

The Agricultural Experiment Station

OF THE

Colorado Agricultural College

AGRICULTURAL PRODUCTS

SHIPPED INTO COLORADO

IN 1909

BY

H. M. COTTRELL

The Agricultural Experiment Station

FORT COLLINS, COLORADO

THE STATE BOARD OF AGRICULTURE

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INTRODUCTORY

Colorado has not provided means of obtaining statistical information which enables the people and commercial interests of the State to take account of their progress and thus to determine the character of their growth or the conditions which may need improving. In the absence of authentic data of that kind Professor H. M. Cottrell was authorized to obtain information from all sources possible as to the amount of produce actually shipped into the State and especially of a character the state could produce. While the information thus obtained cannot be considered as exact, yet as the sources of information are in close touch with the products in question, the estimates are believed to be close to actual facts. In some cases they may be considered as exact. The railroads and commission men, and in fact all classes have been free to aid, in many cases have opened their books to inspection and have given the advantage of their expert knowledge. The statements therefore represent what is, no doubt, the best summary of such knowledge that is available or has ever been made.

From the standpoint of the State it indicates the large demand for agricultural products that is not met by the growers of this State. This shows only the production shipped into the State, and does not show the amount shipped out of the State. In some cases this is considerable. Thus several times the value of flour is shipped out of the State that is shipped in. Our fruit growers ship out several million dollars worth of fruit annually. Several million dollars worth of potatoes are shipped out annually and shipments of hay and live stock amount to many million dollars each year.

The facts, however, deserve careful consideration, and give a basis for lines of intelligent development.

L. G. CARPENTER, Director.

AGRICULTURAL PRODUCTS SHIPPED INTO COLORADO IN 1909

BY H. M. COTTRELL

According to the most accurate data that could be secured by the Farmers' Institute Department of the Colorado Agricultural College, the following agricultural products were shipped into Colorado in 1909 from other states:

	Estimated Value
Fat Animals for Slaughter.....	\$3,568,380
Fresh Meat.....	1,094,080
Cured Meats, Lard and Butterine.....	2,546,680
Canned Meats.....	1,200,000
Dairy Products.....	3,986,000
Poultry and Eggs.....	4,000,000
Wheat.....	3,750,000
Flour.....	1,500,000
Millstuffs and Corn Meal.....	860,000
Corn.....	2,530,000
Oats, Rye and Barley.....	310,000
Breakfast Foods and Food Cereals.....	1,122,000
Crackers, Wafers and Fancy Biscuits.....	350,000
Broom Corn.....	96,000
Hay.....	1,450,000
Field Seeds.....	240,000
Fresh Fruits, Melons and Vegetables.....	1,993,000
Canned Fruit and Vegetables.....	1,345,000
Dried Fruits.....	500,000
Pickles, Catsup and Pork and Beans.....	175,000
Total.....	\$32,616,140

FAT ANIMALS SHIPPED IN FOR SLAUGHTER:

Cattle.....	\$1,297,872	
Hogs.....	2,245,288	
Calves.....	25,220	\$3,568,380

MEAT AND MEAT PRODUCTS:

Fresh Meat:		
Beef.....	\$472,680	
Pork.....	591,600	
Veal.....	10,800	
Mutton.....	19,000	\$1,094,080

Smoked Meats.....	\$918,000	
Lard.....	520,000	
Lard Compounds.....	93,000	
Butterine.....	930,000	
Mince Meat.....	15,680	
Extract of Beef.....	70,000	\$2,546,680

Canned Meats:		
Beef, Veal, Bacon, Ham, Chicken, etc.....		\$1,200,000

Total..... \$8,409,140

PORK:

Of the 241,570 hogs received at the Denver Stock Yards in 1909, 61,947, or a fraction over one-fourth, were grown in Colorado.

The value of hogs, pork and pork products shipped into Colorado in 1909 were:

Hogs.....	\$2,245,288
Fresh Pork.....	591,600
Smoked Meats.....	918,000
Lard.....	520,000

Total..... \$4,274,888

Experts estimated that the value of the pork and pork products shipped from the corn belt into the Rocky Mountain and northwestern territory, of which Denver is the gateway, amounts annually to sixteen million dollars.

The three cracker factories of Denver used in 1909 as much lard as was furnished by all the Colorado hogs slaughtered in Denver. Yet every tillable section of Colorado is adapted to the cheap production of pork of the best quality.

Barley fed pork is the highest priced pork in the world, on account of its superior flavor. The irrigated sections of Colorado yield barley at a less cost per acre than the cost of growing corn in Iowa and Illinois, and the production of pork per acre from irrigated barley is greater than that of pork from corn in the corn belt.

The right strains of barley give profitable yields under dry land farming both on the plains and at high altitudes.

Milo is the surest grain crop for dry land farming on the Plains, and produces a choice quality of pork. The Plains farmers alone could produce all the pork and pork products needed in Colorado and adjoining states if they would make a specialty of pork raising, fattening with Milo.

Field peas as grown in the San Luis Valley make a better flavored pork than either corn or barley, and hogs in the San Luis Valley can be fattened on peas at a cost of one and one half cents per pound for the gain in live weight. There are three million acres in the San Luis Valley adapted to pea growing and a much larger area at high altitudes in other sections of Colorado.

Colorado should not only supply all the pork and pork products needed in the State, but should furnish the high priced, choicest pork, and pork products to the rest of the United States. The State needs 50,000 farmers who are expert swine growers and feeders. The majority of Colorado farmers have failed to make hogs profitable because they have neglected the growing pigs through the summer.

Beef.—Colorado beef cattle are better bred than those of most of the range states. The native grasses are not excelled for making growth on young stock and for putting flesh on older cattle. The meat produced from the grass and from the hay made from native grasses is of exceptionally choice flavor. The Colorado Experiment Station and private feeders have demonstrated that our grains, alfalfa, and roots produce, economically, beef of superior flavor with light waste in slaughtering and in cooking.

