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University of Colorado

78th Annual Report 1964-1965

# Agricultural Research Serves Colorado





# 78th Annual Report

## The Colorado Agricultural Experiment Station

The Colorado Agricultural Experiment Station is the research arm of Colorado State University. Headquartered at Fort Collins, it uniquely ties research to the primary aim of its parent institution—education.

Research serves a number of purposes. First, it provides new knowledge and problem solving for the state's largest industry—agriculture. Because most of the research scientists hold joint teaching appointments, research allows scientists to contribute to and keep abreast of their field.

Research at CSU also provides actual experience for graduate students completing their education. And finally, the Experiment Station supplies the off-campus educational arm of the university—the Extension Service—with problem solving knowledge.

Since 1961, total income from farming in Colorado has exceeded \$700 million annually. The annual budget for the Colorado Agricultural Experiment Station, the principal research agency for this industry, is \$21½ million—or less than four-tenths of one percent of the gross income.

Colorado agriculture also is extremely diverse. It includes crop lands from 3,400 feet in altitude and grasslands above 12,000 feet. It includes both irrigated and dryland farm production.

Natural precipitation varies from 7 to 30 inches per year—and precipitation patterns vary greatly between the western and eastern slopes of the mountains. Colorado soils range from heavy clay to fine sands. Growing seasons vary from 50 to 189 days.

Colorado ranks high in the production of many crops, which also reveals its diverse agriculture. In 1964, the state ranked nationally:

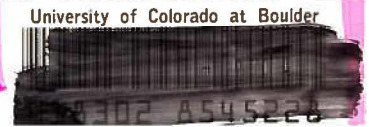
- 1st in Sheep on Feed
- 2nd in Sudangrass Seed
- 2nd in Fresh Market Green Peas
- 3rd in Broomcorn
- 3rd in Sugarbeets
- 3rd in Lettuce

- 3rd in Dry Beans
- 3rd in Fresh Market Spinach
- 4th in All Sheep and Lambs
- 4th in Forage Sorghum
- 4th in Cattle on Feed
- 4th in Onions
- 6th in Wood Production
- 7th in Pears
- 7th in Cantaloupes
- 7th in Fresh Market Cauliflower
- 7th in Cucumbers for Pickles
- 7th in Peaches
- 8th in Sour Cherries
- 8th in Celery
- 9th in Irish Potatoes

In addition, the state ranked between 10th and 17th in the production of:

- |                      |                       |
|----------------------|-----------------------|
| Barley               | Silage Sorghums       |
| Wild Hay             | Alfalfa Seed          |
| Winter Wheat         | Sweet Cherries        |
| Sweet Corn           | Sweet Clover Seed     |
| Grain Sorghum        | All Cattle and Calves |
| Fresh Market Cabbage | All Hay               |

Because of the great diversity of crops, soils, and climate, the Colorado Agricultural Experiment Station operates eight branch stations

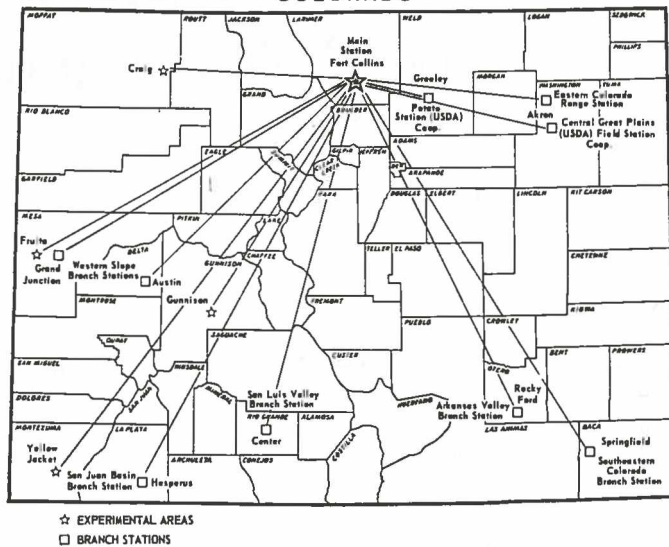


throughout the state so that production research can be conducted under the actual conditions encountered by the state's farmers and ranchers. The station also cooperates in research at several experimental areas and U. S. Department of Agriculture research stations throughout the state.

In addition to serving as the primary research institution for the State's 32,000 operating farms and ranches, experiment station research also concerns problems of consumers of food and fiber, and studies of lawn and landscaping, forestry and engineering.

This report contains some of the accomplishments of the 14 research sections of the Colorado Agricultural Experiment Station in the 1964-65 fiscal year.

## Branch Stations and Experimental Areas COLORADO



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## Section Reports

### Agricultural Engineering

Labor has become a major problem for sugar beet producers. Labor requirements for beet production have been quite high and a dependable supply of seasonal labor has become increasingly more difficult to obtain.

When horses supplied the power and all thinning, weeding and harvesting operations were done by hand, it required 118 man hours to produce and harvest one acre of sugar beets. The tractor, mechanical harvesters and thinners have now reduced the labor requirement to less than 60 man hours per acre.

Today, weed control in sugar beet fields is the most limiting factor in the complete mechanization in the production of sugar beets, industry leaders say. And, weeds can reduce sugar beet yields as much as 38 percent, studies have shown.

To improve weed control in sugar beets, the agricultural engineering section of the Colorado Agricultural Experiment Station is conducting a study on the effect of machinery, weed chemicals, soils and crop management on weed control.

