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# SEVENTIETH ANNUAL REPORT 1956-1957



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AGRICULTURE**

**AGRICULTURAL EXPERIMENT STATION  
COLORADO STATE UNIVERSITY  
FORT COLLINS, COLORADO**

**Letter of Transmittal  
Seventieth Annual Report  
Colorado Agricultural Experiment Station**

Honorable Stephen L. R. McNichols  
Governor of Colorado  
Denver, Colorado

Sir:

In compliance with the act of Congress, approved March 2, 1887, entitled, "An act to establish Agricultural Experiment Stations, in connection with the colleges established in several states under the provisions of an act approved July 2, 1862, and under the acts supplementary thereto," I herewith present the Seventieth Annual Report of the Colorado Agricultural Experiment Station for the fiscal year of July 1, 1956 to June 30, 1957.

Fort Collins, Colorado  
July 1, 1957



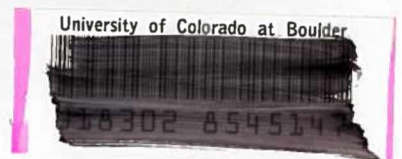
S. S. Wheeler  
Director

*seventieth annual report . . .*

# *Research*

***serves colorado agriculture***

AGRICULTURAL EXPERIMENT STATION • COLORADO STATE UNIVERSITY



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## ***Crops and Soils***

Members of the Agronomy staff are working on such projects as developing disease-resistant crop varieties, increasing fertility of the soil, developing better yielding varieties, reclaiming saline-alkali soil in the San Luis Valley and Grand Junction areas and improving mountain meadows.

One project which takes many years is crop rotation work. This is divided into two parts—an eight-year rotation with alfalfa and a five-year rotation without alfalfa. Both of these projects are now in their twenty-first year. Fertilizers used are nitrogen, phosphorus and a combination of these elements. Purpose of the work is to determine how the residues of a certain crop affect production of another crop the next year.

Gypsum blocks for measuring soil moisture were prepared and installed on the W. H. Monfort farm near Gilcrest. Records were obtained on the soil moisture conditions under alfalfa irrigated by a permanent sprinkler system. As a result of the moisture record, the irrigation water application was decreased by 50 percent without apparent curtailment



*An agronomist checks the heads of grain in a wheat variety trial.*

of crop growth. The experiment was conducted in cooperation with the Extension Service.

After five years of yield testing, the field bean pinto No. 1540 has been approved for release to Colorado farmers. It produced a good yield and growers who had this bean in demonstration plots were generally enthusiastic about the growth and harvesting characteristics.

Much of the important work in agronomy is being carried out in various experimental areas throughout the state. Purpose of the work is to determine how certain crops and grasses will perform in the particular area. This includes mountain meadow studies as well as work with dryland crops and fertilizers.

# Livestock and Poultry

Colorado is endowed with certain feed resources which form an excellent background for feeding and fattening livestock. The state has some of the best range grass and roughages to be found, and few areas have a better array of natural feeds.

One of the important projects in nutrition studies at the Experiment Station is the feeding of hormone supplements to cattle. These supplements aid in the efficiency of feed. In other nutritional studies, three years' work have shown the added value of alfalfa as a partial winter supplement to cows on winter range. Alfalfa supplementation showed to advantage with respect to conception percentage, daily gains of calves during nursing and shortened calving seasons. Another advantage of alfalfa was ease of calving and strength of the newborn calf.

A study of interest to homemakers is the use of the somoscope to grade cattle by determining the amount of fat on the side of the animal. This device operates by bouncing sound waves through the hide. The project was conducted in cooperation with the Home Economics section. In the home economics phase of the experiment steaks were cooked, and a panel judged them for appearance, odor, flavor, juiciness and tenderness.

A maximum of corn silage and a minimum of grain were used to fatten cattle in rations tests. The idea was to keep feed costs as low as possible. Various supplements were used in an attempt to improve the efficiency of roughage utilization. Application of this method of feeding cattle may show a saving of two to three dollars in feed costs per 100 pounds of gain.

In hormone experiments researchers are studying the value of feeding stilbestrol as compared to hormone implants in cattle. In this year's tests, feeding stibestrol to steers gave the best results from the standpoint of cost and rate of gain. The hormone implant was effective in increasing weight gains and reducing feed costs in cattle, but carcass qual-

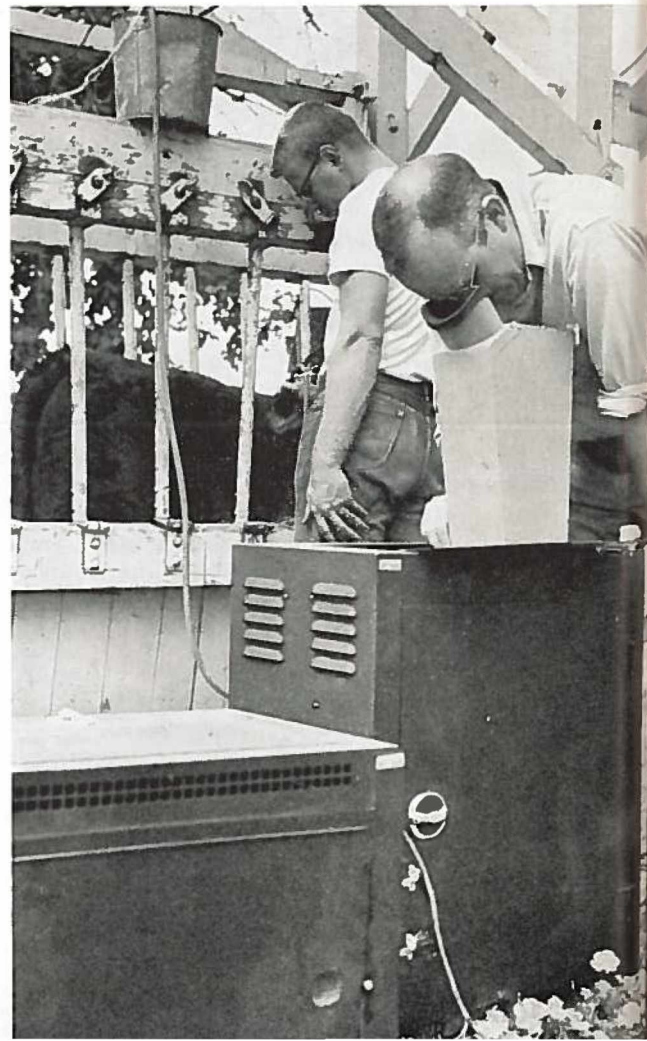
ity of these cattle was lower in comparison to carcasses from the control lot.

In lamb feeding tests, researchers proved that a ration of corn silage with supplements plus a short grain feeding period will give finished lambs in time for the usual favorable April market.

A cattle feeding experiment used varying amounts of concentrates and roughages in fattening rations. The results demonstrate the superior nutritional qualities of green chopped alfalfa in feed.

