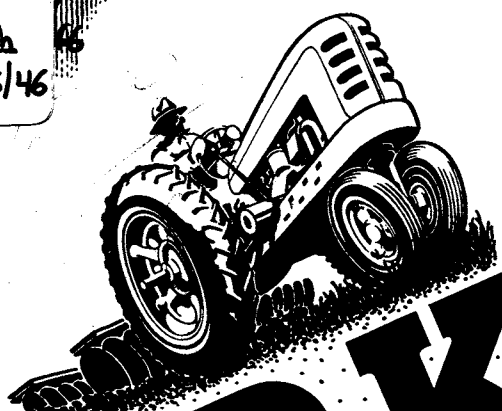


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COLORADO... AGRICULTURAL EXPERIMENT... STATION.....

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and Mechanic Arts

59th ANNUAL REPORT

Letter of Transmittal

Fifty-Ninth Annual Report

Colorado Agricultural Experiment Station

Hon. John C. Vivian
Governor of Colorado
Denver, Colorado

Sir:

In compliance with the law, I herewith present the Fifty-Ninth Annual Report of the Colorado Agricultural Experiment Station for the fiscal year of July 1, 1945 to June 30, 1946, inclusive.



Acting Director

*Fort Collins, Colorado
July 1, 1946*

Director's Annual Report

Fifty-Ninth Fiscal Year 1945-46

Colorado Agricultural Experiment Station

To the President and State Board of Agriculture:

The Trend in Agriculture

Colorado Agriculture continued to draw heavily on its resources in this period of scarcity immediately following the war.

The program of the Experiment Station must be geared to the triple functions of aiding agriculture in its depleted resources, and in meeting the economic problem of anticipated surpluses and resultant keen competition.

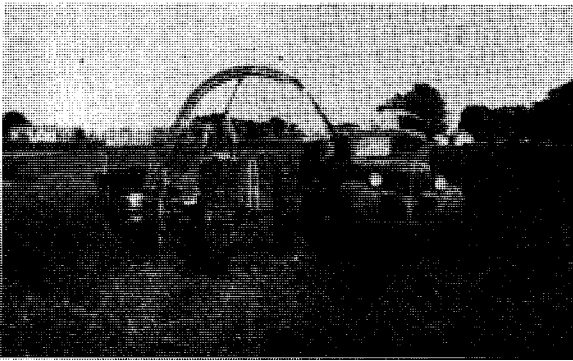
We face an immediate problem of rebuilding soil fertility which has been depleted to the danger point. We must meet this problem by expanding research on soil fertility, application of fertilizers, crop rotation, water utilization, and diversification to provide balance between crops and livestock.

The several transmountain water diversion projects in the State increase sharply the need for such research. Formation of the Institute of Irrigation Engineering this year, more closely integrating the Agronomy and Civil Engineering Sections as well as parts of other Sections, will facilitate needed research in this field.

Industrialization of agriculture is in full swing. The Experiment Station is well prepared to continue its efforts on means of mechanization and simplification of farming operations. The work

on sugar beet machinery is being supplemented by a project on methods of handling hay to yield the highest nutritive value with the least effort.

The economic problems of agriculture are being met by continued research to enable the greater production of higher quality



Field chopper cutting and chopping hay and depositing it in a truck for hauling to trench silo at the Experiment Station.

plant and animal products through improved breeding and cultural, handling, and processing practices. The goal is to eliminate the production of culls or non-marketable products. Studies on improved marketing of peaches and potatoes are planned in cooperation with the U. S. Department of Agriculture. Developments in consumer pre-packaging are being followed. Means of utilizing agricultural surpluses economically are constantly being sought.

The problems of an industrialized agriculture are numerous and intensified. The Experiment Station must be adequately staffed and financed and must have a sufficiently broad and flexible program to anticipate or at least keep abreast of the needs.

Station Program

The Experiment Station program for the past year has not materially changed from the war-time basis because of the continued heavy demand for agricultural products and the continued scarcity of labor, materials, and equipment.

Summary of Research Results

Crops

Fundamental research on barley genetics has provided stock for the hybridization program from which barleys of good commercial value are being developed.



The arrows point to smutted heads of barley in test plots where smut-resistant barley is being developed.

The small-grain hybridization program is providing for test barleys showing resistance to smut and stripe, wheats showing resistance to bunt and rust, and oats showing resistance to loose smut. Under funds from the Plant Disease Control Bill, 35

strains of wheat out of some 7,000 tested show promise of resistance to black stem rust.

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Increase and release of foundation stocks were made to farmers of Ward Winter barley, Lico and Trebi barley, Wichita Winter wheat, and Bannock, Colorado 37, and Brunker oats. By this means standard varieties are kept relatively pure and true to type.

Colorado hybrid corns of much promise are being developed. Commercial hybrids not suitable for Colorado are being screened out. Since this program was inaugurated, use of hybrid corn has increased to 20 percent of dry land corn acreage and 85 percent of irrigated corn acreage. Hybrid corn has out-yielded standard open-pollinated varieties by as much as 12 percent or more.



Hybrid corn seed in the making.

Ranger and Buffalo alfalfa have been found sufficiently productive, winter hardy, and wilt resistant to be recommended for seeding in Colorado. A selected Hardistan has been materially improved in seed-setting characteristics. The Colorado-produced variety, Meeker Baltic, has been registered. Ladak was the highest yielder and Hardistan the lowest in high-altitude tests.