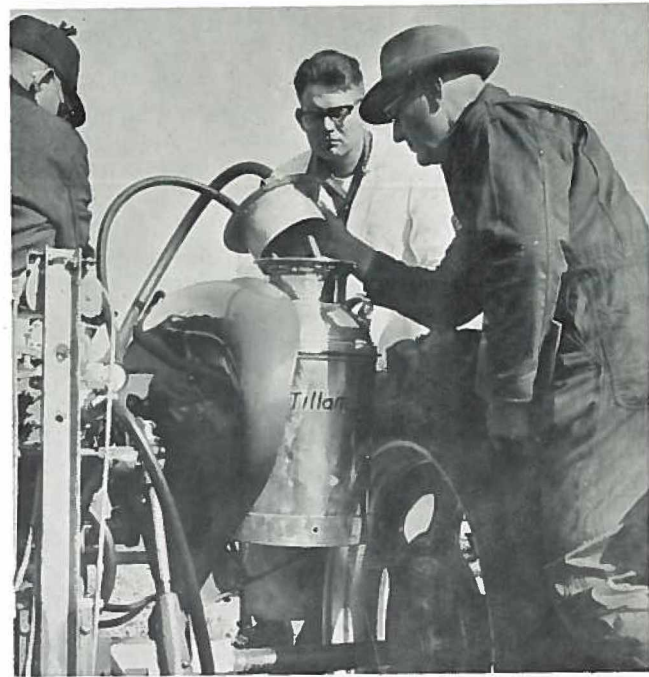
Results of this study in the past year have demonstrated:

- Application of weed control chemicals in the fall is just as effective as application at spring planting time.
- A 3.3 percent increase in yield and a 2.79 increase in sugar content was obtained in beets where a Tillam-Avadex mixture was used as a pre-emergence spray for weed control.
- Use of a bed-type seedbed prepared in the fall—a new approach to beet planting—may have advantages in weed control, preliminary tests show.

Other agricultural engineering research the past year has provided:

- Basic information on the flow of air and liquid in soils which permits the use of models to study the performance of drainage and irrigation installations.
- Knowledge of the movement of virus-like particles in soils, so the effect of waste disposal treatments on ground water quality can be determined.
- Information on ventilation systems and

temperature levels necessary to maintain quality and minimize deterioration and shrinkage of potatoes in storage.



*A team of scientists from the Colorado Agricultural Experiment Station have attacked the problem of weeds in sugar beets. Agricultural engineers, plant physiologists and agronomists joined in a study of seedbed preparation, weed chemicals, application methods, and crop rotations to find the most efficient weed control methods for the state's \$40 million sugar beet crop.*

### Agronomy

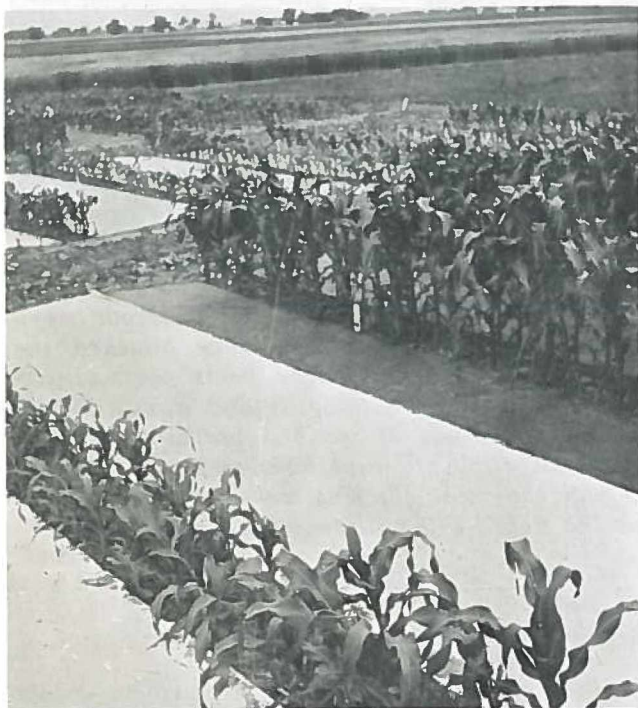
Two perennial problems of farmers—water and weeds—may be reduced considerably by construction of small (micro) watersheds in the fields. Microwatersheds treated to increase the runoff of rainfall to adjacent cropped areas increased yields of corn and wheat over those obtained under standard cropping methods on non-irrigated land.

CSU researchers found that by waterproofing the microwatersheds, profitable yields can be ob-

tained at some locations even in the driest years. Corn planted in double rows with concrete dividers between each 2-row spacing yielded 10 times as much grain with the same rainfall as conventionally grown corn.

This is a basic research study to determine relationships between plant growth, temperature and moisture, and to obtain maximum production from natural rainfall. It may lead to more practical applications, such as the use of plastic sheets, which farmers could use to increase yields with limited rainfall.

In a continuing effort to provide new and improved crops for the state's agricultural industry, three new higher yielding hybrid sorghums were released (Colorado 585, Colorado 604 and Colorado 606). All are productive under dryland conditions and 606 is adapted to irrigated conditions in southeastern Colorado.



*Corn grown between these slabs of concrete outyielded that grown in a conventional manner. The concrete dividers channeled all rainfall to the root zone of the crop. In addition, the black painted surface held more heat and corn between the black surfaces was nearly twice as high as that between white concrete.*

A new Colorado developed hybrid silage corn (Colorado 400S) was released for commercial production in the Arkansas and Grand Valleys of Colorado.