Value of ground alfalfa in swine rations is also being studied. Initial benefits are that the swine producer can feed up to at least 30 percent of the ration in ground alfalfa hay which has been run through a quarter-inch screen.

Dairy researchers have completed a pro-



*Layer of fat in a steer can be determined by the somoscope, a device which bounces sound waves through the hide.*



ject to determine the value of Holstein male calves in a beef operation. It was determined that Holstein steers will feed out well and a dairyman can make a reasonable profit from this operation.

Purpose of the study of blister from milking machine inflations was to determine the cause of the rapid deterioration of the rubber inflations used on milking machines. Much more rapid deterioration occurs during the winter months than the summer. The difference appears to be related to feeding practices. Laboratory tests showed that fatty acids were the most detrimental to rubber. These acids decrease in the milk under summer feeding conditions.

The efficiency of feeding thyroprotein to high producing dairy cows for a period of three months also was studied. This supplement resulted in an increase of about 20 percent in milk production but no increase in fat, which is contrary to most results obtained in the past.

The CSU Experiment Station is the leader in establishing inbred turkey lines. It is hoped inbreeding will lead to a hybrid turkey for Colorado which will grow more rapidly and have better market characteristics. Progeny from about 2,500 birds have been used in this experiment so far.

Another poultry study is to find the in-

fluence of color and the amount of carcass fat on the market grade of turkeys. So far the work has been concerned with establishing whether or not a correlation exists between carcass grade and carcass fat.

Effects of arsanilic acid on egg production, egg size, fertility, hatchability and livability in chickens and turkeys are under study. Tests indicate the acid is effective in increasing egg production and feed efficiency. Mortality was reduced slightly.

Station poultrymen have compared samples of dehydrated and sun-cured alfalfa for vitamin K content in nutrition investigations. Results show that sun curing definitely reduces vitamin K in alfalfa.

In another study, it has been determined that 13 percent protein is ample for laying hens. Many sources advise 15 or 17 percent, but the 13 percent level was found to be equal to or better than the higher levels.

Purpose of the project on radioactive minerals and vitamin D is to study the mechanism of vitamin D, which is effective in preventing and curing rickets. Without vitamin D, calcium cannot be utilized by the body in a normal manner and certain skeletal abnormalities result. In this study radioactive calcium was injected into both normal and rachitic chicks.

## ***Control of Insect Pests***

Work of the Entomology section was conducted in all parts of the state, including the Western Slope fruit orchards, truck gardens of northeastern Colorado, and tomato fields of the Arkansas Valley.

Scientists have developed two new methods of quantitative sampling for mites. One is based on a vacuum pickup for collecting mites from foliage and a second involves the use of a wind trap for collecting migrating mites. Both methods are well adapted for working with the micro-fauna of the orchard.

An important study now under way is to find the amount of insect damage affecting marketability of canning tomatoes. Weekly inspections of 14 tomato fields in the Arkansas Valley were made by examining 100 leaves distributed in the four quarters of each field.

Weekly reports showing the insects and insect eggs occurring in each tomato field were prepared and distributed to interested persons by mail and through the press. As the average egg count increased during September and October, the tomato fields were treated with dust and insecticides.

Of interest to beekeepers is the work to control European Foulbrood. Terramycin gave 100 percent control of this bee disease. All colonies showed an overall increase in strength due to the complete eradication of the disease symptoms.

Producers of crops benefit from work of the Colorado Insect Detection committee which issues weekly reports on movement of insects throughout the state. This is a cooperative program with the Extension Ser-

vice, State Department of Agriculture and the Agricultural Research Service, USDA. In this program, insect activity is surveyed and reports are sent farm leaders, members of the

agricultural chemical industry, aerial applicators, county agents and other persons interested in insect damage to crops.

## *Horticultural and Floricultural Crops*

Present trends in potato production indicate a strong movement toward processing of the crop. In the next 10 years as much as 80 percent of the crop may be marketed ready-to-use by the consumer.

Today there are 15 potato products available in retail stores. They are ready mashed, precooked bakers, frozen French fries, pre-peeled canned whole and diced, potato chips and others. This means a demand for higher quality new varieties adapted to processing.

As a result, horticultural studies at the Station have been directed toward developing new varieties of potatoes that will be useful

to the processor. This year 111 varieties and seedlings were planted at Fort Collins. Thirteen were selected for further testing.

A new onion hybrid, "Pilot," was introduced this year. It is adapted to western Colorado and possibly the northeastern part of the state. Pilot will be extensively planted in field demonstrations in the onion growing areas. Onion breeders are now concentrating on a late hybrid for the Arkansas Valley. It has been difficult to produce a hybrid for that area that will withstand summer temperatures and outyield the late Sweet Spanish varieties.

Researchers are working on carnation propagation, nutrition, disease control and other cultural problems. Work this year on the air conditioning of greenhouses indicates that the new high pressure mist system of cooling is more promising than cooling by exhaust fans and evaporation pads. It has been determined that 75 degrees F. for roses and 70 degrees for carnations are satisfactory mean temperatures in summer. The air cooling work has made it possible for Colorado growers to produce quality carnations during the high summer temperatures.

Horticultural researchers are trying to find how often and how much water to apply to bluegrass turf in order to maintain it in a satisfactory condition. It was found that an application of about one inch of water per week is adequate. Rates above that did not improve the turf.

Research on chlorosis of tree fruits indicates that soil management with cover crops is the most dependable way to prevent and correct the condition. Chemicals have a place in the treatment of individual trees that do not fully respond to soil management practices.

Peach variety trials are becoming more important as growers replace the Elberta variety acreage. By planting varieties with a wide spread in maturity, it is possible to spread harvesting and marketing over a longer period.



*Agricultural economists have developed a way to ship carnations and other cut flowers which lowers costs and insures fresher delivery of the flowers.*



# Home Economics

A great amount of interest is shown by the public in high altitude baking tests. The staff receives innumerable requests each year for information. Most requests are from homemakers, but also many hospital dietitians and school lunch room managers seek information. Work is now being completed to adjust recipes, previously checked at 5,000 feet, for use at 7,500 and 10,000 feet.

Surveys have been made of all the grocery stores in Arapahoe and Pueblo counties and every fourth store in Denver county in a study of factors affecting purchase of fruits and vegetables. These surveys will determine

the availability and cost of fresh and canned fruits and vegetables. The stores surveyed will be checked monthly to collect further data on the products available for purchase by the consumer-buyer from season to season.

Preliminary tests are being conducted to determine the desirability of baked products which have been fortified with cottonseed flour. The low cost of this flour warrants investigation for its use in certain regions as an inexpensive means of increasing amino-acid content of diets which contain a high percentage of cereal products.

## Range Management and Forestry

Surface applications of nitrogen were made at four different rates on native short-grass range in a test of range fertilization. One series of plots was treated for the fourth consecutive year and one series was treated a second time on the basis of nitrogen application in alternate years. For the fourth straight year, the response to nitrogen fertilizer has not appeared strong enough to be economical.

