance on the part of the plant pathologists has detected them in time to point them out to the growers and to prevent their serious spread. Such diseases as rasp leaf of cherry, ring rot of apricot, golden net of peach have been discovered and their cause and control studied.

The very serious X disease of peach was one of those detected when it first appeared; all diseased trees found were destroyed
and so far the disease seems to be stopped.

**Colorado Plant Collections.** - Professor C. S. Crandall 1887-1899 who was Professor of Horticulture and Botany 1890-1906, gave attention to both subjects in his department is evidenced by the fact that he began the very useful collection of Colorado plants now in the Department of Botany and Plant Pathology. Later F. A. Rydberg, basing his work on this collection, was employed to write Bulletin No. 116, "Flora of Colorado," at the time one of the good places of taxonomic work in the country.

E. C. Smith, a member of the Botany staff from 1927 to 1937 and curator of the herbarium until July 1, 1945, increased the collection to 25,000 specimens; and another former member of the department, Mrs. Ruth Ashton Nelson, published "Plants of the Rocky Mountain National Park" which is greatly used by the Park Service. The Colorado Agricultural Research Foundation commissioned Dr. R. D. Harrington, Botany staff 1935 to 1939, to write a complete work on the plants of Colorado.

Dr. W. J. Robbins who became Head of the newly organized Department of Botany in 1915 in Bulletin No. 234 published the first study of "climatic and vegetative zones in Colorado."

**Plants Poisonous to Livestock.** - The Botanical Section of the Experiment Station for years has worked in co-operation with the Division of Veterinary Medicine on poison plants. The plants studied are: "whorled milkweed, poison succleaves, timber milk vetch, yellow bean, poison algae in lakes, black root, and prussic-acid forming plants." Bulletin 316 by Drs. L. W. Durrell and George K. Glover "Poisonous Plants of Colorado" is one of many publications in this field.
Weeds. — With some 40 technical bulletins and papers covering weed control to its credit, the Botanical Section of the Experiment Station stands as one of the leaders in the United States in this field. The work has been done by William May, C. F. Rodgers, W. S. Ball, E. J. Thornton, A. O. Simonds and C. G. Barr.

Publications. — Men of the Department and Section of Botany and Plant Pathology have not only studied Colorado's plant problems, they have published their findings in articles and bulletins which number over 300 in the last twenty years.

Dr. L. W. Durrell who has been Head of the Department of Botany and Plant Pathology for 32 years has built the Department to a position where, though not large or rich, it ranks with those of some of the best departments in the country. The thousands of students that have come to Colorado A & M over the years have received their introduction to biological science in the botanical class rooms, and many famous scientists of the United States have been inoculated with a scientific viewpoint and inspiration there. The research of the Botanical, Plant Pathological staff and those co-operating have solved many serious plant problems and have saved Colorado over $10,000,000 since 1925.
Seed Laboratory. - Back in 1877, "Alford's Pumpin Bill"
Prescribed among the multitudinous duties of the secretary of the State
Board of Agriculture that he should purchase, receive and distribute
such rare and valuable seeds, plants, shrubbery and trees as it may be
in his power to procure — 1. Being a hundred dollar a year man,
the secretary gave much less than half time to his duties as secretary;
and, since he had no budget, he did little toward procuring "seeds,
plants, shrubbery," but the framers of the law initiated a striving
which finally led to establishing the seed laboratory. Frank J. Annis,
Secretary of the Board when the Experiment Station came into existence
in 1888 writes that "the raising of seeds and plants, and the testing
of the same for distribution" — is "one of the principal lines of
work" of the Station.

Such quotations show the attitude of the early law makers toward good seed. The uninformed grower failed to carry out the in-
tent of the legislators; he often secured seed in some such was as,
"After frost, at the close of the growing season, everything in the
line of a cantaloupe, green or ripe, large or small, is gathered and
run through a melon seeder with no attempt at selection." This re-
resulted in unreliable seed and unreliable melons.

In 1913 and again in 1917 the Grange was urging and endors-
ing pure seed laws.

W. W. Robbins, H. E. Veasey, and E. G. Eggington in 1918
Published, "Cleaned, Treated and Tested Seeds for Colorado", the first

1. Sec. 8. "An Act to Establish a State Board of Agriculture and to
Define its Duties.
2. Frank J. Annis, "Annual Report of the Secretary of the State Board
Bel. No. 85, p. 6., Dec., 1903.
of the College bulletins in this field. Before Dr. Robbins left the faculty in 1919 he and members of his staff had written on identification and control of weeds, on the effect of weeds on crop yields, and on the weed seeds in irrigation water.

The Agronomy Department, though not staffed or equipped for seed testing, first responded to requests for the testing service. The urging of some farmers and Professor Alvin Kezer's ability to harmonize factions led to the first State seed law. This Act, signed by Governor Julius C. Gunter April 10, 1917, placed the seed laboratory and the enforcement of the law under the State Board of Agriculture, and W. W. Robbins, Head of the Department of Botany and of the Botany Section of the Experiment Station assumed charge of the Seed Laboratory. G. E. Egginton was the first seed analyst and inspector, with Miss Anna Haude Lute coming in 1920, after Dr. A. K. Peitersen became Head of the Department of Botany. Miss Lute in this position until 1941 made outstanding contributions to the world's knowledge of seeds and seed testing and twice had the opportunity to go as a delegate to the International Seed Testing Congress in Europe.

Seed samples were sent in to the laboratory, and Miss Lute went to dealers to examine seed and into the fields at planting time where she took samples from the drills. Going into the stores where seeds were sold she took a lens and forceps with her and showed merchants good seed and bad; taking samples from drills she could tell farmers such things as, "You planted 239,000 seeds of wild morning-glory, and two kinds of povertyweed on 20 acres." Farmers understood and heeded such comments and demanded of the dealers better seed.

Among the important studies made by Seed Laboratory workers are those on the effect of heat on alfalfa and clover seed, on

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1. Annual Report, Colorado Experiment Station 1936-37, p. 55.
impermeable alfalfa seed, broken seeds, weed seeds, embryoless seeds, field surveys of quality of seeds planted, longevity of agricultural seeds stored in Colorado, etc., etc.¹ Of especial importance are Bulletin 326, "Impermeable Seed of Alfalfa" and the work on longevity which Miss Lute and Dr. D. W. Robertson of the Agronomy Department have been doing together for twenty years or more.

William May, C. F. Rodgers, W. S. Hall, B. J. Thornton, and A. O. Simonis continued the investigations of weeds, and Colorado has become "a leader in the United States in weed control studies." The publications amount to some forty technical bulletins and papers.

Such studies have made the Colorado laboratory one of the leading laboratories in the United States² and have been an influential factor in the profits farmers reap from their planting, in the price and variety of the food on the nation's tables, and in supplying the demand during World War II for certified seed.

The Seed Laboratory continued in the Botany Department until 1932 when it was transferred to the Experiment Station under Director E. P. Sandsten.

Because politics often weighed as heavily in legislative financing of the seed laboratory as did the growers¹ needs and the economic value of pure seed, the Laboratory budget had its ups and downs. Of necessity results obtained went down when the budget did.

Following the retirement of Anna Maude Lute in 1941, B. J. Thornton of the Botany Section of the Station was given charge of the seed laboratory with Miss Helen Kroeger, who had been trained by Miss Lute, returning from Washington as analyst. Under Mr. Thornton the laboratory continued its outstanding work.

² E. W. Durrell, "The Department and Section of Botany and Plant Pathology" ms. p. 4.
THE EXPERIMENT STATION

Chapter XXVIII

Livestock Diseases

versus

Veterinary Science
In 1883 and again in 1888 the State Board of Agriculture made unsuccessful attempts to establish at the College work in veterinary medicine. In 1899 and 1900 Dr. George H. Glover, then practicing in Denver, gave special Saturday morning lectures on diseases of farm animals to the students in Agriculture; in 1901 he became a full-time teacher on the campus. Though he was not formally added to the Experiment Station staff until 1906, he did one of his most interesting pieces of work in the years when he was lecturing to the students in Agriculture on Saturday mornings.

**Tuberculosis in the College Herd.** — Dr. Glover suggested to Burt G. Buffum, an alumnus, who was Professor of Agriculture, that he, Glover, test the College herd. Buffum agreed and the test convinced Glover that the herd was tubercular.

Mr. Buffum and President Aylesworth asked Dr. Glover to go before the State Board with his story. The men on the Board listened to the young veterinarian with scant tolerance, grinned and asked, "How do you know?"

"By the tuberculin test."

"What's that?" demanded a Board member.

"Give me a chance to show you and prove what I say," responded the veterinarian with more courage than discretion.

After some talk the men on the Board agreed that Dr. Glover should kill one of the animals the next Saturday morning at 10 o'clock, members of the Board being present.

Dr. Glover selected a cow carefully. His own knowledge of disease and the god of luck aided the veterinarian, "Suppose," he
Groans now intelling the story, "that I had selected the one cow we found later that showed no symptoms of tuberculosis."

The lungs and glands of the one he did select were rotten with the disease. As he worked the doctor felt a nodule in the udder. Things had gone well with the demonstration; he felt he could be a bit theatric. He dissected out the nodule and with a flourish, cut through it. Out ran puss and milk on the ground.

Dr. Glover stepped back dramatically and pointed, "That's what you've been selling to people for milk."

Jed Brush, an old time cattle man and a member of the Board looked, spat, and "cursed like a Missouri mule skinner.\(^{1}\) "I order this mess be cleaned up. Glover, you go ahead and kill one or two of these animals every Saturday until we tell you to stop."

This was the beginning of the end of a fine imported herd. "While the immediate loss was startling," writes Dr. I. E. Newsom, "he did succeed, in the course of a year or two, in producing a clean herd, thereby setting an example for other stockmen of the State.\(^{2}\)

The example was followed throughout the State with the result that in 1945 less than one half of one per cent of the cattle in Colorado were tubercular.

**Poisonous Plants.** — In studying loco in co-operation with the Federal government, Dr. Glover initiated a long series of studies of poisonous plants — studies which have meant life to thousands of head of livestock, and profit to livestock men. Working with Dr. Glover have been such scientists as the veterinarians, Newsom, Thorp, Deem and the botanists Robbins, and Durrell. That the co-operation of

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1. As told by Dr. Glover.
the two branches of science meant much appears in the nine bulletins and various articles in professional magazines which appeared between 1906 and 1939. The bulletins are:


The toxicity of three of these plants - the whorled milkweed, suckleya suckleyana and oxytenia acerosa acerosa - was first demonstrated by the Colorado Experiment Station.

Brisket Disease. - With all the Coloradoan's pride in his mountains, he has to admit that some of his fellows and more of his cattle cannot be taken abruptly to high altitudes. In three publications in 1915, one in 1917, and others, Drs. Glover and Newsom presented their findings on brisket disease, a dropsical condition of cattle which seems to be due entirely to the effect of altitude. When the animals are shipped down to a mile or a little less above sea level no other treatment is necessary. Bulletins 204 and 229 and articles in technical periodicals recorded the work done in this field by Dr. George A. Glover and Dr. I. E. Newsom.

Oat Hay Poisoning. - In the thirties oat hay poisoning in cattle suddenly reached a crisis. Outbreaks were violent and losses

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1. Dr. I. E. Newsom, "Outline of History of Veterinary Section of the Experiment Station", ms. p. 2.
heavy. After considerable study the veterinarians determined "that the nitrate content of the hay was the chief factor in the causation of the disease."

Liver Abscesses in Cattle. — In Denver packing houses in recent years sometimes thirteen per cent of the livers of cattle have been condemned because of abscesses. This being the highest loss in the United States, the veterinarians were asked to find causes of the condition. Two papers, one by Dr. Newsom and one by Dr. Hilton A. Smith mark the progress in these studies.

Two technical articles by Dr. Newsom and Dr. Hilton A. Smith have recorded progress in this line of work.

Sleeping Sickness in Horses. — Though the College veterinarians have given considerable study to encephalomyelitis in horses, they have not published largely on this topic.

Swine. — Though the College veterinarians have not specialized in work on swine, Drs. Glover and Newsom have published two bulletins and as many technical articles in this field.

Sheep. — Though the veterinarians in their work on swine, cattle and poisonous plants have contributed much toward making Colorado a place in which to earn a living, the Veterinary Section of the Experiment Station is best known for its work on sheep. Dr. Gillette, the entomologist, reported on sheep scab as early as 1897. The first studies by veterinarians Glover, Newsom and Aikire in 1919 and 1921 were followed in 1925 by one by Drs. Newsom and Gross "particularly dealing with paratyphoid septicemia in feeder lambs." This was

1. Dr. I. E. Newsom, "Outline of History of Veterinary Section of the Experiment Station," ms. p. 6.
2. Ibid., p. 3.
followed in the same year by a general bulletin dealing with diseases
of feeder lambs which, like the work on poisonous plants, has seen many
editions and many changes in authors, the most recent edition being
dated 1943.

Beginning in 1918 Dr. Newsom alone or Drs. Newsom and Cross
working together, with occasionally Dr. Thorp added, have published studies
on sheep diseases in eight bulletins and twenty-six technical articles,
the series ending about 1943.

Bul. 38. Sheep scab; a few insect enemies of the orchard.
Gillette. April, 1897.
Bul. 270. Sheep losses in Colorado feedlots, study No. 1.
Glover and Newsom. September, 1921.
Bul. 302. Sheep losses in Colorado feedlots, study No. 2.
Newsom and Cross. June, 1925.
Bul. 305. Diseases of Colorado feeding lambs. Newsom and
Cross. October, 1925.
March, 1934.
Bul. 448. Lamb diseases in Colorado feedlots. Newsom and
Thorp. August, 1938.
Tech. Bul. 31. Effect of rations on the production of urinary
calculi in sheep. Newsom, Tobiska and Osland. 1943.1

Abortion Disease. — As early as 1927 Drs. Newsom and Cross
became interested in the abortion disease and in their work laid the
foundation for a method of control within the State.

Poultry Diseases. — The veterinarians of the Veterinary
Section of the Experiment Station seem to have first become interested
in poultry in 1912 when Dr. B. F. Kaupp published Bulletin 185 on "Some
Poultry Diseases". Three other bulletins, indicating continuing though
intermittent studies of diseases in poultry are dated respectively 1920,
1924, and 1930. Technical articles by Messrs. Newsom, Ufford, Cross
and Stout bring the scientific studies of poultry up to 1933.

1. Ibid., p. 3.
Other Studies. — Other studies by the veterinarians have led to occasional publication on such topics as "Relation of Bovine to Human Tuberculosis" by Dr. Glover, "Rabies" by Drs. Glover and Kaupp, "Necrobacillosis" by Dr. Glover, "Mastitis in Dairy Cattle" by R. S. Sandouse and Dr. Floyd Cross, etc., etc.

Conclusion. — Much of the work of the Veterinary Section of the Colorado Experiment Station has been pure science, a contribution to the sum of the world's knowledge. On the other hand the veterinarians have not been cloistered in marble halls or even in laboratories. They have been in touch with men on the ranch and the range, men who were striving to earn a living, to support families, to send children to school. When these men saw their livestock, the source of part of their livelihood, dying, they asked help of the veterinarians; and they gave the best of their training in research to the livestock men.

Because of this training, tuberculosis in cattle is almost non-existent in Colorado; the work of veterinarians and botanists has given to stockmen a knowledge of those poison plants which might have made a vigorous livestock industry in this State impossible; Drs. Cross and Newsom in their studies of feed deseases of sheep have contributed a larger part of that information which enables Colorado to rank among the first States in the Union in lamb feeding. Veterinarians and animal husbandry-men co-operating were a determining influence in changing Colorado from a State which did not produce enough eggs and poultry for home use to a State exporting these products.
Vitamins. - A Poultry Husbandry Section of the Experiment Station with Dr. Herbert S. Wilgus, Jr. in charge was established in 1936. Dr. Wilgus, trained and enthusiastic, began work vigorously, but World War II depleted his staff and retarded his projects. However, the Section is responsible for findings in vitamin relationships to poultry nutrition in deficiencies in Colorado feeds.

Deficiencies. - The Poultry Section began studies on vitamin content of hays and on the effect of manganese and iodine deficiencies in certain thyroid problems.

Nutritional Value of Eggs. - In co-operation with Home Economics, poultry men have investigated the nutritional value of eggs in cookery.

Dr. Wilgus, Associate Director of the Station. - On October 3, 1945, Dr. Wilgus, in the absence of Director Homer J. Henney who was in Germany, was made Associate Director of the Station.
In 1877, Mr. Carlisle maintained that Colorado was fit "only for mining and cow pasture"; by 1945 farmers and research men had demonstrated that Mr. Carlisle lacked vision and imagination. Colorado crops and values for 1945 follow:

**AGRONOMIC CROPS**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Dollar Value Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter Wheat</td>
<td>$44,424,000</td>
</tr>
<tr>
<td>Spring Wheat</td>
<td>5,671,000</td>
</tr>
<tr>
<td>Total Wheat</td>
<td>48,106,000</td>
</tr>
<tr>
<td>Sugar Beets</td>
<td>25,000,000</td>
</tr>
<tr>
<td>Corn</td>
<td>19,408,000</td>
</tr>
<tr>
<td>Barley</td>
<td>18,182,000</td>
</tr>
<tr>
<td>Oats</td>
<td>8,637,000</td>
</tr>
<tr>
<td>Dry Beans</td>
<td>9,977,000</td>
</tr>
<tr>
<td>Dry Peas</td>
<td>1,008,000</td>
</tr>
<tr>
<td>Alfalfa Seed</td>
<td>857,000</td>
</tr>
<tr>
<td>Broomcorn</td>
<td>2,475,000</td>
</tr>
<tr>
<td>Rye</td>
<td>897,000</td>
</tr>
<tr>
<td>Tame Hay, including alfalfa</td>
<td>27,452,000</td>
</tr>
<tr>
<td>Wild Hay</td>
<td>4,721,000</td>
</tr>
<tr>
<td>Sorghum (forage)</td>
<td>4,822,000</td>
</tr>
<tr>
<td><strong>Total Agronomic Crops</strong></td>
<td><strong>$167,541,000</strong></td>
</tr>
</tbody>
</table>

**TRUCK CROPS**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Dollar Value Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beans (snap-market)</td>
<td>286,000</td>
</tr>
<tr>
<td>Beans (Processing)</td>
<td>286,000</td>
</tr>
<tr>
<td>Cabbage</td>
<td>1,012,000</td>
</tr>
<tr>
<td>Cantaloupe</td>
<td>961,000</td>
</tr>
<tr>
<td>Carrots</td>
<td>780,000</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>854,000</td>
</tr>
<tr>
<td>Celery</td>
<td>1,650,000</td>
</tr>
<tr>
<td>Cucumbers</td>
<td>165,000</td>
</tr>
<tr>
<td>Honeydews</td>
<td>37,000</td>
</tr>
<tr>
<td>Lettuce</td>
<td>1,109,000</td>
</tr>
<tr>
<td>Onions</td>
<td>7,938,000</td>
</tr>
<tr>
<td>Peas-Market</td>
<td>2,600,000</td>
</tr>
<tr>
<td>Peas-Processing</td>
<td>293,000</td>
</tr>
<tr>
<td>Spinach</td>
<td>544,000</td>
</tr>
<tr>
<td>Tomatoes (Market)</td>
<td>1,316,000</td>
</tr>
<tr>
<td>Tomatoes (Processing)</td>
<td>721,000</td>
</tr>
<tr>
<td><strong>Total Truck Crops</strong></td>
<td><strong>$20,552,000</strong></td>
</tr>
</tbody>
</table>

**TOTAL AGRONOMIC AND TRUCK CROPS**

$187,866,000

**HORTICULTURAL CROPS**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Dollar Value Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potatoes</td>
<td>21,976,000</td>
</tr>
<tr>
<td>13 Commercial Vegetable Crops (market and canning)</td>
<td>19,767,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit Crops</td>
<td>$9,752,000</td>
</tr>
<tr>
<td>Nursery Products</td>
<td>$500,000</td>
</tr>
<tr>
<td>Flower crops grown under glass</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>Flower and vegetable seeds</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Home gardens</td>
<td>$5,000,000</td>
</tr>
<tr>
<td><strong>TOTAL HORTICULTURAL CROPS</strong></td>
<td>$62,995,000</td>
</tr>
<tr>
<td><strong>TOTAL CROPS</strong></td>
<td>$187,861,000</td>
</tr>
<tr>
<td><strong>LIVESTOCK AND LIVESTOCK PRODUCTS</strong></td>
<td>$184,325,000</td>
</tr>
</tbody>
</table>

THE EXPERIMENT STATION

Chapter XXX

Research in Engineering
Research in Irrigation After 1886. — In the eighties the watered areas of Weld and Larimer Counties were an irrigation laboratory in which College faculty men worked long hours; in the late eighties and thereafter the demands on the irrigation men took them far beyond these two counties.

Generally speaking, during the fifties and sixties irrigation ditches in Colorado were built and financed by individuals; in the seventies groups began cooperative construction; in the eighties large corporations did much of the work, and about 1900 the Federal agencies took over large scale construction.

In the course of this development, the individuals learned from experience and without the help of engineers; corporations and the Government demanded trained men.

Reports of the State Engineer, 1883-1890 show several hundred individually owned or small cooperative ditches in existence in the valleys of the Fountain, St. Charles and Huerfano rivers alone. The Rio Grande canal, built in 1883, was intended to irrigate about 200,000 acres near Del Norte; the Grand Valley Ditch on the Western Slope, calculated to carry water to 50,000 acres was another project of the eighties; a third project of this decade was taking water from the Dolores river to Montezuma Valley in the southwestern part of the State. In the eighties the need for late-season water for alfalfa and potatoes had started reservoir building.

Big irrigation canals were built at first as much of initiative, courage and determination as of dirt and rock.

The exceptionally dry year of 1896 made it imperative that drastic measures be taken in irrigating the North Fork Valley. Notices were posted around Hotchkiss requesting that all those
interested in obtaining more water for Roger’s Mesa meet
at the schoolhouse. This sparsely attended meeting was
the modest beginning of an even larger undertaking than
the Steward Ditch, which was nearing completion.

No development in the region took more courage and stamina
than the building of the Fire Mountain Canal. It was one
big ditch that was being constructed entirely by the local
people, who furnished both the capital and the labor. Con-
tributions were made by the bankers and merchants, the re-
turns from their investment to be stock in the ditch. The
work was done by the ranchmen, who left their farms during
the winter months when their orchards and fields did not
need attention, to dig through the frozen ground. Wages
were low, most of which were payable in stock. At the com-
pany’s yearly gathering in 1897 the secretary’s report sta-
ted that of the 10,463 shares of capital stock that had been
issued, 9620 were for labor. No eight-hour day laws were
then in vogue, and the men willingly worked from daybreak to
sunset, averaging ten hours a day, even though, so it has
been said, the impoverished treasury was not always able to
keep the workers furnished with enough to eat. The contri-
butions and assessments were just sufficient to keep plows
sharpened, settle blacksmith bills, and pay a minimum
salary. Not a stick of dynamite was used on the entire
length of the canal, through formations of cement, boulders,
shale, and hillsides. The rocks had to be pried out by hand
and rolled away with teams. However, the North Fork ranch-
ers were not afraid of toil and hardships, and at one time
the laborers numbered sixty men with teams, the line reach-
ing a mile long. Ed Duke supervised the job for the first
four miles, riding back and forth among the workers on
horseback.

Ground was first broken in September, 1896, and it took
five strenuous years to complete the Fire Mountain Canal.
When finished, it wound 32 miles along the north side of
the North Fork River, from which stream the canal’s water
supply was obtained, about ten miles above Paonia. This
ditch carried the water to Roger’s, Sunnyside and Pitkin
Mesas, redeeming nearly 10,000 acres of land a mile and
more above the level of the Farmer’s Ditch. Blooming or-
chards and green fields stand today as monuments to the
sacrifice of the canal builders.1

Professor L. G. Carpenter, who had been put in charge in 1888
of both the class and Station work in irrigation, and his assistants
were the leaders in studying irrigation problems of operation, dis-
tribution, seepage, drainage and structures. Professor Carpenter

1. Wilson M. Rockwell, "The Fruit Utopia of the North Fork of the
became an authority on the legal aspects of the use of water. What water did on a farmer's land was a phase of study which came later.

A committee of the State Grange which was invited in 1898 to examine the work of the Experiment Station gave special attention to the work in meteorology and irrigation engineering,

...in view of the immediate and pressing need of the state for definite and reliable information, L. G. Carpenter has been very diligent. His recent bulletin on "The Measurement and Division of Water" indicates the wide range of his work. It is urged that the State Board of Agriculture give this department enough funds with which to work.¹

The committee report continues with a commendation of Professor Carpenter's work on seepage water, its return to streams and its value in irrigation. This was "...of practical importance to the farmers of Colorado..."² Colorado State College (C.A.C.) was congratulated on having the services of such a man.

Again, Professor Carpenter was reported as supervising an important piece of work in the San Luis Valley. His men were measuring the flow of all streams entering the park, except that of the Rio Grande. A peculiar phenomenon of this river is that while it flows through the San Luis Valley, it receives little water from other streams which enter the Valley. The waters of these other streams disappear underground and form a subterranean lake.

The purpose of the measurement was to secure data for contour maps, charts and diagrams to be used in determining water flow, etc. All the data was to be used in the establishment of the water rights of Colorado in the Rio Grande River and in the other streams flowing into the park.

². Ibid.
During one week in 1891 Professor Carpenter received over a hundred requests for a bulletin on Measurement of Water. In 1898 the great horticultural and agricultural development of the Arkansas Valley called Mr. Carpenter there to study irrigation problems. By this year foreign publications were copying pages from the College bulletins on irrigation.

Prof. L. G. Carpenter has been invited to head the program for the annual convention of agricultural colleges and experiment stations which will be held, July 5-8, at San Francisco, and to select his associates and assign the topics to be discussed.

In August, 1899, The Weekly Courier applauds the appointment of Professor Carpenter as head of the Experiment Station; in December of that year he was summoned to appear in the United States district court at Las Cruces, New Mexico, to give testimony in a dispute between the United States and Mexico over uses of the water of the Rio Grande for irrigation. The decision of the court meant much to both the Rio Grande and the Arkansas Valleys in Colorado.