Soils

Efforts are continuing in cooperation with the Soil Conservation Service to make soil surveys and land classifications more useful and more readily related to productivity. Agreement was reached with SCS and the Bureau of Plant Industry, Soils, and Agricultural Engineering on areas in which soil surveys will



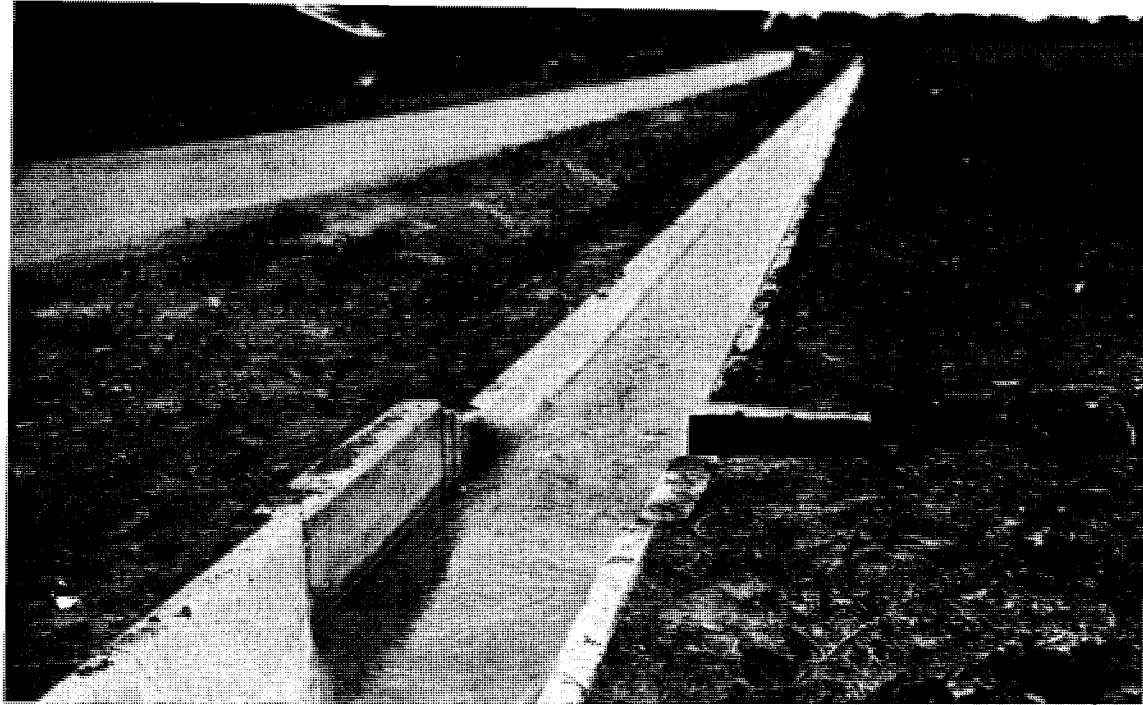
Alfalfa test plots at the San Luis Valley Demonstration and Experimental farm. Differences in wilt-resistance and winter hardiness show up in these plots.

be made this year. The Station is cooperating closely with SCS and the Bureau of Reclamation in salinity studies to ascertain what happens in soils under irrigation, and to determine what soils are suitable for irrigation and how to maintain their productivity. Present evidence indicates that irrigated lands generally are producing at about half their potential yielding ability because of failure of fertility or because of other soil relations.

Work on factors affecting availability of mineral nutrients in soils continues to show that nitrogen and phosphorus are the elements most likely to be deficient in Colorado soils. This is particularly true of high-altitude forest soils. In studies on the effect of leveling on irrigated land, it was found that the exposed subsoil was very low in available nitrogen and phosphorus. These deficiencies could be made up to a large extent by liberal use of manure and phosphates. The Experiment Station is assisting in educating farmers to the need for increased use of commercial fertilizers to overcome deficiencies of plant nutrients.

Irrigation

Efficient and equitable distribution of irrigation water has been furthered in the application of improved portable forms for casting small Parshall measuring flumes. Especially designed channels have been developed to carry away more efficiently the bedload trapped out of irrigation channels. Sand traps have also



Two-inch-thick concrete lining on this 18-inch lateral saved nearly half an acre-foot of water daily by reducing seepage losses 93 percent.

been designed and put into use. Tests of a particular make of automatic check gate valve used in pumping plants show that loss of head is small and is inversely proportional to the size of the discharge. Preliminary results show that 2-inch concrete lining on an 18-inch lateral ditch saved nearly half an acre-foot of water daily by reducing seepage losses about 93 per cent. Road oil and bentonite linings saved 70 and 65 per cent respectively.

Forecasts of runoffs have been improved by more accurate snow-course measurements and analyses. Aerial surveys of snow courses promise to be adequately accurate and much easier to make.

In cooperative work with the Soil Conservation Service, it was again shown that proper light irrigations gave as good yields of potatoes and sugar beets as did heavy irrigations. Early irrigation and irrigation in every other furrow increased the yield of potatoes. Farmers as a whole are not aware of what constitutes proper irrigation practices. Work in this field is being intensified.

Ground water levels in the Big Sandy Valley justify expansion of irrigation farming by pumping, whereas the levels in Prospect Valley are falling because of overuse.



Applying different amounts of irrigation water made the difference in these two rows of potatoes.