In date of seeding tests, tall wheatgrass, sideoats grama, switchgrass, sand lovegrass and Ladak alfalfa were seeded at monthly intervals. The grasses were seeded in plots five feet wide and 400 feet long. Results indicate that seeding tall wheatgrass, sideoats grama and switchgrass from March through June is best. Plots of sand lovegrass and alfalfa seeded through June also look good. Russian wild-

*Field day visitors hear of latest developments in research to improve productivity of mountain meadows.*



rye was tested but failed to produce a satisfactory stand.

Other tests show that there is nearly three times as much production when grass species are planted with alfalfa as compared to planting the grasses alone. These studies would indicate a distinct advantage as measured by forage production when alfalfa is included with cool season grasses on dryland sites. Yield data collected during 1956 permitted calculation of a five-year average yield for plots established in 1950 and 1951.

An improved pocket gopher bait dispenser was developed by Station scientists. One valuable feature of the new dispenser is the improved shape of the probe end of the dispenser which permits more accurate determin-

ation of the gopher runways.

A study of the distribution of Colorado pocket gophers is now complete. It is important for the farmer or rancher to know which gopher he is dealing with since the various species and subspecies do not react the same to various baits, poisons and trapping methods.

In cooperation with the Rocky Mountain Forest and Range Experiment Station, the field work on a lumber grade recovery study on marketing of Colorado forest products has been made for Engelmann spruce and lodgepole pine logs. When evaluated, the data will provide an estimate of the quality of lumber that can be expected from these important tree species in Colorado.

## ***Engineering Research***

Sand trap studies are being continued. The vortex tube sand trap was developed at the CSU Station during the early 1930's. This

is a valuable device for excluding sand from canals. Only partial design data, however, have been collected. Studies to obtain more information are being made in the field and in the sloping flume in the Hydraulics laboratory.

A more efficient and economical use of water is important to irrigation farmers. Station scientists are testing colloidal clays in an attempt to reduce seepage in irrigation canals. Tests so far show that bentonite is an effective sealer in certain soils.

A project which eventually may lead to more intelligent use of water in irrigated areas and on the Great Plains is a study to determine the rate of evaporation from soil. This work is being conducted in an environmental control chamber in which temperature, humidity and radiation can be controlled.

Every farmer in eastern Colorado has a stake in the use of ground water. This problem was studied jointly by civil engineers and economists in the Wiggins area of Morgan county. The engineering phase consisted of determining the quantity of water removed from the aquifer and its effect on the elevation of the water table. This work focused

*In a study to perfect sand traps in irrigation canals, engineers make observations in the field as well as in the laboratory.*





attention on the possible future of irrigated agriculture in this area.

A project which provided considerable information about the sediment-carrying capacity of helical corrugated pipe has been completed. Information which has assisted in establishing basic principles regarding sediment transport has been obtained.

An extensive project is the study of drainage in the Upper Colorado River Basin. Results show that drainage of at least 18,500 acres in the lower Grand Valley west of Grand Junction can be done by drainage wells if they are properly located. After drainage, reclamation can be accomplished by simple leaching and the area can be returned to a high level of productivity. It has been shown that canal and ditch seepage, combined with excess irrigation, place a drainage load on the lower valley which is far in excess of its natural drainage capacity. Improvement in ground water conditions can be expected if both of these sources are controlled.

A project of importance to eastern Colorado is the development of a dryland grass seeder. After several years' work and construction of three different models, engineers have a model machine that is doing a satisfactory job of planting grasses on abandoned cropland and depleted range land.

Engineers also have developed a new machine for metering and applying fertilizers, fungicides, weedicides and insecticides in liquid or dry form to the soil. This has been built to use on fields of small grain, corn and sugar beets. Provision has been made to use both liquid and dry forms of fertilizer. Tests will be conducted to compare the efficiency of the two forms of fertilizer.

Design revisions were made in a commercial sugar beet planter to give better seed distribution and reduce damage to the seed. Monogerm seed was used exclusively, and the improvements will be beneficial to sugar beet growers when monogerm seed becomes available in the near future.

## ***Control of Plant Diseases and Weeds***

Station botanists are conducting studies to control and prevent diseases of fruits, vegetables and flowers. Work on fruit diseases has been of great value to growers on the Western Slope.

Another important phase is the research on control of weeds. This is of interest to farmers and homeowners alike. For farmers, most attention the past year has been given to weed problems encountered in sugar beets. Several chemicals show promise to be worthy of extensive field testing in the future.

For the homeowner considerable testing of chemicals for the control of crabgrass in bluegrass lawns has been done. Several materials have proved valuable, especially when used with a good nitrogen fertilizer and proper management practices.

A study of the distribution of the important weeds in Colorado is under way. Scientists are to locate the initial infestation of certain weeds in new areas, and to evaluate the actual importance of certain relatively common weeds.

Location and severity of infestation of plants injurious to livestock have also been

noted. When this information on weeds and poisonous plants is complete, it will be possible to conduct a more effective control program in Colorado.

In onion disease studies, scientists found that a new material, Vapam, is effective in the control of fusarium bulb rot. Sound marketable onions remaining after the storage period amounted to about 139 sacks per acre from the control plots compared to 402 sacks per acre from the treated plots. Plans are being made to test Vapam further before making any specific recommendations.

Purple blotch has been absent from the Arkansas Valley onion crop in recent years, but tests of fungicidal sprays have been continued with the expectation that this disease would again be a problem with the return of normal rainfall. Thrip-controlling insecticides and five fungicides were applied to test plots. Observation during the growing season and immediately before harvest failed to reveal any leaf infection by purple blotch fungi.

Diseases of potatoes, sugar beets, wheat, beans, cantaloupe and cucumbers are also under study.

Work on soil herbicides was started in 1951 when it became apparent that foliage treatments with 2,4-D were of limited effectiveness against certain species of weeds. At the same time it became desirable to evaluate many of the new soil herbicides. Because of

the wide range of conditions prevailing in Colorado, the tests were conducted in 26 counties representing major sections of the state. There are 60 separate projects involving 17 chemical formulations and 16 weed species.

## ***Agricultural Marketing***

Important projects are studies concerning utilization of labor in the production of sugar beets, crop alternatives for wheat in eastern Colorado, and livestock marketing information problems in Colorado.

Economists cooperated with civil engineers in the ground water survey in Morgan county. Information was secured on the cropping practices, water problems and attitudes of the farmers toward alternative methods of ground water regulation in the Bijou basin.

A project of value to Colorado's carnation industry is the work to improve a shipping container. This container, by eliminating ice and other heavy materials used in shipping carnations, is considerably lighter and strong-

er. One Denver wholesale house now uses this method exclusively to ship its carnations to all sections of the nation.

Researchers are testing the home milk dispenser in Fort Collins households. Consumption of milk is recorded before installation, during the time the dispenser is in use and after its removal. Reaction of householders and dairies to the dispensers is also obtained.