*Soil compaction was another subject of research in the agronomy section. Soil compaction (deteriorated soil structure) reduces yields of corn—note the restricted root development of roots on the right. It also causes sprangled sugar beet roots such as those on the right—but had no effect on sugar beet yields. Fall plowing greatly reduced the detrimental effects of soil compaction. The study also indicated farmers should avoid unnecessary tillage practices, especially when the soil is wet.*

## Animal Disease

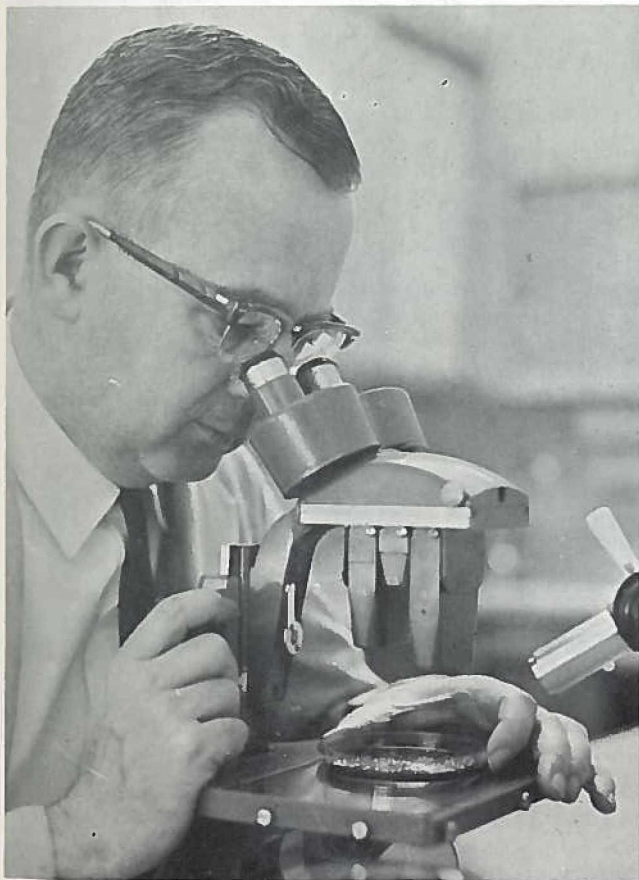
The first vaccine to control vibriosis in cattle was developed by CSU and released to cattlemen in 1965. The development of the vaccine climaxed five years of intensive research.

Vibriosis, a bacterial venereal disease of livestock, has cost western stockmen millions of dollars—but there is no precise way to determine the exact amount. The disease causes infertility and the number of calves is reduced, making it the most costly reproductive disease of beef cattle in the western range states.

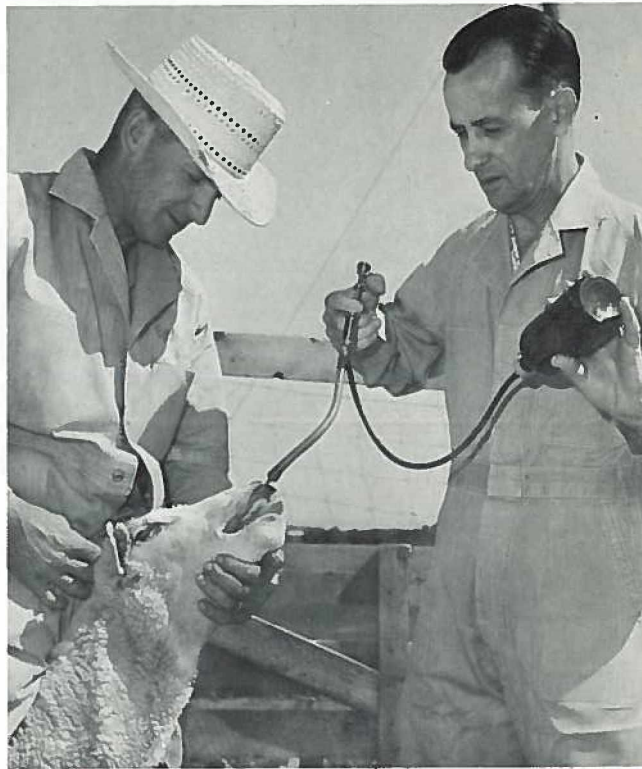
During the study, scientists found newly infected cattle herds where pregnancy rates varied from zero to 50 percent, with an average of around 30 percent. The percentage of cows weaning calves is one of the two most important factors in determining income for ranchers.

Development of the vibriosis vaccine will enable Colorado ranchers to prevent the disease and permit them to produce calf crops at or above the 75 to 80 percent average in the western range states.

A few years ago, vibriosis was a serious disease of sheep and a vaccine for sheep was developed at CSU. Tests this year showed ewes vaccinated two years ago are still immune to the disease.



*Dr. A. B. Hoerlein directed the team of CSU Agricultural Experiment Station and College of Veterinary Medicine scientists who isolated Vibrio fetus bacteria which led to the development of the vibriosis vaccine.*



*Ewes vaccinated with an oil-base vibriosis vaccine developed at CSU College of Veterinary Medicine, are fed live vibriosis germs to test their level of immunity to the disease. Ewes inoculated with the CSU vaccine have proved immune to the disease for 2 years.*

## Animal Science

About 40 percent of the 850,000 to 900,000 fat cattle marketed annually in Colorado are heifers.

One of the problems in feeding heifers is to keep them from being bred prior to being placed in the feedlot. For several years, Agricultural Experiment scientists have been testing hormones which will prevent conception in yearling beef heifers until they reach the feedlot.

A new progestin type compound, Promone, produced by a major drug firm, has proven successful in CSU tests. Ear implants of 300 milligrams of Promone in 1964 prevented conception for 140 days. In addition, heifers treated with the hormone produced heavier carcasses and higher grading carcasses than non-treated heifers.

Earlier work with the compound showed it in-



*Colorado ranks fifth among the 32 cattle feeding states in the number of cattle fed for slaughter. Research for this major industry is provided by the Colorado Agricultural Experiment Station. The department Animal science research also includes studies on range cattle production, meats, dairying, sheep and swine.*

creased the rate of gain in heifers both on pasture and in the feedlot. As yet, the hormone is approved only for research work. Scientists have been unable to find any residue of the compound in carcass tissues, indicating the material should be approved for commercial use in the future.

### **Botany and Plant Pathology**

About four percent of Colorado's annual \$2½ to \$5 million peach crop could be saved through use of a new type of individual paper wrap developed in cooperation with the Colorado Agricultural Experiment Station.

About four percent of Colorado's peaches are lost during shipment due to decay—*Rhizopus* rot. *Rhizopus* rot is a mold which can start in one piece of fruit and soon spread to the entire shipment.