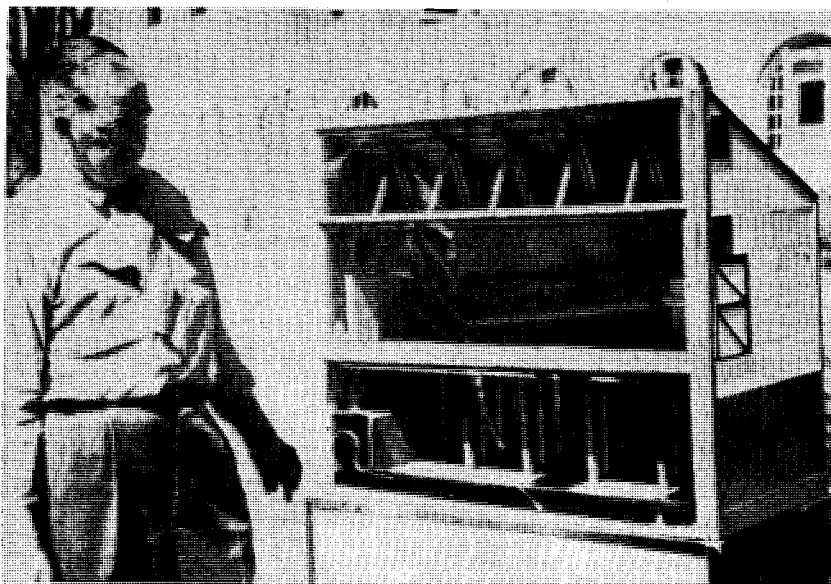
Machinery

In a project cooperative with USDA representatives, beet seed planters have been improved by mechanical modifications and by study of planting factors. Mechanical thinning was found very slightly less effective than hand thinning while reducing labor to 20 percent. Mechanical cross-blocking and cross-cultivating reduced yields to 91 percent but reduced labor to 31 percent. Mechanical harvesters are in successful commercial production with reduction of labor to one-third and costs to one-half. These developments will put the industry on a self-sustaining competitive basis and are essential to its very life with the anticipated serious farm labor shortage.

In further cooperation with USDA representatives, improved construction of commercial facilities for onion and potato storage with forced circulation and conveyor handling has resulted in appreciable improvement in preservation of quality.

Increased accuracy and uniformity in the application of insecticidal and fungicidal dusts to experimental plots was gained

by the development of a precision feeding device to field crop dusters.



This model of storage for potatoes showed the way to improving ventilation.

Fruit

A series of varieties of apples and peaches have been recommended for new plantings to extend early and late periods of harvesting. Biennial sweet clover continues to be the best cover crop for apples in Delta County.

In fertilizer studies with peaches, phosphate treatments hastened maturity. Ferrous sulphate placed in drilled holes around the roots alleviated chlorosis of peach trees.

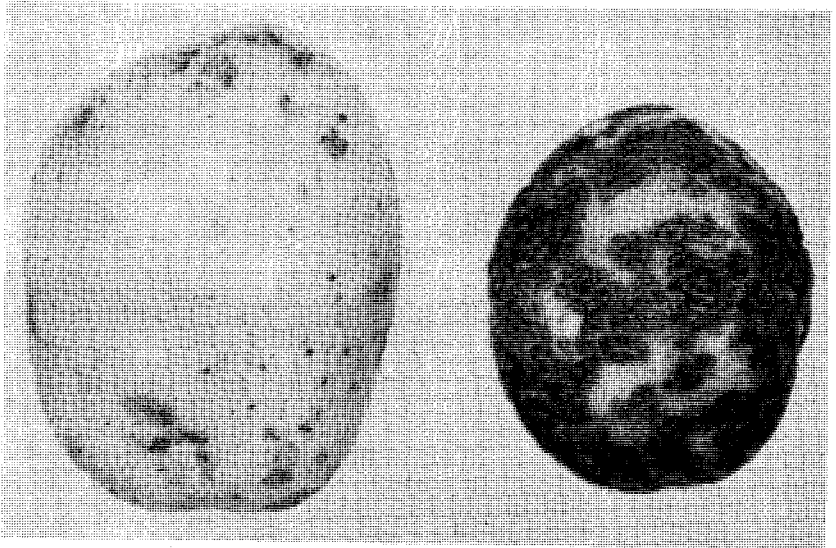
This year 2,000 peach seedlings were budded for studies of peach mosaic. New forms of this disease have been segregated and it is hoped that antagonism of the very mild strain to the severer strains may eventually furnish a means of immunizing against the latter. The "X" disease of peaches is under continuous observation and the State Bureau of Entomology and Plant Quarantine is eradicating these as they are discovered.

Rasp leaf of sweet cherries is being studied. Preliminary recommendations for the control of the several cherry fruit worms have been prepared.

DDT was spectacularly successful in controlling the codling moth on pears. However, precautions in the amounts of DDT applied must be followed since methods of removal of DDT residues on fruits to keep them within the anticipated tolerances have thus far not been satisfactory.