Consumer acceptance of coin-operated egg dispensers is under study. Producers of the eggs supply data on daily sales, prices, labor and other costs. The data will be analyzed to determine the economic feasibility of this method of marketing locally produced eggs.

## ***Animal Diseases***

Veterinarians have made considerable progress in the last few years in the control of serious animal diseases. Current studies include work on liver abscess in cattle and sheep, shipping fever in cattle, enterotoxemia, urinary calculi in cattle and sheep, pine needle poisoning in cattle, vibriosis in sheep and rhinotracheitis in cattle.

In the rhinotracheitis study it was shown that feedlot cattle on a fattening ration are more susceptible to the disease than animals on a maintenance ration. Several vaccines were tested, and two show promise for further study.

A condition peculiar to Colorado and other mountain states is high mountain, or brisket, disease which affects the right ventricle of the heart. Scientists are trying to determine the cause of the disease and why it should affect the heart.

Animal pathologists are studying the male deer in an effort to find out what causes the rapid rate of bone formation in the annual production of antlers. Ultimately it is hoped this information can be used to speed the mending of broken bones in humans.

Research showed that vibriosis of sheep can be transmitted by oral inoculation of infected tissues during the last month of gestation. This emphasizes the importance of strict sanitation and isolation of ewes aborting from this cause to prevent spread in a susceptible flock of sheep.

During the year, the diagnostic laboratory received 1,005 consignments of animals or tissues for diagnosis. Staff members have been requested to investigate many outbreaks of disease throughout the state.



## ***Chemistry and Endocrine Projects***



*Food chemists have developed a frozen peach topping, making use of over-ripe peaches which ordinarily would not be marketable.*

Scientists have made exhaustive chemical tests of Colorado fruits and vegetables. Analyses showed that many varieties of locally grown apples are excellent for pies. These varieties include Golden Delicious, Standard, Foster, Markham, Jonathan, Jonah Red, Black Jon and Idared.

In work with pears, it was determined that the Bartlett makes the best all around canned product. When rated for color, texture and flavor the other varieties were lacking in these qualities as compared to the Bartlett.

Chemists also have devised a method to use over-ripe peaches. By making a puree and using a slow set pectin, a peach topping was

developed for ice cream and shortcake. It also is good as an ice cream flavor.

Endocrinologists are testing the effect of hormones on fattening and feedlot performance of farm animals. More than 30,000 head of feedlot steers and heifers were treated with various combinations of hormones to see how they will improve rate of growing and fattening. Results continue to be satisfactory, indicating that the use of such preparations in a single injection is equally as good as, or in many instances better than, the daily feeding of 10 milligrams of diethylstilbestrol in the diet.

## ***Information and Publications***

Developments in agricultural research were brought before the public through news stories and radio and television programs prepared by the CSU Information Service.

News releases were distributed to all weekly and daily newspapers, farm magazines, press associations and radio and television stations in Colorado, as well as a number of media in

neighboring states. Several news features were prepared for television broadcast.

The public was also kept informed of research progress through the Experiment Station quarterly publication, "Colorado Farm and Home Research." This magazine is sent

### General Series Papers

- Barmington, R. D. "Problems Involved in the Re-seeding of Grasses on Abandoned Cropland." Gen. Series 658.
- Binkley, A. M. "Leaf Analysis Report on Manganese Deficiency Symptom on Apricot Leaves." Western Colo. Branch Station Report. Gen. Series 668.
- Binkley, A. M.; Rogers, E. A.; Green, F. M. "Increased Rates of Potash Applications on Elberta Peach Trees." Western Colorado Branch Station Report. Gen. Series 668.
- Brengle, K. G.; Whitney, R. S.; Greb, B. W.; Tucker, R. H. "Effect of Commercial Fertilizer on Yield and Quality of Dryland Wheat, Corn and Sorghum in Colorado in 1955." Gen. Series 649.
- Daniels, L. B. "1957 Insecticide Recommendations by the Colorado Agricultural Chemical Clearing Committee." Gen. Series 656.
- Davis, E. N. and Barmington, R. D. "Experimental Equipment Used for Seeding Grass on Colorado Rangeland." Gen. Series 650.
- Demott, B. J. and Brandt, L. R. "A Study of Some Factors Related to Rancidity in Pipeline Milk-ers." Gen. Series 646.
- Foskett, R. L. and Binkley, A. M. "Onion Breeding." Arkansas Valley Branch Station Report. Gen. Series 672.
- Franklin, W. T.; Whitney, R.; Code, W. E.; Reeve, R. C. "Reclamation of Saline Alkali Soils, San Luis Valley." Gen. Series 648.
- Green, F. M. "Orchard Management Research." Western Colorado Research, 1956. Gen. Series 668.
- Koonce, Dwight; Fauber, Herman; Brandon, J. F. "Performance Tests of Corn Hybrid Varieties Grown in Various Regions of Colorado in 1956." Gen. Series 655.
- Kunkel, R. and Binkley, A. M. "Tuber Seed Types for Colorado Potato Varieties." Gen. Series 660.
- Lang, Robert W. and Newport, C. A. "Can Native Lumber in Colorado be Made More Acceptable on Market?" Gen. Series 661.
- Mann, H. O. "1955 Progress Report, San Juan Basin." Gen. Series 647.
- McCain, E. and Newport, C. A. "Preliminary Results of a Forest Product Market Study." Gen. Series 662.
- Paulson, W. H. "San Juan Basin Branch Station Report, 1956." Gen. Series 664.
- Rogers, E. A. and Green, F. M. "Effect of Fertilizers on Bing Cherries in Western Colorado." Western Colorado Branch Station Report. Gen. Series 668.
- Stockwell, H. J. "Snow Survey, Feb. 1, 1957." Gen. Series 651.
- Stockwell, H. J. "Snow Survey, March 1, 1957." Gen. Series 652.

without charge to residents of the state who request it. Present circulation is about 3,800.

An additional function of the Information Service was to process for publication the technical papers and bulletins listed below.

- Stockwell, H. J. "Snow Survey, April 1, 1957." Gen. Series 653.
- Stockwell, H. J. "Snow Survey, May 1, 1957." Gen. Series 654.
- Stonaker, H. H. "Beef Cattle Improvement Day—Fort Lewis." Gen. Series 663.
- Story, C. D. and Esplin, A. L. "Feeders Day." Gen. Series 659.
- Thornton, Bruce. "Report on Herbicides." Gen. Series 657.
- Ward, Gerald. "Some Observations of the Effects of Management Practices Upon the Flavor of Milk." Gen. Series 645.
- Willhite, F.; Rouse, H.; Siemer, E. G. "Improvement of Colorado Mountain Meadows." Gen. Series 644.