In 1902:

Carpenter and two assistants from college have made an important investigation which will bear on the pending litigation between Kansas and Colorado over the right of the latter to authorize the diversion of water from the Arkansas within the limits of this state.

Shortly after the recent flood which swept down the Arkansas, Carpenter started down the river to follow the water and ascertain how much of the flood reached the interior of Kansas and how much was lost in the sands of the river bed. Kansas claims there would be

2. Ibid. Aug. 4, 1898. p. 4.
an abundance of water in the river at, for instance, Wichita, if it were not diverted in Colorado. On the other hand, Colorado engineers and others have asserted that even if there were no irrigation in this state, comparatively little of the water that originates in Colorado would reach Wichita.

Conclusion is unavoidable that nearly all the water that passes out of Colorado into Kansas is lost in the sands before it reaches the interior of the latter state. The flood in question was a roaring torrent when it left Lamar. It had almost entirely disappeared by the time it reached Arkansas City. It is therefore not irrigation in Colorado but the character of the river bed which robs the river of water.1

In July, 1903, Professor Carpenter, now State Engineer, was in Kansas

... making readings of the Arkansas River with a view to gathering data to be used in the suit brought in the United States Supreme court by Kansas to restrain Colorado from the use of waters of the Arkansas for irrigation purposes.2

In June, 1905, Mr. Carpenter and Governor McDonald of Colorado signed a contract which secured to the State Mr. Carpenter's services until the termination of the Colorado-Kansas suit.

When some Board members and others made an effort to displace Professor Carpenter as Director of the Experiment Station and put W. L. Carlyle in his place, men of Colorado were not slow in emphasizing what Mr. Carpenter personally had done for the State; others of the Irrigation faculty had been only less active, and, as one editorial writer pointed out, one student trained in irrigation engineering at the College was worth more to the State than all the institution had cost.

Engineering Division of the Experiment Station Organized. — When Mr. Carpenter left the College in 1910 to go into private practice, E. B. House was made Head of the Department of Civil and Irrigation Engineering. He did not, however, supervise the research work.

With Professor L. P. Crain, Head of Mechanical Engineering in charge, a Division of Engineering was added to the Experiment Station in 1913. Mr. Crain continued in charge of this work until his retirement in 1936. Studies were made on: "Road Materials in Colorado", "Coefficient of Heat Transmission Commercial Wall Boards", "Conservation of Fuel at the Time of Burning", "Effect of artificial Lighting on Egg Production", etc.

August 16, 1940 Dean E. A. Christensen was made Head of the Division of Engineering Division of the Station.

Colorado Agricultural Colorado Experiment Station Employees and Federal Employees. — In 1911 the research work in civil and irrigation engineering was divided between employees of the Station and employees of the United States Department of Agriculture who had headquarters on the campus and co-operated closely with the Station.

Robert E. Trimble, Class of 1885, had in 1891 been made Assistant Meteorologist and Irrigation Engineer. Carefully compiling weather data, he grew old at his post. At the last his ambition was to serve 45 years and leave records covering nearly half a century. He was, however, abruptly retired when he had served 44 years and six months. In 1918 he summarized his work in Bulletin 225 "Colorado Climatology."
Work on Pumps. - Beginning in 1928, five power companies supported a co-operative program in developing ways of getting water from the ground. William E. Code, in charge of this work as a Station employee studied wells, drilling, pumps, etc. After five or six years the power companies withdrew and the project was greatly curtailed. Mr. Code then assisted Ralph Parshall but returned to more active work on ground water in 1938.

One of the first projects undertaken by Mr. Code was a study of the cost of pumped water as compared with canal water. Two years were devoted to this study, the first being in Weld County and the second in the Arkansas Valley. Mr. L. R. Brooks, an Aggie graduate was in immediate charge of this work which because of the detail involved required his establishing temporary field headquarters in Greeley and later in Fowler.

In 1940 and 1941 a survey was made in the South Platte Valley to determine the extent of use made of ground water for irrigation. Nearly 2,000 irrigation wells were found in operation and the flow from a great many was measured. About as much water was pumped in 1940 as the Poudre ordinarily discharges.

The study of ground-water development and the testing of pumps has meant that farmers have become more exacting with regard to the pumping machinery they buy; pump companies have found it good business to exercise great care as to the kind of pumping equipment they sell. The over-all result has been a decreased cost to the farmer of pumping.\(^1\)

Work on Building Materials. - In the thirties Adrian Legault studied such things as ways to make adobe waterproof, so

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that it could be used in rainy areas, on the use of looped wire for concrete reinforcement, etc. In a word, he studied ways to make local materials usable for fireproof and waterproof farm structures.

**Irrigation.** - Carrying on the tradition that Colorado A & M must solve irrigation problems, in the years 1940 to 1946, Floyd Brown giving half time to Extension and half time to Experiment Station, made his chief Experimental study the amount of water used. By using demonstration plots, on one of which he applied the amount of water certain farmers recommended and on the other perhaps half or three-quarters as much, he showed that the smaller amount of water produced as good a crop as the larger amount. Of course, the type of soil and the condition of it being important in determining water needs. Mr. Brown demonstrated again and many times again the use of a soil auger.

**Federal Employees and Research in Irrigation.** - The list of Federal research men with headquarters on the campus is a long one. (See end of Engineering Section of Experiment Station.) Some of these hold courtesy appointments on the campus; all co-operate with the Agricultural Experiment Station. Valuable as the work of these men is, space does not permit an account of it; but because of their long residence and close association with the College and with the development of Colorado, we must include a brief statement of the work of Ralph L. Parshall, Carl H. Rohwer, and V. M. Cone.

V. M. Cone came to the campus in charge of irrigation investigations in 1910.1 Ralph L. Parshall, after spending the summer of 1912 designing the concrete work for the Hydraulics Laboratory, became permanently a Federal employee in 1913; in 1914 Carl H. Rohwer

1. Ralph Parshall, Interview.
became the third of a famous triumvirate.

Carl H. Rohwer first worked with Mr. Cone on water measuring devices; he then took up studies of the amount of water required for different crops; he co-operated with Mr. Code on pumping machinery, but Mr. Rohwer being a Federal employee, his activities extended to all the western States. He studied evaporation and his report is a comprehensive guide for the designing of reservoirs in such a way as to make the evaporation loss as small as possible. Mr. Rohwer studied loss of water not only by evaporation from reservoirs but also by seepage from reservoirs and canals; he investigated current meters for measuring stream flow, worked with R. L. Parshall on snow surveys and has given considerable time to such special assignments as the investigation of the water supply of proposed irrigation projects.

The Hydraulics Laboratory on the campus was designed and built in 1912 for the purpose of measuring irrigating water. So science was replacing the keg a pioneer had placed in the bank of of a canal to measure his share of water! The pioneer got all the water in the canal but removed the keg only when his neighbors threatened to hang him. Even today measuring and apportioning water is not without friction among water users.

Messrs. Cone, Rohwer and Parshall, working in the laboratory devised plans for practical weirs and other measuring devices. Science was contributing another tool for use in furthering a civilization founded on irrigation.

In 1915 a very modern and complete current meter rating station was added to the laboratory. Here velocity instruments were studied and calibrated for the purpose of "comparing the velocity
equations for instruments calibrated under these conditions."¹

This work and later studies made at the Bellvue laboratory pro-
vided hydrographers and others interested in measuring water with
essential information regarding the limitations of current meters.

The Bellvue laboratory was planned by Messrs. Parshall
and Rohwer. Built first in 1919, it has been enlarged twice. Here
these men studied the Parshall measuring flume, sand traps, adjus-
table tube measuring devices, current meters, "friction losses in
pipe, elbows, check valves and other accessories connected with pum-
ing water for irrigation."¹

While Mr. Cone was at the College he developed the Venturi
Flume and after he left, Mr. Parshall took up research on this device.
Because of changes he advocated, and improvements he made the American
Society of Engineers changed the name to Parshall Flume. So known,
it is used in irrigated sections all over the world. Mr. Parshall's
work on devising traps for removing sand from irrigation water is only
slightly less well known.

Snow Surveys and Irrigation Water Supply Forecasts. — Begin-
ning in 1935, Ralph Parshall was placed in charge of snow surveys which
make possible the forecasting of stream flow. Mr. Parshall's office
collects snow cover data from Montana, Wyoming, Colorado, New Mexico,
Arizona and even South Dakota.

At first measurements of snow depth were taken on snow shoes
in rather accessible locations, but these were found to be inaccurate
because of the variation in snow density.

... the next step consisted of obtaining cores of snow in a
long metal tube, and weighing the tube and core to learn the
amount of actual precipitation contained in the snow. By in-
genious calculations this tube was made exactly the right size

¹. Ralph Parshall, Interview. May 9, 1946
². Ibid.
so that one ounce of snow core caught inside the tube equalled one inch of water—expressed as depth of precipitation rather than depth of snow. ... the same depth of snow may vary a good deal in water content.1

(Photo of Messrs. Ralph Parshall and Ginter)

Until very recently snow, snowshoes, skis, long miles and human endurance have been the ingredients of snow surveying, but time brings changes. The Rocky Mountain Forest and Range Experiment Station, co-operating with the College, "obtained an Army wéssel for use at the Fraser Experimental Forest."2 Before the days of the wéssel snow surveyors hiked five miles from Fraser and dragged supplies and equipment on a toboggan. Now they ride in luxury to their headquar-
ters, but many miles must be covered afoot.

(Photo of wéssel)

One snow course

... leads over densely forested, precipitous mountainsides to an elevation of almost 11,000 feet. ... Almost at the summit of the course is a deer skull, nailed to a tree over ten feet from the ground. Tradition dictates that each snow-researcher must write his initials and the date of his trip on the skull. But does he climb the tree to write? No—he bends down, sometimes almost to the surface of the snow.3

The snow-survey information is useful to all who must ir-
rigate, to those who must regulate water, to stock men... So reliable are these reports that railroads use them in planning the rolling stock necessary to move the prospective crops in a certain district. Bankers, newspapers, planning boards and engineers depend upon the accuracy of the snow surveys.

A friend and co-worker summarizes Ralph Parshall's snow survey work:

2. Ibid., p. 2.
Parshall has a meeting this morning
To try to determine the flow
Of the muddy old red Colorado
From measurements made in the snow.
He'll figger the flow at Grand Junction;
Then take in the Yampa and White,
Include the San Juan
With the Green added on,
And then hope to Heaven he's right.
—Old Man Paget.

**Mechanical Engineering.** — Because of long association
with work centered at the College, two other Federal men must have
a place in the history of the College.

In 1931 E. M. Mervine began investigations on sugar beet
machinery; in 1932 he was joined by S. M. Mc Birney. During World
War II these men were assigned for a time to war projects, but in
1944 both returned to the beet machinery investigations. During
much of their work together, Mr. Mc Birney was at Davis, California
and Mr. Mervine in Fort Collins,¹ but results were accomplished.

When J. Taylor Strate became Head of Mechanical Engineering in 1937, he greatly encouraged and strengthened Mr. Mervine's
work.

In 1932 the annual report on the beet machinery studies
included summaries of work on: mechanical blocking, mechanical har-
vesters, planting machinery, and fertilizer placement machinery.
In 1932 and to a greater extent in 1933 Messrs. Mervine and Mc Birney
made tests of their machinery under field conditions.

During the thirties they worked on single seed planters
for unscreened whole seed and for small-sized screened whole seed.
Industry became interested in the planters in 1938, and commercial
production began a little later.

¹ Mr. Mervine is at present (1946) an employee of the Colorado
Agricultural Experiment Station.
About this time segmented beet seed was developed by other workers, and, to the amazement of those who watch changes in the use of seeds, by the end of the war this seed was being planted on about 80% of the sugar beet acreage in the United States. Only the fact that the single seed planters were ready for use when the segmented seed was put on the market made such a phenomenal change possible.

Using the single seed planters permits the speeding up of thinning beets by hand and means the saving of 20 to 25% of the hand labor. In terms of dollars this translates into two to three dollars an acre, or a saving on the approximately 800,000 acres of sugar beets in the United States of $1,600,000 to $2,400,000 annually.

Mr. Mervine has been working all the time to get stands of beets better suited to mechanized thinning, and heavy demands in 1946 for Bulletin 476, "Mechanical Thinning of Sugar Beets" by E. H. Mervine and R. D. Barmington show a strong tendency to adopt the new labor-saving and time-saving machinery, and why not? Nine-tenths of the usual labor in thinning can be saved.\(^1\)

Mr. Mervine is now recognized as the outstanding authority in the world on sugar beet machinery. From the British Isles, continental Europe, South America—where sugar beets are raised, men have come to consult E. H. Mervine. Thus, his work has a world-wide significance. At home he has made possible a great increase in the profitable production of sugar from beets.

Mr. C. D. Edgar, also of Mechanical Engineering, came to the campus July 1, 1942 as a specialist on farm structures, especially those for vegetable storages. In his short period of service he has contributed many fundamental and original ideas as to the design of such structures.

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1. "News Notes," April 25, 1946,
CO-OPERATING U.S.D.A. EMPLOYEES

As of December 1945

Brandon, J. F., B.S. — — — — — — — Associate Agronomist, Akron
Deming, G. W., B.S. — — — — — — — — — — — Associate Agronomist
Edgar, A. D., B.S. — — — — — — — — — — — — — Agricultural Engineer
Edmundson, W. C., M.S. — — — — — — — — — — — Horticulturist, Greeley
Elder, Joe — — — — — — — — — — — — — — — — — Senior Scientific Aid
Gaskill, John C., M.S. — — — — — — — — — — — — — — — — — Associate Pathologist
Gifford, Perry — — — — — — — — — — — — — — — — — — — Farm Job Analyst
Headley, Roger R., B.S. — — — — — — — — — — — — Soil Scientist
Klinger, Bruno, M.S. — — — — — — — — — — — — — Associate Soil Conservationist
Lungren, E. A., M.S. — — — — — — — — — — — — — Associate Plant Pathologist
McBirney, S. W., B.S.A.E. — — — Senior Agricultural Engineer
Parkinson, Harold L., B.S. — — — — — — — — — — — Soil Scientist
Parshall, Ralph L., B.S. — — — — — — — — — — — Senior Irrigation Engineer
Rohwer, Carl H., B.S., C.E. — — — — — — — — — — — Irrigation Engineer
Schaal, Lawrence, Ph.D. — — — — — — — — — — — — — — — — — Plant Pathologist
Stockwell, Homer J. — — — — — — — — — — — — — — — — — Associate Irrigation Engineer
THE EXPERIMENT STATION

Chapter XXXI

Economics of Home and Farm
Economics and Sociology

Early Projects

One of the first research projects of the Department of Economics and Sociology was in co-operation with the Office of Farm Management and Farm Economics of the United States Department of Agriculture. This was a study of irrigated farms in northern Colorado, a study made with the idea of developing forms of farm accounts of some of the economic problems of irrigated agriculture. Some thirty farmers kept accurate, daily records of their operations under the supervision of a federal man who visited each farm twice a month.

The Texas Longhorn had been for many years gone from Colorado, but range cattle were still an important source of revenue in the State, and a second project was a study of the range cattle business. The study dealt particularly with “pasture area, quantities of feed, hours of labor, overhead expense and miscellaneous cost items in the production of beef on the range in Colorado.”

A third project was a study in August 1922, of co-operative marketing of the potato crop in the San Luis Valley in 1921.

In an effort “to ascertain the satisfactions and dissatisfactions of country life,” B. F. Corn made a survey of homes in and near Ault, Colorado. The school, the church, transportation, marketing, household conveniences were studied.

Farm management surveys begun in 1922 have continued to have the present, and the same period of years yielded rich results in the studies in marketing. Information gathered on “wheat and potato storage, roadside markets, co-operative marketing, poultry marketing,

2. Ibid., p. 4.
and peach marketing\(^1\) was reported to farmers in bulletins, for example No. 312, "Harvesting and Marketing Cantaloupes and Honey Dew Melons in the Arkansas Valley of Colorado" by N. D. Sanborn. Other results were published in such bulletins as:

- No. 353, "Cost of Producing on Irrigated Farms" by R. T. Burdick and H. B. Pingrey
- No. 451, "Landlord and Tenant Income in Colorado" by R. T. Burdick
- No. 394, "Profits from Winter Feeding in Northern Colorado" by R. T. Burdick and H. B. Pingrey

**Taxation.** From 1925 through 1939 taxation studies occupied the attention of several members of the department, G. S. Klemmedson being the outstanding in this field. In the tax studies the College co-operated with other State Institutions of Higher Learning. Taken together, these studies supplied information to those working on the complicated tax system of Colorado and are used today by the State Planning Commission and other such bodies. (See Financing)

**Types of Farming.** From 1933 to 1943 the Department devoted considerable time to studying types of farming in Colorado. Bulletin No. 418 "Type of Farming Areas in Colorado" by Byron Hunter and others, was revised and during World War II became the basis for Colorado Maximum Wartime Production Capacity reports.

By 1944, Mr. Burdick in a report to President Green listed the type of studies which the Economics Section of the Experiment Station made. Under reports of a statistical nature, he mentions such things as "Factors that Affect Sheep Income in Colorado", "Thirty Years Winter Fattening in Northern Colorado"; reports emphasizing cost studies are, "Expense and Income on Northern Colorado Farms", "Per Acre Cost of Individual Machines; maximum capacity studies, in

co-operation with other Experiment Stations and with Federal agencies for 1944 and for 1945; general reports such as, "Problems of Colorado Egg Marketing", "Consumer Preference for Colorado Peaches", "Sociological Analysis of Colorado Labor Problems", "Can We Help Youth Preserve Democracy?".

The findings of the investigating section of the Department are used:

1. In meetings with groups of farmers and rural people.
2. In conferences with technical groups.
3. In consultation with Extension Service groups.
4. In developing administrative policies.
5. In cooperation with Health, Welfare, and Nutrition groups.
6. As a source of data for classroom instruction.
7. In answering correspondence.
8. In preparing news releases.
9. In advising individuals.

The chief emphasis of economic studies has been (a) in supplying information to aid farmers in making their individual business decisions; (b) in helping governmental action agencies to develop sound policies; and (c) in helping members of farmers' organizations to develop sound economic policies.

The chief emphasis of sociological studies has been (a) to aid county and community groups to organize for effective community action; (b) to assist rural leaders to develop successful methods of rural leadership; (c) to assist youth in studying their problems; and (d) to aid welfare, health, and nutrition organizations in directing their activities along most effective lines.

For example, he is delving into the science of nutrition in an effort to discover why a certain ration, according to present knowledge considered excellent, shows deficiencies when fed to certain farm animals. In another study he recently found that feeding measured quantities of proctomone to sheep meant a definite increase in wool growth. A third project revealed that certain calves which their owners believed were getting too much molybdenum in their water, were, instead, feeding unprocessed minerals, which increased their growth.

1. R. T. Burdick, "Summary of Economics and Sociology Section" ms. p.1
lacking in phosphorus in their diet.}

**Home Economics**

About 1900 Miss Sarah Sutherland, a recent arrival in Colorado and the latest addition to the home economics faculty, when her own cakes fell, turned in desperation to the girls in her classes to bake 17 cakes in time for a wedding.

Miss Sutherland's experience is the experience of every woman who uses in a high altitude flour mixture recipes developed in low altitudes.

Miss Mary F. Rausch, in charge of the Department of Home Economics, 1907-1911, saw the necessity of controlled experiments in baking flour mixtures. She assigned the work to a youngster on her faculty, Inga M. K. Allison.

Miss Allison turned to another newcomer with an inquiring mind, Charlie Lory who was teaching physics and applied electricity in the basement of Old Main.

The completed set-up consisted of an air pump, an electric hot plate under the bell jar, and a manometer. This last gave the registration of reduced atmospheric pressure produced by suction when connected with the sink faucet. Total cost of materials and labor was $19.47.

Miss Allison quickly established "a curve showing the time required at different elevations for cooking in water such foods as eggs, potatoes, and navy beans..." but with equipment which made possible the control of atmospheric pressure but not of humidity or temperature, the baking of flour mixtures produced only two results of consequence: a decision not to do any more of that until an ade-

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1. Interview.
quate laboratory was ready for use, and Miss Allison's determination
to secure the equipment and do the experimental work so greatly needed.

In 1910 Inga M. K. Allison became Professor of Home Econ-
omics, and in 1917 she was made Head of the Home Economics Department.
Between these two dates, she had encouraged former students living at
various altitudes to do some experimental cooking and had supervised
such cooking as class projects at the College; but no money was avail-
able for an Experiment Station project. However, she did not forget
the housekeepers' need of recipes adapted to a wide range of altitudes.

In 1909, Charles A. Lory, Miss Allison's partner in the
bell-jar experiments, moved up out of the basement to the first floor
of Old Main and became the President of the College. In 1917, at
the urging of Miss Allison, he and Director Gillette of the Experi-
ment Station set aside $1500 for operation, costs, and the salary
of a half time research person in home economics. Evelyn G. Halliday
gave half time to learning why housewives lost so much of their canned
fruit, but she left the College in 1918. However, in 1918-1919 with
World War I in the past and President Lory reporting that the College
was out of debt, Dr. M. E. Goldthwaite took up in a more extensive
way, research work in home economics.

Colorado having become a potato growing state, the growers
wanted to know the culinary values of the varieties best adapted to
Colorado. Dr. Goldthwaite's second bulletin on this subject, "Potat-
toes from the Housekeepers' Standpoint," through the teachers in
the public schools, found its way into nearly every home in the State.
However, Dr. Goldthwaite's most requested bulletin was, "Principles
of Making Fruit-Jellies" for which she had done much of the research
before coming to the College.

With characteristic tenacity Miss Allison talked about altitude experiments in the baking of flour mixtures. At one time she and Director Gillette and President Lory planned that she should travel from altitude to altitude in Colorado with a car and trailer and stop long enough at various altitudes to do baking. The trailer never appeared but Miss Allison, Mrs. Marjorie Peterson and Miss Lucille Church, (now Mrs. Fee), did some exploratory baking at the Shelter House on the Fall River Road, altitude 11,797 feet.

Using the exact proportion of ingredients, the manipulative procedure, etc. successful in Fort Collins, altitude approximately 5,000 feet, for all the baking at the Shelter House Mrs. Peterson baked pop overs but they failed to pop; Miss Allison baked sponge and angel cakes and Miss Church experimented with rich butter cake. Each was a sad-looking, soggy mass on the bottom of the pan; each was far from edible and the days were past when ingredients "to wash a shotgun" were among the essentials of living in Colorado; these cakes belonged to science and the future.

Miss Allison interested Director Gillette in building an altitude laboratory; she mentioned her plans to J. M. McQuade of the Taylor Instrument Company, and he believed in their feasibility. In 1924 the Director made a budget available for the laboratory, and Miss Allison called in J. Harry Schofield, Associate Professor of Mechanical Engineering. These two asked advice of others, but in the end Professor Schofield designed and supervised the construction of the first altitude laboratory in the United States, possibly in the world, in which heat, pressure and temperature can be controlled.
From this point the work really moved. Miss Allison was supervising a project in which she firmly believed; Director Gillette, as always, by his meticulous study of an Experiment Station project and his constructive suggestions, aided in laying firm foundations and in opening avenues for future work.

Mrs. Marjorie Peterson, depending more upon repeated experiments and observation than upon science and theory did the first work in the laboratory. However, the 3,000 copies of her first bulletin went "like hot cakes" and the requests for her second bulletin, "Baking Quick Breads and Cakes at High Altitudes" quickly exhausted three issues of 3,000 each.

From 1932 to 1938 Dr. Mark A. Barmore, who was thoroughly trained in physical chemistry, took over the study of the effect of altitude on the baking of flour mixtures. Since it was useless to attempt to interpret or explain the effect of atmospheric pressure on a complicated mixture, such as a cake batter, when the behavior of each ingredient by itself is but slightly understood, Dr. Barmore studied both the physical and chemical factors which affect the foaming properties of egg white, and published his findings in Technical Bulletin 9, July 1934. He followed this in April 1935 with Technical Bulletin 13, "Baking Angel Food Cake At Any Altitude."

Housewives in that third of the United States which varies in altitude from 3,000 to 10,000 feet had been trying to learn since they began moving west out of Kansas, Nebraska, South Dakota and Texas how to proportion the ingredients of a cake so it would not fall. Some learned, some gave their families a poor product, and


2. ibid.
some gave up in despair.

Mrs. Blanche E. Hyde, writing a digest of Dr. Barmore's, "Baking Angel Food Cake At Any Altitude," writes:

Experiments show that the proportions of ingredients is a vital point. Egg white and flour make the cake tough while sugar has the opposite effect. Further, as the altitude increases the cake becomes more delicate in texture and when the altitude change is great enough to cause sufficient reduction in tenderness, the cake falls.\footnote{1}

Dr. Barmore continued his experiments until he could publish in Technical Bulletin 13 recipes for angel cake for altitudes from 1,000 to 15,000 feet.

From the viewpoint of the physical chemist, the high point of Dr. Barmore's studies was Technical Bulletin 15, The Influence of Various Factors, Including Altitude, In the Production of Angel Food Cake.

When Dr. Barmore left the College in 1938, Dr. W. E. Pyke assisted by Gestur Johnson, who had also assisted Dr. Barmore, took over food research. In February 1940 they published Technical Bulletin 27, Preparing And Baking Yellow Sponge Cake at Different Altitudes. Though the bulletin is in general in the terminology of the scientist, such as, "This effect of sucrose is primarily that of a specific negative catalyst,"\footnote{2} the authors do give recipes for whole-egg sponge cake at altitudes from sea level to 12,000 feet, and the summary at the end makes such simple and practical statements as,

It is possible to bake cakes of the same sweetness at any altitude in the United States provided the cake formulas have been balanced to respond properly to the changing effects of altitude.\footnote{3}

\footnote{1} Blanche E. Hyde, Digest of Mark A. Barmore's Baking Angel Food Cake at Any Altitude, Mimeographed Circular 1378, p. 1.
\footnote{2} W. E. Pyke and Gestur Johnson, Technical Bulletin 27, Feb. 1940, Preparing and Baking Yellow Sponge Cake at Different Altitudes, p. 13.
\footnote{3} Ibid., p. 21.
Under date of February 16, 1940 M. L. Enger, Dean and Director of the College of Engineering and Engineering Experiment Station, University of Illinois wrote President Lory:

Three or four years ago I visited your school and you introduced me to the woman in charge of experimental work in cooking under mountain conditions.