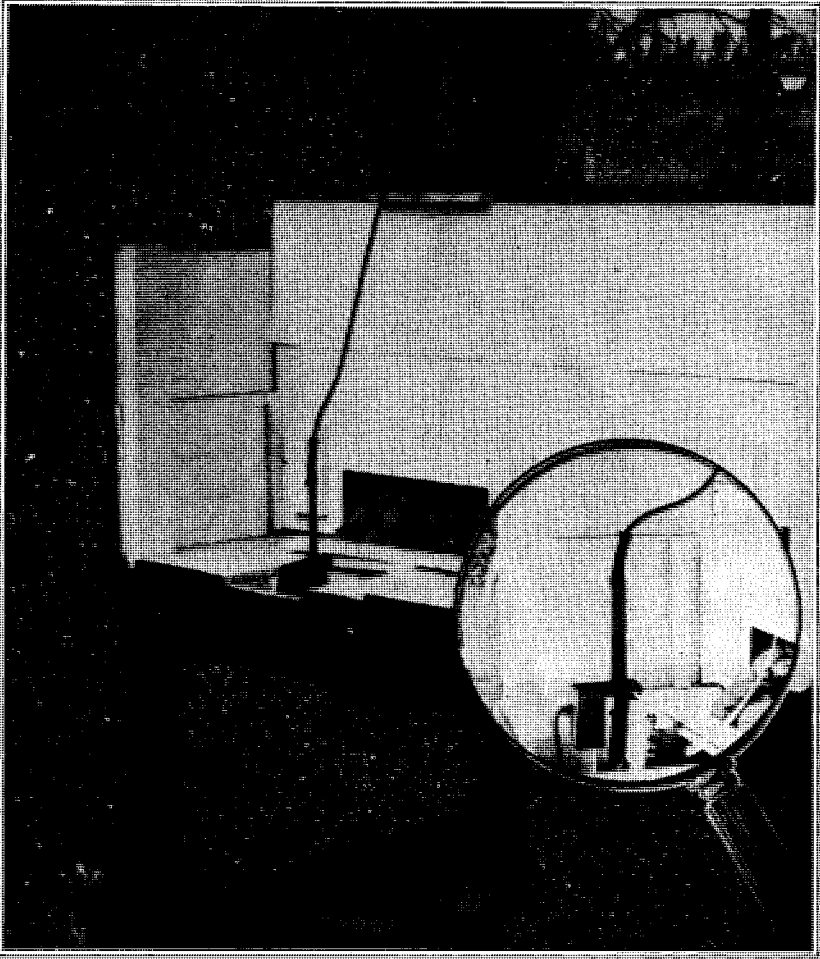
Vegetables

Yields, grade, quality, and red color of potatoes in the San Luis Valley were improved by complete fertilizers and traces of copper, manganese, and iron. No significant effects were noted on cooking quality. In cooperative work with the USDA a scab-resistant variety of potato of high yield and quality has been tested and is about ready for release.



Left: A new scab-resistant potato—No. 6317. It was grown in the same soil as the scabby spud on the right.

Boiling water and a 1-to-500 bichloride of mercury solution have proved to be the only satisfactory means of sterilizing seed potato cutting knives for bacterial wilt and ring rot. A double-edged stationary seed potato knife has been developed as a time saver and as a supplement to the rotary knife. Utilization of ultraviolet light in detecting virus diseases of potatoes promises to be highly practical, but the overlapping of virus symptoms within the different types of fluorescent groups must be corrected. Psyllid injury appears to influence this, tests show. Nevertheless, these Colorado findings are in use commercially in the East for the elimination of seed stock tubers infected with leaf roll viruses.



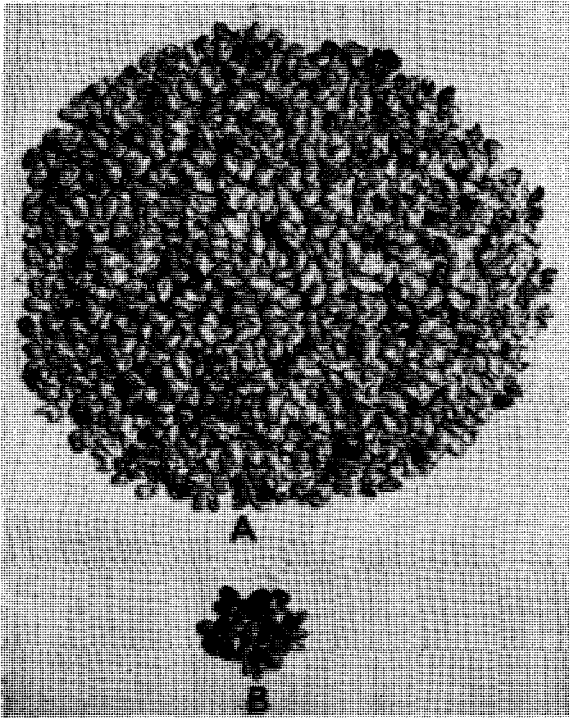
This double-edged stationary cutting knife for seed potatoes has been developed as a time saver.

DDT has been found highly successful in controlling the psyllid and flea-beetle on potatoes. There is strong evidence that an insect is associated with tuber net necrosis.

An answer to the control of fruit rot of tomatoes by ridging, proper use of irrigation water and proper spacing of plants and also by the use of copper sprays or dusts or copper sulphate in irrigation water has been developed.

A thrip-resistant Denver line of onion shows promise out of over 700 lines being tested. DDT has proved highly efficient in controlling thrips.

Seed treatments failed to control root rot of peas, although such treatment delayed infection and increased length of picking time. Use of fertilizers tended to increase yields and length of picking time. Efforts are continuing to find varieties resistant to root rot.



A: Beans injured by the bean cutworm in 100 feet of untreated row—2,972 of them. B: Beans injured by the cutworm in 100 feet of row treated with DDT—23 of them.

A hybrid Giant Pascal celery has been introduced by the Station which is resistant to celery yellows or wilt, a soil-borne disease of celery. This is now being successfully grown in all celery districts of the State.

Two rust-resistant lines of pinto beans designed for irrigated lands are being prepared for release in a cooperative project with the USDA. The bean cutworm was controlled effectively by DDT dust.

Range Management

Russian intermediate wheatgrass used for reseeding abandoned croplands in the foothills and lower mountains of north-eastern Colorado gave better pasture and hay yields than standard reseeding mixtures. For eastern Colorado, intermediate wheatgrass, crested wheatgrass, and smooth brome were superior to standard crested wheatgrass, Russian wild rye, green needlegrass, and African weeping lovegrass.

Chemical analyses of forage plants continue to show that the protein and phosphorus contents are low from midsummer to spring. Mountain park meadow hays were low in phosphorus,

especially under limited or no irrigation. Palatable shrubs are proving to be higher than grasses in protein content. Studies continue to demonstrate that marginal and submarginal croplands can be returned to improved pasture cheaply, thereby conserving the soil and returning a stable income from livestock. Conservative use of native range assures a more constant income of meat products and grass and better range and soil conditions. The anticipated dry cycle will reduce the carrying capacity of Colorado ranges.

Beef Cattle

A steer-calf feeding trial at the Akron Substation has substantiated the results of previous years in showing that gains made by feeding protein supplement to calves in wintering were largely lost subsequent to summer grazing.

