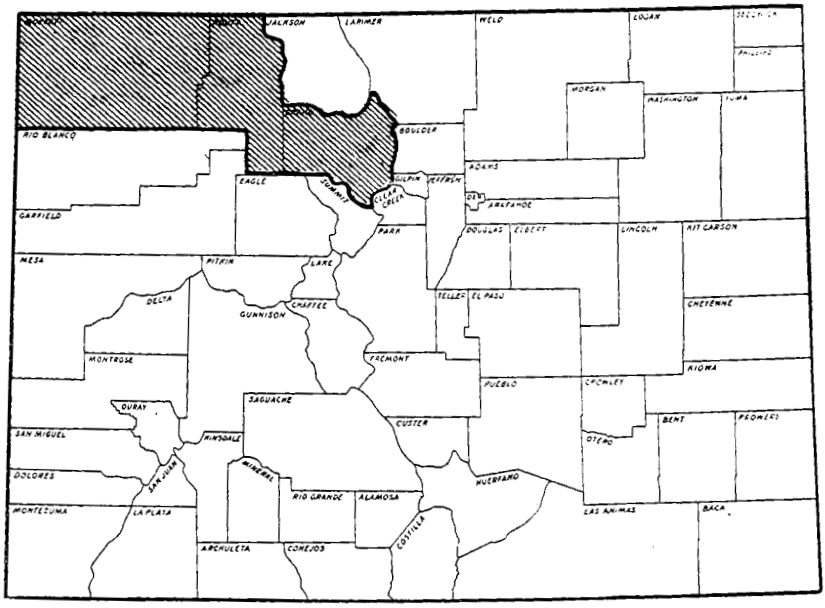
AN AGRICULTURAL PROGRAM FOR NORTHWEST COLORADO

By THOS H. SUMMERS, Farm Management Demonstrator
and R. W. SCHAFER, District Extension Agent

COLORADO



A report dealing with some of the problems having to do with adapting production to market requirements

COLORADO AGRICULTURAL COLLEGE
EXTENSION SERVICE

Fort Collins, Colorado
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CO-OPERATIVE EXTENSION WORK IN
AGRICULTURE AND HOME ECONOMICS, COLORADO AGRICULTURAL COLLEGE
AND U. S. DEPARTMENT OF AGRICULTURE CO-OPERATING
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OF MAY 8 AND JUNE 30, 1914

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Northwest Colorado produces more agricultural products than can be consumed by her population. This surplus must be marketed outside of the region where it is produced, being frequently shipped to distant markets to compete with agricultural products from other production areas. On the other hand some agricultural products which could be produced in the region must be shipped in to supply the local demand.

In considering the agriculture of this area it seems advisable to take an inventory of its resources and possibilities so that a sound program may be developed which will help to bring about a better balance between what farmers produce and what the markets demand. Then, too, in order to show the relative position of the territory in its contribution to the total production, it is desirable to consider what is being done in other sections of Colorado, in the United States and in foreign countries.

It was with this objective in mind that an agricultural economic conference was held at Steamboat Springs in October, 1927. At this meeting farmers and others interested in agriculture gathered to consider the various agricultural problems of the region. After reviewing all available data, a number of recommendations were formulated that might assist in solving some of the problems of this region.

Upon the completion of the Moffat Tunnel, considerable development of this territory is expected. New settlers will come into the region to engage in some type of farming. It is highly desirable, therefore, that the information point out some of the limitations as well as the possibilities of this vast undeveloped section of Colorado.

This publication gives the agricultural recommendations made and approved by the conference together with much of the data used by the various committees at the conference.

ACKNOWLEDGEMENTS

The consideration of this study at this time was at the invitation of the Moffat Tunnel League. This organization assisted materially in making this study possible and contributed valuable suggestions and information. Its members also served on the conference committees.

Much credit is due Mr. Eugene Merritt of the Extension Office at Washington, D. C., who is supervising this type of work in a number of the western states, including Colorado.

To the farmers and others who attended the conference and contributed their time, efforts and experience, is due credit for making such a conference possible. Other cooperating agencies in this work were:

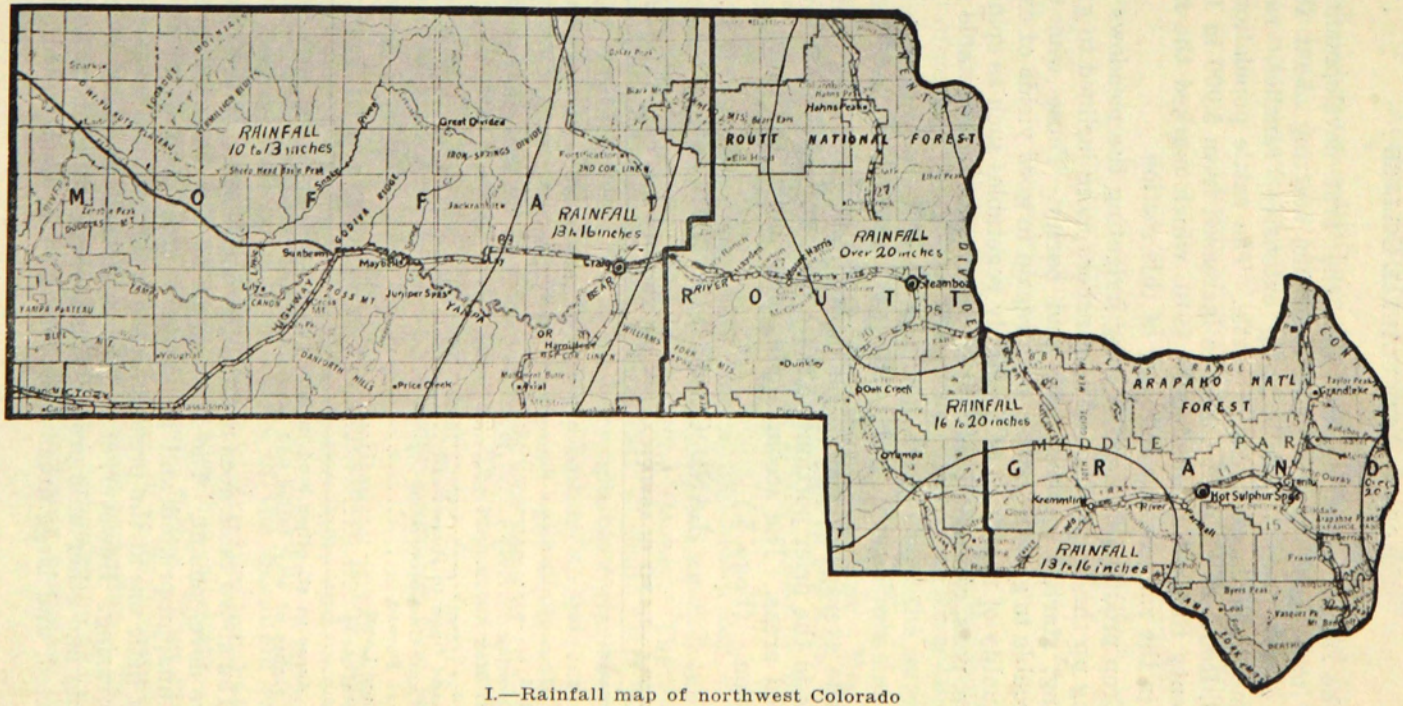
The local livestock organizations
The county commissioners
The editors of northwest Colorado
The State University
The State School of Mines
The Denver and Salt Lake Railroad
The Bureau of Agricultural Economics, U. S. D. A.
The U. S. Forest Service
The U. S. Biological Survey
The U. S. Geological Survey
The U. S. Bureau of Public Roads
The U. S. Bureau of the Census
The Colorado Agricultural College

HISTORY

A map of Colorado in 1861 shows all of northwest Colorado included in the territory called Summit County. In 1874 Grand County was organized from a part of Summit County, and named for the Grand River which has its head waters there. Routt County was organized in 1877 from the west portion of Grand, and was named in honor of John L. Routt, twice governor of Colorado. Moffat County was organized in 1911 from the western part of Routt and named in honor of David H. Moffat, builder of the "Moffat" railroad.

Grand County was originally a part of the dominion claimed by the Northern Ute Indians and was one of their most popular hunting grounds. The first known white settler was Jim Baker, who settled in what is now Moffat County in the early forties, near the Wyoming line in the Snake River Valley.

This territory previous to 1860 was frequently visited by explorers, trappers and prospectors. Gold was discovered in Routt County in 1864 at the base of Hahns Peak by a prospector named Way. Two years later he and Joseph Hahn, for whom the peak is named, organized a party of miners and established the first white settlement in this territory near the present site of Hahns Peak post office. The early settlers, however, were principally stockmen.



I.—Rainfall map of northwest Colorado

The range cattle industry was the first development of much importance in Northwest Colorado, starting about 1880. Some of the first settlers built up extensive ranches, ranch equipment and large herds of cattle. The cattle population of Grand, Routt and Moffat Counties increased from 5,000 in 1880 to twenty times that number in 1910, which marked the high point in the range cattle industry of this section.

Crop production began first by irrigating the meadows and putting up the native hay. The ranchers more inclined to grain farming, started growing oats and barley. Those who took the trouble to grow a garden were repaid in good yields of excellent quality of nearly all of the hardy vegetables such as spinach, lettuce, peas, cabbage, cauliflower, celery and the vegetable root crops.