We are now designing equipment to be used in the College of Medicine in Chicago for the study of the effect of air pressure, humidity, and pressure on human beings. It has occurred to me that the experience at your institution might be useful to us. We should like to have the following information concerning your equipment:

- Absolute Pressure Range, and degree of accuracy ± inches Hg
- Temperature Range, °F. °F.
- Relative Humidity
  Range, % % % % ± %
- Description of controls, air conditioning apparatus, instruments, air handling equipment.

We have found that accurate controls for equipment of this type are difficult to design and also quite expensive. We shall appreciate any help you can give us.

In thanking Dean Allison for the information she sent in answer to this letter Dean Enger said in part,

The information is going to be very useful to us in planning the laboratories for the Medical School in Chicago in which it is desired to obtain the effect of pressure, temperature and humidity.

It is highly probable that, with the employment of Dr. Goldthwaite in 1917-1918, Colorado Agricultural College established the first Home Economics Section of an Agricultural Experiment Station in the United States. State Board records on this point are lacking; but while the formal research at Cornell began in 1925 and at Purdue in 1921, Dr. Goldthwaite's program was initiated in 1917-1918.

1. Letter, March 5, 1940.
The members of the State Board of Agriculture who met in Del Norte in 1888 to set up the Colorado Agricultural Experiment Station selected an Executive Committee as a governing body, adopted a plan of work, and leased a few acres of poor land for experimental purposes. Then they turned the heads of their teams toward the Arkansas Valley there to select land for another substation.

The men of the Board were pioneers with pioneer plans and big dreams. As they drove down the San Luis Valley, possibly they watched the Sangre de Cristo Range turn blood red in the sunset, and probably they estimated the depth of the soil under the tall sage brush; but the most visionary of the group had not the faintest mental picture of farmers spraying crops from an airplane. Such crops as are now grown in the big Valley were in 1888 almost as undreamed of as was the airplane.

To the pioneers of Colorado, to the men on the farm, the ranch and the range goes the major credit for the growth of agriculture and of the livestock industry in the State; but the members of the State Board of Agriculture have been an influential factor in filling some of the ruts and removing some of the rocks from the rough road of the pioneer. The Board has been the State agency which made the power of science available to the pioneer, and thus substituted research for trial and error. The research men have contributed greatly to the growing of beets for sugar and the use of them in feed for stock; to finding varieties of alfalfa best suited to Colorado climate and demonstrating that this too was a valuable stock feed; to persuading growers to limit the number of varieties of corn and wheat grown and to select only tested varieties; to introducing and developing barleys; to solving
the "black alkali" problems; to advocating dairying and home orchards on dry land; to developing or introducing dry land sorghums and other crops; to experimenting with pit silos, to terracing, and contours.

It was the research men who studied the measuring distribution, and evaporation of water; they devised sand traps and made snow surveys; they studied drainage and storage of water; they devised improved farm machinery; they fed livestock experimentally; they learned how to eradicate certain pests and how to control others; and they studies plants poisonous to livestock and preached and demonstrated breeding. Research men studied marketing, farm management and other rural economic problems, and men and women of science provided basic information regarding cooking at various altitudes.

Truly, those trained in a laboratory have contributed greatly to earning a living in Colorado.
THE EXPERIMENT STATION

Chapter XXXII

Those Who Carried the Load
Colorado has an area of 104,247 square miles; it is more than twelve times the size of Massachusetts, or as compared with European countries before World War II, "...it is about equal in area to Austria, Belgium, Denmark, Holland and Ireland combined."¹ Such far-flung miles pose agricultural problems anywhere, but when Colorado's third dimension, altitude, is added the first generation of farmers and the freshman professors at the College rivalled each other in ignorance of soils, climate, water needs and the best varieties of crops.

The Experiment Station established in 1888, has been an important agency in accumulating that information which is making Colorado's miles and possibilities known to men, and the Station is a factor not only in making man's environment to meet his needs.

Experiment Station Directors at the College.

Charles L. Ingersoll. . . . . . . . . . . . . . . . . . . 1888-1891
Frank J. Annis. . . . . . . . . . . . . . . . . . . . May 15, 1891-Nov. 6, 1891
Walter J. Quick. . . . . . . . . . . . . . . . . . . . Nov. 6, 1891-1893
Alston Ellis. . . . . . . . . . . . . . . . . . . . . . . 1893-1899
L. G. Carpenter. . . . . . . . . . . . . . . . . . . . 1899-1911
Charles A. Lory (Acting Director) June 1, 1910 to July 1, 1910
C. P. Gillette. . . . . . . . . . . . . . . . . . . . . . 1910-1932
E. P. Sandsten. . . . . . . . . . . . . . . . . . . . . . 1932-1939
Charles H. Kick. . . . . . . . . . . . . . . . . . . . July 1939 to August 1939
I. E. Newsom, (Acting Director). . . . . . . . . . 1939-1941
Homer J. Henney. . . . . . . . . . . . . . . . . . . . 1941-
H. S. Wilgus (Associate Director). . . . . . . . . Oct. 1945-

Dr. Gillette

Dr. Clarence Preston Gillette, Director of the Station

22 years and a member of the faculty for 42 gave as key stones

¹ Colorado Year Book, 1943-1944, p. 4
in the building of Station, College and State the qualities of a fine man and a great scientist.

Coming to the College in 1891, Dr. Gillette established and built the Department of Entomology and Zoology, the insect collection and the museum. He was State Entomologist from 1910 to 1932 and Director of the Experiment Station for the same period. The scientist in him was not second to the teacher and administrator. So great are both the quantity and the quality of his work that the citing of conspicuous examples is difficult. His publication list is a long one; he and his assistants described 114 new species of aphids, and he discovered the life cycle of several species. In this field, that of the aphids, he became the world's greatest authority of his time.

The eminence attained by many who were in Dr. Gillette's classes and their memories of him bear witness that he was a great teacher. He instilled into his students the scientific spirit and the ability and the desire to achieve greatly.

An evidence of the love and respect in which he was held is the Gillette Club. This was informally organized in December 1925 at a meeting of the A.A.A.S. in Kansas City, Missouri. All graduates and staff members, past and present of the Department of Entomology and Zoology of the College are members. The purpose of the Club was the promotion of friendship among the members and with Dr. Gillette. As long as Dr. Gillette lived the club sent him a New Years telegram of greeting from the meetings he could not attend.
As an administrator he never mixed science and politics and so avoided the peculiarly evil odor of that mixture.

Always thoughtful of others, always giving a great scientist's consideration to a research project, always forward-looking, Director Gillette inspired the loyalty and respect of his co-workers. One of these, speaking for all, exclaimed, "When he was born, they destroyed the mold."

(Photo of Director Gillette)
Chapter XXXIII

The College Begins Extension
In 1877, before the building of the first section of Old Main had disturbed the prairie dogs in "the most populous prairie dog town in Larimer County," the members of the Colorado State Board of Agriculture had begun off-campus activity: they had agreed that each man should learn the number of bushels of each kind of grain raised in his district and the cost per acre and that this information should be kept on file.

Duties of the Secretary. — The law of 1877, changing the College from a Territorial to a State institution, listed scores of off-campus duties as part of the work of the secretary of the State Board of Agriculture. At first he was paid only $100 a year and had difficulty collecting that, but in addition to the usual duties with regard to making and keeping records he was to

...keep and file all reports which may be made from time to time by the different agricultural and horticultural societies, and all correspondence of the office from other persons and societies appertaining to the general business of husbandry; address circulars to societies of the best practical farmers in the State and elsewhere, with the view of eliciting information upon the newest and best mode of irrigation and the culture of these products, vegetables, trees, etc., adapted to the soil and climate of this State; also on all subjects connected with field culture, horticulture, stock raising and the dairy. He shall encourage the formation of agricultural societies throughout the State, and purchase, receive and distribute such rare and valuable seeds, plants, shrubbery and trees as it may be in his power to procure from the general government and such other sources as may be adapted to our climate and soils. He shall also encourage the importation of improved breeds of horses, cattle, sheep, hogs and other livestock, and the invention and improvement of labor-saving implements of husbandry, and diffuse information in relation to the same. He shall encourage such domestic industry and household arts as are calculated to promote the general thrift, wealth and resources of the State.4


5-6.
The duties prescribed, had the secretary of the Board been able to perform them, would have made of him both an off-campus and an experimental worker as well as a keeper of records.

Farmers' Institutes. — At first the off-campus work took the form of farmers' institutes. The first of those were:

<table>
<thead>
<tr>
<th>Location</th>
<th>Date(s)</th>
</tr>
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<tbody>
<tr>
<td>Fort Collins</td>
<td>November 26, 27, 1879</td>
</tr>
<tr>
<td>Del Norte</td>
<td>December 30, 31, 1879</td>
</tr>
<tr>
<td>Monument</td>
<td>January 2, 3, 1880</td>
</tr>
<tr>
<td>Greeley</td>
<td>January 15, 16, 1880</td>
</tr>
<tr>
<td>Longmont</td>
<td>February 5, 6, 1880</td>
</tr>
<tr>
<td>Loveland</td>
<td>December 16, 17, 1880</td>
</tr>
<tr>
<td>Denver</td>
<td>January 5-6, 1881</td>
</tr>
</tbody>
</table>

Of these Frank McClelland wrote years later:

The institutes were of greatest interest to the progressive farmers of the earlier times, a place where was held open discussions of every topic concerned with farm life—both in the field and in the home. . . . Every topic, practical and scientific and theoretical, affecting farm work was on the programs. The discussions often went much further than the papers or lectures. In fact the discussions following the set addresses were more filled with information than were the set papers. . . . These gatherings brought the workers together, so that they could tell of experiences, how this crop had failed on one sort of soil and done well on another, how one treatment of water brought less results than another—what crops did best under certain conditions. Also one who had failed with a certain grain could hear another tell how he had succeeded.¹

This was the pioneer method, the method of trial and error, and the College faculty was very far from knowing Colorado and its problems from the standpoint of research; and so could offer little help.

¹ From a newspaper article by Frank McClelland. Date and title of paper not given. Clipping in Dr. George H. Glover's collection.
Titles of some of the early institute addresses indicate the problems of the farmers and of their wives.

How Much Water Should One Put on Growing Potatoes
Ravages of the Grasshopper
How to Control the Leaf Roller
Making Silos
Caring for Corn in Times of Water Shortage
First Ditches
Proper Soils for Certain Crops
Preserving and Canning
Keeping a House Clean in Bad Weather

For the second and fourth institutes, the ones held at Del Norte and Greeley December, 1879, and January, 1880, respectively, we have a contemporary account, a diary kept by President E. E. Edwards. The diary shows kindliness and whimsical sense of humor and emphasizes:

1. The great differences in altitude and topography of different sections of Colorado.
2. The obstacles to transportation.
3. The fact that peoples in different communities in the State were totally unlike.
4. The president of the College saw Colorado as a tourist saw it. He seemed unconscious of agricultural problems, or of the fact that he was responsible for helping to solve them.

First Off-campus Institute. — In November, 1879, the group that went to Del Norte from around Fort Collins consisted of: the entire faculty of three; State Board of Agriculture members Watrous, Stratton, Stanger and LaGrange; A. L. Emigh of Fort Collins, and a Mr. Plumb of Greeley, the Ahlstrom brothers who were Swedish farmers living between Denver and Golden, and Mr. Wilbur who was an agricultural machinery agent.
These people had a special car on the Río Grande, then narrow gauge, from Denver to Alamosa. Leaving the Denver station behind the train to which the College Special car was attached, was a special train consisting of a locomotive and one car. This was blown off the track by a high wind between Denver and Colorado Springs, but President Edwards' only comment in his diary is that no one was hurt. The fact that this road was the only rail outlet of the San Luis Valley and that such a railroad and such weather were obstacles to marketing and therefore to agriculture seems not to have entered his mind.

Some of the members of the institute group wired ahead to La Veta for a meal, and those who had only a cup of coffee there paid the same price that others paid for a complete meal. Alamosa, the end of the railroad, was reached at one A. M. and, after a good rest, the party took mule and horse drawn vehicles for the ride to Del Norte. In December at an altitude of 7,500 feet the weather was cold, and at relay stations the men ran ahead of the wagons*for exercise* but those who have ridden in an open wagon under these conditions know the stinging and deep-biting cold that prompted the exercise.

President Edwards records that Del Norte was a strange mixture of the American and Mexican in architecture and population.
Adobe seemed to be the prevailing building material. Some adobe houses, however, had trick fronts, and there were some cabins built of mountain pines. The P.M. (postmaster) is a graduate of Iowa Agricultural College and regards his Alma Mater as the model of its kind. His brother edits the San Juan Prospector. ... 

At the Land Office President Edwards was shown a map of the Rio Grande Valley and realized

...that whole townships of the part of the Valley we crossed are still government land. It is possible that we may locate a few thousand acres of our College land here.

The hotel is thronged with a heterogeneous throng of people, Mexicans, Spaniards, Americans, high and low, miners and hunters in deerskin clothing and dandies in broadcloth. There are three billiard tables in the bar room and a keno table, and playing goes on incessantly, day and night, and also drinking. The bar room is hung with paintings of San Juan scenery by Leonard. Some of the paintings are very good and worthy of better surroundings. ...

The Institute, (called by courtesy a Convention) opened in the M. E. Church at two p. m., I leading off with my address on the "Utility of Trees," followed by papers on hay raising and kindred topics. This seems to be preeminently a hay country. This crop alone is certain. Stranger enlarged at some length and with great enthusiasm on the demand for hay especially in Leadville which he claimed would increase from year to year. As the railroad will soon be completed to that point, it occurred to me to ask him how much hay would suffice to keep the iron hourse in good condition, which for a moment rather confused him. ...2

After the evening session they were invited to a Mexican fandango, but President Watrous, Professor Elount and President Edwards did not go. The others ...

2. Ibid. p. 8.
by los Mexicanos. Tonight there is to be an American dance and
tomorrow night another said to be especially for our benefit.
The convention is well attended, the large stone church being
well filled. This church is something unique, a large build-
ing, nearly square, of rough stone, metalliferous, gleaming
with silver particles, unfinished, a temporary roof above.
The rough interior draped with brown muslin tightly stretched.
and profusely decorated with evergreens, wreaths and mottoes.
The benches rude but strong. . . I gave my lecture on Rela-
tions of the Agriculture College to the People. . . Mr.
Stratton has made quite a success of his lecture on Dair-
ing. Professor Blount has improved his lecture on wheat. Pro-

dessor Annis gave a fine lecture on the chemical value of food
stuffs, if anything a little too scientific for the audience
which was mixed. . . 1

(Photo of the Church)

President Edwards, always painting and drawing, amused him-
self sketching some faces of participants in the convention. He de-
scribes his subjects:

The first is of a white haired young Swede who has a farm
down the Rio Grande not far from Mr. Horner. He read a very
thoughtful essay on scientific methods. He has been a student
at a polytechnic school. Number 2, (of a middle aged, rather
roughly dressed man) looke thoughtful and seems to be a good
listener. Number 3 is a puzzle. I would take him to be a des-
perado if he did not look so fearfully cross. I concluded
from his unkempt clothes and unwashed looks (he has hair well
down on his shoulders) and knitted brows that he is not dan-
gerous. Number 4 was a ranchman, a surly but dynamic talkative
fellow. 2

At the close President Edwards says:

We wound up our part of the Institute at twelve today in a
blaze. An orator, Mr. Adair Wilson was selected to make
a farewell speech which he did with uncommon grace and
elegance. I was elected to

1. Ibid., p. 8.
2. Ibid., p. 8.
respond and responded after a fashion and briefly, complimenting on this fine river, broad valley, beautiful town and high snow-covered mountains. They passed flattering resolutions, paid our hotel bills and stage bills and conducted themselves otherwise very handsomely.¹

To give something more of the kind of country to be developed and of President Edwards' appreciation of it, I quote again from the diary:

The day was quite cold. I still preferred a seat on the uncovered hack for the sake of the grand scenery and was well repaid for this sacrifice of personal comfort for never saw I before such a glorious light on mountain or on plain. Near the base of the mountains was a perfect mirage of a broad lake reaching quite to the base of the mountains. The mountains seemed to rise almost perpendicularly from this lake or site, the base a dark rich purple fading farther up into gold and crimson. Never were mountains more gloriously lit up. I could not keep Tennyson's Bugle Song out of my mind:

The splendor falls
On castle walls
And snowy summits old in story
The long light shakes
Across the lakes
And wild cataract...

He saw no cataracts but could easily imagine them. Obviously the first President of the College was impressed by one of Colorado's greatest natural resources - the magnificent scenery - but he comprehended not the first element of irrigation, the basin problem of the San Luis Valley.

The Greeley Institute. - At Greeley on January 15 and 16 in 1880 the men from the Agricultural College met a very different audience and saw a different town. President Edwards writes,

¹. Ibid., p. 8.
It was easy to see, however, that we had here a different audience from any that had greeted us yet, a carping critical audience who seemed determined at the outset to allow nothing to pass without question. The opening address of David Boyd was in its general tone unfriendly to the College and not calculated to soothe our feelings or smooth the way for the work before us. Exceptions were taken by Professor Annis and myself to some of his statements. I reserved my answer until tomorrow evening. Personally I have been treated very courteously, but I could not help but notice indications of some kind of tempest brewing. In fact I was warned by a friend that I would be assailed in the evening after my lecture on Trees. The prophecy was fulfilled. I did not, however, expect Stranger to lead off with broad and dogmatic contradictions. He was followed by Boyd, Welch, Wilber, Blodgett and others and I had to indulge for half an hour in a rather unpleasant gladiatorial contest in which I feel tolerably well satisfied that I came out ahead. I kept my temper rather well and this was hard to do when I felt assured that the contradictions were insincerely made, and for the purpose of discomfitting me. The affair ended in a general wrangle among themselves in which I quietly got out of the way ... .

On January 16, 1880, President Edwards records that

The attendance today was much larger than on yesterday and the agricultural enthusiasm rose much higher. There is a touch of the gladiator about these Greeleyites. They take a pleasure in wrangling and their opinions are as varied as the expressions of their faces, and their faces run the whole gamut of expression. Here every man is a philosopher and has opinions and is happy if his opinions are singular. Each man seems to have a hobby which he is inclined to ride ... .

Recalling that in the fall of 1870, at the end of their first season as Colorado farmers, the men of Greeley had organized a Farmers’ Club for the exchange of personal experiences, recalling that the custom in the Farmers Club was to argue, and to criticize each

2. Ibid.
man's methods, we wonder if the attack on President Edwards was not the usual procedure; possibly, however, E. E. Edwards, a Methodist minister from Illinois knew little about agriculture or trees in Colorado and men who had spent five to ten years around Greeley did not hesitate to point out mistakes.

Though members of the first faculty and all succeeding faculties felt an obligation to serve people of the State who were not registered as students, and the entire faculty could not always attend institutes. As campus demands increased, certain members attended; then the institutes were for a time largely in the hands of local people who were not always conscious that a faculty man had duties on the campus. When institutes were scheduled at dates when no one from the faculty could attend, some people concluded the faculty was not interested. On the other hand, students and parents complained that faculty men were gone from the campus and their classes suffered. Off-campus demands grew like the proverbial mustard seed, or, to use a Colorado figure, like dandelions in the College lawn; and some misunderstanding developed between College and State because the College could not respond to all requests.

However, the institutes, with varying participation by the College system 1879 to 1899 continued into the twentieth century, one or two an year held annually.
Farmers' Institutes & Demonstration Trains. - In 1899 through correspondence with farmers' clubs and similar organizations, a series of institutes was so scheduled that the president and members of the faculty could attend at a minimum of expense and time.\textsuperscript{1} Such meetings were held in Loveland, Longmont, Lamar, Las Animas, La Junta, Glenwood Springs and Grand Junction. The principal topics discussed were cantaloupes, sugar beets and orchard care.\textsuperscript{2}

When in 1945 two Hereford bulls which had sold for $50,000 each at the National Western Stock Show lorded their way across a red velvet carpet to a show pen in the lobby of the Brown Palace Hotel in Denver they were walking the last few yards of a trail that began in 1904 or 1905. Neither the Herefords nor the men watching them could look back forty years to see an institute staff in a wagon creeping over the road from Rifle to Meeker to hold a farmers' institute in the town where a quarter of a century earlier the Indians had massacred N. C. Meeker. The men in the rig were Elias W. Ammons, W. L. Carlyle, George H. Glover, and Fred Johnson.

The day was a gorgeous October day. The road was ungraded, and travel was slow. There was time for talk.

Suddenly one man spoke out of a silence, "Why don't we have an annual stock show in Denver?"

"And exhibit what?" the skeptic grunted.

"We exhibited range cattle at a show in Denver in 1899. January, I think. One of the few shows where range cattle got the prizes."

\textsuperscript{1} The \textit{Weekly Courier}, Dec. 21, 1899, p. 4 quotes an article from \textit{The Rocky Mountain News}.

\textsuperscript{2} The \textit{Weekly Courier}, March 8, 1900, p. 5.
"Huh! Good reason. No competition."

Again silence. The mountain valley through which the wagon was passing was dotted with "grass fat" cattle, but they were long-legged animals.

"This country is the center of the livestock industry in the United States." One man's mental vision was seeing other mountain valleys.

"Quantity, not quality." The skeptic was still unconvinced.

"Western Stock Show. A good name," Skepticism could not stop the man with vision.

"Not bad."

All the men began to plan, even the skeptic joining in, and so the first miles of the cow trails leading from the ranges of Colorado to the Western Stock Show, as the National Western was at first called, were planned by an institute staff in a wagon creeping from Rifle to Meeker.

Mr. Steinex in his History of Agriculture in Colorado gives as the formal and announced organizers of the National Western:


No doubt these were the men who carried out the idea first discussed by the institute staff in the creeking wagon.

It was a long trail with many a dry camp, this developing of the National Western, but with Elias Ammons as president from 1905 until his death in 1929, and with such men as William A. Braiden and Billy Adams riding the ranges, the stock show in Denver was assured.

1. George H. Glover, Interview Jan. 25, 1945
The first cattle over the trail were such rangy, long-legged animals that Billy Adams laughed at Bill Braiden for exhibiting some of the creatures; but the range men knew something of good stock and learned more. At the Agricultural College George H. Glover, George B. Morton, Alvin Kezer and others were teaching treatment of animal diseases, better breeds and better feeding. Thus, slowly the cattle men, the Stock Shoe Board, and the faculty men built the trails that led from the ranges to a red velvet carpet in the lobby of the Brown Palace Hotel.

Not all institute staffs produced the germ of such an organization as the National Western, but W. L. Carlyle in 1905 organized at Gunnison, the location of the Thornton Ranch where the two $50,000 bulls were raised, the first county farmers' institute in Colorado.

Fred P. Johnson, State Director of Institutes and a close friend of Professor Carlyle, organized institutes for one week each in 1905 at: Del Norte, Monte Vista, Manassa, La Jara, Hotchkiss, Gunnison, Fruita, Debeque, Rifle, Eagle, Aspen, Basalt and Canon City. Among the faculty participating were: Professors Carlyle, Carpenter, Olin, Gillette, Paddock, and Ammons. Mrs. Ida E. Tilson had charge of the poultry work.

The following story, this version by Professor S. L. Macdonald, is the favorite of several who followed the institute circuit.

About 1910 I went with Glover, Vaplon and an agronomist and a dairyman whose names I have forgotten to Elizabeth a small town some 50 miles SE from Denver to speak to a gathering of farmers.

Our agronomist, Mr. Kezer, was first on the program and began his talk by saying, 'I am here to tell you how to make 2 blades of grass grow where one grew before.'
Our dairyman was next and he began with, 'My friend has
told you how to make 2 blades of grass grow where one grew
before, I am here to tell you how to make 2 gallons of milk
flow where one flew before.'

Vaplon, our poultryman was next and began his talk by
saying, 'My friend told you how to make 2 blades of grass grow
where one grew before, my second friend told you how to make
2 gallons of milk flow where one flew before, I am here to
tell you how to make 2 cocks crow where one crow before.'

Glover was the next man to speak and he began by saying,
'My first friend told you how to make 2 blades of grass grow
where one grew before, my second friend told you how to make
2 gallons of milk flow where one flew before, my third friend
told you how to make 2 cocks crow where one crow before; now
who in God's name will tell me how to make 2 hairs grow where
none grew before?'

This whole development had been most natural and impromptu
and as Glover stood there—a picture of droll, child-like
earnestness, not a hair on his head—the big crowd of farmers
broke into such a storm of uproarious applause as can only
be compared to the pandemonium of a political convention.

The off-campus schools and institutes were coeducational,
and the work for rural women developed side by side with that for men.

Institutes for Women. — Miss Mary F. Rausch, who upon the
death of Miss Ammons became head of the work in Home Economics,
matched even Mr. Carlyle as an off-campus worker. In 1909 she re-
ported one-week short courses at:

<table>
<thead>
<tr>
<th>Place</th>
<th>No. Attending</th>
<th>Place</th>
<th>No. Attending</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ouray</td>
<td>140</td>
<td>Greeley</td>
<td>225</td>
</tr>
<tr>
<td>Salida</td>
<td>150</td>
<td>Newcastle</td>
<td>90</td>
</tr>
<tr>
<td>Delta</td>
<td>130</td>
<td>Rocky Ford</td>
<td>250</td>
</tr>
<tr>
<td>Rifle</td>
<td>109</td>
<td>Fort Collins</td>
<td>205</td>
</tr>
<tr>
<td>Durango</td>
<td>125</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Miss Rausch and her small staff, compelled to obey that
law of physics that one body can occupy only one place at a time,
could not give all the lectures and demonstrations requested. After
giving under the auspices of the Beef Producers Association, a demo-
stration lecture in the Tabor Opera House to an audience of 1,350,
Miss Rausch received over 100 invitations for similar programs from Massachusetts, New Jersey, Ohio, New York, from Kansas State Teachers College and from the British Columbia Packing Company.\(^1\)

After Miss X, one of Miss Rausch's assistants, had given a demonstration at the Stock Show in Denver, she was called to the front of the platform at the next "chapel" on the campus to receive a huge bunch of American Beauty roses, the gift of a stockman who thus began his wooing.