Preliminary results on a broad study of the vitamin A nutrition of beef cattle point to a deficiency of carotene (plant form of vitamin A) in winter range forage in many areas of Colorado. Native hay has shown much higher levels of this vitamin than sorghum fodder or winter range forage. Best gains of beef calves this winter have been produced thus far by supplementing cane fodder and soybean meal with 2 pounds of alfalfa hay daily. Alfalfa silage when properly put up maintained its vitamin A content at a higher level than alfalfa hay. It is therefore a valuable supplement to a ration otherwise low in vitamin A.

Chemical studies show that first-calf heifers require more carotene for reproduction than aged cows. That vitamin A may be concerned in the development of telangiectasis, "sawdust", and abscessed livers was evidenced by the fact that these abnormalities of the liver increased during the fattening of cattle in the feedlot while the amount of vitamin A in the livers decreased. This possibility is being investigated at the present time through the feeding of graded levels of vitamin A to different lots of steer calves in the feedlot.

Dehydrated potatoes showed a feed replacement value equal to corn when charged at the same price. The addition of corn silage to alfalfa was of doubtful value.

The rickets-like difficulty in beef cattle, not due to calcium, phosphorus, or vitamin D deficiencies, appears to be approaching solution. Copper and thyroid relationships are under intensive investigation.

The amount of vitamin B complex in rumen contents of slaughtered cattle has been shown to be adequate to justify drying this waste material from packing houses as a vitamin supplement for poultry and swine rations.

Sheep

In fattening lambs, dehydrated cubed potatoes gave excellent results as did wheat and dried beet pulp. Alfalfa-acid silage was again demonstrated to be an excellent feed.



Lambs eating dehydrated cubed potatoes. This proved to be an excellent feed for fattening lambs.

An intensified study has been initiated to ascertain the life cycle and the control of the fringed tapeworm of sheep.

Wool shrinkage studies on commercial clips are being expanded with the cooperation of the Extension Service. This is service work for wool growers. Studies of fiber quality are being done in cooperation with a breeder of Corriedales in an effort to improve wool quality on the entire pelt.

Swine

A mixture of soybean oil meal and meat and bone scrap was more efficient as a protein supplement for growing pigs than either one alone. Distillers' dried grains and distillers' dried solubles were inferior as sole protein supplements. The value of the latter as a vitamin supplement in pig rations remains to be determined.

The incorporation of 2 percent sulphur in the grain mixture reduced death loss from overeating, or enterotoxemia, in feedlot lambs to 1 percent as contrasted to 8 percent in the lot where no sulphur was fed. However, this amount of sulphur reduced rate of gain and feed consumption and increased the cost of gain. Further studies will determine whether smaller amounts of sulphur will be as effective.

Dairy Cattle

A study of various irrigated pasture seedings for dairy cattle (heifers) is being continued.

In field studies, the incidence of mastitis has been reduced on one large dairy farm from 60 percent to less than 10 percent, and on a second farm from 85 percent to less than 30 percent. The value of various drugs remains to be determined.

A dairy farm of 95 acres has been purchased for development of the herd. A dairy research unit is planned.

Poultry

Increased comfort, due to better insulation and lower humidity in the Wyoming type of laying house did not result in any marked increase in production, egg size, body weight, or health when compared to the Colorado and Cornell types of houses.

A minimum ratio of meat and bone scrap to soybean oil meal as the protein supplements in poultry rations for best growth, egg production, egg weight, and hatchability was 1 to 3. This confirms previous results.

Wheat germ was found to be approximately as goitrogenic as soybean oil meal.

The toxicity and growth-depressing effect of linseed meal was destroyed by wetting in water for 25 hours and drying. The diarrhetic effect was not entirely overcome but growth was excellent.

The gizzard-erosion preventive effect of liquid milk was confirmed as was the lack of this factor in dried milk and milk fractions. Raw soybeans, coffee, and alcohol were found to aggravate gizzard erosions. Canned beef and gravy and pork and gravy and a casein-digest had no effect. This project was part of a study on nutritional factors in human ulcer.

Studies on the protein and vitamin values of new-laid eggs of various physical quality of albumen are in progress.

The new poultry plant is practically completed for the present. An experimentally seeded range to study different seedings under dry and irrigated conditions is being planted.

Hormones

Manure from pregnant cows was found in chick assays to be exceedingly rich in the male type hormone. Successful means of extracting the active substance (s) have been developed at the University of Colorado Medical School, and efforts are in progress to crystallize and identify the potent material (s). Progress is most encouraging.

Dried cow manure significantly depressed growth when added to a nutritionally adequate chick ration.

Fox

It was found that 5 percent DDT in taic was highly effective in controlling the grey flesh-fly of foxes that causes high mortality in pups. This treatment was also successful for fleas.

Lungworms in foxes were not controlled in wire-floored pens.

Fresh-frozen chicken offal fed with a special cereal mixture showed superior gains and improved fur development.

Arrangements have been made for service to fur farmers whereby any surplus over expenses will be utilized to develop a fox research unit.

Foods and Food Technology

Methods for canning the Stout pear have been satisfactorily investigated. Formulas for mixed-fruit frozen purees have been developed. Frozen purees of cherries and peaches were improved. The Turley apple was found to be superior to the Orleans and Newfane varieties for storage, pies, and baking. Methods of defrosting frozen cantaloupe and of utilizing it in fruit velvets were studied.

The vitamin and solids contents of tomatoes processed by canning were followed. Sulphur residues on tomatoes did not affect their keeping qualities when canned. The shelled yield, size, solids, starch, sugar, and vitamin content of 20 varieties of peas when fresh, frozen, and canned were ascertained. Similar studies were conducted on spinach, chard, beet greens and sweet corn. Solids and ascorbic acid contents of onions were determined. Corys WSS, a variety resistant to disease, was lowest in ascorbic acid and high in solids. The Emperor carrot, a high yielder of superior quality and shape, has stored the best for the fourth year. Broccoli qualities were determined on fresh and frozen samples. Sugar beet greens were found to be rich in carotene and ascorbic acid during the main growing season.