Paper wraps impregnated with a new fungicide (Botran) effectively halts spread of the mold.

### **Chemistry**

A new process for the preparation of fresh-flavored instant applesauce powder has been developed by the chemistry section of the Colorado Agricultural Experiment Station. The natural fresh flavor of the apple is retained to a remarkable degree and the product rehydrates immediately when cold water is added.



*Effectiveness of Botran in preventing Rhizopus rot in peaches is shown here. Containers top left and top center were treated with another experimental material after being inoculated with Rhizopus organisms. Peaches on top row right were treated with a 500 parts per million solution of Botran. Those on bottom left were treated with a solution of 1,000 ppm. solution of Botran. Peaches in bottom row center and right were not treated after inoculation.*

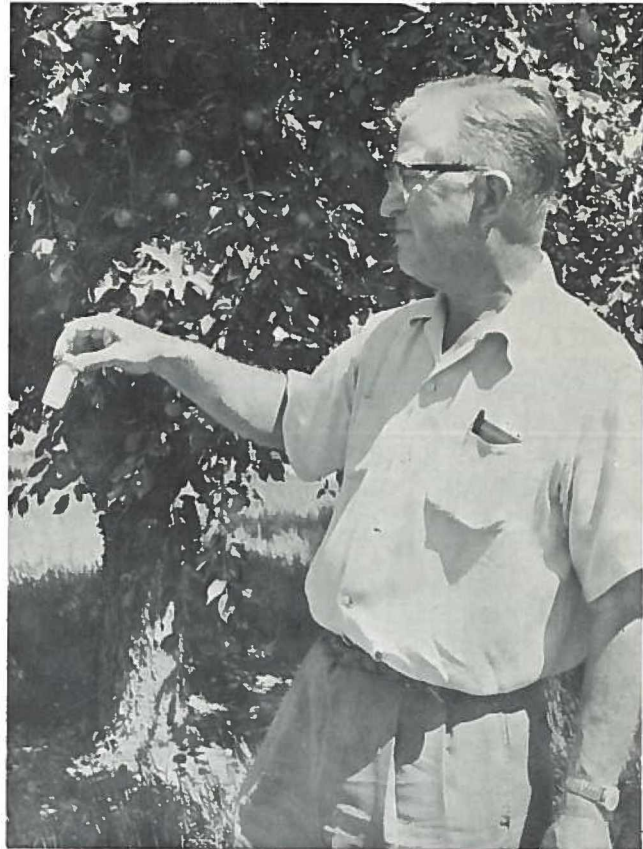




*Considerable savings to potato growers could result in the use of this "spore trap." The trap holds a glass slide coated with Vaseline. By checking the traps periodically, scientists can determine the number of early blight spores present and advise potato growers when and if sprays are necessary. Some growers have sprayed too soon for the potato disease so that the material was not effective. CSU studies showed three properly timed sprays controlled the disease as well as with seven applications.*

The process offers an improved method for utilization of apples in the form of a powder possessing superior flavor to commercial powder and canned applesauce being produced today.

A patent has been received for a wound healing material in plants. The material, hydroxyhydroquinone and its derivatives, stimulate wound healing in plants. With the material it is possible to cut potato seed pieces one or two months prior to planting.



*The powder contained in this small bottle will make a small serving of tasty applesauce when two tablespoons of water are added. Instant apple sauce is made by vacuum freezing and drying uncooked apples. The powder can be stored at room temperature until ready for use.*

## Civil Engineering

A statewide network monitoring water table levels was expanded in the High Plains area and in the San Luis Valley during the year. Information from measuring stations provide important information for evaluating local and state ground water supplies.

Reports on ground water levels are vital in development of the state's water resources and also provide further knowledge of ground water hydraulics.

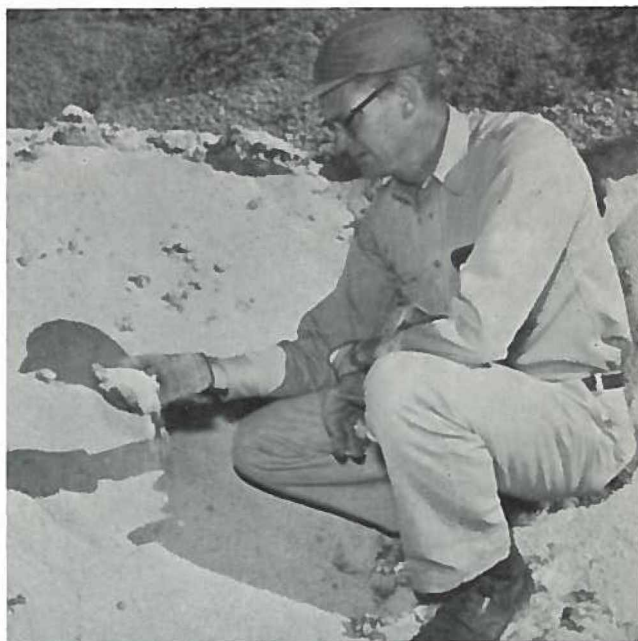
With the increasing value of water to the state of Colorado, the civil engineering section is continuing research to improve the accuracy of water control and measurement.

Research to conserve water which is lost from irrigation canals and reservoirs through seepage also was continued. Past research has provided methods of sealing ditches and ponds with low cost bentonite.

During the past year assistance was provided to contractors in evaluating and developing clay deposits and work was started to evaluate chemical agents such as soda ash and common salt as low cost sealing materials.



*This "wing"—a cross between a kite and balloon—was used to lift instruments into mountain storm clouds to gain improved understanding of cloud formation and development. Ultimate goal of the study is to understand the processes which bring moisture to the state and possibly increasing precipitation.*



*Clay deposits such as this are largely undeveloped in Colorado, mainly because there has been little demand for the product. Quality varies widely, but much of the clay can be used to seal leaking streams, canals and ponds, which have been estimated to lose as much as 2,500,000 acre feet of water per year.*

## Economics

Colorado has one new business partially as a result of an economic study of the Colorado pork industry by the CSU economics section. And a second business is on the horizon.