### Scientific Series Papers

- Amemiya, M. and Robinson, C. W. "The Use of Undisturbed Soil Cores in Making Investigations Relative to the Reclamation of Saline and Alkali Soils." Soil Science Society Proceedings. Sci. Series 519.
- Burke, D. W. and Seliskar, C. E. "A Study of the Extent and Importance of Cultivation Injury to Beans in Northeastern Colorado." Plant Disease Reporter. Sci. Series 505.
- Chow, T. L.; Brown, W. W.; Deem, A. W.; Collier, J. R. "Infectious Bovine Rhinotracheitis. IV. Reproduction of the Disease and Resulting Immunity in Cattle." Amer. Vet. Med. Assoc. Sci. Series 513.
- Dudley, J. W. and Klitgaard, Knud. "Number of Chloroplasts in the Guard Cells of Inbred Lines of Tetraploid and Diploid Sugar Beets." Sci. Series 517.
- Flint, Jean C.; Roepke, Martin H.; Jensen, Rue. "Feline Infectious Anemia Clinical Aspects." Jour. of AVMA. Sci. Series 503.
- Fults, Jess and Payne, Merle. "Effects of 2,4-D and Maleic Hydrazide on Free Amino Acids and Proteins in Potato, Sugar Beet and Bean Tops." Botanical Gazette. Sci. Series 487.
- Gerhold, N. R. "Artificial Field Inoculation of Potatoes." Plant Disease Reporter. Sci. Series 499.
- Gerhold, N. R. and Barmington, R. D. "A Planter for Experimental Field Plots." Plant Disease Reporter. Sci. Series 506.
- Jensen, Rue; Flint, Jean; Udall, Robert; Deem, A. W. "Parakeratosis of the Rumen in Lambs Fattened on Pelleted Feed." Jour. of Vet. Research. Sci. Series 520.
- Jensen, Rue; Miller, V. A.; Hammarlund, M. A.; Graham, W. R. "Vibrionic Abortion in Sheep. I. Transmission and Immunity." Sci. Series 492.



- Johnson, Gestur and Schaal, Lawrence. "Accumulation of Phenolic Substances and Ascorbic in Potato Tuber Tissue Upon Injury and Their Possible Role in Disease Resistance." Amer. Potato Jour. 34:200. 1957. Sci. Series 498.
- Johnson, Gestur and Schaal, Lawrence. "Chlorogenic Acid Content of Periderm Tissue of Triumph and Russet Burbank Tubers." Phytopathology. Sci. Series 486.
- Kemper, W. D. "Structural Implications of Moisture Retention of Clay Size Soil Materials." Soil Sci. Soc. of Am. Proc. Sci. Series 485.
- Kemper, W. D. and Amemiya, M. "Alfalfa Growth as Affected by Aeration and Soil Moisture Stress Under Flood Irrigation." Sci. Series 502.
- Kemper, W. D. and Amemiya, M. "Air Permeability of Porous Ceramics as a Function of Hydraulic Stress in Soils." Sci. Series 507.
- Krouch, E. D.; Kintzley, J. P.; Taylor, R. D. "Apparatus Used by the Sugar Crops Section at Fort Collins to Control Pollination of Sugar Beets." Sci. Series 516.
- Lindholm, H. B. and Stonaker, H. H. "Economic Importance of Traits and Selection Indexes for Beef Cattle." Journal of Animal Science. Sci. Series 493.
- Miller, Richard. "Rate of Incisor Growth in the Mountain Pocket Gopher, *Thomomys talpoides*." Journal of Mammalogy. Sci. Series 509.
- Mueller, K. E. and Durrell, L. W. "Sampling Tubes for Soil Fungi." Phytopathology. Vol. 47, No. 4, p-243. April, 1957. Sci. Series 491.
- Payne, M. G.; Gaskill, J. O.; Fults, J. L.; Daniels, L. B. "Exploratory Studies on the Use of Paper Chromatography and Electrophoresis for Detection of Yellow Virus in Sugar Beet." Proc. Amer. Society of Sugar Beet Tech. Sci. Series 494.
- Pierson, R. E. "Copper Poisoning in Sheep and a Case Report." Amer. Vet. Med. Assoc. Sci. Series 512.
- Powers, LeRoy. "Identification of Genetically Superior Individuals and the Prediction of Genetic Gains in Sugar Beet Breeding Programs." Jour. Amer. Soc. Sugar Beet Tech. Sci. Series 484.
- Quist, John A. "The Collection of Eriophyid Mites and Other Small Arthropods." Sci. Series 511.
- Roberts, Jack E. "Toxin Production by *Clostridium Perfringens*. I. Synthesis of Alpha and Theta Hemolysins, Lecithinase and Proteinase in a Synthetic Medium." Journal of Bacteriology. Sci. Series 510.
- Roberts, Jack E. "Hemolysin Production in a Reproducible Medium by *Clostridium Perfringens*." Journal of Bacteriology. Sci. Series 490.
- Roberstad, G. W. and Morrison, S. M. "An Improved Method for the Rapid Cultivation of Large Yields of *Fibrio Fetus*." Jour. Vet. Research. Sci. Series 495.
- Robson, Douglas S. "A Generalized Genetic Variance Component Model and Application." Sci. Series 489.
- Rouse, H. K.; Dotzenko, A. D.; Wilhite, F. M. "Species Composition of a Colorado Mountain Meadow as Affected by Irrigation, Nitrogen, Fertilization, and Harvest Method." Agronomy Journal. Sci. Series 508.
- Salisbury, Frank. "Growth Regulators and Flowering. I. Survey Methods." Plant Physiology. Sci. Series 515.
- Skiver, R. E. "The Use of Antibiotics and Fungicides in Mist Propagation." Plant Disease Reporter. Vol. 40, No. 12, December 15, 1956. Sci. Series 488.
- Thornton, P. A.; Blaylock, L. G.; Moreng, R. E. "Protein Level as a Factor in Egg Production." Journal of Poultry Science. Sci. Series 496.
- Thornton, P. A. and Moreng, R. E. "Egg Production and Reproduction as Affected by Arsanilic Acid and Penicillin." Journal of Poultry Science. Sci. Series 500.
- Ward, G. M.; Elsey, V. R.; Hurry, J. A. "The Effect of Milking Practices Upon the Deterioration of Milking Machine Inflation." Milk. Food Tech. Sci. Series 518.
- Weinhold, A. R. and Gerhold, N. R. "Rate of Fall of *Puccinia Graminis* var. *Triticis* Erikss. and Henn. as Affected by Humidity." Phytopathology Journal. Sci. Series 504.
- Wilson, W. T. and Moffett, J. O. "The Effect of Erythromycin and Other Antibiotics on the Control of European Foulbrood of Honeybees." Jour. of Econ. Entomology. Sci. Series 501.