Miss X was a modest person and resented the publicity of the gift, but later she married the stock man.

Miss Rausch was an exacting lecturer; every detail had to be foreseen and provided for; but Mr. Cottrell, on hearing complaints of her, replied, "Give me more like her. She gets results."

In 1910 Miss Rausch was compelled by ill health to give up her work, but under Miss Inga M. K. Allison as Acting Head and later as Head of the Department of Home Economics, the off-campus work continued in normal institutes, fairs, school visitation, talks before clubs and conferences, etc.

H. M. Cottrell. — From 1906 to 1910 H. M. Cottrell was Director of Farmer's Institutes and Extension work.

Mr. Cottrell's father was one of those men sent to Kansas by Henry Ward Beecher to

\(\textit{...make Kansas free.}\) To each head of a family Beecher gave a Bible and a rifle, to be used against the enemies of freedom as the situation might require. The group was puritanical, intolerant and highly courageous. \(\textit{\ldots}\) \(\textit{\ldots}\)


\(^3\) Letter from Roy H. Cottrell, son of H. M. Cottrell.

H. M. Cottrell was one of nine children, all of whom graduated from Kansas State Agricultural College. The family income was filled with the proceeds from a rocky hillside farm in eastern Kansas. At one time H. M.'s mother asked him how much he had spent at Kansas Aggies during a year, and when the boy replied "sixty dollars" the mother said, "Well, I didn't think it would cost that much, but I guess it was worth it."

With this background, Mr. Cottrell understood the needs of the pioneer in northern Colorado. Through letters, bulletins, personal visits, he organized farmers into institute groups; he gave much attention to emergencies of weather, to economic conditions; he established "news Notes", a clip sheet for editors which is still published. He made the droughts and the blizzards of the dry land sections his problems and struggled to find a way for men to live under these conditions.

Trains. — Before the passage of the Smith-Lever Act in 1914 and the formal organizing of the Extension Service under this act, farmers' institutes were not the only form of off-campus work. In co-operation with the college, both before and after the Smith-Lever Act, special trains on the Rio Grande, the Colorado and Southern, the Santa Fe, the Burlington, and even on the old Denver Pacific puffed to stops in wind-blown Eastern Colorado, in the fruit districts of the Western Slope, in the potato and cantaloupe areas, and in the mountain-walled valleys where the road grades were better for goats than for trains.

(Use photo)

Potatoes, soils, silos, alfalfa growing, dairies were demonstrated on one or more special trains each before 1915. Nor was

1. Ibid.
subject matter for women neglected. Talks and exhibits presented canning, clothing, nutrition, curing meat. Tools for the house such as a saw, a hammer and a file were exhibited under the sign "Keep these in the house. Make the old man buy his own." Seeing this sign, women paused, read, laughed, and dragged their husbands in to see.

In 1907 Mr. Cottrell organized one institute train which covered 185 miles; those in charge held fifteen sessions with an attendance of 1,705. In the same year he supervised 113 institutes which 19,730 persons attended.

In 1908 The Denver and Rio Grande railroad placed at the service of the College, a special train to go through potato growing regions which were the Montezuma and San Luis Valleys, and the valleys of the Eagle, the Grand, the Roaring Fork, the Crystal, the North Fork, and the Uncompahgre rivers. Since these areas were especially adapted to the production of high yields of the best quality, Colorado Agricultural College determined to do all it could to raise the average of potatoes and the output increased from 2,000 to 40,000 cars.

The 1908 train consisted of baggage car and three passenger coaches. The baggage car contained all the machinery needed in Colorado for raising large yields of potatoes. A working model of a potato cellar was exhibited. As soon as the potato train reached a station, the people were seated in the cars, and lectures and demonstrations followed. Lectures were well attended by both men and women.¹

Business houses closed in almost all towns during the lectures. An excursion train to meet the potato train was run from

¹ "Potato Information by College Specialists," The Fort Collins Morning Express, Apr 10, 1908, p. 6.
Ridgeway to Montrose, and another from Villa Grove, Hooper, and Mosca, to Alamosa. The crowds were so large at Aspen and Montrose that after three cars had been filled to overflowing, meetings had to be held on depot platforms, and at each place four lecturers were speaking at the same time, each speaking twenty minutes in a car and then moving to the next car. There were more people at Monte Vista than cars would hold, and the meeting was held in a hall.

At Aspen, Newcastle, Rifle, and Montrose regular meetings were held in the cars and evening meetings in the halls.

The people were chiefly Mexicans at Antonito, and an interpreter was necessary. R. A. Chisholm, champion potato grower, spoke at Del Norte.

Mr. Cottrell left the College in 1910 and Mr. C. H. Hinman continued the same lines of activity and inaugurated others. In 1913 he reported:

<table>
<thead>
<tr>
<th>No.</th>
<th>No. Sessions</th>
<th>Total Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmer's institutes</td>
<td>73</td>
<td>115</td>
</tr>
<tr>
<td>Short Courses, Farmers'</td>
<td>2</td>
<td>98</td>
</tr>
<tr>
<td>Short Courses, Housekeepers'</td>
<td>2</td>
<td>190</td>
</tr>
<tr>
<td>Farmers' Congress</td>
<td>1</td>
<td>Delegates</td>
</tr>
<tr>
<td>Institute Trains</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>Demonstration Trains</td>
<td>1</td>
<td>78</td>
</tr>
<tr>
<td>Normal Institutes</td>
<td>14</td>
<td>85</td>
</tr>
<tr>
<td>Fairs</td>
<td>4</td>
<td>No. Pd. present</td>
</tr>
<tr>
<td>Stock Show</td>
<td>1</td>
<td>28,800</td>
</tr>
<tr>
<td><strong>Total Attendance</strong></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>No. each Article</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>News Notes</td>
<td>17</td>
<td>800</td>
</tr>
<tr>
<td>Programs</td>
<td>1</td>
<td>102</td>
</tr>
<tr>
<td>Silo Bulletins</td>
<td>1</td>
<td>5,000</td>
</tr>
<tr>
<td>Literature for Demonstration Train</td>
<td>6</td>
<td>15,000</td>
</tr>
<tr>
<td><strong>Total Issue</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The demonstration train here listed is the first of this type sent out by the College; Mr. Cottrell's train had been an institute train.

Superintendent Hinman wrote of a 1913 train:

"This train will carry three cars of exhibit material and two lecture cars. The subjects to be treated by demonstration are Alfalfa Improvement; Seed Grain Improvement; Beekeeping; Livestock Feeding; Silo Construction; Poultry Raising, Prevention of Animal Diseases, with special reference to hog cholera and sore mouth; Home Improvement; and Improvement of the Rural Schools. The subjects to be treated by lecture will vary somewhat according to the needs of the different sections. This will include Silo Construction, Potato Growing, Sugar Beet Growing and other special topics that may be of particular interest to certain sections."

With the passage of the Smith-Lever Act in 1914, response to early trains became the steam in the boilers which made the twenties the Decade of Trains. A glance at the tabulated statement of the work of the Extension Service shows that the Colorado and Southern, the Burlington, The Rio Grande, and the Santa Fe operated trains on which Colorado Agricultural College employees lectured and demonstrated the advantages of purebred stock, poultry breeding and feeding, apple grading, diversified farming and crop rotation, better wheat, better seed, more beets per acre, household conveniences, apron patterns, canning (etc., etc). Everything that touched learning to live and earning a living on a Colorado farm seems to have reached rural people as the screeching brakes brought the train to a stop.

Good stories of the life on the trains multiplied more rapidly than the number of trains.

At one time one of the exhibits on a demonstration train was a model poultry yard in which green sawdust had been used to represent grass. When the train stopped in Boulder a facetious professor asked, "Is the sawdust colored or dyed?"

"Neither," Mr. Vaplon replied promptly, "It was cut from green wood."

Another of the remarks for which Mr. Vaplon was famous is from an institute lecture delivered on a train in 1911.

An egg weighing very much less than two ounces is not an egg; it is only half an egg. A dirty egg, taken from a dirty nest, or accidentally found with others under a broody hen or kept in a hot kitchen, or musty cellar for a week, then kept in a grocery store several days more, is not an egg, it is fertilizer; —

All men on the trains became so familiar with all the lectures that they could and did "pinch hit" for each other. In such cases the original lecture was reproduced even to the gestures and the profanity.

At one time in 1913, Miss Grace F. Smiley who was in charge of the Home Economics Exhibit ran the engine of a demonstration train for a few miles. It was all for the experience, and the engineer stood beside the young lady who, when she rejoined her fellow passengers commented,

and when the big locomotive commenced to throb as we whirled along at thirty miles an hour, I felt a power I had never experienced before. I was running a train—

One wonders if her daughter pilots an airplane at 300 miles an hour!

Mr. Hinman who was in charge of farmers institutes after

L. W. E. Vaplon, "Poultry on the Dry Farm". Lectures Presented on the Dry Farming Special, p. 9
Mr. Cottrell's resignation in 1910, resigned in 1913. Not until 1915 were Smith-Lever and matching State funds available for off-campus work. During 1914, when the college had little money on hand to pay lecturers, or finance trains and institutes, farmers and not ceased farming; they sent to the college 12,000 letters requesting information. 12,000 personal replies were sent out, each reply written by a man who knew or made himself acquainted with the section of Colorado to which he sent information. This took time, and the faculty, not thinking of "time and a half for overtime," worked well into the nights. The best men were called upon because "...the wrong information might cost a farmer hundreds, or in the case of large stock feeders, thousands of dollars."¹

During one week Professors Kezer and List, Miss Oberlin, Roud McCann, then Deputy State Dairy Inspector, and Walter Groom "worked" the institute circuit on the Moffat Road. The same week these people and B.C.D. Bishopp, no doubt all wishing for seven league boots, appeared at Haxtun and Holyoke. At the same time Dr. Glover and Miss Haynes "made" the institutes at Grand Junction and other towns on the Western Slope, and Monte Vista and Antonita, while Mr. Sargent and Dr. Sandsten talked before Denver organizations.

Before the end of March 1915 the names of towns visited by institute lecturers from the College sound like a drum beat: Akron, Brandon, Eads, Haswell, Sugar City, Ordway, Olney Springs, Hugoe, Limon, Burlington, Flagler, Brighton, Platteville, La Salle, Kersey, and Julesburg.

Even the Smith-Lever funds did not immediately relieve the

campus workers of the off-campus load. Because the Federal funds
at first were largely used for county agents, Boys and Girls Clubs,
and home improvement projects, the departments still carried the
lecture and correspondence service. In his June, 1915, report,
President Lory wrote:

This load has been heavy and in trying to meet it,
we had to draw too heavily upon our instructional force.
---The calls from outside are so urgent, there is such
a need that work be done, that at times it is practi-
cally impossible to refuse. On the other hand, the
Institution owes a distinct duty to the students on the
campus, and it is not just to them to cripple the in-
structional force in order to meet these outside calls.

Chart line showing Extension
activities from 1915 & 1946

Chapter XXXIV

County Agents Before 1915

Co-operation Agreements
County agents were employed in Colorado before the Extension Service under the Smith-Lever Act was set up. Mr. D. W. Working who was the representative of the United States Department of Agriculture with headquarters in Denver when the first county agents were employed, insisted in talks with the writer that the generally accepted accounts of the beginning of county agent work contained inaccuracies as to dates. In order to secure documentary evidence as to these dates he wrote the county clerks of the counties concerned. The dates herein used are those given in the county records as reported to Mr. Working. The other information as to how the first agents were selected came also from Mr. Working.

El Paso was the first county in the State to move toward securing a county agent. On September 4, 1912, the County Commissioners passed a resolution to

3. accept the proposal of the Bureau of Plant Industry of the United States Department of Agriculture to bring an agricultural expert into El Paso County at a cost not to exceed $2600 a year provided that El Paso County will pay one-half of the salary and expenses of such expert not to exceed $1300 in any one year.

Seeing the news of this action in the newspapers, County Attorney Turman of Logan County wrote Washington presenting the interest of authorities in his county in county agent work. His letter was sent to D. W. Working, representing the Federal Office of Farm Management in Denver.

Mr. Working went to Sterling and talked with the county commissioner and Superintendent J. A. Sexson of the Logan County

1. Karl C. Parker, Letter to D. W. Working, May 9, 1944, in reply to letter written by Mr. Working March 1, 1944.
Industrial High School. Mr. Sexson, being a man of exceptional vision and a believer in vocational training, was willing that D. C. Bascom of the high school staff should give half his time to county work. Mr. Working recommended Mr. Bascom, the recommendation being approved in Washington; on October 1, 1912 Mr. Bascom began work on a half time basis as the first co-operative county agricultural agent in Colorado.

In Logan County, a ladies club, forerunner of Home Demonstration Clubs was organized. Again Superintendent Sexson contributed to the success of the club when he permitted the home economics teacher in the high school to act as godmother.

In some counties of Colorado other than Logan and El Paso, county agents were employed before the passage of the Smith-Hughes Act. These counties and the agents were: Stanley V. Smith, Pueblo County, 1913; W. H. Harrison, Mesa County, January 1, 1914; H. H. Simpson, Boulder County, February 1914; C. G. McCord, Morgan County, April 1914; E. F. Brown, summer months only, Prowers County, May 1914.

The problems these men tackled were in general similar, but with some differences and emphases peculiar to each county. All the agents encouraged the building of silos, crop rotation, better seed selection, better adapted varieties, use of more and better livestock on farms, milk or cow testing, farm meetings, farm associations, and library service.

In most of the counties farm tours with field demonstrations

2. Blanche Hyde, "Historical Statement", ms. p. 1
and talks were an important method of disseminating information. Since few farmers in those days owned cars, these were provided by the business men. One farmer in Logan County said a field demonstration was worth $5,000 to him, and many in Logan and other counties echoed his words.

Not waiting for the Federal Soil Conservation Service, some form of care of the soil such as summer fallowing, fall listing, or a "dust mulch" was stressed; and along with the work on soils went study of seeds and crops. In Logan County Mr. Bascom and the farmer gave much attention to: corn, small grains, vegetables, Baltic and Grimm alfalfa, Marquis wheat, sudan grass and selection of seed potatoes. Mr. Smith in Pueblo County emphasized the necessity of re-seeding old fields of alfalfa, of feeding stock on the farm rather than hauling hay to town and selling it at a low price. Because of pests on orchards and vegetable gardens, he also gave much time to that phase of his work.

The service of the county agent in Mesa County being poorly financed, Mr. Harrison could not accomplish what he hoped, but he made several definite steps in improving farming. Potatoes were one of the chief crops of the county, but so many varieties were grown that a carload of one kind was not available for marketing. With larger quantities of one variety harvested, the marketing became less of a problem.

Mr. Harrison with the assistance of Professors C. P. Gillette and E. P. Sandsten and with the co-operation of progressive orchardists, brought the San Jose scale under control and at this time, too, the professors pointed to codling moth in the orchards.
Boulder County ranked high in an interest in silos and in new and better-adapted crops and better seed. Among the outstanding achievements of Mr. Simpson, the Boulder County agent was the introduction of Minnesota 13 corn.

In Prowers County, too, the work of the county agent was poorly financed, but in his one summer there Mr. Brown stressed the culling of dairy herds and crop rotation. Alfalfa and sugar beets, each grown on the same field year after year, and each characterized by low yields formed the backbone of farming.

Hog cholera was a problem of the years just before 1915. Becoming acute in the San Luis Valley first, it was there that Colorado farmers learned its deadliness and how to handle it. Farmers in the Valley had made more than satisfactory profits on pea-fed pork.

The Silver Spruce for 1909, in a page supposedly taken from one of Professor Cottrell's institute lectures, gives a view of this interest in fattening pigs.

The flavor of the pea-fed pork spread like wild fire. Woman told woman across the back fence of the delicious bacon, and strong men told each other in their clubs with baited breath of the pea-fed pork chops.

The next day, a whole train, sixty cars loaded to the guards with pea-fed porkers left the San Luis Valley. Banks and business houses closed for a week's holiday.

All day and through the black night the great engines puffed, wheezed and plunged their way through the mighty snowdrifts.

The people of California were wild with impatience. Day after day and night after night they scanned the bulletin boards for the latest report from the pea-fed special. Strong voiced orators would be hoisted to the shoulders of their fellows. 'Reno, Nevada,' they would read, 'Pea-fed pork special just passed here.' And the roar of the multitude swept out to the sea.
More engines, the flavor crazed people shouted, and the president of the great railroad corporation having tasted the pork, joined the howling maniacs. Four, five, six engines were added. Though the great train was going as had no other train in the history of the road, more speed was demanded. Gasoline motors were hitched on and the speed increased. The cars rocked from side to side but still to the frantic people it seemed to fairly crawl.

Gentlemen, there was never anything like it before or since. They hitched electric motors to that train when it got within 500 miles of Frisco and hurled that pea-fed pork into the city as a bolt of lightning.

Seattle, Portland and all the cities in the coast country got a whiff of the fragrant pea-fed bacon and pork chop air the next day and

Suddenly, with the demand for pea-fed pork something less than the Spruce represented but at its height, the hogs in the Valley seemed to be afflicted with the black plague of the Middle Ages. They died in the pens, by the roadside, anywhere and everywhere. Mr. Winsor, the county agent, sent an S.O.S. to Dr. Glover, but at first hog growers did not welcome the veterinarian when he diagnosed the disease as cholera.

Scoffed one man, "Ain't heard anything in Missouri. This ain't it."

"We had hog cholera back in Kansas. It wasn't this," and another man spat and jeered.

Dr. Glover inspected, dissected and talked from the Valley to Antonita. One day, having finished his noon meal in Antonita, he was preparing for a two p.m. meeting when a young farmer entered and urged him to come see a pig recently dead. Dr. Glover donned overalls and dissected the pig only to realize before he was finished that it was two o'clock.

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1. The Silver Spruce, Class 1907, p. 183.
Since most of the men at the meeting spoke Spanish, Senator Garcia, immaculately dressed, was on the platform to serve as interpreter. Dr. Glover, knowing the value of a good entrance, appeared with his clothes bloodstained, his hands unwashed and carrying on his back the carcass of the pig he had just dissected. The audience roared; but Senator Garcia, urbane, courteous, greeted his guest and introduced him.

"Gentlemen, this is a serious situation," the veterinarian began bluntly.\[2\]

With elaborate Spanish oratory Senator Garcia caught up the words, delivered them, and fixed his eyes instantly on Dr. Glover's lips.

Dr. Glover uttered a second blunt sentence and heard it float out to the audience on waves of oratory.

"And so we gave the talk," Dr. Glover concludes the story, "We were like two dogs that meet, smell noses and then dash off in opposite directions only to come back together and repeat."

At last in Monte Vista the veterinarian talked to a crowd packed into the largest hall and standing close outside the open windows. For an hour he presented evidence to support his belief that the disease was cholera, and told stories in the Glover style. "We've discussed this enough," he concluded. "We'll need $2,000 to begin the work," and he started a paper through the crowd. In twenty minutes the money was subscribed.

The county commissioner made Dr. Playne Guyselman, who was Dr. Glover's right hand man, a deputy sheriff, and two other veterinarians, Dr. Wadleigh and Dr. Decker, assistants. The State
Livestock Board made these men State Sanitary Inspectors. When men did not voluntarily burn or bury the dead pigs, they were compelled to do so and nightly, as dead animals were burned, fires blazed the length and breadth of the Valley. A State quarantine law and strict local rules were enforced. Every hog that came in on the long train loads to be fattened on the famous Valley field peas was quarantined thirty days and released at the end of that period only if healthy; if cholera had appeared the animals were inoculated with serum—no virus was used—and the quarantine continued.

In six months hog cholera in the San Luis Valley was among the events of the past men told about.

Justifiably boastful, the men who had fought the battle organized the H. O. G., High Order of Grunts, a phase of the Monte Vista Hog Growers Association which took over and put over entertainment features. For years the annual banquet, at which Dr. Glover was guest of honor, was an enduring tribute to him.

In 1914, the officers of H. O. G. were wondering for what they should spend the few dollars left in the treasury, so definitely was hog cholera in the Valley conquered.

In addition to sponsoring Dr. Glover’s battle against cholera, Mr. Winsor, the county agent in the San Luis Valley, introduced Marquis wheat.

On November 1, 1912 before L. M. Winsor the third county agent was appointed, D. W. Frear who had been in the Agronomy Department since 1909 became State Leader. In the twelve months ending July 1, 1914,

Mr. Frear addressed 105 farm meetings as total attendance
of 9,330 farm people. He visited county agents 42 times and traveled a total of 18,492 miles, mostly by rail. More than half his time was spent in the field.\textsuperscript{1}

Obviously he was serving as a general field man.

A Colorado law passed in 1913 outlined a way in which counties and the Agricultural College could co-operate to develop agriculture. Under this law taxpayers and farmers could by petition authorize their county commissioners to appoint an agriculturist and pay his salary. This man, co-operating with local farm organizations, was also to work with the College and the United States Department of Agriculture.\textsuperscript{2}

The Smith-Lever Act which became a law May 8, 1914 made possible the setting up of a division for the education of rural people in agriculture and home economics. Since the function of this division was to serve off-campus, it was called the Extension Service.

From 1862 when the Land-Grant College Act was passed to 1887, there was great need in all farming areas of the United States for agricultural information. With establishing of experiment stations, the building up of a stock pile of needed principles and facts began. However, though the stock pile grew, the farmers, in spite of bulletins sent them, made comparatively little use of the information available. The function of the Extension Service was the carrying to the farmers the results of the agricultural research at the stations. Both the colleges and Department of Agriculture had carried some messages to Garcia, but

\begin{itemize}
  \item Session Laws 1913, pp. 17-18.
\end{itemize}
the Smith-Lever Law meant that these two agencies should work together.

Commenting on the Smith-Lever Law, President Lory in his report to the State Board, December 9, 1914, said, "I question whether any of us fully realize or are in a position to estimate the importance of this new legislation."

Before the Extension Service could be set up in connection with a Land-Grant College, the State Legislature had to pass a law of acceptance, and an authorized representative of the College had to sign a "Memorandum of Agreement" between the College and the United States Department of Agriculture.

This Memorandum of Agreement, carefully specifying as it did, the functions of the county, the State, The Agricultural College, and the Department was the foundation for many years of what was, on the whole, harmonious co-operation; but with the coming of Soil Conservation Service, A A A, Rural Resettlement, no such memorandum of agreement was signed, and functions and agencies of these overlapped those of the Extension Service. The "Mt. Weather Agreement" of July 8, 1938 defined the duties and purposes of Extension and provided in each state for an Agricultural Land Use Program or Policy Committee made up of representatives of all services and agencies concerned with land use.

Like the "Memorandum of Agreement" of 1914 the "Mt. Weather Agreement" of 1938 provided the basis for co-operation.

In Colorado those who have served, both before and after the passage of the Smith-Lever Act, as Directors of Extension are:

1. E. C. Form 1905, Jan. 15-16
Colorado's Code of Agriculture. - Another document which has meant much both in Colorado and outside the boundaries of the Centennial State is the "Code of Agriculture". The men and women in the photograph, while attending an Extension Conference at Mesa Lakes on the Western Slope in 1923, suggested and adopted the code. It caused much discussion and has been the statement of principles about which action programs have been built both in Colorado and other States. The Code follows:

COLORADO’S CODE OF AGRICULTURE

Farm returns commensurate with ability, risk and investment involved.

A. To adapt production to market requirements.
   1. Survey of local and outside markets.
      a. Consumption requirements of market centers.
      b. Production and marketing costs.
      c. Transportation to consuming centers. Cost Service.
   2. Market crops through your own livestock.
      a. Grow crops to be fed. Amount of each.
   3. Grow kind of cash crops markets will handle.
      Amount of each.
   4. Standardize on variety and quality of cash crops.
   5. Orderly marketing.
   6. Home markets the first to be supplied.
      a. Farm home supply.
      b. Local markets.
   7. Farm financing.
   8. Adapt farm business and rotation to meet economic conditions above outlined.

B. To make rural home life attractive.
   1. Balanced diet for the family.
   2. Thrift and attractiveness in dress.
   3. Labor-saving devices and conveniences.

C. To interest children in practical farm work and farm home life through club work.

D. To develop progressive communities.
   1. Where leadership is developed.
   2. Closer relationship between town and country.
   3. Good schools, churches and recreational centers.

The following chart presents a condensed statement of the work of the Extension Service from 1915 to 1941.
Chapter XXXIV.

4-H Clubs.
The 4-H Clubs are one of the most successful projects of the Extension Service. W. E. Vaplon, appointed in 1914, was the first State Club Leader; served until 1919. Maude E. Sheridan, Walter R. Freeman, and C. W. Ferguson followed W. E. Vaplon in the order named. In 1945 Cecil Staver succeeded Mr. Ferguson.

If the future men and women of America are to be friendly, clear-thinking, steadfast in reaching a goal, and self-supporting, every boy and girl should belong to a 4-H Club. Attend a junior fair and see for yourself the clean barns, the fine poultry, sheep, swine, cattle, riding horses, and children.

Every child is clean, alert, businesslike, friendly; every child talks readily and well about his sheep, or pigs, or cattle, about how and when he feeds them, about how he secures feed and the accounts he has kept. There are no crying children whose most urgent need is a handkerchief and scattering of paper sacks, pop or coke bottles, no cigarettes.

Mary Jane has seven Hampshire sheep and is exhibiting three of them. She is combing the fleece of a black-nosed ewe, an ewe that has been cared for so intelligently that some of the intelligence has crept into her eyes and they have lost the marble-like look, the typical eye expression of sheep. Her wool is fluffy and soft without a speck of dirt, but Mary Jane still combs.