Sigman Meat Company, partially on the basis of information developed in the analysis of the state's pork industry, decided to establish a new hog processing plant at Brush.

Establishment of a frozen potato processing plant in the San Luis Valley is probable. The "Colorado

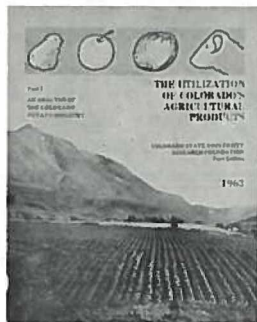


Potato Processors Cooperative, Inc.," has been incorporated and plans are underway to build a \$1.2 million processing plant and fresh potato

shipping plant. This plant also was in part augmented from research findings on the state's potato industry.

Today's farmer is caught in what is termed the "cost-price" squeeze. Many agricultural products are sold by the farmer at prices little changed from 20 years ago. Yet the farmer's costs of machinery, labor, taxes and other items for his business have increased greatly.

Colorado is participating in a regional project to help farmers determine profitable farming adjustments. One of the major cost items under the control of the farmer is machinery.



The Colorado study has analyzed basic machinery costs for eastern Colorado wheat farms. The report indicates how farmers might reduce costs through secondhand machinery, hiring work done, ownership of machinery jointly with other farmers, and use of larger machines.

## Endocrine

Esmopal, a compound related to natural female sex hormones, was released as a fattening agent in chickens by the U. S. Food and Drug Administration following research by the endocrine section at Colorado State University.

Ever since stilbestrol was outlawed for this purpose by the FDA in 1960, there has been a concentrated effort to find a substance to take its place. Research resulted in the approval of Esmopal.

Esmopal has the effectiveness of stilbestrol in giving good carcass quality in chickens but does not leave residues in carcasses of treated birds.

Although approved for use in chickens, CSU researchers are still working for clearance of the compound which is also effective as a fattening agent for turkeys.

## Entomology

Some potato growers have found their insect problems are right in their own back yard, literally.

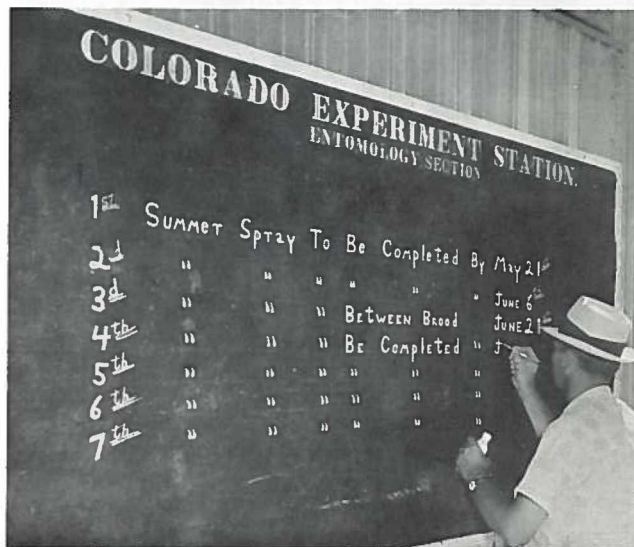
One of the pests of potatoes is the green peach

aphid, which was once thought to move into the potato producing areas from other locations. Research at CSU showed, however, that this insect's flights are usually less than 250 yards and the flights are not migratory, but rather local dispersal flights.

Further study showed that the green peach aphids headquartered in back yard peach trees or other wild or abandoned fruit trees throughout the potato growing areas. Growers were advised that controls in their own back yards are much more important than attempting to prevent movement from one region to another.

Other current entomology research concerns:

- Development of "integrated" control for fruit insects, which takes utmost advantage of beneficial insects and other natural con-



A state-wide network to sample insect populations is operated during the growing season by the CSU entomology section. Findings alert farmers and ranchers when to apply insect controls. The insect survey is often looked upon as a service function—but it also has research aspects. Information from the surveys provide much valuable knowledge on the occurrence and development of insects. Here a survey entomologist posts suggested spray dates for local fruit growers. State-wide, estimated total savings to Colorado agriculture through prompt application of control measures—or avoiding unnecessary spraying—was estimated at nearly \$8 million.

trol measures. Thus chemicals are used at critical times only, reducing reliance upon chemicals and costs to growers.

- Use of sex attractant traps for studying time of appearance, distribution and control of codling moth and oriental fruit moth.
- Screening of new chemicals to determine the best ones for insect control.
- Use of certain colors to repel aphids and means of attracting greater numbers of beneficial insects.

## Forestry and Range Management

Research on Engelmann spruce at CSU has resulted in increased use of Colorado produced wood. As a result of the research, mechanically rated Engelmann spruce and lodgepole pine are accepted by the Federal Housing Administration and the National Home Builders Association. Several Colorado cities have revised their building codes to include locally produced lumber.

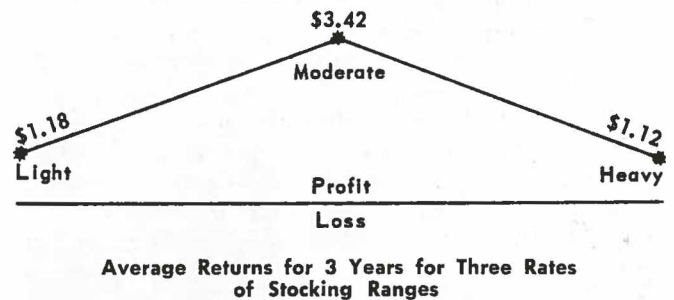
Previously, much Colorado lumber was considered inferior, until CSU studies revealed the mechanical stress ratings of the lumber greatly exceeded many minimum construction specifications.