Fresh beef and veal are shipped weekly from the corn belt into most Colorado towns, and fat cattle were shipped, in 1909, from other states into Colorado, as follows:

	Cattle	Calves
Nebraska.....	3,778	716
Wyoming.....	10,299	1,118
Kansas.....	1,478	402
Utah.....	5,177	70
Idaho.....	3,823	151
Nevada.....	795	19
Oregon.....	723	46
Montana.....	343	...
California.....	623	...
Total.....	27,039	2,522

If Colorado cattle growers appreciated the value of our feeds, and would make a business of finishing their stock before marketing, we could not only supply our own needs for beef and veal, but on account of the flavor of meats made from Colorado feeds could create a widespread trade outside the state.

Butterine.—There has been such a scarcity of butter in the state and the prices have been so high that during the past year there has been an abnormal increase in the use of butterine, experts estimating that an average of over 10,000 pounds per day is used in Colorado, and that there will be a large increase over this during the coming year. Government officials state that over four times the number of people are selling butterine in Colorado than were in the business eighteen months ago.

Fresh Meats.—Fresh meat is regularly shipped from Omaha to

Denver, and also in carload lots as far west as Grand Junction. It is distributed throughout the mountain sections of Colorado, as well as in the eastern part of the state.

DAIRY PRODUCTS.

Butter and Cream.....	\$3,000,000
Cheese.....	500,000
Condensed Milk.....	400,000
Malted Milk.....	86,000
	Total.....
Butterine, which is used to take the place of butter	\$3,986,000
	930,000
	Total.....
	\$4,916,000

There are approximately 160,000 milch cows in Colorado. Many are cows selected from the range and are poorly handled and milked through the summer, producing annually only from \$20 to \$50 a cow. A number of well selected cows are kept in or near towns, and are fed, producing annually from \$50 to \$150 a cow. The average annual production is probably not over \$40 a cow, or a total yearly production for the state, from dairy products, of \$6,400,000. If these estimates are correct, Colorado farmers are supplying about 56 per cent. of the dairy products and substitutes for dairy products consumed in the state.

Butter and Cream.—A large amount of butter is shipped into Colorado from Kansas and Nebraska and the larger proportion of the cream churned in the large factories in Denver, Colorado Springs, and Pueblo is shipped in from Kansas and Nebraska. One concern alone in Denver churned, in 1909, over three million pounds of butter, a large per cent. of it from Nebraska cream.

Some of the largest handlers of dairy products in the state estimate that in 1909 an average of over 30,000 pounds of butter were shipped daily into Colorado either as butter or in cream that was churned after arrival. Butter made from Kansas and Nebraska cream is used in Mountain sections of Colorado 450 miles distant from Denver.

Cheese.—The quantity of cheese made in Colorado is so small that it is seldom found in most of the towns of the state. Most of the cheese eaten in the state comes from New York.

Condensed Milk.—The one condensed milk factory in Colorado is situated at Fort Lupton. It has a good trade, puts up a good product, and pays a high price to the farmer for milk.

During 1909 there was a general shortage of milk and cream in most of the towns of the state, and city families were forced to use condensed milk. Many thousand farm families also used condensed milk.

The use in Colorado of condensed milk has been increasing rapidly every year for several years. Wholesale houses report that in 1909 they had a demand for double the quantity of condensed milk that they sold, but they could not secure it from the manufacturers.

More than the usual amount was shipped into the state from the east and several carloads from the Pacific Coast.

The fresh milk from 8,000 average Colorado cows would have been required to produce the condensed milk that was shipped into Colorado in 1909, and the milk from 16,000 cows to fully supply the demand in the state for this food.

Every section of Colorado offers favorable conditions for dairying. The irrigated sections of Colorado offer ideal conditions in every respect:—feed, climate, water, and good markets.

The mountain parks and valleys of Colorado furnish almost the same dairy conditions as the mountain dairy districts of New York, with the advantages of richer feeds and a dry climate. These parks and valleys cover a large area, a single one—the San Luis Valley—having a tillable acreage as great as the entire state of Connecticut.

Good, early cut alfalfa hay will produce as much milk as an equal weight of bran, one of the chief eastern dairy feeds. Alfalfa hay can be produced and fed to dairy cows on the average Colorado farm for \$3 to \$5 a ton. Bran in eastern dairy sections costs \$20 and upwards a ton. A ton of alfalfa hay contains about as much milk producing material as four tons of timothy hay.

Alfalfa grows well in most sections of Colorado up to an altitude of 8,000 feet. From 6,500 to 8,000 feet field peas give high yields. Both the hay and grain from this crop are good milk producing feeds, pea hay ranking next to alfalfa for this purpose.

At high altitudes red and alsike clover yield large crops, the latter doing well up to an altitude of 9,500 feet. Both are rich milk producing feeds. The nutritious character of Colorado forage crops makes little grain necessary.

To the many new settlers who are starting dry land farming on the plains of eastern Colorado, dairying offers a sure income. In the past thirty-three years there has never been a year so dry but that a sufficient quantity of feed could have been raised, together with the native grasses, to produce a good yield of milk.

The native grasses are good milk producing feeds, summer and winter. The Sorghums, Milo and Kafir-corn are good drought resisting crops, and in a dry year wheat, oats and beardless barley cut just as they are filling make excellent dairy feeds and often a profitable crop can be secured from these grains by making them into hay, when if left to mature the season would be too dry for them to make marketable grain.

The mild climate of Colorado makes the necessary expense low for shelter. For twenty years the average temperature at Fort Collins for January—the coldest month—has been twenty-six degrees, and for July, the warmest month, sixty-eight degrees, with a few days each year of either extreme heat or cold.

The dry bracing air and high altitude give vitality and health to the cows. Dr. George H. Glover reports that only one-half of one

per cent. of the native cattle of Colorado show any trace of tuberculosis, and less than two per cent. of the cows in Colorado cities, where they are closely confined.