RAINFALL

The average rainfall of northwest Colorado varies from 10 inches in the drier portions to more than 20 inches in the more favored areas. The accompanying map shows the rainfall distribution. (Page 5.)

LAND CLASSIFICATION

TABLE 1.—LAND CLASSIFICATION OF NORTHWEST COLORADO—1926

Classes	Number of Acres		
	Grand	Moffat	Routt
Irrigated	29,759	17,126	43,061
Dry Farming		116,618	54,120
Natural Hay		3,840	
Grazing	204,574	687,406	379,884
Gov. Land Open to Homestead	104,150	1,163,885	114,185
State Land Unappropriated	63,808	205,873	70,983
National Forest	533,586	42,196	570,252
All Other Land	258,363	744,176	245,275
Total Area	1,194,240	2,981,120	1,477,760

Note: Acres in all other land include coal, mineral and timber land, railroad rights of way, cities and towns and land unclassified as to ownership.

The above table does not tell the entire story of the possible future development. The large areas of land reported as state land unappropriated and government land open to homestead are of little use at the present time for agricultural purposes except grazing. However, of all land now classified as dry farming, grazing and other unimproved areas, some will eventually be irirrigated, and large areas undoubtedly will be classified as tillable.

A recent reconnaissance report of the United States Geological Survey gives the approximate possible tillable area of the three counties as follows:

County	Total area (acres)	Possible tillable area Percent	Acres
Grand	1,194,240	25	298,560
Moffat	2,981,120	50	1,490,560
Rout	1,477,760	30	443,328
Total	5,653,120	40	2,232,448

SOIL

There is a wide variation in soil types in this territory. In point of geological origin the Brown's Park, Green River and Vermillion Soils were laid down immediately following the formation of the Rocky Mountains, and the Laramie, Mesa Verde and Mancos soils were formed before the Rocky Mountains. These are among the more abundant agricultural soils in the area. In addition to these there are many other smaller areas of different geological formation.

In structure the soils range from a tight heavy clay, to loam, light sandy soils and even to a non-agricultural sandhill type in a limited area south of Maybell in Moffat County. The alluvial soils along the streams and valleys vary in depth from several inches to several feet. These are very valuable agricultural soils and are usually irrigated. The second bottom, uplands and mesa soils range from heavy clays to loams and light sandy soils. Most of these soils, except the tighter clays and some of the lighter sands are very good agricultural soils. The rich mesa and upland soils when not too sandy produce well under dry farming. The heavier of the clay soils do better under irrigation than for dry farming.

Another soil type of especial importance is the mountain-valley loam located in the valleys, on the slopes and on some of the adjoining mesas close up to the foot hills, and in some cases even running well up onto the sides of the mountain ranges. These soils vary greatly in origin but in structure usually range from a coarse rather gravelly loam to a fine silt loam. These mountain-loam soils are quite uniformly fertile. They lay in a territory receiving an average of from 18 to 20 inches or more rainfall, thus insuring good crops without irrigation. They are well adaped to production of grain and forage crops and are the soils upon which head lettuce and the hardy mountain vegetables do best.

Soils of Moffat County lying north and west of Craig were formed immediately after the Rocky Mountains were formed and were the lighter and more sandy types. The agricultural areas lying south and east of Craig, and on thru Routt County east to the main mountain range are largely of cretaceous origin and are heavier soils with greater clay content. It is within this area that the mountain-loam soils are found.

The same variation in soils is found east of the mountain range in the Grand County area, but with a smaller percentage of the lighter soils and more of the heavier soils. The alluvial soils along the streams are quite similar thruout the eastern territory.

CROP YIELDS

The crops grown in the territory are the ordinary grain crops, the native meadow hays, timothy, clover and alfalfa, potatoes, root crops, head lettuce, peas and the other hardy vegetables with some sunflowers for silage and some corn in the lower altitudes.

The average crop yields per acre on irrigated land are:

Wheat, 25 to 27 bushels, oats about 40 bushels, barley, 38 bushels, and potatoes, about 160 bushels. The yields per acre on non-irrigated land are, of course, somewhat less than on the irrigated land. Wheat yields from 10 to 17 bushels per acre, oats and barley about 23 and potatoes vary from about 50 bushels in the drier areas to over 100 in the more-favored locations. Yields considerably above the average are not unusual in most sections. These average yields are well above the general averages for the entire state both for irrigated and non-irrigated crops.

TABLE 2.—ALTITUDE AND LENGTH OF GROWING SEASON
Elevation of Farm and Range Land

County	Elevation	
	Farm Land	Range Land
Grand	7300 to 8000 ft.	to 13,000 ft.
Moffat	5400 to 6400 ft.	to 7,600 ft.
Routt	6230 to 7900 ft.	to 12,000 ft.