"Pigs like to be clean". "Pigs take to unsanitary conditions and prefer them". Thus, two Aggies, one a well known teacher and the other a colonel in the army carried on in 1945 an argument started during student days on the campus. The 4-H boys agree with the colonel: pigs like to be clean. And those 4-H pigs are clean.
The boy owners see to that. There's little odor about the porkers; their coats shine; the boys' eyes shine; the pigs grunt with contentment; the boys show nice teeth as they smile at visitors.

And there is Anna's Hereford, Daisy Mae, hair healthy and combed into waves. Little Abner, another Hereford, was home, Helen said, but Daisy Mae, placid and obeying the halter lead, had feminine personality and an eye on the judge, and for once had forgotten Little Abner.

Bill and his Hereford with hair parted down its back were offering the keenest kind of competition to Helen and Daisy Mae, but Bill and Helen exchanged friendly grins as they led their animals into the show ring under the trees.

Guernseys, Jerseys -- and don't forget the ponies. Even if Old Dobbin as a work horse has lost place and prestige to a tractor and a truck, the children, true to western tradition, want to ride. Silver, part Indian pony and part Shetland, has the rolling mane of the wild branch of his family, and, truly, almost a sheen of silver over his pajamino coat.

Those 4-H boys and girls are learning stock feeding, breeding, showmanship, marketing; they are learning food production and preservation and home nursing. Under the best of leaders, volunteer leaders, they are learning both independence and co-operation. They know the pride of accomplishment and the value of planning. They take part in civic activities.

But back in the lumber wagon days, the fathers and mothers of these boys and girls, if they grew up in Colorado, had no help with feeding rations or marketing practices. They never owned a calf or a pig to feed, to exhibit or to market; they did not belong to clubs.
In winter they dressed in unheated rooms to do chores by lantern light. In the long hot days of summer John was driving a horse-drawn hay rake, or the horse on the hay derrick. He turned the grindstone, milked and fed stock. He hauled rock off the fields and manure on; he built fences. His jobs had no end and his reward no beginning. The stock and the hay belonged to dad. John had little or no money of his own, and John soon

left the farm.

John’s sister Mary raised chickens and cooked them over a coal stove for hired hands. She learned the hard and often un-sanitary ways of caring for milk and making butter. Usually she and her mother did the washing for the family and sometimes for the hired men; and they carried the water in and carried it out.

Home was not attractive. Cheerful curtains were not an essential; chairs were mended with baling wire. The back of porches meant that mud was tracked in directly from the grassless yard.

Food was often bread, meat and potatoes, oatmeal and perhaps apples, gooseberries, or currants from one year’s end to the next.

Mary knew little about sewing or about buying materials, and, since she had no money for ready-made clothes, she looked and felt dowdy beside the town girls.

John, because he was needed on the farm, had little opportunity to go to school.

4-H Clubs have made John and Mary into the youngsters at the fair.

Looking down from the bank of the Grand Valley Ditch where it scans the side of the Never Summer Range, one sees the
course of a winding trickle of water. On the very top of the ridge pole of the continent, at that point, the trickle seems undecided which direction to flow, and one is amazed that it is the beginning of the Colorado River.

Boy's and girls' agricultural clubs were at first as uncertain in propose and direction as the trickle of water. In 1902 there were 85 members in the first club,¹ said Mr. A. B. Graham in a radio address on the Mile-high Farmer Program. The trickle of water became a river, and in 1945 the 4-H Clubs have a membership of a million seven hundred thousand,² an accumulated membership of about ten million. The Colorado River made the Grand Canyon; those club members influence legislative programs and agricultural planning commissions; they are a productive force to reckon with; newspaper editors bow to them, and educators know their value. Juvenile Court judges report that they have never had a 4-H boy or girl before them.³

Mr. A. B. Graham was a rural school teacher in Ohio and began his club work there. Many consider him the founder of boys' and girls' agricultural clubs, but Illinois, Ohio, South Carolina, Texas and possibly other states lay claim to being the State of origin of the clubs. In those States it seems that the organizers were not employees of the state college.

4-H Clubs in Colorado. — In Colorado the reverse of this is true. Colorado Agricultural College reached out in 1910 under the new and vigorous leadership of Charles A. Lory to help rural boys and girls. The College plan was to organize clubs wherever the county

². Ibid.
³. Ibid.
clipped clip was to organize clubs wherever the county superintendent of schools would cooperate. In irrigated sections both boys and girls were to study beets the first year; in dry land areas the subject was milo. The second year the boys turned to grains, alfalfa and fruits; and the third year to stock judging. The second year plans for girls included bread making and serving; the third year, fruit canning, jelly making and sewing. The plans sound prosaic, but they were a beginning.

Business men were to encourage clubs by offering a first prize of $3, a second prize of $2 and five prizes of $1 each, these prizes to be awarded at an autumn meeting in the dreary local schoolhouse.

Since lack of funds made a specialist in club work impossible, Superintendent of Extension H. M. Cottrell, Principal of the School of Agriculture, T. M. Netherton and W. E. Vaplon of the Animal Husbandry Department in 1910 visited ninety-six schools and talked to 3,740 boys and girls. Fifty-two clubs were formed, many of them in the dry land sections; but, leaders and supervisors being unavailable, and the irrigation season being difficult, the clubs withered like a crop when the irrigation ditch goes dry, and only sixteen exhibited products at the end of the year.

Securing club leaders was a major headache. The College tried to persuade school districts to pay their teachers to do this work during the summer school; but boards and teachers were untrained in agriculture and home economics.

In Cheyenne County in 1911, the co-operations of the County Superintendent of Schools meant the enrolling of 100 members with

Mrs. D. H. Zuck as secretary. Very few such leaders appeared, and 
the clubs were still the runt calves of the farm program.

The next year, 1913, D. C. Pascom, county agent in Logan 
County and J. A. Sexson, Superintendent of Schools, backed boys and 
girls to success in garden, canning, sewing, cooking, corn and 
beet clubs. The token prize of three dollars was forgotten when Mr. 
C. B. Goddard offered a top buggy as first prize in the Corn Club. 
The Great Western Sugar Company played Santa Claus with $125.00 in 
prizes.

A genuine interest in rural boys and girls was the 
irrigation water that nourished the agricultural clubs, and by 
1913-1914 county agents reported more success with the clubs than 
in any other line of work.

The Smith-Lever Acts of 1914 and the State acceptance of 
them in 1915 provided for the Extension Service, and the funds and 
leaders this made possible meant that by 1920 boys' and girls' clubs 
gave to Colorado farms, what the Indian paint brush gives to many 
of its hillsides - a brave splash of color.

In the early twenties 4-H members invaded the State Fair. 
They exhibited stock, crops, canned fruit, and clothing they had 
made; they brought enthusiasm and new future to the fair grounds.

Bertha Boger and Elaine Hendricks, a canning club team 
from Kit Carson County in 1922.

...so well prepared for demonstrating and so well 
grounded in subject matter that they easily won the trip 
to France arranged for by the American Committee for 
devastated France. They, with the team from Iowa, re-
presented the United States in a canning demonstration 
tour throughout France.

2. Bertha Boger Bear, Emergency War Food Assistant, 1944. 
3. Alvin T. Steiney, U. W. Working Collaborator, History of Agri-
culture in Colorado, p. 624.
In this same year of 1922, twenty-six teams demonstrated canning, clothing, poultry culling, poultry housing and feeding, corn selection, corn testing, potato selection and potato grading. Judging teams rivalled the demonstration teams. Winning teams went to the State Fair, and in 1924 10 champions went to the International Livestock Show in Chicago as guests of certain railroad and business houses.

In 1923 the 4-H dormitories of Camp Tobin at the State Fair were made possible by a legislative appropriation of $25,000 which was unanimously voted.

To the 1923 projects work in forestry was added in 1924.

During the ten years from 1915 to 1925, years when like the mountain stream, 4-H work was finding its way and establishing a course, farm men and women saw in the clubs an answer to many a community problem and in impressive numbers volunteered to serve without pay as club leaders. Mrs. J. J. Ross of Montrose County and Mrs. Robert Linton of Boulder County, both of whom served as 4-H leaders for more than twenty years, are typical of these leaders.

When heavy-footed years blasted hopes and destroyed crops, other leaders appeared to save that which was good. In 1935 when dust storms came down on southeastern Colorado like a plague of darkness; when the soil took to the air; when cattle starved and humanity became desperate, Mrs. Lucy A. Russman of Prowers County organized the boys and girls of Pleasant Valley (the name was a misnomer in those days) into 4-H Clubs. Mrs. Russman tells a

2. Ibid., p. 123-124.
bit of her story: "I often walked two miles to meeting carryin a
camp stove, a iron for pressing, a little bucket of water and
my book of instructions. What fun!"

What chance had dust storms to destroy a country and
a population defended by such people!

Looking back to the dust bowl of ten years ago, Mrs.
Russman adds now: "At last the dust is quiet and rain has returned.
Where once there was only dirt banks, prize-winning grain is
grown and attractive homes are made by these 4-H Club boys and
girls."

1927 was a year of glory in 4-H Club history. Again
this year 4-H boys won the sweepstakes in corn, the third time this
had been done in the six years of the Pure Seed Show. It was in
this year, too, that a national convention in Washington adapted
the 4-H pledge. "I pledge

My head to clearer thinking
My heart to greater loyalty
My hands to greater service
My health to better living

For my club, my community, and my country."

The decade of the thirties was notable for the growth of
4-H Camps, the growth of junior leadership training, the emphasis
on attendance, and exhibiting at the Denver Stock Show and the
"catch-it" contests. In the first of these contests seventeen boys
and twelve calves were turned loose in the arena on the show grounds.
A boy who could catch a calf, owned, exhibited and sold it the next

year and was allowed to keep the money. Such contests were popular and have become features of the State Fair and some County fairs.

One of the outstanding 4-H camps was that held in July 1938 at Copeland Lake Lodge for 4-H members interested in forestry. This was the first Colorado camp to stress "conservation of forests, wild life and water."

Clubs grew and thrived. With some money, trained State leaders and the best of volunteer local leaders, few projects became dried tumble weeds banking the fences of rural life or drifting before the wind. In the quarter century between 1914 and 1939 membership in Colorado 4-H Clubs increased from 853 to 13,703, and the number of projects grew from eight to thirty-three.

Arthur Schultz of Larimer County is an example of what an individual member of a 4-H Club may do. After much questioning and much insistence that he state facts even, apparently, at the expense of modesty, Arthur wrote the story of his work.

"Ten years ago I started my career as an active 4-Her. Behind me I had one year as an associate member. During that year I had been indoctrinated in the principle of making the best better.

I carried several projects that year. One of these was a hog project. I got my start in hogs when a neighbor gave me a "runt" pig. I became very attached to Gumbo throughout the summer, and it certainly was hard to say goodbye. Neither the good price which I received for her, nor the fact that she outweighed the littermates by twenty pounds succeeded in comforting me.

With the money I received from Gumbo I purchased some pigs for the National Western Stock Show. After feeding these pigs it was mighty hard to take it when the judge seemingly

completely overlooked them.

The next summer I hoed corn to secure the money to purchase more barrows for the Denver show. I was fortunate in obtaining some exceptionally good ones that year. Two of them in particular showed great promise. On the day after Christmas, however, both of them became ill with pneumonia. Much to the surprise of the vet they survived. The high fever which accompanied the illness caused them to lose their bloom, however. Despite this fact one of them placed second in his class to the grand champion of the show, while the other one placed second to the hog which was the reserve champion.

Hogs have not been the only project which I have carried. Sheep, dairy, poultry, garden crops, and tractor maintenance projects have received their share of my attention.

Sheep was one of the projects which I carried the first year. For my foundation in this project I bought an old ewe from a neighbor. I kept this ewe two years. The second year she presented me with two strong healthy ewe lambs which I kept in my flock for many years. For the past few years I have been feeding lambs for the National Western Stock Show. Last year I exhibited the Grand Champion fat lamb, at the State Fair in both the 4-H and open classes. I kept this lamb with the intention of showing it at the Denver show, and everyone who saw it said it would surely win. Three weeks before the show opened this lamb died. This was a hard blow. Other lambs that I showed at the 1945 Stock Show won second, third, and sixth in the 4-H class and first, third, and fourth in the open class.

In 1940 I planted two acres of sugar beets for my 4-H crops project. These beets came up and looked promising until a sand storm blew them out. So— I replanted them. Again they came up and a sand storm hit them. That time I had enough of a stand left that I did not have to replant again. Due to a drought which prevailed that year, the beets did not receive sufficient moisture and therefore the yield was low. My 1940 sugar beet crop was successful educationally, if not financially. The next year and again in 1942 Lady Luck smiled on me and I won champion in the Fort Collins Factory District Sugar Beet Yield Contest.

In 1941, my sister and I gave a demonstration on Irrigation Practices. On this demonstration we won Champion Crops Demonstration and Reserve State Champion Demonstration team at the State Fair. We were asked to present this demonstration at several State and County meetings.

I was chosen as one of the members to represent our county at the State Livestock Judging Contest held at the 1942 State Fair. At this time I won the Duke Lascelles Trophy for being the champion individual dairy judge. This past year I
entered a National Hog Picture Judging Contest sponsored by the United Duroc Record Association. I placed in the upper one per cent of 3,100 entered including college specialists, county agents, breeders, and farmers, etc.

I have found that my dairy and poultry projects have blended very nicely with my other projects to make for a well-balanced 4-H program.

I entered the Rural Electrification Contest in 1942 and 1944. In 1942 I won the gold medal for being the county winner. I contributed toward winning a plaque for our county in this electrification contest.

I won a trip to the Twenty-second National 4-H Congress, held in Chicago in December 1943. My trip was awarded by Burlington Railroad for outstanding achievement.

I was declared the State Champion 4-H pig club member at the State Fair in 1944 and 1945. As the 1944 champion I attended the National Western 4-H Round-Up in Denver.

I exhibited the Grand Champion Chester White sow at the State Fair in the open class in 1944 and 1945, and also the Junior Champion Open Class boar in 1944 and 1945.

In 1945 a new 4-H project was inaugurated. This was the Tractor Maintenance Contest. The county winner was to receive a scholarship to a tractor school held on the Colorado A. & M. Campus. The State prize was an all-expense trip to the Twenty-fourth National 4-H Congress held in Chicago. It was a thrill to be selected as the county winner and even a much greater thrill to be named the State winner.

I feel that I have gained much from my 4-H projects and activities. Foremost of these is the training in good clean competitive spirit. By that I mean the ability to lose without jealousy and win with modesty. It has brought me to the realization that the best must ever be improved upon.

Obviously, with such opportunities open to members of 4-H Clubs, no rural boy or girl in Colorado is condemned to the life of John and Mary. Most of them know this and many equal Arthur’s record.

The original three dollar prize suggested in the early days of boys and girls club work is microscopic, and even the top buggy is more than antiquated when these are compared with the prizes offered in 1944. However, though the top buggy Mr. Goddard offered was not even good salvage in a scrap drive in 1944, his interest in
the clubs had spread to other business men and to all sections of
the State. The poultry clubs of Canon City and their sponsors were
an example:

Business men Provide Means for 4-H Project

Ask any member of the Canon City Chamber of Commerce
about 4-H Club work—poultry clubs, especially—and you'll
hear the story of unique co-operation that exists between
these business men and Fremont County boys and girls inter-
ested in raising chickens.

Fifty business men, individually, sponsor each 4-H
Club poultry exhibitor.

Each boy or girl is given 50 baby chicks, paid for in
advance by a civic-minded business man. Then, when the annual
fall poultry show takes place, these sponsors become richly
regarded 'chicken fanciers,' Chamber of Commerce secretary,
Louie Bessemer, tells us. Each 4-H co-operator selects four
of the best of his flock for the October exhibit and then
turns them over to his sponsor.

During 1944 each of the 50 sponsors invested $6.00 in
either a boy's or girl's poultry project. One milling com-
pany presented each child with 5 pounds of starter-mash at
the time the chicks were received from the hatchery.  

Such projects dot Colorado's mountains and plains, and
the boys and girls participating made a proud record in World War II.

Statistics of 4-H activities for 1945 follow:

<table>
<thead>
<tr>
<th>1945 4-H Activities</th>
<th>No. 4-H Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOME GARDENS 204 Acres</td>
<td>583</td>
</tr>
<tr>
<td>POULTRY 29,658 Birds</td>
<td>496</td>
</tr>
<tr>
<td>DAIRY CATTLE 1208 Animals</td>
<td>709</td>
</tr>
<tr>
<td>BEEF CATTLE 2591 Animals</td>
<td>1280</td>
</tr>
<tr>
<td>SHEEP 2059 Animals</td>
<td>446</td>
</tr>
<tr>
<td>SWINE 1923 Animals</td>
<td>483</td>
</tr>
<tr>
<td>FOOD SELECTION &amp; PREPARATION</td>
<td></td>
</tr>
<tr>
<td>FOOD PRESERVATION 80794 Qts. Canned</td>
<td>324</td>
</tr>
</tbody>
</table>

CLOTHING
4706 Garments Made
751 Garments remodeled

HOME FURNISHING
142 Rooms Improved
416 Articles Made

The statistics are impressive, but they do not show the girls and boys ten years of age running tractors; they do not show the girls in the Red Cross course being trained for home nursing in case of such a thing as an influenza epidemic; they do not show the part these 4-H members took in bond drives and salvage campaigns. However, they do show the 4-H Clubs as an economic factor in Colorado's contemporary life and a guiding force in the future.

1. Compiled by Audrey Sandstead.
Chapter XXXVI

1917 - Extension specialist in agronomy. Extension schools; soils, water, root growths.

1920 - Corn and wheat improvement projects; Spray wheat introduction and universally used until 1945.

1921 - Pasture crop work. Certified seed corn advocated.

1922 - 1928

County agents helped with farm records. Boys and girls farm management clubs formed. Extension schools in farm management and farm demonstrations.

Almost all extension schools stressed crop work. Extension held men of dept. of ag. for extension work.

1929 - 1932

Farm business analysis and farmer's needs in specific areas. Agriculture improvement program. More record keeping accounts information.

1930 - Four extension economists - Four regions.

1933 - 1940

Continued emphasis on better seed, improved varieties of crops, crop rotation, better cultural practices, adapting crops to local climatic conditions and altitude.

1941 - 1946

War emphasized need of increased production in spite of labor shortages. Need for co-operation with seed certification program and with farm labor program. Increased use of hybrid corn. Re-seeding of abandoned crop and range land to build up range especially where range had been damaged by drought by blizzards. Increased use of commercial fertilizers. Expansion of potato seed production, partly due to government support prices. Increased seed control program, used both chemical and cultural methods. Co-operation with grain trade to induce farmers to plant varieties of wheat which will produce best flour. Increased-scale forcing newتصميم of hybrid seed, increased mechanization.

1944 - Large increase in Sudan grass seed production because of government support for seed-lake production.

1945 - Government support lowered, production decreased. Goal - to have enough seed certified to plant one-fourth total acreage so that farmers can get certified seed every 4 years.
1920 - Agronomy program emphasized crop rotation and livestock to solve problems of soil fertility and of earning a living.
1915 - 1921

1916 - Dept. of Animal Husbandry and Ext. specialist worked on dairying, selection and breeding of livestock, better care and feeding.

1917 - A campaign for more and better livestock on Colorado farms.

1918 - 1928

Irrigated pastures, economical feeds, draft-horse production, cost studies. Importance of purebred beef and dairy cattle, hogs and sheep stressed. 4-H Club work became important part of livestock program.

1929

Irrigated pastures demonstrated Morton's pasture grass mixture. Used by farmers in irrigated areas. Dry land pastures of Petkus rye urged.

Cattle, hog, lamb feeding demonstrations in many sections of state. Turfitter, 4-H Pig Club contests. Hog raising in eastern Colorado emphasized.

1924 - Emphasis on livestock marketing.

1917-1933 - Animal diseases.

1929 - Specialist in dairy improvement employed. Emphasis on cow-testing samples, particularly with purebred cattles breeders eager.

1939 - A program for each section of the State supplied to stockmen in circular form. Set a goal in providing better income from livestock. During drought years, drought-resistant crops and balanced rations stressed. 4-H Club work stressed.

1933 - 1940

1933 - Extension assisted in educational work leading to milk marketing agreements. During drought years emphasis on drought-resistant crops, balanced rations. 4-H dairy club work stressed.

Federal programs intended to lead to more efficient livestock production.

1941 - 1946

Improvement of cattle on range. Better sires and culling of breeding stock. Emphasis in work with sheep much the same as with cattle. In addition, tried to persuade sheep men to breed animals that were good for both food and wool. Draft horses decreasing in number. Revival by use of horses for pleasure. Shortage of protein supplement a problem in feeding.
1922 - 1928
1923 - Extension co-operated with C & S & Burlington Railways in reaching farmers by use of the Purebred Sires Special. A train of 12 cars, 17 days, 29 stops. At each stop, demonstration of the advantages of purebred over common stock was given. Purebred and Shorthorn bulls were traded for scrubs, and purebred heifers for scrubs. Total attendance 25,645. Better Farming Special operated by Union Pacific. Extension stressed diversified farming, better types of livestock, crops adapted to areas, total attendance 6,800.

1924 - Extension, Rio Grande Railroad, Denver Chamber of Commerce, State Director of Marketing & State Horticulturist co-operated on a train demonstrating apple grading.

1925 - Great Western Sugar Co. V.P., C.H. S., and Burlington Railroads and Extension co-operated in an educational campaign to increase beet yields. Campaign repeated in 1926. Beet yield in 1926 greatest in Colo. up to that date.

1927 - Extension, Nebraska Ag. College, Burlington Railroads and other institutions co-operated on a better-wheat train. Colorado men advocated use of standard varieties of seed, particularly Kenred and treatment of all seed wheat with copper carbonate. C.H. S. and Burlington Railroads operated a poultry demonstration train. 10,000 attended the meetings. The A.P.H.S. Railroad operated a train demonstrating crop rotation, sugar beets and livestock feeding. Other trains followed these.
In addition to work listed under other headings, extension organized county and community seed and feed loan committees in 33 counties; through these about one million dollars from federal funds were made available to farmers not otherwise able to finance their work.

Extension organized drought-striken counties to ascertain needs and distribute relief, assembled contributions, etc.; worked with State Relief and Red Cross.

Food and feed preservation and conservation emphasized; gardens, eliminate waste, drying and canning, trench silos.

Financial conditions meant reduction of county workers from 46 in 1930 to 30 in 1933.
1915 - 1921

Ento-
Dept. of Entomology, Federal Reserve Bank and Agricultural Research. An entomology worker appointed to work on grasshopper control.

Farr, E. J. Morrill, Head of Dept. of Entomology and State Forester of the University of Colorado. Forestry and State Forester shipped trees to farmers in eastern Colorado.

1922 - 1925

Work conducted as in earlier period.

1925 - Tried to develop AUD interest in trees but no extension could then distribute trees. Extension Forester, Nov. 1, 1925, Oct. 31, 1926, and from March 16, 1926 to Nov. 30, 1928. Tree distribution continued to be the first interest of farmers in forestry.

1929 - 1932

Farr
Forestry
1931-37, R. E. Ford part-time teacher and part-time Forester; full-time Extension Forester in 1937-39. Fire control work on privately owned land. AUD helped with grazing, cover and fire; for wild life. Better conservation. Forest protection of livestock. AUD helped with Clark National Forest Act 25 to 50 trees donated each spring to 4-H club members, protective planting and home beautification.

1939-45, R. E. Ford part-time Extension and part-time Experiment Station; after July 1, 1945 Full-time Extension. Fire control work on range and farm fires. Timber management harvesting. Christmas trees, etc. Survey to determine market trees or wood products used in the State, shipped in. Effort to get market and grow wood products in the State together. 1940 - Full Time Extension Forester. 1940 - State Land Board acting as State Board of Forestry took over tree distribution.

Increased food production to meet war needs, with each boy and many girls having a garden. Food preservation for girls. Special war activities for girls. Red Cross and home centers, home nursing training. Helped with victory 4-H, crop and rubber drives. Increased rabbit production. Clothing projects stressed remodelling and use of other materials, flour sacks, etc. Community recreational activities for all, especially the home extension. Donated livestock for drive. Girls and Boys Clubs took places of older boys in service doing farm work.

1946 - 1947

Treatment of cattle for cattle grub control, 5,000 head in 1942-43; 56,973 in 1946-47. Extensions established in 1947-48. New discoveries in insecticides and fertilizers, such as D.D.T., partially invalidated much of former work done by college.

Farr
Forestry
1940 - Enroll ment - 14,972 and 1,414 volunteer adult leaders were assisting.

4-H Clubs
1915 - 1921 1922 - 1928 1929 - 1932

Duties to include assistance with 4-H Clubs.
1927 - Club pledge adopted.
1915 - 1921

Relief

1922 - 1928

1929 - 1932

1933 - 1940

1941 - 1946

1932 - Because 25,000 people in Eastern Colorado were destitute, Extension Service co-operated with State and County and the Red Cross to gather and distribute seeds, food, feed for livestock.

1973 - Colo. Relief Committee provided seed for subsistence gardens and Extension supervised all details of the garden project, the Extension Horticulturist, Mr. Case being in charge.

1974 - Working with the Federal Emergency Relief Administration and State Relief Committee, the Extension Service provided information on garden and food crops, canning, storing, etc. Co-operated with the various federal agencies up to and including Farm Security administration.

1974 - Because of drought conditions Government bought sheep, cattle and some goats. Kept stock from starving. Again county agents, with Bureau of Animal Industry and Federal relief agencies co-operating, did the educational and administrative work.

1974 - Extension men co-operated with farm-credit agencies to farm people concerning financial aid available. In connection with the Winona Production Credit Corporation, eight credit associations were formed in Colorado. Debt-adjustment committee obtained $127,000 for farm debts.

1. Howard W. Finch, "Anneny of Annual Summary of State Extension Service, 1921, p. 72"
AAA Petty. In all AAA work Extension Service Staff, particularly county agents, rearranged their di- 
weights, schedules and gave long hours to edu-

Cereal 1931 - 1934. Education and Extension 

Corn- 1935 - Extension work on corn project, 10th Extension 

Hogs 1936 - Extension work on corn project, 11th Extension 

Sugar 1937 - Extension work on corn project, 12th Extension 

Marketing 1938 - Extension work on corn project, 13th Extension 

Peaches 1939 - Peach marketing program held prices uniform for producers and predicted orderly 

Mechanization, Sickness and Death 1940 - Peach marketing program held prices uniform for producers and predicted orderly 

J. H. McCollam, "Almanac of Federal Farm Programs in Colorado," Extension Service, 

Colorado State College, p. 6.
Cauliflower, potatoes and peas and other crops.