A study of the plains pocket gopher's diet revealed about 64 percent of it is grass. This means that when gopher populations are high there is competition for forage between cattle and gophers. Gopher control would result in improved ranges for grazing.



*Test stands such as this one were made to show Colorado woods exceeded minimum construction specification. Test results have gained increased acceptance and use of Colorado forest products.*

The study also indicated prickly pear is an important food and water source for the mountain pocket gopher where it occurs on shortgrass plains. These findings suggest control of prickly pear may influence gopher populations.



When all economic factors are considered, cattlemen can obtain the greatest profit per acre of land through moderate grazing rates. Moderate grazing also results in conservation or improvement of grass species, while forage production declines with intense stocking rates, CSU studies show.



*The Pocket Gopher competes with range cattle for grass.*

## Home Economics

Cholesterol—that substance in the blood that has been linked to heart attacks—is one of the subjects of research in CSU's home economics section. And other basic studies there may lead to improved human health after further research is conducted by the medical profession.

Nutritional studies with guinea pigs in the home economics section indicate ascorbic acid may decrease blood cholesterol when fed under certain conditions.

Other studies on cholesterol have been carried into the kitchen. In CSU's High Altitude laboratory various shortenings are being tested on different types of baked products prepared at high altitude. The choice of shortenings is based on fat products which have been shown in nutritional studies to affect blood cholesterol levels.

In another study, home economics scientists have found that higher levels of Vitamin A will reduce the phenylalanine content of the plasma in rats. Phenylalanine is the amino acid which accumulates in the blood of infants who may suffer a hereditary defect. The acid causes mental retardation. This basic finding may result in a method to reduce the number of retarded children who have this defect.



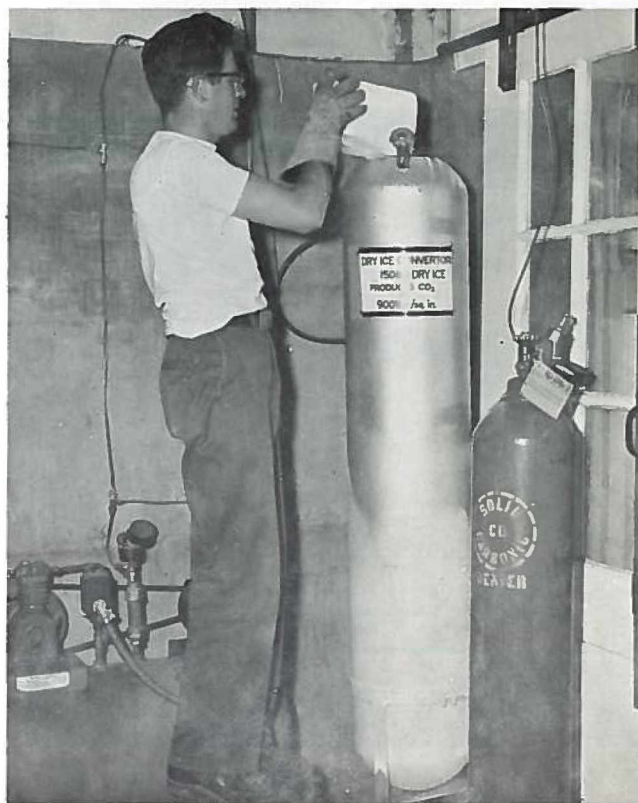
*Evaluation of fabrics is done by the home economics section of the experiment station. This instrument is the flex-tester used to measure resistance of fabric to flexing and bending. Fabrics may flex hundreds of times without breaking. The instrument will test either wet or dry fabrics and is used also to study fabric finishes.*

## Horticulture

A new era in greenhouse plant growing is being developed in horticultural research at CSU.

Earlier CSU studies demonstrated the value of atmospheric fertilization or use of an artificial atmosphere for the greenhouse. Horticulturists found that adding carbon dioxide to the atmosphere greatly increased yield and quality of carnations and roses. They found carbon dioxide was the limiting factor in growth of plants in the greenhouse during winter.

Current studies are designed to determine the proper amount of carbon dioxide and sources of the gas. Horticulturists have found that carbon dioxide generators using natural gas are a safe, low-cost source of carbon dioxide for the greenhouse.



*One of the sources of carbon dioxide for the greenhouse is dry ice. It was one of the sources tested by the CSU horticulture department. Earlier studies showed plant growth can be increased 10 to 15 percent with the addition of carbon dioxide to the greenhouse atmosphere.*

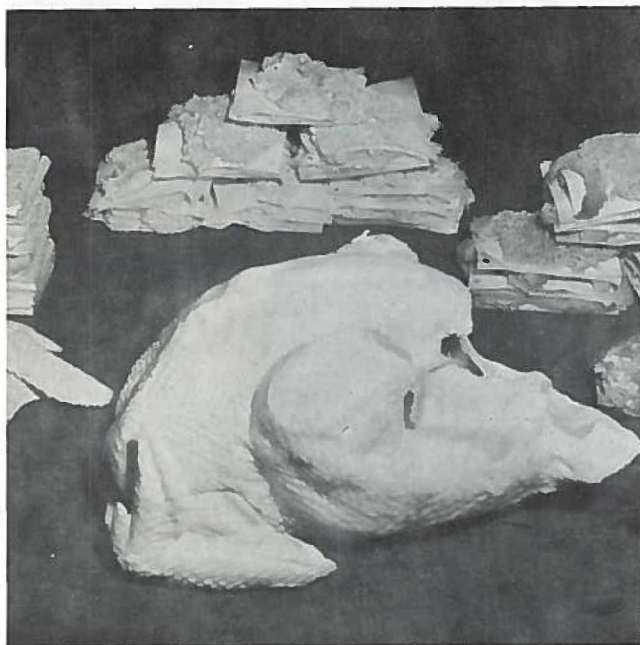
## Poultry

Turkey is considered by many consumers as a "holiday" meat. And the large size of turkeys today makes the bird a natural selection when the whole family gets together.