The pure air of the high altitude and the intense sunshine—an average of three hundred and twenty days of sunshine each year—make the air much freer from germs which taint milk than the air in low, humid states. For this reason it is much easier and costs less to keep milk and cream sweet in Colorado than it does in states East.

POULTRY AND EGGS.

Eggs.....	\$2,000,000
Poultry.....	\$2,000,000
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Total.....	\$4,000,000

Fifty car loads of eggs were taken in a single month from cold storage plants in the East and brought to Denver. Poultry is shipped direct from Omaha to Glenwood Springs and other mountain towns. Even in mountain towns as distant as Telluride, poultry and eggs are shipped direct from Wichita, Kansas. In July, 1909, the hotels in Durango were obliged to furnish their guests Kansas eggs because Colorado eggs could not be secured.

During the past Fall and Winter an average of \$1,000 per week has been sent out of Fort Collins for Kansas and Nebraska eggs, and most towns in Colorado have sent out proportionate amounts. One Bank in Denver reports that its customers, alone, send an average of \$10,000 a week to Nebraska for poultry.

An investigation made in Pueblo by the Business Mens' Association showed that more money was being sent out of that city to other states for poultry and eggs and butter than was being spent in the city by the 4,000 employes of the great ten million dollar steel plant of the Colorado Fuel & Iron Company, and by the employes of the smelters. Denver dealers handle an average of over \$3,000 worth of eggs, daily, and a large part of this is brought from other states.

Two years ago the Farmers' Institute Department of the Colorado Agricultural College made an investigation of egg production in Colorado, having the assistance of a poultry expert from the East as well as Colorado poultry experts.

It was found that in both small and large flocks and in various parts of the state, poultrymen who thoroughly understood the managing of the business under Colorado conditions of feed and climate were making an average of \$2.00 a hen a year above the cost of feed. Poultrymen around New York, Boston, and Philadelphia were making but half this amount.

At the same time most of the Colorado farmers, who were consulted, reported that their hens were "eating their heads off" and that keeping poultry was a loss to them.

Colorado needs, at the present time, at least 5,000 men who are

experts in egg production, and these men can make much more than they are making in eastern states.

Our average of 320 days of sunshine, the dry climate, high altitude, and bracing air, are as beneficial to poultry as they are to people. Colorado feeds—wheat, barley, field peas, and alfalfa are especially valuable for egg production. The field peas of the San Luis Valley produce a specially choice flavor in the meat from poultry.

GRAIN AND GRAIN PRODUCTS.

Wheat.....	3,750,000	
Corn.....	2,530,000	
Oats, rye and barley.....	310,000	
Flour.....	1,500,000	
Millstuff and corn meal.....	860,000	\$8,950,000
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Breakfast foods and food Cereals....	1,122,000	
Crackers, wafers, fancy biscuits, etc..	350,000	\$1,472,000
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Total.....		\$10,422,000

Wheat.—The U. S. Department of Agriculture reports that there were raised in Colorado in 1908 6,153,000 bushels of wheat, and in 1909 9,467,000 bushels. It requires in the state annually for flour, seeding, and ordinary feeding about 5,600,000 bushels. There was therefore a surplus of wheat above home needs, in 1908, of nearly 10 per cent. and in 1909, of 69 per cent.

A large quantity of soft winter wheat was shipped into Colorado in 1909, from Idaho, and adjoining states. The wheat was shipped with milling in transit privileges through Colorado to southern states. It was ground in Colorado and the flour sent south. Considerable hard winter wheat was shipped into Colorado for grinding from Kansas and Nebraska.

Flour.—Colorado bakers do not use flour made from Colorado wheat for bread making. Practically all the bakers' bread in Colorado is made from Kansas hard winter wheat flour. Experts estimate that over one-half the bread eaten in Denver, and four-fifths the bread eaten in Pueblo, is from Kansas hard winter wheat flour.

Most of the families in Pueblo, particularly those connected with the steel works and with the smelters, use Kansas flour. San Luis Valley Millers buy Kansas flour to supply their bakery trade, and Kansas hard wheat flour is shipped to Durango, Telluride, Grand Junction, and other points, to be used by bakeries and hotels.

Flour to the value of about \$190,000 was shipped from Minneapolis to Colorado points in 1909. Most of the flour used by Colorado families is made from Colorado soft wheat with a blend of Kansas or Nebraska hard wheat.

While Colorado produces more wheat than is required to make all the flour needed in the states yet flour, costing at wholesale, \$1,500,000, was shipped in, most of it from Kansas. Some flour was received from Nebraska, and a little from Missouri and other states.

The reason bakers use Kansas flour is that the hard wheat Kansas

flour absorbs more water than Colorado soft wheat flour. One hundred pounds of Colorado flour will absorb fifty pounds of water; one hundred pounds of Kansas flour will absorb sixty to sixty-two pounds of water, and make good bread, and can be made to absorb seventy pounds of water if the best quality of bread is not wanted. One hundred pounds of Kansas hard wheat flour will make from ten to fifteen more bakers loaves than one hundred pounds of Colorado soft wheat flour. The Kansas flour contains more gluten. Colorado flour made from Durum wheat contains considerably more gluten than Kansas flour, but is not used by bakers, because it makes a dark colored bread.

Colorado soft wheat alone, or with a blend of hard wheat, makes bread of the best quality. In a bread making contest held by the Denver Gas & Electric Company in 1909 with 1200 loaves competing, the first, second and third prizes for the best loaves were won by loaves made from Colorado wheat. Most Colorado families who bake their own bread use flour made from Colorado wheat. Colorado bakers prefer Colorado flour for cakes and pastry, as it is softer and makes pastry more tender and flaky than hard wheat flour.

The flour made from Colorado wheat, and that from the enormous quantity of soft wheat shipped into Colorado from Idaho and adjoining section, and not used in the state, was shipped to Southern states, where it is preferred, because it makes better biscuits and hot bread than hard wheat flour.

The soft wheat shipped into Colorado should have been produced in the state, and it would have required nearly two-thirds as many additional acres to produce it as were seeded to wheat in Colorado.