A method of overcoming the reaction that causes browning in dehydrated and deep-fat-fried potatoes is being developed.

Snow-ice proved quite superior to water spray in the market handling of peas, head lettuce, and celery.

Differences in procedure in utilizing the 80 percent extraction flour have been determined for cakes and yeast breads. A new type of canned bread, highly palatable and nutritionally adequate in itself, is being developed. This bread must keep for prolonged periods of a year or more under varying conditions. Distillers' dried solubles, a vitamin- and protein-rich by-product,

has been successfully incorporated in nutritionally significant amounts into such foods as muffins, cookies, cereals, meats, candy, pudding, ice cream, and milk shakes.

Tested recipes for game meats and for cakes and cookies have been collected and published in special bulletins for which there has been great demand.

Herbicides-Plant Hormones

Numerous formulations of 2,4-D as applied to 10 different weeds in various concentrations and rates have been applied at 5 different stations and in 38 counties, the latter in cooperation with the Extension Service. Evidence indicates definite possibilities and limitations. Studies of physiological effects on plant tissues and on soil organisms are in progress. The danger to useful plants and crops has been investigated. Two compounds of greater intensity of action than 2,4-D have been found out of 40 developed and studied. Methods of testing such compounds in the laboratory have been developed. Types of equipment for applications are under study.

Information gained thus far has saved farmers thousands of dollars by offsetting exaggerated claims, by exposing exorbitant charges and rates of application, and by less costly equipment.

The use of electric current on bindweed and Russian knapweed shows limited value.

New Insecticides

The physiological effect of DDT on certain micro-organisms is under intensive study. Approximately 25 organic compounds have been prepared and studied for insecticidal value. So far, one of these has given excellent results in a field trial on potatoes.

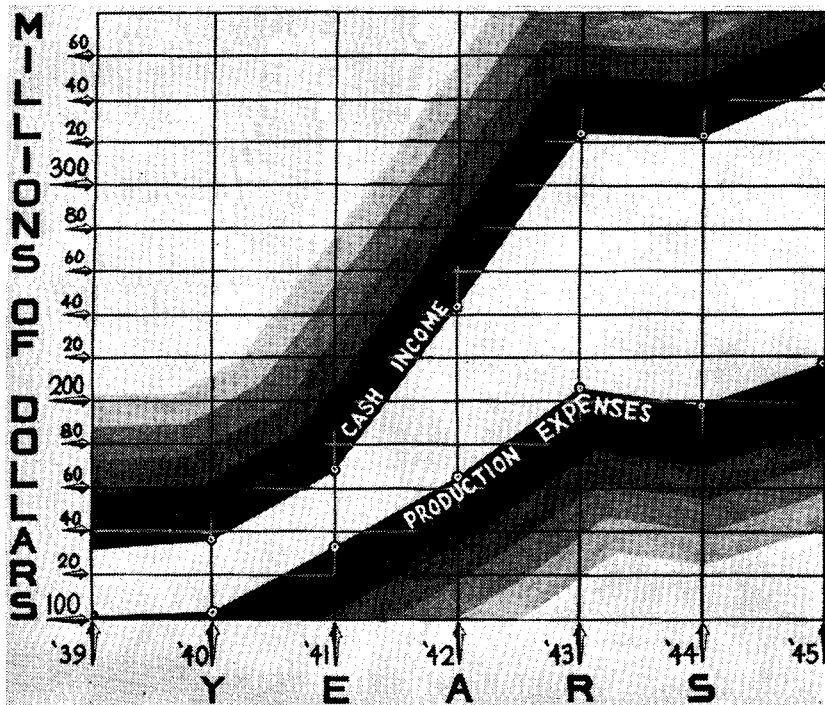
Forestry

The best adapted species of trees for shelterbelts in Eastern Colorado and the effects of shelterbelts are under study. Farm methods of treating fence posts of Colorado timber to render them long-lived are being investigated.

Economic Studies

Farm operators in irrigated areas had smaller net incomes in 1945 than in the 2 previous years, largely because cash operating expenses per acre of crop land were 2½ times as high in 1945 as in 1940. Net incomes on dry land farms were 60 percent better than in 1944, chiefly because of better crop yields.

Cattle and lamb feeders made excellent net profits in the 1944-45 winter season. Cattle feeding operations tended to increase at the expense of lamb feeding operations, probably be-



Cash income advanced more sharply than did expenses on Colorado farms during the war years.

cause of labor costs. Costs are continually rising in both operations.

Major attention is being placed on work simplification used in training imported laborers. Bulletins were prepared in cooperation with the Extension Service on spacing and thinning beets, weeding onions, and picking tomatoes, snap beans, and peaches.

The 1945 pack of peaches lacked uniformity and top quality, reflecting the use of unskilled labor. A survey of midwestern markets showed a pronounced consumer preference for Colorado peaches, a factor to be considered in anticipating a large increase in peach production within a few years. Intensive work on improved marketing of Colorado peaches and potatoes is being arranged for the 1946 season.

Data on improved community organization are being gathered for use of the Extension Service.

Federal agencies were supplied with the basic information on which agricultural production goals for Colorado were established.

Seed Laboratory

The growing interest of farmers and ranchers in viable pure seed is reflected in the continued increase in number of samples submitted for test. The increase in volume this year was slightly over last year and was 150 per cent over the 1941-42 fiscal year.

Publications

Every effort was made to publish the accumulation of manuscripts so that results may be disseminated promptly hereafter. This was done after considerable increase in the expense budget. Publications numbered 12 bulletins, 135 scientific and miscellaneous articles, 96 news items, and 26 radio releases.