#### Other Published Articles

- Beach, Geo. A. "Irrigation of Turf." Rocky Mountain Turf Grass Conference Report. 1956.
- Binkley, A. M. "Increased Rates of Potash Application on Peaches. Results of Commercial Fertilizer Experiments in Colorado." Three-year summary. Mimeo Report, 1957.
- Binkley, A. M. "Blackheart of Celery. Results of Commercial Fertilizers in Colorado." Mimeo Report, 1957.
- Fults, Jess L. and Payne, Merle G. "Effects of 2,4-Dichlorophenoxyacetic Acid on Free Amino Acids and Proteins in Potato, Sugar Beet, and Bean Tops." The Botanical Gazette. Vol. 118, No. 2, pp. 130-133. Dec. 1956.
- Holley, W. D. "Schedule for Pruning Roses." CFGA Bul. 88. April 1957.
- Holley, W. D. "Some Effects of Greenhouse Cooling on Carnation Timing." CFGA Bul. 89. May 1957.
- Holley, W. D. "Soil Permeability Can be the Key to Good Growing." CFGA Bul. 90. June 1957.
- Holley, W. D. "Propagation of Carnations from Mother Blocks." CFGA Bul. 19. July 1957.
- Holley, W. D. "Some Effects of Timing and Cooling on Carnation Quality." CFGA Bul. 94. October 1957.
- Holley, W. D. "A Modern Concept of Feeding Greenhouse Plants." CFGA Bul. 97. Jan.-Feb. 1957.
- Holley, W. D. "Breeding for Better Carnations." CFGA Bul. 97. Jan.-Feb. 1957.
- Holley, W. D. "Nutrition Control for Carnations." CFGA Bul. 78. April 1956.
- Holley, W. D. "What Source Nitrogen for Carnations?" CFGA Bul. 81. Aug. 1956.
- Holley, W. D. "More on Trace Element Nutrition." CFGA Bul. 83. Oct. 1956.
- Holley, W. D. "Further Investigations on the Effects of Nitrogen Sources on Carnation Growth." CFGA Bul. 85. Dec. 1956.

Holley, W. D. "Some Factors Which Influence Soft Growth." CFGA Bul. 86. Feb. 1957.

Holley, W. D. "Rose Cooling Can be Over Done." CFGA Bul. 87. Mar. 1957.

Johnson, Gestur and Schaal, Lawrence A. "Chlorogenic Acid and Other Orthodihydroxyphenols in Scab-Resistant Russet Burbank and Scab-Susceptible Triumph Potato Tubers of Different Maturities." Phytopathology. Vol. 47, No. 5, pp. 253-255. May 1957.

Kunkel, Robert and Edmundson, W. C. "A Modified Witz Test of the Toughness of Potato Skins." Amer. Soc. for Hort. Sci. Vol. 70, p. 397. 1957.

Petrie, Harold and Holley, W. D. "Lighting and Shading Chrysanthemums During Fall and Spring Critical Periods." CFGA Bul. 92. Aug. 1957.

Rogers, E. A. and Green, F. M. "Effect of Fertilizers on Bing Cherries in Western Colorado," Progress Report Sixth Annual Fertilizer Conference, Colorado State University.

Schmidt, Robert G. and Holley, W. D. "Some Effects of High Temperature on Carnations." CFGA Bul. 93. Sept. 1957.

White, John W. and Holley, W. D. "Some Effects of Soluble Salts and Soil Moisture on Carnation Growth and Quality." CFGA Bul. 95. Nov. 1957.

### **Pamphlets**

Ferguson, A. C. and Jones, H. A. "Pilot, a New Hybrid Onion." Pamphlet 2-S.

### **Bulletins**

Drage, C. M. and Beach, George. "Tree Fruits for Plains and Foothill Regions." Ext. Cir. 142-A.

Drage, C. M. and Beach, George. "Small Fruits in the Home Garden." Ext. Cir. 143-A.

Kunkel, Robert. "Factors Affecting the Yield and Grade of Russet Burbank Potatoes." Technical Bulletin 63.



## Financial Report for Year Ending June 30, 1957

RECEIPTS 1956-1957

DISBURSEMENT OF FUNDS BY CLASSIFICATION FOR THE FISCAL YEAR ENDED JUNE 30, 1957

	Balance July 1, 1956	Receipts from U.S. Treasurer	Receipts Other Sources	Total Income	Personal Services	Travel	Transporta- tion of Things	Communi- cation Service	Rents and Utility Service	Printing and Binding	Other Contractual Services	Supplies and Materials	Equipment	Land Structures	Contributions to Retirement	Total Expendi- tures	Balance June 30, 1957	Grand Total
Hatch		295,207.00		295,207.00	204,024.92	10,917.10	481.96	1,834.42	3,856.83	512.36	5,243.18	35,533.41	26,431.27		6,371.55	295,207.00		295,207.00
RRF		135,879.98		135,879.98	89,856.74	4,756.24	76.80	312.28	1,243.88	1,192.09	2,515.43	20,076.56	13,621.89		2,221.07	135,879.98		135,879.98
RRF Trust		20,800.00		20,800.00	12,455.04	5,680.29		996.59		353.80	125.22	850.43	338.63			20,800.00		20,000.00
Title II Sec. 204 (b)		5,000.00		5,000.00	4,197.55	321.80		1.70	9.41		175.94	171.91	109.20			4,987.51	12.49	5,000.00
General Appropriation			285,018.98	285,018.98	206,625.52	4,269.25	510.82	2,264.95	9,245.81	3,919.98	10,071.47	27,524.12	12,422.09		8,164.97	285,018.98		285,018.98
Plant Disease			50,000.00	50,000.00	38,001.08	193.38	519.04	415.23	1,391.22	127.42	1,633.65	4,494.84	2,070.55		1,159.59	50,000.00		50,000.00
Pure Seed			7,999.14	7,999.14	7,500.54	19.24	3.95	46.68	26.76	91.35	19.36	187.94			103.32	7,994.14		7,994.14
Mountain Meadow			7,500.00	7,500.00	5,452.77	20.20		181.82	221.81	3.60	614.55	967.81			37.44	7,500.00		7,500.00
E. Colo. Branch Sta.	12,589.19		17,509.42	30,098.61	8,092.25	126.98	29.31	26.76	1,573.17		1,167.50	5,938.71	4,897.22	7,858.00	388.71	30,098.61		30,098.61
Colorado Gopher Fund			22,000.00	22,000.00	16,153.08	1,596.76	78.32	105.24	101.66	20.80	1,372.64	1,929.26	320.58		321.66	22,000.00		22,000.00
Mill Levy Tax	22,235.77		156,661.42	178,897.19	92,321.50	2,748.46	648.44	3,907.10	5,072.25	3,801.06	8,852.50	25,228.77	10,525.75		3,473.99	156,579.82	22,317.37	178,897.19
Librio Tax Fund	693.14		17,601.50	18,294.64	3,166.64	38.60					2.25	9,343.32	436.25		258.36	15,245.42	3,049.22	18,294.64
Station Special	15,967.63		229,344.30	245,311.93	38,119.88	7,140.35	2,558.78	1,573.01	19,096.58	861.17	13,841.55	88,956.41	47,664.39	21,351.95	323.53	241,487.60	3,824.33	245,311.93
Hybrid Corn	6,703.44		4,277.65	10,981.09	539.50	243.56	79.70	49.59		221.95	64.35	1,698.00				2,896.65	8,084.44	10,981.09
SURF	161,524.07		578,220.07	739,744.14	368,458.07	21,228.82	1,338.19	1,869.11	4,652.17	2,207.19	93,865.57	58,277.89	29,885.85	13,545.00	3,415.62	598,743.48	141,000.66	739,744.14
<b>TOTALS</b>	<b>219,713.24</b>	<b>456,886.98</b>	<b>1,376,132.48</b>	<b>2,052,732.70</b>	<b>1,096,965.08</b>	<b>59,301.03</b>	<b>6,325.31</b>	<b>13,584.48</b>	<b>46,491.55</b>	<b>13,212.77</b>	<b>139,565.16</b>	<b>281,179.38</b>	<b>148,723.67</b>	<b>42,754.95</b>	<b>26,239.81</b>	<b>1,874,444.19</b>	<b>178,288.50</b>	<b>\$2,052,732.69</b>