Some hard winter wheat is grown in Colorado, particularly on the Plains. Millers have been unable to make a flour from it equal to Kansas hard wheat flour. The largest bakers in Colorado find that the most good loaves of bread can be made from hard wheat flour of certain sections of Kansas only and that the hard wheat flour from other parts of Kansas is not satisfactory.

The Kansas localities named by the bakers as producing desirable flour are those that for several years have paid particular attention to selecting seed and maintaining wheat having hard red berries. The sections of Kansas named as producing unsatisfactory flour are those that have allowed considerable of the yellow berry to show in their wheat.

All hard winter wheat raised on the Plains in eastern Colorado examined by the writer has been badly affected with yellow berries. It would seem that it would pay farmers, farmers' organizations and commercial clubs in eastern Colorado to make a united effort to secure pure seed of hard winter wheat entirely free from yellow berries and to grow wheat from which flour can be made equal to the best Kansas flour. It means the securing for the Plains a market that now amounts to \$1,500,000 a year and that is constantly increasing.

Corn.—About 3,700 cars of corn, costing approximately \$2,530,000, were shipped into Colorado from Kansas and Nebraska in 1909.

Over 350,000 lambs were fattened on this corn. Most of the hogs slaughtered at home and at packing houses in this state were finished on this corn. A large quantity was fed to beef cattle, to dairy cows, and to horses. We found Kansas corn being fed to fattening hogs in La-Plata county, 450 miles southwest of Denver.

Much of this feeding of imported corn is done from habit, the farmers who feed it having come from corn belt states. Both barley and field peas produce better pork than corn. Barley is as good a feed for horses and dairy cows, and oats is a better feed. Beef produced at the College showed that the choicest flavored beef can be produced without feeding any corn, and many lamb feeders have shown that good results can be secured in fattening lambs on barley, except just at the finish.

Breakfast Foods and Cereal Products.—Over 1,700 tons of cooked cereals, and over 4,200 tons of uncooked breakfast foods, such as oatmeal and cracked wheat, were shipped into Colorado in 1909. These breakfast foods took out of the state over \$460,000. Hominy and Grits to the value of \$3,200 were shipped in.

About 760 tons of peanuts were shipped into Colorado, costing \$114,000. Peanuts do well on sandy soils on the Plains.

Over 430 tons of macaroni were shipped into the state at a cost of \$44,000.

About 1100 tons of starch were shipped into the state, costing about \$165,000. We shipped in over 3,000 tons of rice that cost us over \$300,000. Rice cannot be raised in Colorado, but it is used largely as a substitute for flour products and potatoes.

Less than one pound of cane sugar for each inhabitant was shipped into the state, showing that the greater part of the supposed cane-sugar used by the Colorado housekeeper must be beet-sugar.

About 145 tons of popcorn were shipped into Colorado from East of the Missouri River at a cost of \$7,000.

Crackers, wafers and fancy biscuits were shipped into Colorado that cost \$350,000. As our home cracker factories use Colorado products chiefly in manufacturing their goods this sum could be kept in the state by buying Colorado made products.

BROOM CORN

Broom Corn..... \$96,000

It requires annually from 500 to 600 tons of broom corn to supply home needs in Colorado, and about an equal amount is shipped into the state, made up into brooms and brushes, and then sent to other states.

In 1909 about 150 tons were grown in Colorado, leaving 450 tons to be shipped in for home consumption, and between 500 and 600 tons shipped in that were sent out later in manufactured goods. A considerable portion of the 450 tons needed for home use was shipped into the state in manufactured goods. About two-thirds of the total amount grown in Colorado in 1909 was produced in Baca county.

Normally good broom corn is worth from \$60 to \$80 a ton. Some-

times it drops as low as \$30 a ton, and at present, owing to a severe shortage throughout the United States, the best grade of broom corn is selling at \$275 a ton.

The extreme high price for broom corn is exciting many Colorado farmers, particularly in the dry land sections of Eastern Colorado, and many are planning to raise this crop in 1910 for the first time. Some Colorado farmers who have never raised the crop are planning to raise from 200 to 300 acres each.

Most of these beginners will probably make failures. The growing of a good quality of broom corn is the work of an expert of long experience. The differences between strains of broom corn are as many and as great as between varieties of corn. The successful Colorado grower must start with seed adapted to his locality and seed that will produce a tough quick-growing brush, ripening early, and neither brittle nor coarse. He must prepare his soil and keep it through the season in such condition that a rapid growth is maintained. He must have sufficient teams tools and labor to harvest the crop at just the right time to secure the best quality of brush, and he must have proper sheds and racks for curing the crop. Skill, judgment, and experience are needed at every step.

Most of the broom corn grown in Colorado has been of poor quality, considerable of it almost unsalable in years of good supply. A few experienced Illinois growers who have come to Colorado have produced broom corn of high quality.

Colorado broom corn is generally brittle and rough, and much of that raised under irrigation is coarse. These faults come first from the seed. The cool nights tend to make it brittle. Much of the broom corn raised in the state is damaged by not being harvested at the right stage and by being cured without shelter.

The southeastern part of the state is best adapted to the production of broom corn on account of having warmer nights through the growing season than other sections. It is probable that in this territory a quality of broom corn can be produced that will supply most of the demand of the state, if skilled growers give due attention to every detail in producing the crop and are well supplied with the needed equipment.

It is probable that the warmer sections of the fruit belt in western Colorado are adapted to broom corn.

A good yield is one ton to three acres, on irrigated land, and one ton to four acres on dry land. This gives a good profit in years of exceptionally high prices, a little more than pays expenses in average years, and returns less than cost in years of low prices. Broom corn is a fairly good sod crop. It requires about 4,500 acres annually to supply the demand in Colorado.

HAY.

Hay..... \$1,450,000

About ten thousand cars of hay were shipped into Colorado in 1909, with an estimated wholesale value of \$1,450,000. This hay came

chiefly from Kansas, Nebraska, Oklahoma and Wyoming. Most of it was shipped in to be fed to horses and was hay made from native grasses.