POPULAR BULLETINS

- 489 "Cakes and Cookies Recipes for Different Altitudes" by W. E. Pyke and Marian Brown.
- 490 "High Altitude Forage Investigations in Southwestern Colorado" by Dwight Koonce.
- 491 "Father and Son Farm Agreements" by R. T. Burdick.
- 492 "37 Years of Windbreak Planting at Akron, Colorado" by Richard J. Preston, Jr., and J. F. Brandon.
- 493 "The Double-Edged Stationary Potato Cutting Knife" by J. L. Paschal, George H. Lane, and W. A. Kreutzer.

PRESS BULLETINS

- 100 "Suggestions on How to Top More Onions" by J. L. Paschal and R. W. Roskelley.

BI-MONTHLY BULLETINS

- Vol. VII, No. 4, Colorado Farm Bulletin, July-August, 1945.
- Vol. VII, No. 5, Colorado Farm Bulletin, September-October, 1945.
- Vol. VII, No. 6, Colorado Farm Bulletin, November-December, 1945.
- Vol. VIII, No. 1, Colorado Farm Bulletin, January-February, 1946.
- Vol. VIII, No. 2, Colorado Farm Bulletin, March-April, 1946.
- Vol. VIII, No. 3, Colorado Farm Bulletin, May-June, 1946.

ANNUAL REPORT:

- Fifty-Eighth Annual Report, Colorado Agricultural Experiment Station, 1944-45.

Short Courses and Conferences

The following short courses and conferences were offered during the past year: Grain Trade and Feed Dealers' Short Course, Rocky Mountain Feed Manufacturers' Nutrition Conference, Colorado Cannery Conference, Potato Growers' School, Cattle and Lamb Feeders' Day, Artificial Revegetation Conference, and Agricultural Chemical Dealers' Conference.

These short courses and conferences are in popular demand and should be increased. Short courses of 2 weeks duration in poultry husbandry and in rabbit management are being considered.

The Substations

The following 11 substations or substation areas are operated to assure that research findings at the main station are applicable to the diverse topographic, climatic, and soil conditions throughout the State: Akron Dry Land Station (USDA cooperating) on dryland crops and livestock feeding; Briggsdale Experimental Range area (Soil Conservation Service, Rocky Mountain Forest and Range Experiment Station, and Crow Valley Cattle Association cooperating) on range problems with beef cattle; Cheyenne Wells Reseeding Station on reseeding range lands; Craig Soil Conservation Reseeding area (Great Divide Soil Conservation District and SCS cooperating) on management and reseeding sagebrush lands; Denver area on floriculture, truck crops, and fur-bearing animals; Fort Lewis High Altitude Station on crops and vegetables adaptable to high altitudes; Greeley Potato Station (USDA cooperating) on potatoes; Mesa County area (Mesa County cooperating) on fruits, vegetables, and soils; Rocky Ford Substation on vegetables and field crops; San Luis Valley Demonstration Farm (Extension Service and San Luis Valley Potato Improvement Association cooperating) on potatoes; and the Western Slope Fruit Substation on fruits.

These substations and areas permit research on agricultural enterprises not feasible at Fort Collins because of climate, soil, etc. The researches are conducted by the Station sections involved, and the results have been incorporated in the Summary of Research Results. The research to be conducted in each area is determined after consultation with an advisory committee of representative farmers and ranchers of the area served.

Personnel

Returning from military leave during the fiscal year were:

George Beach	Associate Horticulturist
Robert Eslick	Assistant Agronomist
Melvin Hazaleus	Assistant Animal Husbandman
Allen Heidebrecht	Assistant Animal Husbandman
Marvin Russell	Station Editor
Ralph Weihing	Assistant Agronomist
Robert Whitney	Assistant Agronomist
H. S. Wilgus	Associate Director and Poultry Husbandman

Returning from semi-military leave were N. A. Christensen, civil engineer; Dwight Gunder, associate civil engineer; Homer J. Henney, director; Adrian Legault, assistant civil engineer; C. F. Metz, chemist.

The Station staff members still on military leave are Warren

R. G. Coffin, M.S.	Associate Chemist
Merle G. Payne, B.S.	Assistant Chemist
E. B. Crone, Ph.D.	Assistant Chemist
Gestur Johnson, M.S.	Assistant Chemist
Howard A. Durham, M.A.	Assistant Chemist
W. W. Allison, M.S.	Assistant Chemist
E. G. Hill, B.S.	Research Assistant

Entomology

George M. List, Ph.D.	Entomologist
John L. Hoerner, M.S.	Associate Entomologist
Leslie B. Daniels, M.S.	Associate Entomologist
J. H. Newton, B.S.	Associate Entomologist
M. T. James, Ph.D.	Assistant Entomologist

Forestry and Game Management

J. Lee Deen, Ph.D.	Forester
R. J. Preston, Ph.D.	Forester
J. V. K. Wagar, M.S.	Game Conservationist
E. W. Nelson, M.A.	Range Conservationist
Clinton H. Wasser, B.S.	Associate Range Conservationist
D. F. Hervey, B.S.	Assistant Range Conservationist

Home Economics

Flora L. Slocum, Ph.D.	Home Economist, Dean of Division
Elizabeth Dyar, Ph.D.	Home Economist, Head of Section
Elizabeth Cassel, M.S.	Assistant Home Economist
May S. Bay, B.S.	Assistant in Home Economics Research

Horticulture

A. M. Binkley, M.S.	Horticulturist
George A. Beach, M.S.	Horticulturist
Robert Kunkel, Ph.D.	Horticulturist
Walter C. Sparks, M.S.	Assistant Horticulturist

Poultry

H. S. Wilgus, Jr., Ph.D.	Poultry Husbandman
Robert Adolph, B.S.	Assistant in Poultry Research

Rural Economics and Sociology

R. T. Burdick, M.S.	Rural Economist
J. L. Paschal, Ph.D.	Associate Rural Economist
G. T. Hudson, Ph.D.	Assistant Rural Sociologist
Catherine Clark, B.S.	Assistant in Rural Sociology Research