# Administrative Officers and Staff

## State Board of Agriculture

Warren H. Monfort, President	Greeley	Walter G. Lehrer	Denver
Raman A. Miller, Vice President	Strasburg	John H. Brownell	Hooper
James R. Miller, Secretary	Fort Collins	Walter B. Cooper	Fort Collins
Jesse McCabe	Cortez	George McClave	McClave
L. S. McCandless	Craig		

## Experiment Station Officers

W. E. Morgan, LL.D.	President	Lowell H. Watts, B.S.	Director, Information Service
S. S. Wheeler, Ph.D.	Director	L. G. Thomas, M.S.	Acting Director, Information Service
G. W. Hamilton, B.S.	Administrative Assistant	Kenneth Cushman, M.S.	Station Editor
Joseph M. Whalley, M.S.	Treasurer	A. G. Potwin, B.S.	Station Field Editor

## Experiment Station Staff

### Agronomy

D. W. Robertson, Ph.D.	Chief Agronomist
W. H. Leonard, Ph.D.	Agronomist
R. S. Whitney, Ph.D.	Associate Agronomist (Soils)
W. R. Schmehl, Ph.D.	Associate Agronomist (Soils)
D. S. Romine, M.S.	Associate Agronomist (Soils)
Dwight Koonce, M.S.	Associate Agronomist
T. E. Haus, M.S.	Assistant Agronomist
D. D. Johnson, Ph.D.	Assistant Agronomist (Soils)
R. E. Danielson, M.S.	Assistant Agronomist
D. R. Wood, M.S.	Assistant Agronomist
K. G. Brengle, M.S.	Assistant Agronomist
S. G. Romsdal, M.S.	Assistant Agronomist (Soils)
A. D. Dotzenko, Ph.D.	Assistant Agronomist
E. G. Seimer, B.S.	Assistant Agronomist
W. T. Franklin, M.S.	Assistant Agronomist (Soils)
J. H. Marion, B.S.	Assistant Agronomist

### Cooperators:

Minoru Amemiya, Ph.D.	Associate Agronomist
A. J. Cline, B.S.	Soil Scientist
J. G. Dean, M.S.	Agronomist
W. D. Kemper, Ph.D.	Assistant Agronomist (Soils)
H. R. Haise, Ph.D.	Soil Scientist
S. R. Olsen, Ph.D.	Senior Soil Scientist
J. L. Paschal, Ph.D.	Agricultural Economist
E. M. Payne, B.S.	Soil Scientist
L. R. Powers, Ph.D.	Principal Geneticist
Melvin Robecker, B.S.	Soil Scientist
F. M. Willhite, M.S.	Associate Agronomist (Soils)
C. W. Robinson, B.S.	Assistant Agronomist
H. K. Rouse, C.E.	Irrigation Engineer
F. S. Watanabe, M.S.	Soil Scientist

### Animal Disease

Rue Jensen, DVM, Ph.D.	Chief Pathologist and Bacteriologist
A. W. Deem, DVM, M.S.	Pathologist
A. F. Alexander, DVM	Junior Pathologist
Maxine M. Benjamin, DVM, M.S.	Associate Pathologist and Bacteriologist
Tsu-Ling Chow, DVM, Ph.D.	Associate Pathologist and Bacteriologist
J. R. Collier, DVM, Ph.D.	Associate Bacteriologist
L. A. Griner, DVM, M.S.	Associate Pathologist
V. A. Miller, DVM	Assistant Pathologist and Bacteriologist
H. J. Hill, DVM	Vet-in-charge (Artificial Bree-ling)
M. A. Hammarlund, DVM	Assistant Pathologist
Robert Udall, DVM, Ph.D.	Assistant Veterinary Physiologist
Dale D. Maag, M.S.	Assistant Chemical Pathologist
Robert Rubin, M.S.	Associate Parasitologist
E. T. Hedrick, B.S.	Assistant Animal Husbandman

### Animal Investigations

L. E. Washburn, Ph.D.	Chief Animal Husbandman
H. H. Stonaker, Ph.D.	Animal Husbandman
Charles D. Story, Ph.D.	Associate Animal Husbandman
M. H. Hazaleus, M.S.	Associate Animal Husbandman
A. L. Esplin, Ph.D.	Associate Animal Husbandman
F. C. Daughtery, M.S.	Assistant Animal Husbandman
T. R. Blackburn, M.S.	Assistant Animal Husbandman
V. B. Swanson, M.S.	Assistant Animal Husbandman
Kent Riddle, B.S.	Assistant Animal Husbandman

### Botany and Plant Pathology

J. L. Fuels, Ph.D.	Chief Botanist and Plant Pathologist
L. W. Durrell, Ph.D.	Botanist and Plant Pathologist
H. D. Harrington, Ph.D.	Associate Botanist
Bruno Klinger, M.A.	Associate Botanist
G. H. Lane, M.S.	Associate Plant Pathologist
Bruce J. Thornton, M.S.	Associate Botanist
R. R. Baker, Ph.D.	Assistant Botanist
N. R. Gerhold, M.S.	Assistant Plant Pathologist
F. B. Salisbury, Ph.D.	Assistant Botanist
J. A. Twomey, M.S.	Assistant Plant Pathologist

### Cooperators:

J. O. Gaskill, M.S.	Plant Pathologist
Lawrence Schaal, Ph.D.	Associate Plant Pathologist
E. A. Lungren, M.S.	Associate Plant Pathologist
R. W. Davidson, M.S.	Senior Plant Pathologist

### Chemistry

W. E. Pyke, Ph.D.	Chief Chemist
F. X. Gassner, DVM, M.S.	Endocrinologist
Paul R. Frey, Ph.D.	Chemist
A. R. Patton, Ph.D.	Chemist
L. W. Charkey, Ph.D.	Associate Chemist
R. E. Carlson, Ph.D.	Associate Chemist
Joe J. Lehman, Jr., Ph.D.	Associate Chemist
Merle G. Payne, M.S.	Associate Chemist
H. A. Durham, M.S.	Assistant Chemist
Gestur Johnson, M.S.	Assistant Chemist
Duane K. Johnson, M.S.	Junior Chemist
Adaline K. Kano, B.S.	Assistant Chemist
M. L. Hopwood, M.S.	Assistant Chemist
H. L. Bedrick, Ph.D.	Assistant Chemist
C. O. Guss, Ph.D.	Associate Chemist
Grace Maag, B.S.	Temporary Chemist