During this same time a large quantity of alfalfa hay was shipped to southern states for feeding work animals—horses, mules, and oxen. Colorado alfalfa hay is in demand in eleven southern States—planters, contractors and other large users of horses, mules, and oxen considering it the best feed for animals doing hard work. Colorado horsemen do not like alfalfa for this purpose.

Colorado men handling large numbers of horses and mules doing heavy work consider that the best hay for work animals is timothy, grown at an altitude of 7,000 to 8,500 feet. The timothy hay grown at these altitudes in Grand, Routt, and Gunnison Counties sells in the wholesale markets of eastern Colorado at from \$4.00 to \$5.00 a ton more than the hay that is shipped into the state.

Timothy at these high altitudes yields two tons and upwards an acre, and is a profitable crop. Any one of these three Counties has a sufficient area to supply all the hay of this character needed in Colorado markets, but has not the farmers to produce it. Any considerable increase in the quantity of hay produced in these sections will have to be secured from new settlers.

Eleven southern States want Colorado alfalfa to feed to their work animals, and there is a large and continually increasing demand from all the eastern states for Colorado alfalfa hay, and alfalfa meal. Appreciation of alfalfa hay is growing much faster in the United States than is production, and if Colorado had the farmers to grow it, a good demand would be found for many times the quantity of good alfalfa hay than is now being produced in the state.

FIELD SEEDS.

Alfalfa Seed.....	\$150,000
Seed Potatoes.....	30,000
Timothy Seed.....	50,000
Sorghum, Kafir, and Milo.....	6,000
Millet Seed.....	4,000
Total.....	\$240,000

Alfalfa Seed.—This season, up to February 1st, 1910, 32 cars of alfalfa seed shipped direct from Germany had been sold in Colorado, and importers expect to sell several more cars of this seed before the end of the seeding season. These 32 cars cost, wholesale, \$4,300 per car, a total of \$137,600.

German alfalfa seed has a very high germination test, but the adaptability of the various German strains of alfalfa to Colorado conditions, and the quality of hay that they produce, have not been determined.

A few years ago Colorado received large shipments of alfalfa seed from Utah, and the alfalfa from Utah seed was found to be particularly adapted to our conditions. Practically no Utah alfalfa seed

is now used in Colorado, for as soon as the trade was established, the Utah shippers began sending seed badly adulterated with sweet clover. Some of the highest priced shipments contained 90% of sweet clover

Some Colorado dealers, after being forced to abandon the Utah seed on account of the sweet clover adulteration, decided to secure seed grown in Arizona; and considerable Arizona alfalfa seed is now on sale in Colorado.

The few tests made of Arizona seed by the Colorado Experiment Station have shown that the plants from it are too delicate for our climate, and begin to rot and die within a year after seeding. Whether this will be true of all alfalfa from Arizona seed we do not know.

Alfalfa seeding in Colorado from seed grown in the western sections of Nebraska and Kansas have shown that seed from these sections is very desirable.

Probably less than half of the alfalfa seed sown annually in Colorado is grown in the state. There is a great opportunity for the development of this industry, as Colorado farmers prefer home grown seed, and if it could be produced there would be great demand for Colorado alfalfa seed in the northern section of the corn belt as well as at home.

Seed Potatoes.—At least 50 cars of seed potatoes are shipped each year into the Greeley district from outside the state, costing wholesale, \$20,000. Other parts of Colorado ship in from other states seed potatoes, costing at a low estimate, \$10,000, a total of \$30,000 per year for seed potatoes shipped into Colorado. Some years nearly twice this amount has been shipped into the Greeley district alone. This seed comes chiefly from Wisconsin, some from Minnesota, and a few cars from Maine.

C. L. Fitch, of the Colorado Experiment Station, has made a careful investigation of the results obtained from this "shipped in" seed. He reports that the average returns in the crop from the seed shipped in is \$40 an acre less than that from acclimated seed. The seed shipped into the state is sufficient to plant 4,100 acres, which at \$40 an acre, makes a direct loss in the crop each year of at least \$164,000. Sometimes double this acreage is planted with seed shipped into Colorado, and the loss is then double the amount given.

On the other hand, for the past two years carefully selected seed potatoes from Greeley sent to the San Luis Valley have produced an average gain in profits of \$75 an acre over home grown seed.

About 30,000 acres are planted to potatoes each year in the Greeley district, and the acreage is constantly increasing. If seed could be secured for this district that would give as great an increase in profits an acre as the Greeley seed gives in the San Luis Valley, the additional profits would be enormous.

One of the most promising lines for the potato grower at an altitude of 7,000 feet is the production of seed potatoes grown from seed taken from high yielding hills. When the right seed is developed northern Colorado alone needs 800 cars a year.

Another loss, small to the individual farmer, but large in the aggregate of the state, comes from the common practice of ordering seed potatoes of the new sorts glowingly advertised in eastern seed catalogues. Tests made by the Colorado Experiment Station show that not over one in one hundred of these varieties equals in yield the standard Colorado sorts, and many are worthless.

Timothy Seed.—Most of the large quantity of timothy seed sown in Colorado is shipped into the state. Seedmen state that \$50,000 a year is a low estimate of the amount sent out of the state annually for this seed.

Colorado grown seed is heavier and has greater vigor, but Colorado timothy growers prefer to market hay rather than seed. It would seem that there is a good opening for growing timothy seed in Colorado at high altitudes at points too distant from railroads to make the shipping of hay profitable.

Sorghum, Kafir, Milo and Millet.—In a recent examination of sorghum seed from Colorado and from Kansas, Colorado seed averaged in every case heavier per struck bushel than that from Kansas. Colorado grown milo weighed 63 pounds per struck bushel. Colorado farmers should not only supply the demands in the state for these seeds, but should ship large quantities to other states.

FRESH FRUITS, MELONS AND VEGETABLES.