1915 - 1921

1922 - 1928

1929 - 1932

1933 - 1940

Cauliflower, 1935 - An agreement concerning marketing of cauliflower and peas in effect, and several other agreements proposed. 1935-36 Educational and organization work on marketing potatoes. 1937 - Program operated with a purchase program under Federal Surplus Commodity Corporation and a diversion program to direct low-grade potatoes to livestock feed. 1936 - January 6, AAA declared unconstitutional. Extension assisted in completing contracts and in liquidating program.

Wind Erosion Control

Agricultural Conservation

Rural Electrification

Ag. Adjustment Act of 1938

Federal Farm Programs (Depression)
Continued conservation programs, provided for removal of ag. surplus, and for special commodity programs and shear crop insurance. Extension Service in charge of necessary educational background for farmers and business men.
War conditions increased farm labor difficulties, production goals, shortage of farm machinery. Purpose of Emergency Farm Labor program was to supply farm labor which farmers could not themselves supply. State staff & district supervisors, and county agents, aided by field and office assistants, were the labor recruiters. Labor force included men, women and youth from the communities, Mexican Nationals, German and Italian prisoners of war, some Jamaicans.

1925 - Recruited 45,532 individuals for farm work. Recruiting done through contacts with clubs, FFA, Extension Clubs, colleges and high schools. Good cooperation with these groups. Advertisements in newspapers sponsored by business firms. Radio talks. Home Demonstration agents assisted in showing farm women how to work more efficiently in the house and in the fields, in making county surveys, in giving news articles and radio talks, in promoting a safety program, in health protection work, by working themselves in harvesting crops, driving tractors and sorting potatoes during their vacations. Work done outside the home by women included care and harvesting of farm crops, work with poultry and farm animals, gardening, driving school buses, irrigating, marketing, Red Cross work, hospital work, housework and care of children in the other homes so farm women could work outside.
1915 - 1921

First women extension workers appointed. 1915 - Improvements of farm school curricula. World War I temporary and part time home demonstration agents in a few counties. Instruction staff grew much time to extension efforts. 1916 - "Sirian Haynes, state home and food leader. 1920 - Women's work in 15 counties but only two M.D.A.'s. During World War I emphasis on gardens, canning, food substitutes. Later - nutrition, food selection, children's health stressed. In clothing, emphasis on re-modeling. 1919 - In home management, much time given to advocating water in the home. Built lack of water and iceless refrigerators much discussed.

1929 - First specialist in home management; some work done earlier by specialists and state leader of home demonstration agents. Much emphasis in this period on running water, water washing machines, hot water attachments, bathrooms - in a word, emphasis on labor saving devices in the home woman's workshop. This meant better standing of living. 1930 - Three economic sections stressed ways and means of raising and preserving of food. M.D.A.'s conducted survey of winter foods. Fast emergency and relief work took time of women workers. 1933 - Emphasis in clothing on speed up your swing, patterned to fit your moneys worth, dressmaking in silk and wool, with the dought same great emphasis on remodeling, repair.

1934 - Scheme of county organization clothing book completed. Extension and dept. of economics and sociology made surveys which became the foundation of programs. 1934 - Dairy products for health program stressed. Live-at-home project difficult to carry out because drought made the preservation of home-raised food impossible when little food was raised. Nutritional projects in child development and parent education were initiated in 1936. As a result of this work health conditions were improved; family friction decreased; there was a marked interest in character building and in spiritual values and in home as a cultural center. 1936 - In 51 counties, programs continued. M.D.A. healthful food selection and encouraged use of Colorado grown foods. 1938 - Dairy program resulted in an estimated increase of 20% in Denver and 10% in Colorado. Home management in 1935 stressed thrift practices such as home canning, and stop and back-saving devices. Beautification of ground and room by room making education a popular home activity.

1935 - 1940

1935 - 1940

World War II meant clothing shortages. Program to help this included: Care and repair; restyling and remodeling, clothing extension work completed in 1940. Work quality of ready made garments resulted in increased interest in home sewing. Machine clinics. Do-it-yourself clothing.

1942 - 1946

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1915 - 1921

State Horticulturist, Experiment Station and county agents co-operated on problems.

1922 - 1928

Work carried on as from 1915 - 1921.

1929 - 1932

First Extension horticulture. Extension project was tree beautification. Vegetable crops: improve quality, reduce costs. Burning taught assisted State and Federal relief agencies. Emphasis on substitutes gardens not on important educational work on marketing and distribution. In all works in horticulture, Extension men stressed use of improved varieties, the use of many crops rather than one, improved production and marketed methods.

1933 - 1940

Horticulture
Potato seed certification and potato-improvement program.
1935 - Market agreements under AAA. These became important in horticulture in State.

1941 - 1946

Demand for certified seed potatoes to plant increased acreage. Supply short of this demand; resulted in War Approved Seed. Experimental farms at Monte Vista and Fort Lewis and U.S.D.A. farm near Greeley made variety tests and assisted in disease control. Agents of railroads co-operated. County agents assisted growers with materials, up-to-date methods and sources of certified seed. Potato specialist used index plots in California in addition to growing potatoes in greenhouses in Colorado. 1944-1945 (2 winters) grew potatoes in 5 or 6 acre index plot at Oceanside, California. 1945 Co-operated with ten other northeastern states in adopting standardization of tags and disease tolerances. 1945 - National Certification meeting - Chicago discussed national co-operation in use of standard tags, recommendations for insect control, improvement program in San Juan basin. Increase in production of truck crops - tomatoes, green peas, snap beans, carrots, onions - partly due to government support price, but had been increasing 1938-42.
1944 - Colo. Horticultural & Forestry associations started the Green Thumb. 1945 - Many inquiries from out-of-state food processors interested in locating plants for canning, drying, and freezing fruits and vegetables and in juice extraction.

Trend toward organization of growers groups - Western Colorado Horticultural Association included growers and business men who worked with Colorado A. & H. in making recommendations early for needs in insect and disease control. Flower growers association (~ $9,000,000 business) listed 25 problems and asked aid from Colorado A. & H. College agreed to try to help with 3. Increase in home gardening from 69,543 in 1942 to 110,672 in 1943, 1946 - Trend from home gardening to home beautification.

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Description</th>
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<tbody>
<tr>
<td>1915 - 1921</td>
<td>One and two-day meeting called institutes; a meeting of 3 days or more was a school. No reports or minutes were kept. Information could be given in the longer period schools were encouraged. In 1916 - 25,148 attended Extension Institutes and schools. In 1918 - 37 schools with an average enrollment of 25 were held. Small attendance due to bad weather, impassable roads and poor advertising. Work in each subject was planned for a three-year course. In 1920 - 43 schools emphasized such subjects as: farm crops, livestock feeding, livestock disease control, home nursing, foods, etc. Agronomy handled irrigation until 1927. Program consisted of educational meetings of farmers' institutes, etc.</td>
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<tr>
<td>1922 - 1928</td>
<td>Beginning in 1922 schools and institutes less stressed.</td>
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<tr>
<td>1929 - 1932</td>
<td>Institutes as a state project not conducted but many county agents produced similar meetings in the counties.</td>
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<tr>
<td>1933 - 1940</td>
<td>In Weld and some other counties institutes still held. 1936 - No institutes held then at any other time for ten years. 1939 - 10 institutes in various counties. 1939 - Extension cooperated with National Recreation Association in six recreation schools.</td>
</tr>
<tr>
<td>1941 - 1946</td>
<td>Increased emphasis on efficient use of water. Training of farmers in methods necessary to determining their own particular, peculiar needs, taking into consideration type of soil, kind of crops, climatic conditions.</td>
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1913 - 1932

Legislatiure authorized State board of Agriculture to do investigation work in marketing, and for this, the Experiment Station contributed funds.

Extension agent in marketing employed, headquarters in Fort Collins. Assisted in organizing, and supervising, agricultural marketing organizations, published market conditions and trends. The specialist in marketing resigned in 1928 when replaced by a farm management demonstrator. He initiated a program to produce crops for specific markets 1929 - 1932. By arrangement with Bureau of Economics, a news service to Denver supplied fruits, vegetable, and livestock news by radio, mail, telegraph, and newspaper. Radio market reports received and distributed on a twice weekly basis. Very active in developing marketing agreements for potato growers and filling market needs for these products. Continued in 1932.

County Farm Bureaus first organized for Extension work in 1917. Twenty coun-
ties had organized farm bureaus. The purpose of County Farm Bureaus was to enable County agents to reach larger numbers of farmers. In 1920 - Extension work was carried on with farm organizations in addition to Farm Bureaus.

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1. All material on organization by Howard D. Pitch "Organization for Program Determination".
1913 - 1921
Botany Department and extension services worked together on disease control program during World War I. scout control demonstrations; college departments worked on plant disease problems.

1917 - U.S.D.A. appointed poultry specialist for Utah and Colorado. At this time few hens in Colo. 1918 - Program: more and better flocks, care, housing, feeding, preserving eggs for winter use, boys' and girls' poultry clubs. Because weather, bran, short, etc were scarce or high prices, feeding balanced rations was difficult. 1920 - First Colorado poultry specialist. As part of Home Economics program, worked with boys' and girls' clubs. 17 counties participated in culling, poultry records, building approved houses. 1921 - Program more definite. Demonstrations farm, poultry-culling and schools, better housing, boys' and girls' clubs.

1922 - 1929
Work continued as in earlier years.

1929 - 1932
Work continued as in earlier years.

1933 - 1940
Poultry raising an important industry in Colo. Extension program much expanded. Work on breeds, housing, etc.

1936 - Extension project inaugurated. New and old crops, and great variety of climates and other conditions meant many plant diseases. Stressed value of disease-resistant varieties, fungicidal sprays, proper cultural practices, control methods. Much emphasis on diseases of wheat, corn, sorghum, and other grains, peas, beans, sugar beets, vegetables and potatoes.

1935 - National Poultry Improvement Plan; better breeds, careful culling, housing, feeding, etc.

1941 - 1946
Web food shortages stressed need for increasing production of eggs and poultry meat. Included better housing, feeding, culling, management and disease control. Economized storage of surplus for use after production lull. 1945 - 60 hatcheries with egg capacity of 200,000,000 by 1946 operated under National Poultry Improvement Plan. Pullorum control laws. During war, government supported egg prices. Egg drying plant in Denver, capacity of 3600 cases daily, dried eggs for Holland.

1946 - Government program specified 10% reduction in number of eggs and 15% reduction of laying flocks.

1946. Nov. - Promotion of work with young people between 14-21 clubs and older adult clubs. Work done through existing groups and is based on their interests and needs. Started in three counties - El Paso, Kit Carson, Jefferson. Types of projects: Keeping records, feeding projects, rural electrification, public health, recreation. 1945 - Purpose to train leaders in the counties to conduct recreation in local groups. Started work in 6 counties - Logan, Washington, Kit Carson, Larimer, Jefferson, Boulder.

1946 - First Rural Drama Festival in the State. County plays given in home county contests. County groups in festival at college.
1915 - 1921
See under Agronomy for this period.

1922 - 1928
1924 - Ext. Agronomy program included soil testing, fertilizer demonstrations, crop rotations.
1925 - Range management and alfalfa production. Labor, sweet clover and a green manure crop, crop rotation, moisture, conservation, soil blowing, and drainage.

1929 - 1932
1932 - Transferred to U.S.D.A. under Public Law 46 as the Soil Conservation Service.
1936 - Extension soil conservationist and associate employed. 1937 - State Soil Conservation District Law.

1933 - 1940
...

1941 - 1946
Stress on food production meant disregard of soil conservation practices. Land which had been restored after drought years again plowed up and put to crop production. Better moisture conditions mitigated evils of this. Late 1944 - end of war in sight, revival of soil conservation activities.
1945 - 36 districts in Colorado included in soil conservation. 16,863,127 acres in 16,385 farms.
1946 - Objectives, to build us land severely strained by war production, to let it rest.

Objectives during war periods:
- Vaccination for hog cholera.
- Get rid of hog cholera, special work on sleeping sickness.
- Control mastitis in dairy cows.
- Control diphtheria in swine caused by toxic foodstuffs used to control Bang's disease.
- Reduce poisonous plants in pastures.
- Provide complete food ration, hygiene, sanitation.
- Live control program.

Main purpose during war:
- To increase hog production, milk production and leather production.

Veterinary Medicine
- Work in animal diseases under Dept. of Animal Husbandry and Dept. of Veterinary Medicine.
- Program in connection with bovine tuberculosis, Bang's disease, etc.
- As in previous period but 1926-1927 veterinarian employed for special work.

Veterinarian appointed:
- 1933 - Dr. E. H. Stout appointed Extension Veterinarian. His activities were chiefly education.
- 1934 - Extension Veterinary in connection with bovine tuberculosis, Bang's disease control. Stock losses from poisonous foodstuffs served to control Bang's disease.
- Special work on sleeping sickness in horses, hog cholera, etc.
Advisory committee on food production and conservation formed at the College. This consisted of heads of agricultural departments and Director of Extension. 20,000 copies of a bulletin, "We are Facing a Food Shortage," mailed.

At the beginning of 1917 there were 12 county agents in the State, four men from campus assigned as district agents to assist in Extension war-emergency program. Local councils of defense assisted these men and the county agents in urging increased food production.

Increases first year were: spring wheat, 444,452 bu.; oats 29,430 bu.; corn 126,900 bu.; etc. Barley, sugar beets, potatoes and beans, especially cattle, hogs, and sheep showed good increases for the period.

Extension men helped work out a labor-exchange program which alleviated a labor shortage. However, the labor exchange did not overcome a manpower shortage and transportation difficulties in San Luis Valley, and a campaign to teach proper storage of potatoes saved hundreds of carloads. 1917 - Crop diseases and pests demanded much attention. Thousands of acres of alfalfa were destroyed; 1,200 acres of potatoes were treated, etc. By end of 1917, 24 county agents in State. 4-H work greatly increased; livestock clubs but especially garden and canning clubs. Botany Departments and Extension co-operated on a seed program.

Extension and U.S.D.A. co-operated in securing national recognition of pinto beans, which had been locally used, as a food.

1917-1918 - Women of Instruction and Extension staffs met the demand for help in problems of clothing, canning, preserving, dietetics. Preparation of food, food values and substitutes stressed.
In a schools and many two-day institutes demonstrations were given on breadmaking, sugar saving, crafting and altering patterns, etc. Three urban centers of home demonstration work established: Denver, Oct. 1917; Pueblo, Nov. 1917; Colo. Springs, Apr. 1918. President Wilson appointed Miss Allison, Head of Home Economics work on the campus, to be in charge of these. Kirwin Haynes took over supervision of this work and also the county work in July 1918. Home Conservation included: increased vegetables and poultry production, drying of vegetables - 18,213 pounds dried; child welfare work - 14,500 babies weighed and measured, milk distributed to under-nourished children, etc., etc. During influenza epidemic home demonstration agents worked in hospitals and diet kitchens. In Pueblo Emergency Hospital nurses and took charge of serving 1200 meals; set up an emergency kitchen in the high school.

In Denver and Colo. Springs the work was much the same as in Pueblo.
THE EXTENSION SERVICE

Chapter XXXVII

The Extension Service and World War II
In 1945 the executive structure of the Extension Service under F. A. Anderson, Director, was as follows: The supervising officers were James E. Morrison, Assistant Director; Cecil Staver, 4-H Club Agent; Helen Prout, State Home agent; A. J. Hamman in charge of the Farm Labor Program; and Messrs. H. D. Finch and T. G. Stewart, assistant State Supervisors.

The organization in which the director and his assistant, the men and women specialists, the county and home demonstration agents, and rural men and women were united in World War II had developed slowly but was perfected during the war years. The chart (pages ) indicates the phases of growth. Keeping trained men and women on the staff, devoting and strengthening rural units, and the gearing of these rural units and the staff together to function as a smoothly running whole was the task assigned during the war to Mr. Morrison with Mr. Stewart as assistant.

The County Agricultural Planning Committee was made up of representatives of the County Agricultural Council, the Home Demonstration Council, and the 4-H Council. The counties were grouped into eight districts, and the district planning groups consisted of one man, one woman and one 4-H member from each county planning group in the district.

Typical of the work of a district planning group are the recommendations made by the home demonstration members at a meeting in Steamboat Springs March 27, 1944.

1. Provide modern conveniences in farm homes through R. E. A. making it attractive for the young people who are coming home from the war.
2. Co-operate with and boost 4-H Councils.

3. Organize county health clinics—pre-school as well as school children.

4. Organize a state school lunch program which is suitable to our small rural schools, rather than the present set-up which is only beneficial to a school with attendance of 25 or more.

5. We recommend that rural schools with small enrollment be consolidated in order to make it possible to hire better teachers and make for better schools for our children. This will probably also involve school taxation.

We further recommend that something be done to improve county roads to make this consolidation possible.1

Typical of the work of the State Agricultural Planning Committee and an illustration of the way in which the group considers rural needs are extracts from the program for the Annual Meeting of the State Agricultural Planning Committee, February, 23, 24, and 25, 1944.

February 22, 1944

10:00 A.M. Meeting of State Agricultural Planning Committee
1:30 P.M. State Agricultural Planning Committee (continued)
7:30 P.M. Group Meetings.

A. Joint meeting of State Agricultural Planning Committee and representatives of County Agricultural Planning Committees.
B. Representatives of County Home Demonstration.
C. Representatives of County 4-H Club Councils
D. State Association of County Extension Agents.
E. State Association of County Home Demonstration Agents.
F. Members of State Staff of Extension Service.

February 24, 1944

MOBILIZATION OF LAND AND LABOR RESOURCES FOR MAXIMUM FOOD PRODUCTION AND CONSERVATION.

Ruth McCammon, Homestead Home Agents
Gen. Ag. Agent Chicago and North
1:30 - 1:50 P.M. The 1944 Farm Labor Program

2:40 - 3:00 P.M. Leadership Training.

3:00 - 5:00 P.M. Panel Discussion

February 25, 1944

7:00 - 10:00 A.M. Sectional Meetings.

POST WAR PLANNING FOR AGRICULTURE

7:00 - 10:20 A.M. State Post War Agricultural Committee.

Homer J. Henney, Dean of Agriculture and Director of Experiment Station, Colorado State College, Chairman.

Dr. E. Roy Nelson, Director Colorado State Planning Commission.

J.E. Morrison, Assistant Director, Colorado Extension Service.


Dr. Edmund deS. Brunner.

8:40 - 11:00 A.M. State and County Agricultural Planning Committees.

11:00 - 11:20 A.M. Soil Conservation Districts.

11:20 - 12:00 Necessity for Local Responsibility and Organization for Current and Post War Planning.
In addition to these organizations Mr. Morrison, carrying out a Federal request, developed during the war an organization of neighborhood leaders to receive and send out information essential to defense. These "minute men" were chosen in Colorado County and Community Agricultural Planning groups.

Larimer County during one bond drive may serve as an example of the way in which the neighborhood leader system functioned. One Friday night it was decided that on Monday night all the neighborhood leaders should meet for a dinner in Fort Collins and there receive instructions for the drive. The county agent called two men; each of these called a few others, and each of these passed the word along to certain men. Within two hours all had been notified and on Monday 138 out of 142 reported for the dinner.

At Kremmling County Agent Homer McCullah asked women's club members to serve as party leaders. In Mr. McCullah's territory seven streams which empty into the Colorado River divide the country into seven mountain valleys. In each valley there was a party telephone line, and in 30 minutes, by using these lines, the neighborhood leaders could pass information along to every person in Grand and Summit Counties.

James E. Morrison. - The plans for State-wide services which James E. Morrison, Assistant Director, makes annually are carried out through these agricultural planning committees, the men specialists, the county agents, and others. In outline and generalized form, Mr. Morrison's plans show the far-flung and deep-going services which Extension men render to Colorado. Selections from his plan made in 1945 for the year 1946 follow:
The index of the plan includes such topics as: organization, crops, and control and eradication, horticulture, soils, pests, animal husbandry, dairying, veterinary medicine, child development and parent education, and so on the the number of 23.

The subtopics listed under these main topics show the multitude of contacts of the Extension Service with rural men and women. An example follows:

II. Project: Crops
   Sub-project A. Corn
      Phases 1. Variety and yield trials.
      2. Seed supply and registration.
      3. Cultural methods and labor-saving practice.
      4. Crop sequence, rotation, fertilizer, and fertility.
      5. 4-H Clubs.
      6. Uses including pasture and harvesting with livestock.

Mr. Morrison outlines similar sub-projects for: barley, oats, wheat, grain sorghums, forage sorghums including sudan; millets, sugar beets, alfalfa, red clover, field peas, bield beans, alsike clover, ladino clover, strawberry clover, and grasses.

Another typical part of the plan which reveals another type of service which Mr. Morrison gears into the agriculture of Colorado is represented by:

VIII. Project: Pests
   Sub-project A. Insect Control
      Phases 1. Grasshoppers.
      2. Cutworms.
      3. Forage insects.
      5. Horticultural crop insects.
      7. Control of flies, fleas, bed bugs, cloth moths.
      8. Control of livestock pests that control meat, milk and leather production.
Through the men specialists, these plans now reach rural men and women as services.

The war ended, other States found themselves with muddled or no rural organization and they envied Colorado as she shifted gears to peace operations and proceeded smoothly on her way.

Many of the services which the rural organization had performed so satisfactorily under the stress of war were continued with some changes in emphasis when peace returned. Other problems which the existing committees could and did handle were: surveys of farming opportunities and of rural housing, the local phases of reactivating the rural electrification program, recommendations and plans for health, libraries, roads, taxes and schools.
The Men Specialists
and Men on the Farms

But summarizing the work of the Extension Service from 1915 to 1941 in the chart is somewhat like taking food in pellets instead of in normal meals. The chart presents fairly complete, though condensed, information, and the pellets may offer adequate though condensed nourishment; but the chart conceals the way in which Extension personnel work with rural men and women, and food in pellets lacks the richness and variety of meals.

Though, because there were twelve men and five women Extension specialists in 1945, space limitations permit only a photo-flash glimpse of each person at work, these glimpses present the many-faceted contacts of the Extension Service with the people of the State. For these flashes we turn to the period of World War II. In these years most of the Extension men and women, with emphasis shifted here and there, followed their regular lines of work, the labor program being the important new phase of Extension activities.

Agronomy. — Agronomists Rodney Tucker and Claude Gausman during the war years preached and demonstrated certified seed and hybrid corn and saw the corn production on irrigated land in Colorado increase eight bushels per acre in the years 1940 to 1945; they have shown farmers that some high-producing varieties of wheat do not make good flour, and, since wheat is still the biggest money crop in Colorado, the agronomists have persuaded the growers to co-operate with the grain trade in varieties which are good for flour.

Tied up with the all-time-high demand for food during the war was increased emphasis on weed control; and agronomists, horticulturists, and the seed laboratory co-operated in testing seeds taken from drills at planting time and showed, as Anna Maude Lute had showed
years earlier, the percentage of weeds farmers were planting. The goal in the seed program is to have enough certified seed so that one-fourth of total acreage of the State can be planted each year with certified seed, or every four years a farmer can get all certified seed. The program has convinced farmers that

Crops, not weeds
Grow from certified seeds.

During World War I the College was the activating agency in demonstrating the value of pinto beans as food. Because during World War II Messrs. Tucker and Gausman carried to the farmers of Colorado the news that the Russians and the Chinese wanted the spotted beans on a Lend-Lease basis, the farmers responded with bumper crops.

Certified Potatoes. So convinced are farmers of the value of certified potato seed that testing of index potatoes has been a practice in Colorado since 1939. In order to test more potatoes between growing seasons than could be tested in greenhouses, in the winter of 1944-1945 Colorado and five other States grew the tubers at Oceanside, California. The following winter Colorado and nine other States tested potatoes at Oceanside, as elsewhere in handling index potatoes Mr. Gordon Poe in charge of the six-acre plot for Colorado, knew that each piece planted was numbered to correspond with the number of a certain hill in a certain field on a certain farm. This field then represented the foundation and certified seed stock to be used for re-certification all over Colorado.

Another of Mr. Poe's lines of work is the co-operating with regional and national groups on standardization of tags and disease
tolerance, insect control, etc.

Another interesting phase of the potato program of World War II was the work in the San Juan Basin. Here the experimental station at Fort Lewis, the work being under Dwight Koonce, with the growers in improvement of the tubers. Mr. Koonce indexed the potatoes in the greenhouse and grew them as foundation stock. This foundation stock as certified seed potatoes was released to the growers.

Mr. Harry Copson, a farmer and potato grower, was the Extension man with headquarters in the county agent's office in Durango to work on the inspection and the improvement of all potatoes in the Basin.

**Horticulture & Entomology.** Closely related to other work in the general field of agriculture is the work in horticulture and entomology. C. M. Drage in charge of this work saw victory gardens increase in Colorado from 62,243 in 1942 to 140,672 in 1945. So successful was Mr. Drage in encouraging victory gardeners and in helping them secure results that he was lent to the Federal Extension Service from March 1 to July 1, 1946 to serve as organizer and co-ordinator of garden programs in the eleven western States.

To Mr. Drage one of the marks of the end of the war was the number of requests that flooded in to him on decorative plantings and home beautification in general. In periods of war or depression men and women stress the strictly utilitarian; but, the emergency ended, they turn to making the home beautiful and life rich in both tangible and intangible values.
In entomology and veterinary medicine one of the important accomplishments of the Years of World War II was the treatment of cattle for grubs.

<table>
<thead>
<tr>
<th>Date</th>
<th>No. of head treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1942 - 1943</td>
<td>5,000</td>
</tr>
<tr>
<td>1943 - 1944</td>
<td>19,475</td>
</tr>
<tr>
<td>1944 - 1945</td>
<td>56,973</td>
</tr>
<tr>
<td>1945 - 1946</td>
<td>153,685 (estimated)</td>
</tr>
</tbody>
</table>

This program increased the supply of leather, meat and milk. In addition, because feeding of productive cattle meant increased supply of leather, meat and milk, the eradication of the grubs conserved feed.