### Dairy Industry

E. K. McKellar, M.S.	Acting Chief of Section and Associate Dairy Husbandman
W. E. Snyder, Ph.D.	Associate Dairy Husbandman
G. M. Ward, Ph.D.	Associate Dairy Husbandman

### Economics and Sociology

Rex D. Rehnberg, Ph.D.	Chief and Associate Economist
C. R. Creek, M.S.	Associate Economist
Henry Hudek, Ph.D.	Assistant Economist
Dwight Blood, M.S.	Assistant Economist
J. R. Davidson, M.S.	Assistant Economist
Irving F. Davis, Ph.D.	Assistant Economist
D. F. Jones, M.S.	Junior Economist

### Cooperators:

H. G. Sittler, M.S.	Agricultural Economist
J. L. Paschal, Ph.D.	Agricultural Economist

### Entomology

Leslie B. Daniels, Ph.D.	Chief Entomologist
J. L. Hoerner, M.S.	Associate Entomologist
Adal Kamal, Ph.D.	Associate Entomologist
T. O. Thatcher, Ph.D.	Associate Entomologist
J. O. Moffett, M.S.	Assistant Entomologist
L. E. Jenkins, M.S.	Junior Entomologist

### Cooperators:

F. B. Knight, M.F.	Entomologist
Calvin Massey, Ph.D.	Entomologist
R. H. Nagel, M.S.	Entomologist
B. H. Wilford, Ph.D.	Entomologist
N. D. Wygant, Ph.D.	Entomologist

### Forestry and Range Management

D. F. Hervey, Ph.D.	Chief Range Conservationist
B. E. Dahl, M.S.	Assistant Range Conservationist
A. C. Everson, M.S.	Assistant Range Conservationist
V. L. Garrison, B.F.S.	Junior Forester
R. M. Hansen, Ph.D.	Assistant Biologist
B. M. Huey, M.S.	Associate Forester
B. S. Miller, Ph.D.	Associate Biologist
H. E. Troxell, M.F.	Assistant Forester

### Cooperator:

L. E. Yeager, Ph.D.	Game Management
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### Home Economics

Elizabeth Dyar, Ph.D.	Chief Home Economist
Ferne Bowman, Ph.D.	Home Economist
May Combs, M.S.	Assistant Home Economist
Inez Harrill, Ph.D.	Assistant Home Economist
Edna Page, Ph.D.	Associate Home Economist
Adelia E. Weis, Ph.D.	Associate Home Economist



### Horticulture

A. M. Binkley, M.S. Chief Horticulturist  
George A. Beach, M.S. Horticulturist  
R. L. Foskett, Ph.D. Associate Horticulturist  
Joseph Galba, M.S. Junior Horticulturist  
W. D. Holley, M.S. Associate Horticulturist  
Jack Weigle, Ph.D. Assistant Horticulturist  
**Cooperator:**  
W. E. Edmundson, M.S. Horticulturist

### Poultry

R. E. Moreng, Ph.D. Chief Poultry Husbandman  
Paul A. Thornton, Ph.D. Associate Poultry Husbandman

### Civil Engineering

D. F. Peterson, Ph.D. Chief of Civil and  
Irrigation Engineering  
M. W. Bittinger, M.S. Assistant Civil Engineer  
W. E. Code, B.S. Associate Irrigation Engineer

Herman Fauber, M.S. Superintendent, Arkansas Valley  
Branch Experiment Station  
Alfred Denham, B.S. Superintendent, Eastern Colorado  
Range Station  
Ferris M. Green, B.S. Superintendent, Western Slope  
Branch Experiment Station  
Verne Cooper, Jr., B.S. Superintendent, San Luis Valley  
Branch Experiment Station

### Branch Stations

A. R. Chamberlain, Ph.D. Associate Engineer  
R. E. Glover, M.S. Civil Engineer  
M. L. Albertson, Ph.D. Engineer  
H. K. Liu, Ph.D. Assistant Engineer  
Maxwell Parshall, B.S. Assistant Engineer  
August R. Robinson, M.S. Assistant Engineer  
Edmund F. Schulz, M.S. Assistant Civil Engineer  
H. H. Schweizer, M.S. Assistant Civil Engineer  
Aristokles Spengos, M.S. Assistant Civil Engineer  
R. D. Dirmeyer, B.S. Assistant Geological Engineer  
A. T. Corey, Ph.D. Assistant Civil Engineer

### Cooperators:

H. J. Stockwell, B.S. Irrigation Engineer  
J. N. Washichek, B.S. Engineering Aide

### Agricultural Engineering

N. A. Evans, M.S. Chief Agricultural Engineer  
R. D. Barmington, B.S., M.E. Associate Mechanical Engineer  
Edwin N. Davis, B.S. Assistant Mechanical Engineer  
R. T. Lorenzen, B.S. Assistant Agricultural Engineer

### Cooperators:

W. C. Edmundson, M.S. Senior Horticulturist, Colorado  
Potato Station, Greeley  
J. F. Branson, B.S. Associate Agronomist, USDA  
Dry Land Field Station

### Personnel Changes

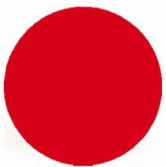
#### Joining the staff during the fiscal year were the following:

Kenneth Cushman Station Editor  
Arlan G. Potwin Station Field Editor  
L. B. Thomas Acting Director Information Service  
A. F. Alexander Junior Pathologist  
J. R. Collier Associate Bacteriologist  
Robert Rubin Associate Parasitologist  
J. A. Twomey Assistant Plant Pathologist  
W. E. Snyder Assistant Animal Husbandman  
D. F. Jones Junior Economist  
Adal Kamal Associate Entomologist  
L. F. Jenkins Junior Entomologist  
B. E. Dahl Assistant Range Conservationist  
B. M. Huey Associate Forester  
V. L. Garrison Junior Forester

Joseph Galba Junior Horticulturist  
Jack Weigle Assistant Horticulturist  
M. W. Bittinger Assistant Civil Engineer  
A. R. Chamberlain Associate Engineer  
R. E. Glover Civil Engineer  
R. T. Lorenzen Assistant Agricultural Engineer

#### Resignations from staff during fiscal year:

Kenneth Goodrich Station Editor  
Floyd Cross Pathologist  
R. H. Porter Plant Pathologist  
C. E. Seliskar Associate Plant Pathologist  
N. R. Gerhold Assistant Plant Pathologist  
B. J. Demott Assistant Dairy Husbandman  
Robert Kunkel Horticulturist  
W. F. Larsen Assistant Horticulturist



**AGRICULTURAL EXPERIMENT STATION**  
**COLORADO STATE UNIVERSITY • FORT COLLINS, COLORADO**