Fruits and Melons not grown in Colorado or shipped in out of season.....	\$1,237,000
Fruits that could have been grown in Colorado....	367,500
Potatoes and sweet potatoes.....	184,000
Green Vegetables.....	195,500
Total.....	\$1,984,000

FRUITS AND MELONS NOT GROWN IN COLORADO OR SHIPPED IN OUT OF SEASON.

Oranges.....	\$360,400
Bananas.....	371,000
Lemons.....	138,000
Strawberries.....	164,500
Grape Fruit.....	49,000
Cranberries.....	42,500
Tomatoes.....	41,200
Pineapples.....	35,500
Water Melons.....	27,900
Figs.....	7,000
Total.....	\$1,237,000

Oranges, bananas, lemons, grape fruit, pine apples and figs cannot be grown in Colorado, but if there were a sufficient quantity of choice, home grown apples and peaches, the quantity of these sub-tropical fruits used would be greatly reduced, and the money spent for them kept in the state.

Nearly one-third of the strawberries came in out of our season, and were sent from California, Texas, and Arkansas. Two-thirds of the strawberries shipped into the state came from Missouri, and a large part of these should have been produced in Colorado. Some strawberries came from Oregon, and Utah.

The tomatoes came from Florida, Georgia, Texas, Arkansas, essee, and Mexico, and were received before Colorado tomatoes were marketable.

The watermelons came from Florida, Georgia, Texas, Arkansas, and Oklahoma, and were shipped in out of season.

FRUITS THAT SHOULD HAVE BEEN GROWN IN COLORADO.

Grapes.....	\$208,300
Apples.....	65,500
Cantaloupes.....	57,200
Pears.....	33,500
Prunes.....	8,300
Peaches.....	5,800
Cherries.....	1,300
Total.....	<u>\$379,900</u>

One hundred and thirty cars of Concord grapes were shipped into Colorado in 1909, costing, wholesale, \$104,850. Half of these grapes came from New York, over one-third from Michigan, and the remainder from Pennsylvania and Iowa.

The writer has purchased New York grown Concord grapes, at Cortez, Colorado. They were shipped from New York to Denver, and re-shipped to Dolores, 510 miles by rail from Denver, having to be transferred at Alamosa to narrow gauge cars. They were carried by freight wagons from Dolores to Cortez, nearly twenty miles. Yet grapes thrive particularly well in the Montezuma Valley, of which Cortez is the center, and the few vineyards there yield \$500 and upwards an acre a year.

California grapes to the value of \$91,000, and Imported grapes to the value of \$12,450 were shipped into Colorado in 1909. Professor O. B. Whipple, formerly Field Horticulturist for the Colorado Experiment Station, states, in Bulletin No. 141, that California varieties of grapes grow in the fruit section of Colorado will, when mature, give an average annual return of \$525 per acre, and Concord grapes an average annual return of over \$600 an acre. One of the most successful apple growers in Canon City stated to the writer that grapes planted between rows of bearing apple trees have given him, for twenty years, an average annual return per acre of \$100.

The fruit sections of western Colorado are well adapted to grape growing, and it is an industry that offers quick returns. If there were a sufficient number of men to grow them, Colorado could not only fully supply the home market, but the demand in all the other mountain states.

Apples.—About three-fourths of the apples shipped into Colorado in 1909 came from California. They were inferior in flavor, size, and coloring to Colorado apples. Other shipments were made from Oregon, Utah, Montana, and Kansas.

In a trip made by the writer in November and December, 1909, covering the dry land sections of eastern Colorado, it was found that the towns in these sections along the lines of the Burlington, Union Pacific, Rock Island and Missouri Pacific railroads were supplied almost entirely with California apples. The fruit growers of the eastern Slope and of the Arkansas Valley should organize and secure this trade. It is a market that can be greatly increased.

Potatoes and Sweet Potatoes.—Potatoes for the table use to the value of \$116,000, and sweet potatoes to the value of \$68,000, were shipped into Colorado in 1909.

About half of the potatoes came from Texas, the others from California, Utah, Idaho, Arkansas, and Kansas. Most of the potatoes came in before Colorado potatoes were ready for the market. In February, 1910, a car of new potatoes was received in Denver from Cuba.

Over half the sweet potatoes came from Kansas, one-third from Virginia, and the others from California and New Jersey. From limited trials, it seems probable that the sandy soils in the Arkansas Valley are well adapted to growing sweet potatoes, and that this section should furnish all the sweet potatoes needed in the state, and in other mountain sections.

Green Vegetables.—Cauliflower, cabbage, celery, and onions were shipped into Colorado from California, celery from Florida, cabbage from Tennessee and cabbage and onions from Texas. The growers of these products in Colorado need to pay more attention to the early crops, and to methods of storage that will lengthen the period of home grown supplies.

CANNED GOODS.

California Fruit.....	\$500,000
Corn.....	310,000
Tomatoes.....	300,000
Peas.....	80,000
Beans, Succotash, Sweet Potatoes, Beets, Asparagus and other vegetables and eastern Berries and Fruits.....	100,000
Grape Juice.....	35,000
Cider.....	20,000
Total.....	<u>\$1,345,000</u>

This estimate is conservative. Some of the largest jobbers in the State consider that the actual total is nearly \$2,000,000. The most careful estimates place the value of canned goods put up in Colorado, in 1909, at \$500,000. The business in the state is increasing every year.

Fruit.—Most of the canned fruit sold in Colorado comes from California, some of it from states east. There is a great opportunity for the fruit growers of western Colorado not only to supply the demand for canned fruit in Colorado, but the demand for the best quality in many other states.

Colorado canned fruit, when properly prepared, is as much superior in flavor to canned fruit from other sections as Colorado fresh apples and peaches surpass those from other states. Only a small proportion of the fruit trees in the fruit sections of Colorado have reached the age of bearing, and in a few years the fruit output of the State will be increased many fold.

As fruit production increases, the canning industry can be gradually established, and the knowledge and skill acquired to produce a canned product uniform and equal in quality to that of our fresh fruits.