Growers Organizations and the College. For many years growers and processors in Colorado have made a practice of asking the Agricultural Experiment Station to help solve their problems. During World War II, instead of requesting that research work be done on any and all difficulties, organizations of producers and processors, or committees representing these organizations met with representatives of the Extension Service and of the Station, selected a few of their most urgent questions and asked for help during a certain year on these problems and on these only.

The number of organizations following this plan of working with Extension and with the Station is increasing, and new organizations are coming into being. For example, the Western Colorado Horticultural Society, which began when a small group of business men and orchardists met with Sam McCampbell, Extension Horticulturist in 1942, on January 7, 1946 held a meeting with 300
to a 1,000 members present. At this meeting growers and business
men discussed their difficulties with C. M. Drage of the Extension
Service and with Experiment Station men and deciding which were the
most urgent problems, agreed that for 1946 they would not request
help on other needs.

A group similar to the Western Colorado Horticultural Soci-
ety was organized in Fremont County, January 28 and 29, 1946. As on
the Western Slope, the Fremont County men discussed their needs with
Extension and Station representatives and measured their requests by
the time, money and agreed to ask for help on only certain ones dur-
ing 1946.

Flower and cherry growers, canners and others are adopting
this system of determining the number of problems they will present
to the Station for investigation in any one year.

The amount of money available for research in agriculture
is always limited in Colorado, only .035% of the agricultural income
going into this work. Limited funds restrict the number of men who
can be employed and necessarily the research work that can be done.

Plant Pathology. W. J. Henderson, Extension Plant Patholo-
gist, describes his work as, "---keeping abreast of the cause,
symptoms and control of crop plant diseases." In doing this, he
passes on disease control methods "to the farmers, truck gardeners,
orchardists and greenhousemen in the State."1

In the late thirties, for example, covered kernel smut
meant losses of forty to fifty per cent of all the grain sorghums

grown in Colorado. Mr. Henderson, working through county agents, county leaders and others, stressed treatment methods until now there is scarcely a head of smutted sorghum in the State.

During the War, orchardists on the Western Slope called for help in fighting powdery mildew on apples. The apple crop in Colorado amounts to 1,571,000 bushels valued at $1,600,000; 1,125,000 bushels with a value of $1,406,000 come from the Western Slope. Powdery mildew was causing about a thirty per cent loss, and, since something like ninety per cent of the Western Slope apples are grown in Delta County, that county led the call for help.

Mr. Henderson responded, and tested sprays and determined that washable sulphur properly applied eradicated the mildew in a high per cent of cases. This done, Messrs. Henderson, Harry Newton and Dr. George M. List developed a spray program which meant death to both insect pests and powdery mildew.

This spray schedule will be generally adopted in 1946.

Turning his attention to potatoes, tomatoes, and beets, Mr. Henderson showed mosaic on these could be prevented by sanitary measures in handling; he insisted upon disinfecting hot beds; and he and Dr. William Kniptzer, working as all specialists did, with county agents, convinced growers of the efficacy of copper sulphate in the treatment of late blight of potatoes, and convinced them, too, that they must destroy cull piles and must dust vines.

The Extension Service and Experiment Station maintain at the College a laboratory service for diagnosing diseases of plant specimens sent in.
Each year the plant pathological work becomes more demanding and Mr. Henderson says must necessarily be "more closely co-ordinated with the community leader system for conducting control demonstrations and tests."

Soil Conservation. - For two years of the war period, there was no soil conservationist on the Extension staff, and Messrs. Tucker Guzman and Droge preached care of the soil and watched apprehensively the plowing up of grass land. Creating another dust bowl was far from an impossibility. A part of the care of the soil was the need for fertilizer and the agronomy team of Tucker and Guzman were responsible for urging the use of the best of chemical fertilizers.

However, that the conservation program was well underway before World War II is indicated by the number of conservation districts organized and the acres in these districts in Colorado.

<table>
<thead>
<tr>
<th>Date</th>
<th>No. Districts</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 15, 1940</td>
<td>17</td>
<td>3,822,000</td>
</tr>
<tr>
<td>September 1, 1942</td>
<td>31</td>
<td>8,884,360</td>
</tr>
<tr>
<td>September 1, 1944</td>
<td>47</td>
<td>13,602,463</td>
</tr>
</tbody>
</table>

During the war, this increase in districts was more a growth in organization than in conservation practices, but with the transfer of William F. Droge in 1945 from work as assistant State Supervisor to soil conservation, the program of saving and building the soil was emphasized.

Mr. Droge's definition of soil conservation gives us a glimpse of his program. He says: "Conservation means not only correction of abuses but also making possible maximum production. It included the teaching of the use of soil resources to serve the greatest number of people over the longest period of time."

In his saving and building farm land, Mr. Droge plans to avoid in Americanthe Gobi Desert of China and the desert areas of Palestine—both the result of mining the soil.

2. Ibid., 1941-1942, p. 92.
3. Ibid., 1943-1944, p. 108.
conservation laws so that non-resident operators could be prevented
from creating soil erosion conditions which are injurious to the
long-time value of the land.\footnote{"News Notes", Feb. 14, 1946.}

**Domestic Animals.** With much of the farmer's income and
much of the food of the world dependent upon domestic animals, care
of stock in Colorado is a major factor in the work of the farmer
and of the stockman.

The outline of the duties of Dr. Floyd Cross, Extension
Veterinarian during World War II, included the investigation of
outbreaks of contagious diseases, losses of cattle and sheep, etc.
He attended county planning meetings and there, in order to assist
in the control and prevention of disease, he encouraged the planning
of programs for a year ahead. In these programs he tried to per-
suade men to:

- Vaccinate for hog cholera
- Get rid of lice on cattle
- Control mastitis in dairy cows
- Practice calfhood vaccination for the control of
  Bang's disease
- Handle pastures so as to reduce poisonous plants
- Feed complete rations
- Study hygiene and sanitation.

Mr. Harry H. Smith during the war years stressed, as he
had before this period, the outlining of sheep and cattle and the
use of better sires. In Colorado sheep have been produced chiefly
for food; as Extension Animal Husbandman, Mr. Smith is urging the
raising of types of animals good for both mutton and wool.

Because of the use of trucks and tractors, draft horses
were not during World War II in great demand, but the interest in
riding for pleasure revived considerably.
Dairy. Mr. H. A. Sandhouse, Extension Dairyman, divided his war production work into the two normal phases of feeding a world at war: first - increased production; second - conservation of food resources. In fulfilling these two aims Mr. Sandhouse, working of course with county agents and producers, accomplished the following things:

1. The production of milk in 1942 was 4% greater than in 1941; the increase in the number of cows on farms in Colorado in this year was 1%.

2. In 1942 the Denver and Rio Grande Railroad ran a Food For Freedom Demonstration Train. For this train Mr. Sandhouse prepared an exhibition of two large pictures illustrating the right and wrong methods in producing milk; a large chart showed the food values of milk. An electrical mechanical cow and a small model barn and corrals attracted attention and showed new and improved practices in feeding and management.

3. During World War II the first women supervisors for Dairy Herd Improvement work in Colorado, Martha Allen and Mary Lind, took over essential work of testing cows for production of milk and butter fat.

4. The first Purebred Cattle Association was organized and a meeting held at Fort Collins December 13, 1941. Each of the five dairy breeds, Guernsey, Jersey, Holstein-Friesian, Ayrshire and Brown Swiss selects annually representatives to serve on the executive committee.

5. Two features were added to the State Fair department in 1941 -
   1. Dairy Queens - the Queens are representatives from each breed and are selected on type, lifetime production, and show awards of offspring.
   2. Purebred Cattle Booth - This booth was sponsored by the five dairy breeds.

6. Breed type herd classifications were held for Holstein-Friesian, Jersey and Ayrshires by official classifiers who placed ratings on about 800 individual animals. Classification ratings are used in evaluating animals breed type.

Forty-two County Commodity Dairy Committees were organized to form county production programs and achieve county goals.
The 4-H Dairy Club project was revised from Dairy calf and producing cow projects to five separate projects:
1. Dairy calf, 1st year project
2. Developing dairy heifer, 2nd year project
3. Producing cow, 3rd year project
4. Herd management, 4th year project
5. Dairy products, 5th year project

To help farmers save time, steps and equipment, an educational program on labor saving devices was carried to counties by means of visual aid, circular letters and demonstrations.

Protein feed stretchers were developed to meet a severe shortage of protein supplements needed for increased dairy production.

The National 8-point Dairy Programs, cooperatively sponsored by the Extension Service, The Dairy Industry Committee and the U. S. Department of Agriculture, were adopted as a part of the Colorado dairy production goals program.

Sheep and Wool. In February, 1946, the Extension Service announced the appointment of a new specialist, Gordon C. Winn, Specialist in Sheep and Wool.

During World War II, O. C. Ufford, Poultry Specialist, persuaded Colorado hatcheries to follow the breeding principles of the National Poultry Plan. He was also influential in the educational program which led to the passage in Colorado of the Pullorum Control Act.

Another of his duties was to show farmers how to increase production of eggs and poultry meat.

In urging improved practices in housing, feeding and management, he invaded the chicken yards and made the birds themselves participate in radio programs, or he took an unwilling biddy into a

l. H. A. Sandhouse, "Summary of Dairy Extension Activities 1941-45" (Manuscript)
radio station where her squawks and cackles drew listeners' attention to the practices he advocated.

The conversation between rural women waiting for Mr. Ufford to begin a poultry culling demonstration in a chicken yard, shows the importance they attached during the war to poultry raising.

"I hope we don't have to wait long. I spilled a sack of sulphur on the kitchen floor and just walked off and left it."

"I've got my own family and a carpenter to get dinner for and my beds aren't made."

"I put out feed for the chickens last night, so I wouldn't have to do this morning."

"I left garden things picked that should have been cooked, and you know what that means these days."

"I tore through the dishes, the separator and the beds and left the rest."

Often women with so many duties were, because of the labor shortage, helping in the fields in addition to their indoor work, and yet they attended poultry culling demonstrations.

Agricultural Economics. Extracts from the Plan of Work of Thomas H. Summers, Senior Agricultural Economist, indicate the scope of his work.

Agricultural Economics Extension PLAN OF WORK
for Calendar Year 1945

Major phases of project of subdivisions of project covered Percentage of time devoted to entire project

A. Farm Management
   1. Farm planning and budgeting to meet production goals 15
The Extension Specialists and Rural Men and Women

2. Farm accounts as a basis for planning farming operations 15
3. Enterprise records in relation to costs, and ceilings, support and floor prices 5
4. Farm wage hearings 5
5. Income tax schools 5
6. Landlord-tenant relations 10

B. Agricultural Credit

1. Farm Credit Administration 5
2. Colorado Bankers Association agricultural program 5
3. Postwar credit policies 5
4. War loans 5

C. Agricultural Planning

1. Economic information 5
2. Postwar adjustments and opportunities 5
3. Maximum production studies 5
4. Aid to returning war veterans 10

Another phase of Mr. Summers' work is the sending out of such information as the following:

The 1945 food production goals have been established for Colorado as follows:

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Unit</th>
<th>1945 Goal</th>
<th>Percent 1945 Goal of 1944 Estimated Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>1000 acres</td>
<td>957</td>
<td>100</td>
</tr>
<tr>
<td>Oats</td>
<td>&quot;</td>
<td>220</td>
<td>96</td>
</tr>
<tr>
<td>Barley</td>
<td>&quot;</td>
<td>950</td>
<td>118</td>
</tr>
<tr>
<td>All Sorghums</td>
<td>&quot;</td>
<td>673</td>
<td>99</td>
</tr>
<tr>
<td>Grain Sorghums</td>
<td>&quot;</td>
<td>130</td>
<td>99</td>
</tr>
<tr>
<td>Milk Production</td>
<td>1,000,000 lbs.</td>
<td>1,081</td>
<td>104</td>
</tr>
<tr>
<td>Egg Production</td>
<td>1,000 doz. ⇒</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hens on Farms, Jan.1</td>
<td>1,000 head</td>
<td>3,873</td>
<td>31</td>
</tr>
<tr>
<td>Chickens raised</td>
<td>1,000 head</td>
<td>5,885</td>
<td>102</td>
</tr>
<tr>
<td>Sows to Farrow (spring)</td>
<td>1,000 head</td>
<td>46</td>
<td>100</td>
</tr>
<tr>
<td>Cattle and Calves, Jan.1</td>
<td>1,000 head</td>
<td>3,535</td>
<td>80</td>
</tr>
<tr>
<td>Sheep and Lambs, Jan.1</td>
<td>1,000 head</td>
<td>2,522</td>
<td>97.2</td>
</tr>
</tbody>
</table>

2. Ibid.
Prices received by farmers for their products on March 15, 1945 reached 198 per cent of the 1909-14 average and were 2 points higher than a year earlier. Prices were 114 per cent of parity compared with 115 per cent in 1944. Farm prices compared with parity on that date for 1945 and 1944 were as follows:

<table>
<thead>
<tr>
<th>Commodity</th>
<th>March 15, '45 Farm Prices</th>
<th>March 14, '44 Farm Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in Per Cent of Parity</td>
<td>in Per Cent of Parity</td>
</tr>
<tr>
<td>Apples</td>
<td>153</td>
<td>187</td>
</tr>
<tr>
<td>Potatoes</td>
<td>137</td>
<td>111</td>
</tr>
<tr>
<td>Lambs</td>
<td>136</td>
<td>129</td>
</tr>
<tr>
<td>Beef Cattle</td>
<td>131</td>
<td>129</td>
</tr>
<tr>
<td>Chickens</td>
<td>127</td>
<td>122</td>
</tr>
<tr>
<td>Milk, wholesale</td>
<td>119</td>
<td>121</td>
</tr>
<tr>
<td>Veal Calves</td>
<td>117</td>
<td>116</td>
</tr>
<tr>
<td>Hogs</td>
<td>111</td>
<td>106</td>
</tr>
</tbody>
</table>

When war veterans return and warworkers drift back, problems will arise in the process of providing a place for those who wish to go to farming. From the standpoint of the future demand for food, we must have almost enough farmers now to more than do the job. The 1944 food production was one-third larger than the 1935-39 average and was produced by 10 per cent fewer people on farms. Any guess at the possible future production must also take into account the effect of further mechanization of agricultural production. Two questions need to be answered at the outset. First, how many men are coming to agriculture after the war and second, how many places are there for purchase, rent or even that have jobs for these men. Knowing the demand and the supply, the job commences to adapt itself to a satisfactory solution. Agriculture can do her part in meeting this problem but she must guard against becoming a dumping ground for war or industrial casualties who are not qualified or cannot qualify to assume the responsibility that goes along with a happy and successful farm life.1

1. Ibid.
Forestry. Russell E. Ford who was Extension and State Forester from 1939 to July 1, 1945 became full time Extension Forester on the latter date. He has given much time to education in fire control, to tree distribution,\textsuperscript{1} to 4-H forestry projects, to education of private landowners in forest harvesting practices, and to teaching lumber users to buy from resources within the State so far as these are adequate.

A survey made in 1940 by P. L. Ginter and C. K. Collins of the United States Forest Service showed that in the eleven north-eastern counties of Colorado the "total forest products needs -- which could be native material"\textsuperscript{2} reached 163,891,000 board feet. Much of this wood was imported when a large part of it was available on forests within the State. A part of Mr. Ford's work was to get growers and users of wood together.

Young Farmers and Homemakers. Lester L. Osborn, working with young farmers and homemakers, men and women from about twenty-one to thirty years of age, encouraged the organization of rural groups for the study of occupational questions and for recreation. El Paso, Kit Carson and Jefferson Counties served as guinea pigs in starting the program for the group between the 4-H Clubs and those in their early thirties. As an example of activities selected, the El Paso County young men and women divided themselves into three groups to study respectively meat cutting, agronomy, and diseases of farm animals.

\textsuperscript{1} Late in 1945 the Land Board acting as the Colorado Board of Forestry took over tree distribution. (Interview Ford 11/14/45).
Extension Activities of the Editorial Service. - During World War II the Extension work handled by the Editorial Service under G. E. Ferris grew considerably in quantity and quality of printed matter distributed and showed an increased interest in the use of the radio. In addition to recordings made on the campus, Rex Brown of the Editorial Service, in co-operation with the United States Department of Agriculture, held radio schools in sections of the State where county and home demonstration agents were close enough to a radio station to make use of it.

To present more forcefully and more attractively the printed information on agricultural topics Miss Mary Callopy became editor of "The Colorado Extension Record" in May 1944.

She increased the size of the "Record" and published it twice instead of once a month; she stressed news from the field and used many photographs.
Because of the scarcity of farm labor, the decreased supply of farm machinery and the increased demands for production, the Emergency Farm Labor Program became part of the Extension Service during World War II. A. J. Hamman was State Supervisor with, during most of 1944, R. W. Roskelly as Assistant State Supervisor in charge of Victory Farm Volunteer and Labor Training, while Mary Sutherland was Assistant State Supervisor in charge of the Women's Land Army. The State Staff handled the contracting of labor, and in general the education and co-ordinating features of the program such as the training of the farmers who employed the different types of labor and the adjusting of conflicting and changing requests for help.

The Emergency Farm Labor Program and the Office of War Food Administration co-operated in allocating labor. In Denver and Pueblo labor recruiting offices were on a year round basis.

In order to give those in charge an understanding of the program, Mr. Hamman called district supervisors and field assistants to general meetings. Other meetings including supervisors, county agents, field assistants, and others were held to discuss local problems, and methods and procedures for their solutions. Supervisors then followed up in the counties to complete the training.

On the county level the organization consisted of County Farm Labor Advisory Sub-committees, County Wage Boards, and the Neighborhood Leader Systems.

Carrying out the educational phase of the program, members of the State staff wrote for newspapers, gave radio programs and spoke to groups of all sorts. For example, Mary Sutherland,
in charge of the Women's Land army, spoke to twenty-nine groups ranging in number from a County Council of twelve to a junior and senior high school assembly of 2300.¹

Laborers made available by the Emergency Farm Labor Program included, for example, nearly 4000 Mexican Nationals delivered into Colorado in 1944. In 1945 the Program recruited 45,332 individuals; in October 1945, one of the heavy months, Mr. Hamman and his staff put into specified fields 1315 Mexican Nationals and 11, 668 prisoners of war, in addition to local volunteers.

The laborers included Spanish-American, Mexican Nationals, a few Japanese evacuees, prisoners of war and local men, women and youth in every farming area. Among the P. O. W.'s were Germans, Czechs, Poles, Norwegians, French, and a few Hindus and Mohammedans. These last two groups had impressed into the German army during the African campaign.

Education of farmers who were to handle prisoners of war as laborers was a careful process. Some of the instructions given the employers were:

1. Prisoners of War are accustomed to orders. Give your orders to the German leader in charge of the detail. In giving these orders don't be rough or abusive about it. If the Prisoners of War don't do the task assigned or are troublesome, call the camp commander or his representative. Merely call him and ask him to come out. Don't state you are having trouble. Most of you are on party lines.

2. Have the work to do. Have the equipment to do it with. Have the work laid out. Don't have the prisoner waiting on you.

3. In using Prisoners of War, keep your mouth shut. Don't explain trouble over the telephone. Don't explain it to neighbors or other people. Don't permit newspaper reporters to gather information.

4. Don't try to gain information from Prisoners of War.

5. Don't talk to Prisoners of War except in line of duty. You should not fraternize with Prisoners of War or allow a third person to do so.

6. Everyone must understand that Prisoners of War are enemy nationals. What might appear to be innocent conversation and small favors may in reality prove to be acts of treason.

DON'T EVER BELIEVE A PRISONER OF WAR LIKES YOU. HE DOESN'T. DON'T BELIEVE THAT A PRISONER OF WAR LIKES TO WORK FOR YOU. HE WORKS BECAUSE HE IS ORDERED TO WORK.

8. Do not take any written letters, slips of paper or packages from a Prisoner of War. All this matter must be censored by the Armed Services.

9. Don't think a Prisoner of War won't escape if he can. He will. YOU ARE AS RESPONSIBLE FOR THE SECURITY OF THE PRISONER OF WAR AS THE ARMED GUARDS.

Prisoners of War to the number of 6,404 were employed in 1944 in thirteen Colorado counties and did fair work.

Prisoners generally delivered a good quality of work, but their volume per man per day was approximately half that of the free workers. The average production of all free workers has decreased with the employment of large numbers of inexperienced people.

In the long run, however, farmers found the prisoners more satisfactory help than the general volunteer labor. The prisoners were supervised, and so were of necessity punctual, dependable, and, after V-E Day, willing.

On paper the State staff could handle figures and labor groups; in the field with human beings other problems presented themselves. For example, Mexican nationals had been given to understand that in the United States racial barriers were down. When

these men found they were not welcome in restaurants, in moving picture houses, or even in social gatherings of Spanish-Americans, members of the staff of the Emergency War Labor Program had a problem which could not be solved in a report.

Mr. Hamman, trying to adjust such differences, discussed with the laborers, personal cleanliness and sanitation, and American social customs; with the Mexican consul, Mr. Hamman discussed the laborers themselves. However, the racial solutions being a process of long-time adjustment of man to man and man to a new environment, were not settled during World War II.

In Delta County the first Mexican Nationals arrived before their supplies of bedding, cooking equipment and dishes. Their employers supplied them with a cot and one blanket per man, and the men ate at restaurants. At the end of their Delta County employment, though conditions had improved, agitators among the Nationals had kept them dissatisfied, and they were glad to leave.¹

As fruit pickers the Nationals were so satisfactory that one orchardist said, "-- they are spoiling me for any other type of labor."²

Because of some men among the Nationals group who had never worked and never intended to do so, Rio Grande County had an unhappy experience with the Mexican Nationals.²

In the irrigated sections of Colorado, however, the majority of farmers found the work of Mexicans satisfactory in both quantity and quality.

The volunteer workers, though they did not always arrive

¹. Ibid., p. 24.
². Ibid., p. 23.
Emergency Farm Labor Program

in a field when they said they would, or stay as long as expected, saved many a crop. The photograph and a quotation from an article in "The Rocky Mountain News" for August 20, 1944 help us to visualize a volunteer group.

A woman in faded overalls and dusty, down-at-the-heel oxfords shuffled along a dirt roadway with four children behind her, dodging trucks laden with fruits and vegetables.

It was 6:30 a.m., and the sun was beginning to touch highlights on the metal rooftops of open-air stalls at the Denver Market, under the Broadway viaduct.1

This woman, Mrs. Vigil, her children and others, like them, formed the group in the photograph below.

Mrs. Vigil was a Spanish-American as were many others in the picture, but equally typical of the emergency farm volunteers was the group in the cherry orchard. Here Mrs. J. T. Strate, wife of the Professor of Mechanical Engineering at Colorado Agricultural College is the supervisor, and one of the pickers is her thirteen year old daughter, Jo Anne. This group harvested a full quota of the cherry crop.

Women working on their home farms or those of their neighbors did amazing things. The Montgomery County Demonstration Club of Boulder County reported:

Nearly 100% of our women took Junior's place out in the field, as well as around the farmstead, doing gardening, raising chickens, haying, tractor work, combining wheat, siloing, picking pumpkins, etc.2

In the Bowe Home Demonstration Club in Rio Grande County,

One woman helped feed sheep through March and April. The first of April, when ewes started lambing, she did all the night work for three weeks; also helped herd, mark ewes and lambs.3

2. Ibid, p. 132.
From the Hygiene Club in Boulder County came the report:

One of our members—a tiny little thing of about 108 pounds—did everything a man would be called upon to do, milking fifteen cows with the help of her daughters and a milking machine. She raked and bucked hay, mowed, cultivated, hauled in hay and straw, raised a fine flock of chickens, fed calves, and even irrigated when her husband was needed elsewhere.¹

Mr. A. J. Hamman comments that an interesting outgrowth of the scarcity of labor and of machinery during World War II was the development of co-operation among farmers. If this carries into the future, Mr. Hamman thinks small farmers with low capital may meet the competition of the business farmer with machinery.
Miss Helen Prout as State Home Agent heads those phases of Extension work designed to be of help particularly to rural women. The specialists who report to her and who are responsible for carrying the latest in subject matter and methods to home demonstration agents and to rural leaders are: Mary Sutherland in Parent Education and Child Development, Sybil Bates in Clothing, Exine Davenport in Home Management, Marian Brown in Nutrition and and Margaret Prendergast Fillas in Rural Recreation.

In Colorado there are approximately half as many home demonstration or county agents; for example in 1944 there were twenty-two of the former and forty-seven of the latter. In counties in which there are no home demonstration agents, the specialists make an extra effort to train rural leaders.

"Show me a nation's homes, and I will show you her destiny", said Major Victor Grant, speaking to the members of the Home Demonstration Council in Colorado, February, 1944. If we count this true, the Extension Service has clasped hands with destiny. The specialists in food, clothing, recreation, and family life - the basic essentials of human living - take to rural women help with those things which make the texture and fabric of the home.

Though statistics are cold and seem to lack connection with human motivation, goals and plans stated statistically give the scope of the Work of the Extension women; and when we read the accomplishments of Home Demonstration Clubs and of individual home-
makers, we see the statistics translated into human living.

Miss Helen Prout, State Home Agent, is especially concerned with the training of leaders to carry on all sorts of work with rural women. A part of the goals she strove to reach, in, for example 1944, indicate the wide range of her interests in this field.

**Major Problems and Results**

**Goals**

1. To have 550 home demonstration clubs.

2. To have 12,000 home demonstration club members.

3. To reach 40,000 homes through home demonstration work in adopted improved practices.

4. To have 6,000 different project leaders in home demonstration work.

5. To carry home demonstration programs thru leader training meetings in 48 counties.

6. To hold farm women's camp for 3 counties with 60 in attendance.

7. To have 90% of the home demonstration clubs belong to the State Association.

8. To have home demonstration councils functioning in 45 counties.

**Results**

- There are 461 clubs, an increase of 16 over 1943.
- There are 9,299 members, an increase of 320 over 1943.
- There were 33,011 homes which adopted improved practices in home demonstration work. This was a decrease of 13% over 1943.
- There were 4,030 project leaders in home demonstration work. This was a decrease of 50% or 11% over 1943.
- This was done in 45 counties.