To avoid being a seasonal industry, turkey producers are looking for a year-round market. And this suggests smaller portions of the giant bird.

Consequently, CSU poultry research has included work on the sale of turkey parts. Studies show a turkey carcass can be made into turkey steaks. A 26-pound live weight turkey will produce a 21-pound carcass or 12 pounds of boneless meat, the CSU study shows. In addition, there is another 3 pounds of salable items such as wings, neck and giblets after boning.

The poultry section study also has evaluated cooking and processing methods in order to help the industry move to a new marketing system.



*These boneless steaks are from the turkey drumstick and thigh. The three steaks make a convenient consumer package for a family of three or four, depending on the size of the bird. A new method for pulling tendons from the turkey legs was developed by CSU poultry scientists, opening the way for more processors to bone out turkey drumsticks.*



## Information and Publication

So that research can make its contribution to the state's farmers, ranchers and agricultural business, results must get into the hands of these people. The Colorado Agricultural Experiment Station uses a number of methods to get research results to those who can apply them.

The station holds field days and special meetings. County extension personnel are provided research reports through state extension specialists, and research reports are published in bulletins, magazines, pamphlets and newsletters. Stories on research results are provided to the state's daily, weekly and farm papers. Radio programs, featuring research reports, are provided to radio stations in the state, and scientists discuss their research on radio and television programs.

Getting research results to the public through publications and broadcasting is the duty of the Information Service and Publications Office. In the past fiscal year these offices have written, edited, produced, processed, published and/or distributed the following:

- 277 news stories, including photographs, on research accomplishments, and educational meetings or events.
- 60 radio programs on research activities
- 76 Articles for scientific journals
- 5 Popular Bulletins
- 4 Technical Bulletins
- 18 General Series Publications
- 25 Progress Reports
- 18 magazines or newsletters
- Arranged numerous special appearances on radio and television

## General Series Papers

<i>GSP Number</i>	<i>Title</i>
809	Making Charcoal from Singleleaf Pinyon Pine and Utah Juniper
810	Looking into the Dairy Industry in Colorado
811	1965 Tree Fruit Spray Guide
812	Insect Control Guide—Cereal Crops
813	Insect Control Guide, Section III—Vegetable Crops
814	Insect Control Guide, Section IV—Fruit Insect and Control Schedule
815	Variety Trials and Tomatoes
816	Information for Seed Producers of Colorado 400-S
817	Water Supply Outlook for Colorado and New Mexico, Feb. 1, 1965
818	Water Supply Outlook for Colorado and New Mexico, Mar. 1, 1965
819	Water Supply Outlook for Colorado and New Mexico, Apr. 1, 1965
820	Water Supply Outlook for Colorado and New Mexico, May 1, 1965
821	Sorghum Hybrid Performance Tests
822	Mechanical Stress-Rating of Engelmann Spruce
823	Present Status of Weed Control in Sugar Beets and Other Crops
824	Corn Performance Tests, 1964
825	Beef Cattle Improvement Day
826	Insect Detection Summary

## Progress Reports 1964-65

<i>PR Number</i>	<i>Title</i>
129	Peach Rhizopus Decay
130	Dryland Forage Sorghum Tests
131	Grain Sorghum Tests, Southeastern Colorado
132	Winter Wheat Variety Testing, Southeastern Colorado
133	Safflower Testing
134	Winter Barley Variety Test, Southeastern Colorado
135	Broomcorn Field Test
136	Grain Sorghum Cultural Experiment
137	Evaluation of Herbicides for Control of Annual Weeds in Onions and Tomatoes
138	Tansy Mustard Control in Alfalfa
139	Small Grain Tests
140	Two Spotted Spider Mite Control on Corn
141	Onion Thrip Control
142	Protecting Peach Trees from Cytospora Canker
143	Spraying for Rhizopus Rot Control on Peaches
144	Soil Fumigation for Onion Diseases and Weed Control
145	Management of Seeded Ranges
146	Irrigated Forage Crops

147	Management and Improvement of Gambel Oak
148	Oat Variety Tests
149	Wheat Variety Tests, San Juan Basin
150	Barley Variety Tests, San Juan Basin
151	Bean Improvement
152	Small Grain Tests, Western Slope
153	Winter Wheat Variety Tests

## Technical Bulletins

<i>Number</i>	<i>Title</i>	<i>Author</i>
83	Evaluation of Colorado Clays for Sealing Purposes	Dirmeyer and Skinner
84	Partitioning Method of Genetic Analysis Applied to a Study of Weight Per Root and Percentage Sucrose in Sugar Beets	LeRoy Powers, et al
85	Attitudes and Plans of High School Students in Sedgwick County, Colorado	E. Robin and Sardo
86	Cost Analysis of Fluid Milk Production in Colorado	O'Connell and Snyder

## Popular Bulletins

<i>Number</i>	<i>Title</i>	<i>Author</i>
514-S	Weeds of Colorado	B. Thornton and Harrington
521-S	Costs of Farm Machinery on Colorado Wheat Farms	H. G. Sitler
522-S	Weed, Seed and Trash Screens for Irrigation Water	Pugh and Evans
523-S	Goals and Methods in Beef Cattle Improvement	H. H. Stonaker
524-S	Colorado 400 S: A New Silage Corn Hybrid for the Arkansas and Grand Valleys of Colorado	D. W. Crumpacker

## Scientific Papers

Ahmad, M. Masoud and Moreng, R. E.	"Response of Three Breeds of Gallus to Elevated Environmental Temperatures." <i>Poultry Science</i> . (Sci. Series 972)
Altman, Jack and Lawlor, Sue.	"Effect of Six Chlorinated Hydrocarbons on Certain Soil Bacteria." <i>Journal of Applied Bacteriology</i> . (Sci. Series 1021)
Altman, Jack and King Mon Tsue.	"Changes in Plant Growth with Chemicals Used as Soil Fumigants." <i>Plant Disease Reporter</i> . (Sci. Series 1023)
Bauer, A. and Lindsay, W. L.	"The Effect of Soil Temperature on the Availability of Indigenous Soil Zinc." <i>Soil Science Society of America Proceedings</i> . (Sci. Series 966)