Corn.—The best grade of canned sweet corn comes from Maine. The bulk of this product shipped into Colorado comes from Iowa, Missouri and other states in the corn belt.

A few thousand cans were put up at Fort Lupton, Colorado, in 1909. In most of the tillable sections of Colorado the nights in summer are too cool for the best growth of sweet corn. The Arkansas Valley and the warmer sections of the Western Slope have conditions well adapted to the growing of sweet corn for canning, except the damage from boll worms in the ear. In some seasons the worm damages almost every ear, and in other seasons the damage is very slight, but the uncertainty prevents the growth of the sweet corn industry.

Tomatoes.—Experts estimate that 7,200,000 cans of tomatoes were eaten in Colorado in 1909, one-half of which were shipped into the State. Most of the tomatoes shipped into the State came from the corn belt, though large shipments were made from California, and from as far east as New York.

Fifty thousand cases of tomatoes were shipped into Colorado from Utah. These tomatoes were grown under conditions almost identical with those found in the fruit sections of western Colorado.

Tomatoes do well in several sections of Northeastern Colorado and the soil and climate of a large proportion of the Arkansas Valley and of the Western Slope fruit sections are suitable for growing large yields of tomatoes of good quality.

The industry should grow until most of the canned tomatoes used in the State are a home product, and the quality that can be produced in Colorado will find a good market in many other states.

The objection made by retail grocers and by consumers to tomatoes canned in Colorado is that they are not uniform in quality. Several cases may be as uniform in character and of as good quality as the best or the most expensive brands of eastern canned tomatoes, while in the same shipment, from the same factory, will be other cases that contain cans whose contents are watery, often to a serious

degree. California canned tomatoes often have the same fault.

Some expert handlers of canned tomatoes believe that this condition is largely caused by over irrigation and that it is made worse by the use of seeds from strains that do not produce firm fleshed tomatoes, by too little cultivation and by a too high temperature in canning.

The best canned Colorado tomatoes are equal to the best produced in any other part of the United States, and the industry needs the intelligent co-operation of the seedsmen, growers and canners to produce a uniform quality of high grade.

Peas.—The peas canned in Colorado by Empson are equal in every respect to the best grades of canned peas produced anywhere else in the world, and if a sufficient supply was produced, they could be sold anywhere on the globe where canned peas are wanted. They are the only canned peas produced in the United States equal to the French peas.

About 90% of the canned peas used in Colorado are from the Empson factories, and most of the peas that are shipped into the state are brought here because jobbers want their own names on the cans and the Empson factories refuse to do this.

Beans, Succotash, Sweet Potatoes, Beets, Asparagus, and Other Vegetables.—These can profitably be canned in Colorado in quantity and of the quality required to supply all the demands of the state.

Canned Goods.—This industry can be developed until a sufficient quantity is produced not only to supply the demands of Colorado, but a much larger market in other states. Before this can be effected a uniform, choice quality must be produced season after season.

The Empson canned peas produced in Colorado are not surpassed by those produced in any other part of the world. Mr. Empson determined the most suitable varieties the best strains of these varieties, and the methods and locations for producing and maintaining seed that will secure high quality in the crop. He ascertained the character of soil that will produce the choicest flavored peas, and he allows peas to be grown on that kind of soil only. The methods of planting, cultivation, irrigation and canning that produce the choicest quality of peas were all discovered and then adopted.

It will require similar methods to give Colorado canned fruits, berries, tomatoes and vegetables the same standing through the United States that is now held by Colorado fresh fruits and potatoes. Many towns in Colorado are planning to establish canning factories. Such factories will be profitable only when methods like those of Mr. Empson are adopted.

DRIED FRUITS.

Dried Fruits..... \$500,000

A large proportion of the dried fruits shipped into Colorado come from the Pacific Coast.

The dried fruit industry has been started in a small way on the Western Slope in Colorado. Apples, peaches and prunes make up the bulk of the product.

Jobbers and grocers complain that Colorado dried fruits fail to be uniform in quality, and state that the production of dried fruit will have to go through the same stages of development through which the production of fresh fruits and potatoes has passed before Colorado dried fruits will have a high standard in the markets of the United States.

PICKLES, CATSUP AND CANNED BEANS.

Pickles (Colorado Sorts).....	\$50,000
Catsup.....	50,000
Pork and Beans.....	75,000
Total.....	\$125,000

Pickles.—The pickle industry is comparatively new in Colorado, and is annually increasing. The pickles put up by those of our manufacturers who are skillful and have had experience are fully equal in every respect to pickles shipped in from other states. Growing material for pickles gives good profits to the farmers who understand the business and the industry is likely to have a continual steady growth.

Catsup.—Some Colorado catsup is equal to the best eastern brands and some is of poor quality. Consumers do not feel certain of the quality and many prefer to buy eastern brands that are good and always uniform. Greater care on the part of all Colorado makers of catsup could overcome this difficulty.

Pork and Beans.—The large demand for eastern brands of pork and beans seems to have been created largely by the expensive advertising given these brands in magazines and ladies' journals.

WHAT THIS INQUIRY SHOULD SHOW COLORADO PEOPLE.

This investigation shows that over *Thirty-one Million Dollars* were sent out of Colorado in 1909 to buy agricultural products that should have been produced in the State. This heavy drain on the State is annually increasing.

The entire output from the metal mines of Colorado, for 1909, is reported by the State Commissioner of Mines, Mr. T. J. Dalzell, to be \$33,211,527, as follows:

Gold.....	\$21,946,684
Silver.....	4,587,643
Lead.....	2,765,512
Copper.....	1,220,642
Zinc.....	2,295,046
Tungsten.....	396,000
Total.....	\$33,211,527

The gross returns from our metal mines was but little more than sufficient to pay for the agricultural products shipped into the State. The gross product of our silver mines was not quite sufficient to pay for the dairy products shipped into the State. The gross returns from silver, lead and copper were slightly more than enough to pay for the meat and meat products shipped into Colorado. All the zinc mined would a little more than pay our bill for eggs shipped in.