Seed Laboratory

Bruce J. Thornton, M.S.	In Charge
Ellen Zink, M.S.	Seed Analyst

ENGINEERING DIVISION

N. A. Christensen, Ph.D.	In Charge
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Civil Engineering

N. A. Christensen, Ph.D.	In Charge
W. E. Code, B.S.	Associate Irrigation Engineer
D. F. Gunder, Ph.D.	Irrigation Engineer
Maxwell Parshall, B.S.	Meteorologist
Floyd Brown, B.S.	Associate Agricultural Engineer
Fred Beatty, M.S.	Associate Civil Engineer
Cooperators:	
R. L. Parshall, B.S.	Senior Irrigation Engineer, USDA
Carl Rohwer, C.E.	Senior Irrigation Engineer, USDA

Mechanical Engineering

J. T. Strate, M.S.	In Charge
E. M. Mervine, M. E.	Agricultural Engineer
H. H. Kob, B.S.	Associate Agricultural Engineer
Raymond D. Barmington, B.S., M.E.	Assistant Mechanical Engineer
H. B. Mummert, B.S.	Associate Engineer
Cooperators:	
A. D. Edgar, B.S.	Agricultural Engineer, U. S. D. A.
S. W. McBirney, B.S.	Senior Agricultural Engineer, U. S. D. A.
George Stafford	Engineering Aid, U. S. D. A.
P. F. Gifford, B.E.	Farm Job Analyst, U. S. D. A.

SUBSTATIONS

Herman Fauber, M.S.	Superintendent, Rocky Ford
Ferris M. Green, B.S.	Superintendent, Austin
Dwight Koonce, M.S.	Associate Agronomist, Fort Lewis
Cooperators:	
W. C. Edmundson, M.S.	Horticulturist, U.S.D.A., Greeley

†On military leave.

‡As of June 30, 1946.

FINANCIAL REPORT, COLORADO AGRICULTURAL EXPERIMENT STATION

For the Year Ending June 30, 1946

	Hatch fund	Adams fund	Purnell fund	Bankhead-Jones fund	State mill levy fund	Special fund	Research Foundation	Total funds
DR. (Receipts)								
Balance July 1, 1945					\$ 16,905.35	\$ 64,348.35*	\$ 32,266.96	\$ 113,520.66
From the treasurer of the United States per appropriations for the fiscal year ending June 30, 1945, under the Acts of Congress approved March 2, 1887, (Hatch fund), March 16, 1906, (Adams fund), February 24, 1925, (Purnell fund), and June 29, 1935, (Bankhead-Jones fund)	\$15,000.00	\$15,000.00	\$60,000.00	\$24,243.48				\$114,243.48
Other sources than the United States.....					\$111,031.30†	\$165,841.38‡	\$ 21,202.04	\$298,074.72
	\$15,000.00	\$15,000.00	\$60,000.00	\$24,243.48	\$127,936.65	\$230,189.73	\$ 53,469.00	\$525,838.86
CR. (Expenditures)								
Personal Services	13,813.64	12,695.18	44,207.41	20,069.97	76,072.80°	46,160.27	10,157.15	223,176.42
Travel	471.03	353.02	2,012.44	1,042.31	1,335.60	3,022.06	997.51	9,233.97
Transportation of Things			13.24		578.60	1,242.03	67.90	1,901.77
Communication Service	41.36	22.72	101.09	95.13	1,581.72	267.89	28.81	2,138.72
Rents and Utility Services	51.20	345.92	1,276.88	437.41	2,606.15	4,355.39	337.31	9,410.26
Printing and Binding			35.39		4,222.86	102.22	222.89	4,583.36
Other Contractual Services	38.75	230.46	1,174.95	364.68	4,379.69	11,690.51	1,416.30	19,295.34
Supplies and Materials	206.60	829.95	5,456.18	1,331.93	4,706.99	52,991.19	2,982.64	68,505.48
Equipment		264.82	4,007.62	479.24	2,461.98	29,911.18	5,471.31	42,596.15
Lands and Structures			698.00			29,519.20		30,217.20
Contributions to Retirement	377.42	257.93	1,016.80	422.81	957.14	600.78	98.82	3,731.70
Total—Regular Disbursements	\$15,000.00	\$15,000.00	\$60,000.00	\$24,243.48	\$ 98,903.53°	\$179,862.72‡	\$ 21,789.64	\$414,790.37
Total—Station Disbursements	\$15,000.00	\$15,000.00	\$60,000.00	\$24,243.48	\$ 98,903.53	\$179,862.72§	\$ 21,780.64	\$414,790.37
Balance on hand June 30, 1946					\$ 29,033.12	\$ 50,327.01	\$ 31,688.36	\$111,048.49
Grand Total	\$15,000.00	\$15,000.00	\$60,000.00	\$24,243.48	\$127,936.65	\$230,189.73	\$ 53,469.00	\$525,838.86

*Includes \$20,721.95 Avon Reserve, \$1,080.74 American Potash, \$1,410.88 Hybrid Corn, \$335.40 Flower Reserve, and \$7,500.00 San Luis Valley Rent.

†Includes \$20,000 H. B. 73.

‡Includes \$10,000 Bind Weed, \$9,250 Plant Diseases, \$19,000 Industrial Development, \$6,000 Pure Seed, \$2,305.65 Hybrid Corn, and \$215.25 Fur Farmers.

§Includes disbursements of \$10,027.62 Bind Weed, \$8,934.15 Plant Disease, \$16,714.89 Industrial Development, \$6,000 Pure Seed, \$20,611.95 Avon Reserve, \$100.30 American Potash, \$2,799.66 Hybrid Corn, \$2,500 San Luis Valley Rent, and \$52.41 Fur Farmers.

°Includes disbursements of \$20,000 H. B. 73, personal services.