- Black, A. L. and Whitney, R. S. "Phosphorus Status of Horizons of Four Loessial Soils in Colorado." *Soil Science Society of America Proceedings or Agronomy Journal*. (Sci. Series 1020)
- Bowman, Ferne. "Basic Breads." *The 1965 Yearbook of Agriculture*. (Sci. Series 984)
- Branson, Terry F. and Simpson, Robert G. "The Effects of a Nitrogen Deficient Host and Crowding on the Corn Leaf Aphid, *Rhopalosiphum maidis*." *Journal of Economic Entomology*. (Sci. Series 1025)
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McCambridge, W. F., B.S. Entomologist  
McKnight, M. E., M.S. Entomologist  
Miller, Robert L., B.S. Research Forester  
Mueller, Lincoln A., B.S. Technologist  
Nagel, Roy H., M.S. Entomologist  
Olsen, S. R., Ph.D. Senior Soil Scientist  
Paulson, H. A., M.F. Range Conservationist  
Peterson, Geraldine P., B.S. Statistician  
Peterson, Roger, M.A. Plant Pathologist  
Price, Raymond, M.S. Director, Rocky Mountain Forest  
Experiment Station  
Range Conservationist  
Reid, Elbert H., B.S. Range Conservationist  
Reid, Vincent H., B.S. Biologist  
Richardson, E. V., B.S. Hydraulic Engineer  
Roebecker, Melvin, B.S. Soil Scientist  
Robinson, A. R., M.S. Agricultural Engineer  
Ronco, Frank, Jr., B.S. Forester  
Schaal, Lawrence, Ph.D. Associate Plant Pathologist  
Shawcroft, R. W., B.S. Soil Scientist  
Sittler, Harry, M.S. Agricultural Economist  
Smith, D. R., B.S. Range Conservationist  
Tanner, H. A., Ph.D. Fisheries  
Townsend, Charles, Ph.D. Research Geneticist  
Viets, F. G., Ph.D. Technical Staff Specialist  
Washichek, J. N., B.S. Hydraulic Engineer  
Watanabe, F. S., M.S. Soil Scientist  
Whitfield, C. J., Ph.D. USDA Liaison Representative  
Wilford, B. H., Ph.D. Entomologist  
Wvgant, Noel D., Ph.D. Entomologist  
Yeager, Lee E., Ph.D. Game Management\*\*

## Financial Report for Year Ending June 30, 1965

RECEIPTS 1964-65					DISBURSEMENTS BY CLASSIFICATION FOR FISCAL YEAR ENDING JUNE 30, 1965										
Funds	Carryover 7-1-64	Receipts from U.S. Treasurer	Receipts from other Sources	Total Income	Personal Services	Contribu- tions to Retire- ment	Labor	Travel	Equip- ment	Land and Struc- tures	Live- stock	Supplies and Materials	Total Disburse- ments	Balance 6-30-65	Total Disburse- ments & Carryover
Hatch		429,958.00		429,958.00	315,435.06		39,047.09	11,236.79	18,081.33	1,988.08		44,169.65	429,958.00		429,958.00
RRF		247,395.00		247,395.00	166,973.91		16,134.33	10,068.01	19,436.53			34,782.22	247,395.00		247,395.00
McIntire-Stennis	8,882.96	17,221.00		26,103.96	13,588.69		2,009.49	1,925.14	1,904.29			4,178.56	23,606.17	2,497.79	26,103.96
State Appropriation			1,383,248.00	1,383,248.00	751,622.79	65,160.87	78,520.96	31,720.70	33,263.25			422,959.43	1,383,248.00		1,383,248.00
Vibrio Tax	6,204.81		873.89	7,078.70									None	7,078.70	7,078.70
Sales Income	(15,360.56)		311,365.35	296,004.79	2,755.50	118.08	31,429.57	5,574.33	21,865.60		30,485.66	218,073.87	310,302.61	(14,297.82)	296,004.79
Service Income	(2,200.54)		97,165.79	94,965.25	5,595.43	494.71	24,636.92	1,476.29	5,388.99			37,921.86	75,514.20	19,451.05	94,965.25
Trust & Agency	20,632.27		65,556.03	86,188.30	12,560.29	220.23	5,592.45	2,891.47	2,439.04			37,866.97	61,570.45	24,617.85	86,188.30
Foundation Seed	8,425.24		6,114.50	14,539.74	890.88	53.40	1,579.26	844.87				2,151.25	5,519.66	9,020.08	14,539.74
ARS Contracts	(18,169.31)		64,498.92	46,329.61	22,709.53	1,087.11	33,892.45	1,852.85	87.51			7,604.63	67,234.08	(20,904.47)	46,329.61
<b>TOTAL</b>	<b>8,414.87</b>	<b>694,574.00</b>	<b>1,928,822.48</b>	<b>2,631,811.35</b>	<b>1,292,132.08</b>	<b>67,134.40</b>	<b>232,842.52</b>	<b>67,590.45</b>	<b>102,466.54</b>	<b>1,988.08</b>	<b>30,485.66</b>	<b>809,708.44</b>	<b>2,604,348.17</b>	<b>27,463.18</b>	<b>2,631,811.35</b>



*The Colorado Agricultural Experiment Station is one of the agencies cooperating with the Soil Conservation Service in making snow surveys and water flow forecasts. Information from these surveys and forecasts is used by farmers, ranchers,*

*municipal water systems, irrigation companies, and power firms to guide their operations during the summer. This massive drift was near snow survey courses on Buffalo Pass northeast of Steamboat Springs during the winter of 1964-65.*

To simplify terminology, trade names have been used. No endorsement of products named is intended, nor is criticism implied of products not mentioned.