Nearly every agricultural product shipped into Colorado could have been more easily produced in the State, at a greater profit, and under conditions more enjoyable for the producer than in the sections where it originated.

The following figures from the United States Department of Agriculture show the average yearly yields per acre for the past ten years, and indicate the larger yields in Colorado:

	WHEAT Bu.	OATS Bu.	BARLEY Bu.	POTATOES Bu.	HAY Tons
Colorado.....	24.5	34.2	33	122	2.31
Indiana	29.1	25.6	77	1.36
Illinois.....	31.3	28	85	1.33
Iowa.....	13.8	30.1	26	83	1.52
Kansas.....	11.6	24.4	19.7	77	1.42
Nebraska.....	12.6	26.9	24.4	84	1.57
Wisconsin.....	15.7	33.4	28.8	92	1.56
Minnesota..	12.7	31.6	25.8	86	1.66

Although Colorado produces high yields of grain, yet ten million dollars were sent out of the State in 1909 for grain and grain products. The conditions of climate are ideal for growing beef animals, and the feeds produce beef of a choice flavor, yet one million eight hundred thousand dollars were sent out of the State for fat cattle, beef and veal. Pork can be produced at less cost and of better quality than it is being produced in the corn belt. We sent out in 1909 over four million dollars for hogs, pork and pork products. Both climate and feeds are adapted to the economical production of dairy products, still we sent out nearly five million dollars for these products, alone. Four million dollars were sent out for eggs and poultry, while our few expert producers of these products were making nearly double as much, per hen, as was being made in the States from which we made these purchases.

Why, then, with such favorable conditions, did we send out thirty-one million dollars for agricultural products that could have been more profitably produced in the State? Because there was not a sufficient number of farmers in the State. Almost every farmer in Colorado is undertaking more than he can accomplish well, and it will be impossible to increase the present agricultural output of the State to any considerable extent, unless we secure more farmers.

With many products shipped into Colorado, the consumption would be larger could home products be secured. When people are obliged to use cold storage eggs, the consumption drops to a fraction of that when fresh layed eggs are available. More meat, more butter, more cream and milk, and more fruit and vegetables are eaten when strictly fresh, home produced products can be secured.

We need 30,000 more farmers this year in order to produce the agricultural products that will be consumed in the State. We need men who are skillful in the management of beef and dairy cattle, hogs and poultry; grain, fruit and vegetable growers, and men who can produce choice raw material for canning and pickle factories.

The potatoes and fresh fruits grown in Colorado have a National reputation for choice quality and there is every reason to believe that if a surplus above home needs were produced, a large demand could be created in other States for Colorado meats, dairy products, poultry and eggs, seeds, canned goods, and dried fruits. It will require thousands of farmers to produce a sufficient surplus of these products to secure a large outside market.

SECURING ESTIMATES.

The figures given in this bulletin are estimates only. They are based on the most accurate data that could be secured and are conservative estimates, considered in many cases by the largest handlers of the products to be low.

The writer has had charge for over three years of the Farmers' Institute Work of the Agricultural College and during that time has traveled over 60,000 miles in Colorado. During the three years he and his associates from the college in Institute Work, 35 in number, have been collecting data in regard to the agricultural products originating in the State and those shipped in. The data so obtained have been used as the basis for these estimates.

In addition to the above information the railroads furnished us with a statement of the exact number of tons of each agricultural product from the Missouri River, Eastern and Texas points that were shipped in 1908, and in the first four months of 1909, into, but not through, Colorado, to Denver, Colorado Springs, Pueblo, Trinidad and other points by way of the Santa Fe, Burlington, Rock Island, Missouri Pacific, Union Pacific, Rio Grande and Colorado & Southern Railroads. These figures were used as the basis for estimates where accurate statements for 1909 could not be secured.

The Rock Island and the Denver & Rio Grande furnished statements of the exact tonnage of all agricultural products brought by these railroads in 1909.

The Burlington and Union Pacific Railroads furnished us the tonnage of grain and grain products brought by them into Colorado in 1909, and the Union Pacific gave us a statement of the tonnage of hay brought into the State by that railroad in 1909. The Santa Fe Railroad furnished us a statement of the tons of grain and grain products brought into Colorado in 1909 by that road.

The Denver Union Stock Yards furnished a statement of the number and value and origin of all fat animals shipped into Colorado in 1909.

The quantity of meat and meat products shipped into Colorado in 1909 was secured from the railroads and the values were furnished by the experts from the Colorado Packing Company.

The estimates on the value of butter and cheese was made after securing figures from all the large handlers of these products.

The estimates on eggs were made from the combined estimates of eight of the largest handlers of these products in the State, together with information obtained during the past year by Professor Vaplon, the Poultryman of the Agricultural College, and myself in most of the towns in Colorado. The estimate on poultry was obtained in the same way, and in addition, information was obtained in regard to the amount being sent out of Colorado through the banks for poultry.

The estimate on condensed milk was secured from the Condensed Milk Factory at Fort Lupton, and from the jobbers of this product at Denver, Colorado Springs and Pueblo.

The estimate on Malted Milk was secured from wholesale and retail druggists.

The information in regard to grain and grain products was obtained from railroad records, from millers, from wholesale dealers in flour and feed and from bakeries.

Seedsman in Denver and Pueblo and records from railroads furnish the information in regard to seeds.

Data in regard to fresh and dried fruits and vegetables were secured from jobbers and brokers and the records of the railroads. Mr. Geo. Knifton, Denver, was particularly helpful in securing this information. The estimates on canned goods, pickles and condiments are based on information furnished by the largest jobbers in these products in the State, and by canning and pickle factories.

The estimates on hay were based on records of shipments furnished by the railroads and information given by large handlers of this product. The information in regard to broom corn was secured from the chief handlers of this product in Denver and Pueblo.

We shall be very glad to receive corrections and additions to these estimates from any reliable source.