Jefferson, Arapahoe and Adams counties held a joint camp with 81 women attending.

- 80% of the clubs belong or an increase of 10% over 1943.
- 44 counties have county councils functioning. This is an increase of 7 counties over 1943.

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1. Ibid. pp. 7-10.
The State Home Agent
and the Women Specialists

Goals

10. To hold achievement
days in 45 counties.

11. To have local leaders
hold 2,500 meetings
where home demonstration
agent did not participate
and to have 40,000 attend
these meetings.

14. To assist with gardens
142,000

15. To assist with organizing
councils in 6 counties.

16. To assist in perfecting
the organization of 10
counties.

17. To assist in strengthening
home demonstration clubs
in 47 counties.

18. To assist agents in training
schools for officers in 10
counties.

21. To enroll in the Extension
summer school.

22. To attend farm women's
camps.

23. To assist in planning the
meeting of the Colorado
Home Demonstration Council.

27. To send circular news
letters to Home Demonstra-
tion agents.

28. To cooperate on 3 radio
programs.

29. To prepare 12 articles to be
used for publicity purposes.

Results

34 counties held achievement
days with a total attendance
of 8,962. This was an in-
crease of 36% over the number
of counties holding achieve-
ment days in 1943.

2,474 meetings were held with
an attendance of 39,463 which
was an increase of 31 meetings
over 1943. The attendance at
these meetings was an increase
of 6,250 or 19% over 1943.

There were 138,400 gardens in
1944 or an increase of 5,300
or 4% over 1943.

Councils were organized in
Delta, Huerfano, Prowers and
Eagle counties.

Organization was strengthened
in Douglas, Kit Carson, Lincoln,
Gunnison and Rio Blenco counties.

Clubs were strengthened in 40
counties.

Training schools for officers
were conducted in 3 counties.

No summer school was held.

Did not attend.

This was done.

3 letters were sent to the
Home Demonstration Agents.

6 programs were participated
in.

Articles relative to home demonstra-
tion work were in all issues of
the Extension Record; other arti-
cles were given to all papers for
release.
Though charts and statistics are good for a statement of goals, with the plans made, how did the women specialists and the home demonstration agents put them into operation?

If, in imagination, we hang a monster spotlight on the horn of the crescent moon and focus it on this and then on that section of Colorado, we can see how these plans and projects became work accomplished by rural women. In many counties specialist and home demonstration agent work together; in others the specialist must work without the H. D. A. We focus the spotlight first on changes in rural homes which are, at least in part, due to the work of Exine Davenport in home management.

Ten thousand families reported in one year that they received help with home management problems. These problems included repairing, remodeling and refinishing old furniture so it would "do"; they included rearranging 2,227 kitchens and other rooms to make them more convenient and comfortable; assistance given to 2,946 families in the management of money gave them more satisfactory budgets; hundreds of families removed fire and accident hazards from their homes.¹

Next, we swing the spotlight on Syhil Bates, the clothing specialist, on the home demonstration agents, and on others helping to clothe men, women and children during the war years.

"Wear it out; Make it do; Do without."

said rural women, but they needed help with the "make it do."

During the war, the shortage of materials created a need

¹ Ibid., p. 83.
for remodeling clothes and for devising "wardrobe refreshers", but in many homes sewing machines had to be cleaned and oiled before any sewing on a family scale was possible. In sewing machine clinics the specialist supervised and directed the recondition of many a clattering old machine. After such a clinic the Elk Mountain Home Demonstration Club in 1944 reported that 100% of its members had put their machines in top running order, and in Adams County home demonstration club members reported 205 homemakers had cleaned and oiled their machines.

In 1945, Miss Bates reported supervising the cleaning and adjusting of 1715 sewing machines. She added that demonstrations in clothing construction resulted in the making of 25,386 garments valued at $380,790 and in the renovation and restoration of 180,348 others.

During 1944 in county after county, Extension personnel, in order to help women with sewing problems, taught the making of dress forms. One lady used such a form in fitting dresses for a daughter who was away at college; another sent the dress form to the college daughter who made her own clothes, and dozens of women used the forms for home sewing. In Bent County women made about thirty dress forms and fitted at least sixty dresses on them. So the story could continue for almost every county in the state.

Other essentials in remodeling and in "making the old do" were cleaning, dyeing and pressing, so Extension personnel demonstrated these useful arts from Baca County to Moffat and from Sedgwick to Montezuma.
Sibyl Bates, is never satisfied with even a record year in sewing machine clinics and their impressive results. "I think of well made new clothes or skilfully remodeled old ones as contributing to morale and good citizenship", she says. "Good clothes give people self-confidence. Those who would crawl into a corner if they were poorly dressed, when well dressed take part in community activities of all sorts."

This being true, the clothing specialist contributed much more than help with clothing to the winning of World War II.

Mary Sutherland as Specialist in Parent Education and Child Development deals with such immaterial and unmeasurable but fundamental psychological and spiritual phases of living as the value of pictures, magazines, and good music in the home; she stresses the basic needs and traits of personality development, emotional maturity, and ethical standards. Going beyond the home, Miss Sutherland points out that being a good neighbor is one phase of good citizenship but citizenship is not limited to the home community. Good citizenship means an intelligent knowledge of the post-war world, and each individual must bear his full share of responsibility for understanding international relationships and making this peace a lasting one.

Miss Sutherland emphasizes the value of health, of recreation, and of religion. In a word, she stresses the human problems and relationships that underlie human living.

Struggling to reduce her work to figures, she reports for the part of the year 1944 that she spent on Parent Education and Child Development:
High Lights of Parent Education and Child Development Program

During 1944 four sub-phases of this project were included in the County Extension Agents' programs:

(a) Recreation with the objective of encouraging home and community type games, play music, book reviews, one-act skits, pantomimes, also the construction of homemade toys, games and other devices to minimize travel and save rubber, gasoline and maintain morale.

County reports show that in 30 counties 4,670 families improved home recreation.

560 communities in 25 counties were assisted in improving community recreation.

(b) Health maintenance and improvement included assistance as follows:

1,406 families in 18 counties with child feeding problems.
2,557 families in 21 counties with prevention of colds and other common diseases.
4,109 families in 26 counties with other measures to improve health through first aid and home nursing.
5,434 families in 33 counties in removing fire and accident hazards. (This includes 4-H club work as a cooperative project).

(c) Family Relationships resulted in:

2,461 families in 17 counties helped in improving family relationship and guidance problems.
779 families in 17 counties were aided in recommended clothing, furnishings and play equipment, and
1,031 parents with 2,037 children participated in parent education and child development programs.

(c) Citizenship -- This important phase of the project was conducted in El Paso, Fremont and Weld Counties during this year.

880 families were assisted in the project.

Summary: 11,095 families were assisted in some phase of this project during 1944.

Margaret Prendergast Fillas, beginning work September 1945, as the first Extension Specialist in Rural Recreation in

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2. The work done by Mrs. Fillas was under both home economics and agriculture.
Colorado reduces the purposes of her work to a short statement of objectives as follows:

a. To provide wholesome recreation in communities.
b. To develop a recreation program which will grow and develop leaders.
c. To develop a medium for bringing people together to get better acquainted and to know the joy of living.
d. To maintain a proper balance between work and play in agricultural activities.
e. To develop social poise in 4-H groups and Young Farmers and Homemakers Clubs.
f. To offer training for the beneficial use of leisure time.
g. To develop an appreciation for quality in types of entertainment.
h. To teach families how to have a good time at home.
i. To teach young people to help build a desirable community life in rural areas. Too many are attracted to cities because of lack of entertainment at home.
j. To develop mental and physical health.

Such an outline has a sociological value, but the photograph reveals that, basic to all these objectives, is Mrs. Fillas' belief that recreation means fun.

1. Interview, Jan. 10, 1946.
In the work in Food and Nutrition Marian Brown's statistics for 1943 indicate the scope of her duties.

**SUMMARY OF FOOD AND NUTRITION WORK**

- Days devoted to adult work = 225
- Days devoted to 4-H work = 39
- Foods work was conducted in 1095 communities
- Number volunteer leaders assisting = 4244
- No. days devoted by workers to the project = 2746
- No. of victory farm gardens = 46694
- No. of victory town gardens = 78000
- Number of pressure cookers checked = 5088
- No. of families improving food preservation methods = 31054

17% increase in the number of families producing and preserving food according to a good nutrition plan

Number of families planning year's food supply = 8000

Other figures which indicate the scope of the work of the Specialist in Nutrition and of home demonstration agents for the year 1943 are:

- 5,133 people attended demonstrations on freezing, canning, curing, brining, etc.
- 9,134 qts. of food processed in cookers lent by the El Paso County office.
- 63% increase in use of Jefferson County cookers over the 1942 use.
- 5,366 families given information on freezing foods.

Home demonstration clubs sponsored school lunches and canned food for this purpose. 

A full share of producing food falls upon rural women.

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In Colorado for the year 1944, the Extension Horticulturist C. M. Drage and State Home Agent Helen Prout worked out a check sheet for those responsible for producing and preserving food for a family for a year.

**WAR FOOD PRODUCTION PROGRAM**

**Farm Home Food Supply**

<table>
<thead>
<tr>
<th></th>
<th>I did in 1943</th>
<th>I plan to in 1944</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Raise 3/4 of the food we use</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Have 1/3 acre or more in garden</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Spend one hour each day between April 15 and October 15.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Grow crops to provide leafy green and yellow vegetables</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Grow dry beans and potatoes and sweet corn in addition the regular garden.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Start a perennial garden by planting strawberries, asparagus and rhubarb. Other fruits where adapted.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Produce and use at least 5 varieties of vegetables for salads.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Produce and preserve by canning, drying or freezing at least 5 varieties of vegetables.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Produce and store at least 5 varieties of vegetables</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Make butter we use.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Make cheese (6 gallons of milk will make 5 lbs. of cheddar cheese)</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Produce eggs we use (an egg a day)</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Raise meat - pork, lamb, beef or poultry - for family use.</td>
<td></td>
</tr>
</tbody>
</table>

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The work of Miss Marian Brown, nutritionist for the Extension Service, dovetails with this program as she preaches and demonstrates canning, freezing, preserving of foods together with food values, balanced menus, etc.

Any woman who has ever raised a garden, made butter or preserved fruit can mentally construct a bridge of hours on which she crossed from such a check sheet to a well filled cellar. In 1944, the food figures of, for example, the Ranch Home—Home Demonstration Club of Gunnison County, show why rural women, having crossed such a bridge, could forget most of their food ration points.

4. In 1944 our club did the following:

Canned 918 quarts vegetables, 3620 quarts fruits.
Froze 85 pints fruit, 53 quarts vegetables, 9317 pounds meat.
Cured 2928 pounds meat.
Stored vegetables and fruit, 6580 pounds, 45 bushels.
Stored 120 dozen eggs.
Made 1176 pounds cheese (cottage), 124 pounds American Cheddar Cheese.
Made 2675 pounds butter.
Preserved 398 containers jams, jellies, preserves.
Raised 297 chickens, 304 rabbits.

The women of the Columbine Club of Las Animas County made as good a use of the long hours in the bridge connecting check sheet and cellar. In 1944 they reported: "4890 quarts of canned food, 2400 pounds of stored vegetables, and 910 pounds of cured meat."

They had raised 1525 chickens which had produced 2161 eggs, and the

same women made 199 pounds of soap, had cared for 300 pounds of lard, made 475 pounds of butter and 313 of cheese.\textsuperscript{1}

A glance at the record of the Ohio Creek Home Demonstration Club of Gunnison County shows that under the guidance of Extension personnel, a wise use of food followed the raising and preserving of it.

**FOOD SELECTION AND PREPARATION**

1. One half of the members served variety meats (liver, heart, tripe, kidneys, etc.) one or more times a week.

2. All members served meat alternates or non-rationed meats (eggs, beans, fish, cheese, game, poultry, nuts) one or more times a week.

3. All members served meat extender dishes (such as salmon loaf, beef stew with vegetables, pork-potato puff) one or more times a week.

4. All members cooked meat or meat alternate dishes at low or moderate temperatures.

5. All members cooked tender cuts of meat with dry heat (for example: broiling, roasting, pan broiling).

6. All members cooked less tender cuts of meat with moist heat (example: braising, stewing, simmering, pot roasting).

7. All members used enriched or whole grain flour or bread for the family's meals.

8. All members served five or more fruits and vegetables to the family each day.

9. All members served a pint or more milk to each family member each day (this could be a beverage or served in cooked food.)

10. All members served butter at every meal.

11. All members shortened the time spent in meal planning and preparation without sacrificing good standards of preparation and serving.

12. All members are active in supporting a school lunch program by donations.\textsuperscript{2}

\textsuperscript{1} Ruth McCammon and Helen Frout, p. 5 of report on Home Demonstration Clubs included in "Annual Report", 1944.  
\textsuperscript{2} Ibid., p. 119-120.
There is something tremendous in the sight of a nation gearing not only the machines but also its humanity into the job of fighting a war. General George C. Marshall could write of the international military conference in Washington in May, 1943 as possibly "one of the most historic military conclaves of this war."\textsuperscript{1} By 1943 United States war material production staggered the Axis, but the fate of the United Nations was as basically in the hands of the farmers and ranchers as in the war plants or in the rooms where strategy was decided.

America in World War II was no dictatorship where citizens not in the armed forces were ordered when and where to work; we had no slave labor working under torture and starvation. If men were to plan a war, others were to fight it and still others were to produce the munitions, back at the grass roots wheat and corn and gardens had in every state to be planted, hoed and harvested; hogs and cattle and sheep had to be raised. Bill Smith and the old Burdall place and Al Thompson on the last ranch up the "crick" were the G. I. Joes whose co-operation was asked, not ordered; and the county agent to be found in three-fourths of the agricultural counties across the nation was at best a Pfc. in the infantry.

Since the function of the Extension work is to serve rural people, we perhaps see best its actual touch with men on the farms as we watch these county agents.

When World War I came upon us, the county agent in Colorado was only getting a toe hold; by 1941 in many of the counties of the State, the agent was as well known to the farmer as his own

south forty. In the years between the two wars he had become the link connecting the agricultural experiment station and the farmer and stockman; during the thirties, he translated federal farm plans into comprehensible English and performed the feat, as he tried to explain the mental peregrinations in Washington, of retaining a measure of the farmers' confidence. As one county agent remarked, "If I went fifty miles from the office to explain a federal ruling to a group of farmers, a change in Washington had made a liar of me before I got back."

In World War II the county agent was no stuffed shirt, no swivel chair artist, no brass hat; he was "a guy who lives here and knows a lot of the answers." He was not a politician; he was not a small-time dictator. Because the funds that paid him were local and part Federal, no bureau could clamp down on him and dictate his activities.

When farm laborers were drafted into the armed forces, when the supply of farm machinery was limited, when the demand for farm produce reached an historic high, and the super-heated problem of farm labor was thrust upon the county agent, he accepted it as part of the day's work; but this was not his whole job. His duties touched every aspect of agricultural production and rural living.

The county agent was in the direct line of communication between world needs and supply. In 1940 farmers in the United States were wondering where they could sell their crop; in 1941 they were told they had not only to feed America, but also to contribute largely to Great Britain; in 1942 American farmers more than any other one group were responsible for feeding the Allies. What was the county agent's job?
County Agent A. V. Lough, a World War I veteran knows Colorado with its mountains and snows, its dry land and wind, and knows particularly the bad mud holes and the magnificent scenery of Garfield County. He lives over there in Glenwood Springs where the Eagle River roars out of its canyon and slips quietly past the bath house and under the bridge.

A page from a diary which he kept to give the writer a picture of "A County Agent's Day" (The capitals are mine) amazes us because we wonder where he ever found time to keep a diary and because Mr. Lough is so modestly unconscious that he is helping win a war.

April 23, 1943 - Monday

John Bershenyi was in and asked for another Mexican if we had one available. There is none available right now.

A telegram was sent to Roskelley about the labor meeting which is to be held April 24th.

Max Rivers, discharged serviceman, was in looking for a ditch riding job.

Floyd Bauers stopped to see how the Prisoner of War camp was coming along.

Two REA men stopped at the office.

F. S. James and the County agent reviewed some farm plan work sheets for the Selective Service Board.

Oscar Cerise paid for the weed blading done on his place last year.

The County Agent attended a AAA meeting where plans for the coming year were discussed.

Mrs. George Palmer was inquiring about the kind of fertilizer to use and grafting of trees.

Claude George was asking about a way to treat alkali soil.

Emery Arbene was in to inquire about the hired man who is supposed to work for him.
Alvin Kelly stopped in to get some more information about the G. I. loan. He plans to rent now instead of buy.

The tax money for the 4-H Club dance was turned over to the tax collector.

Mrs. Blue called explaining some difficulties on the Mexican payroll.

Mr. Jarvis was inquiring about the use of muslin in agriculture for the purpose of getting some in his store.

Alex Cuaz stopped in and made application for a hired man.

Dexter Lillie called about the treatment of potato seed.

Doctor Swenson called to get information on the AAA program.

We received a letter from the Silt Extension Club about the planning of a memorial park in Silt.

Like other county agents, A. V. Lough was on the Board that selected some farmers' sons to go to war and recommended deferment for others; yet so sincerely and justly did Mr. Lough do this difficult work that one father, making the last sad arrangement for the burial of his son, asked Vance Lough to serve as a pall bearer.

County Agent L. V. Toyne of Weld County closed one day at 11 p.m. with the meeting of the County War Bond Committee and included in the next day's work: a talk (County agents don't "interview" or hold conferences) with the President of the Rocky Mountain Beet Growers' Association, the answering of questions put by eighty-six office callers, in forty telephone calls and in twenty-seven letters. These dealt with: "Labor, pressure cookers, draftboard deferments, potato diseases, insect control, harvesting-machinery priorities which were referred to the AAA Office, recommended crop varieties • • •, weed control, potato certification, truck and tractor tires, beef-cattle shipments, sewage disposal,
bond and scrap drive, pickle making, cans and canning, poultry diseases, etc.¹

He made arrangements to secure another 25,000 pounds of weed poison, investigated fifteen applications for selective service deferment, and secured thirty-seven volunteers to help in washing and grading a day’s delivery of potatoes. In the evening he attended a meeting of the County War Board where seventeen requests for deferment from Selective Service were discussed, and five requests for release from Service were made.²

Another of Mr. Toyne’s chores was to go to Fort Lupton for a conference with the school officials there where the school district threatens to charge tuition for about 70 children of Spanish families and others who are living in the permanent labor camp there. ³ ³ Mr. Toyne said that he planned to show the value of the camp to the community, in order to avoid such tuition payments.³

Such was the day’s work of the average county agent.

Bernard J. Trierweiler, county agent in Morgan County in 1943, extended the list of the agents’ activities by inspecting, on August 23, 1943, test plots of fifty varieties of potatoes, beans and hybrid corn. After six p.m., and before going to a War Board meeting, he sandwiched in a visit with a 4-H boy whose Angus steer had won the junior championship.

Often the county agent’s job was salvage, but conservation or production, he never spoke with big-gun pronouncements.

A. F. Hoffman, Jr. of Delta County enlisted the hearts and hands of people with a mimeographed sheet called, “Howdy, Friend,”

¹ I. C. Kinghorn, Letter to Director F. A. Anderson, Aug. 28, 1943, p. 1
² Ibid.
³ Ibid., p. 2
Under date of August 11, 1944 one article in this began:

"Milkweed Goes To War"

"U. S. lost its kapok supply when the Japs took Java. Common milkweed has been found to be a good substitute."

Directions follow for picking, drying and sacking the milkweed. Under date of October 9, 1944, the story continues:

"Several hundred West jackets will be filled with the milkweed floss you people have gathered. . . . there's nothing wrong with your co-operation. Each member of the committee wishes to extend thanks to you personally. It is quite possible that some Delta County boy will also be thankful for the milkweed floss gathered in the county."

The Forest Service furnished a truck to gather the sacks of floss and the Soil Conservation supplied a driver.

There was nothing with that community co-operation and nothing high hat about County Agent Hoffman. One of his ways of getting attention and action was:

O my luve's a little red hen
She was new-hatched last May;
O my luve gets balanced rations
And lays for me each day.

The advice in such a jingle helped raise American egg production to a world's high, and the suggestion in the following put milk on many a table:

THE SCRUB BULL

Once upon a June day sunny while the bees were gathering honey
From many a quaint and curious blossom round my kitchen door
Suddenly there came a bellow like a river boat whistle mellow
Or some inebriated fellow, smello with the roses four.
"'Tis some politician", I muttered, "bellowing like the barber shop four--

Only this and nothing more."

Then I found out to my sorrow that the fence I'd "Fix tomorrow"
Had not kept the Jones' scrub bull away from Hoffman's Jersey's door
Believe you me it was a laugh when in due time she dropped her calf
A thing that looked like a giraffe, draft of a dirty bovine dor.
"Think of how a few", I muttered, "staples would have helped, before--

Only fixing you forbore".

--Edgar Allen Hoffman Jr.

Any efficient county agent could borrow the title of Mrs. Roosevelt's column "My Day" and top that lady in work done, if not in news value.

With some fun, with common sense, with long hours, with the latest scientific knowledge, but always with the human touch the county agent served as liaison man between the soldiers in uniform and the soldiers of the soil.

In times of peace one forgets some of his war time activities and takes up others, but he is always, "a guy who lives here and knows a lot of the answers."
Chapter XXXVIII

A Tribute
A Tribute

The Extension Service and Colorado. - Preventing a thirty per cent loss of apples, saving potatoes and tomatoes, supervising victory gardens, demonstrating the reason for planting high producing varieties with marketable qualities; convincing farmers that certified seed is best; caring for the soil; treatment and prevention of diseases of farm animals; helping rural people to set up social machinery which makes possible the discussion of rural problems and the formulating of plans; showing growers how to co-operate with the Experiment Station and the Extension Service in studying production problems; determining how much water to use on certain types of soil for a particular crop, soil condition being known; showing farmers how the increase production of eggs and of poultry meat; increasing beef production, organizing dairy committees, Purebred Cattle Associations, evaluating animals by breed type classifications;
animals by breed-type classifications; developing ways of controlling plant diseases and insect pests; passing on to farmers Colorado’s agricultural quotas during the war; comparing current prices with those of the past; teaching fire control in rural areas; educating 4-H Club members in planting trees for beauty and protection; helping to market home-grown forest products; giving information as to rural economic problems of the immediate future; supervising 4-H Clubs; finding and assisting in allocating laborers during World War II; in general, raising food production to feed a nation at war, to contribute greatly to the food needs of the United Nations, then to the world; — these are a few of the ways in which men of the Extension Service assisted in the solving of the problems of rural men and women. In all of these, Extension has come a long way since the faculty of three conducted a farmers institute at Del Norte in 1879.

Directors of Extension in Colorado. — The members of that first faculty of three who rode in an open wagon from Alamosa to Del Norte would not now recognize the San Luis Valley; they would lift their hats in respect to the men who kept the off-campus work growing until 1915; they would stand in stunned but delighted amazement if they could watch the work of the more than 100 technically trained men and women on the Extension staff of 1945; they, who saw the early stages of Colorado's agricultural problems, would recognize the leadership and devotion of the men who have directed the Extension Service in Colorado since 1915. These men are:

Charles A. Lory, Acting Director
June 1, 1914 - September 1, 1915
January 15, 1929 - July 1, 1929

Alvin Deer, Professor of Agriculture, approved Extension Plans for a few months while Mr. Lory was on leave.
T. H. French – September 1, 1915 – February 13, 1920

A. E. Lovett, Acting Director
February 13, 1920 – July 1, 1921

Roud McCann, – July 1, 1921 – January 15, 1929

F. A. Anderson – July 1, 1929 –

On December 15, 1945, P. V. Kapner Assistant Director of Extension in Washington, presented at an Extension Conference banquet at Colorado A. & M., the Epsilon Sigma Phi Award to F. A. Anderson, the eighteenth man in the United States to receive this award. In this presentation Extension men and women everywhere recognized the worth of F. A. Anderson, the man, and the value of his work as a director.

In making the presentation, Mr. Kapner read a message from W. A. Lloyd, Chief of Western Section of the U.S. Extension Service:

As a friend of twenty years standing, I wish to say a word of Andy, the man—and the qualities of mind and heart that are back of his high achievement. For some reason as I grow older, I find myself thinking of my professional associates somewhat less in terms of what they have done, and more in terms of what they are. After all, work is a reflection of character. It is true, the friend we honor tonight, as it is of each of us. The Director possesses three outstanding qualities that would have made his work outstanding in any field. We are just fortunate that he chanced to turn his talents to extension.

First, he has a tireless industry, that knows nor observes no reasonable limits. He may hold his staff to the filling of a large order, but no one works harder than the boss. It is an inspiration to watch him work, but he is a hard man to follow and not get lost if one sits down to rest a while.

Second, Andy has a high integrity that makes adherence to sound principles automatic. In his thinking, things are either right or wrong. Once he has made up his mind as to the course that is right, he drives straight down that road. This adherence to sound principles has
made for a consistency in extension programs and procedures under his administration. His strict adherence to sound principles may sometimes be called Scandinavian stubbornness, but back of his determination are long hours of honest thinking. While the matter is still in the formation stage, our friend is open to suggestions, but once he has made up his mind, don't monkey with the buzz saw—he probably knows most of the answers.

Third, he has an unquestioned loyalty that knows no cloudy days. Often have I heard of said, 'you can count on Andy'.

I congratulate the Extension Service, the Agricultural College and State of Colorado, for having such a man, and I congratulate myself in having enjoyed the fruits of his industry, integrity and loyalty, throughout these twenty years.

Director Anderson, we feel greatly honored to have the privilege of presenting to you tonight the certificate awarded by the national Epsilon Sigma Phi in respect and in honor of the contributions you have made.

(Use photo of Director Anderson)
A Selected List of the Main Sources of Information

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