The length of growing season varies with the elevation. The average frost free season varies from about 60 days in the highest of the cultivated areas to 120 days in the lower altitudes.

Under the more rigorous conditions of the higher altitudes hardy vegetables and other crops seem to be able to withstand more frost than at the lower altitudes.

AGRICULTURAL RECOMMENDATIONS

RANGE AND FORAGE

The committee on range and forage finds:

That the region is primarily grazing, 92.3 percent of total land area being suitable stock range.

That a vast area of public domain, over two and three-fourths millions of acres, is practically uncontrolled.

The committee therefore recommends:

1. That there be no increase in numbers of range livestock (cattle and sheep) within the district in view of the present feed resources, until and unless the following recommendations are met:
   - (a) Proper utilization of ranges in reference to the kinds of livestock grazed.
   - (b) Improvement of range forage types by
     - (1) Revegetation with native range grasses
     - (2) Controlled seasonal use
   - (c) Supplemental feeding to increase calf crop and avoid losses as well as to protect early spring range.

2. Local ownership of the livestock grazed within the district.

3. Increase in hay production and quality of hay produced in direct ratio with increase in locally owned range stock.

4. To encourage independence of stock growers relative to national forest and public domain ranges.

5. The improvement of range forage and carrying capacity by government control of the public domain.

6. The withdrawal of all existing public domain lands from entry subject to classification.

7. That an organized effort be made to control rodents within the district.

8. That greater effort be made to increase yield and quality of hay acreage by reseeding more frequently and the greater use of alsike in meadows and reseeding of alfalfa land.

9. That oats or barley and pea hay be used to fill in when other hay is scarce.

Glenn Sheriff, Chairman
Hot Sulphur, Colorado
C. A. Lee, Secretary
Fort Collins, Colorado

IRRIGATION

The committee on irrigation and drainage finds:

On account of the general topography of the country, the development of large irrigation projects would mean excessive costs.

In certain sections of Routt and Grand counties, the rainfall has been adequate to produce crops without much irrigation.

Extensive irrigation of bench lands under present economic conditions now cropped without irrigation, with the necessary construction and maintenance of ditches of considerable length would be very expensive, and in addition, fields on steep slopes would require numerous laterals and structures and constant attention in water application.

The committee therefore recommends:

1. That under present marketing and transportation facilities and crops grown, no large irrigation development be encouraged.
2. That under present conditions no irrigation projects be considered that entail a cost per acre to exceed $25, unless an extension of the railroad to Salt Lake City is made, such being estimated to justify double this expenditure per acre.
3. That pumping for irrigation be done only where conditions are most favorable with a crop of high return per acre.
4. In certain localities where shortage of water is likely to occur, small storage reservoirs be provided to assure a supplemental water supply.
5. Advantages of the consolidation of small ditches in a common carrier are questionable at this time.
6. Continuous application of water to hay meadows is believed not to produce best results.
7. More conservative use of water to prevent injury to land and promote increase of yield.
8. Leveling of fields where possible is recommended as a means of more uniform distribution of water and better yield of crops.
9. Improvement of headworks and control of diversion.
10. Some study be made as to best use of water in the present irrigated areas.
11. That water commissioners be paid a nominal salary during the off season and be required to meet with the Division Engineer in the spring and fall to discuss administration problems.
12. That the importance of administration of water and the importance of more complete irrigation records be impressed

upon the minds of the various boards of county commissioners, thereby creating a closer cooperation between county commissioners and water commissioners.

L. C. Chambers, Chairman
Steamboat Springs, Colorado
R. L. Parshall, Secretary
Fort Collins, Colorado

CATTLE

The cattle committee finds:

That there is practically the same number of cattle in the United States in 1927 as there was in 1914, but that Colorado shows a 20 percent increase for this same period.

That altho there was about 25 percent fewer cattle shipped out of this area in 1926 than in 1914, there has been some replacement by sheep.

That there is sometimes a surplus of hay in the region which is usually wiped out in the course of two or three years.

That at the present time there is little danger of curtailment of the cattle industry on account of farm development. There are about 4,000,000 acres available for grazing, while farms comprise 300,000 acres.

That the completion of the Moffat Tunnel is the only change in sight in marketing facilities which will aid by reducing shrinkage and danger of delay of shipments.

The committee therefore recommends:

1. That unless sheep decrease in number, the cattle industry be not increased but carried on the present scale, but more attention be paid to economical production and marketing.

2. That since the feeding demonstrations carried by the Agricultural College Extension Service at Oak Creek on warming-up feeders showed that timothy hay is not economical in a ration, is is recommended that where warming-up of feeders is contemplated with a 60 to 90-day feed to reduce the market glut in the fall months, timothy be replaced in the meadows by orchard grass or some other meadow grass in connection with alsike clover.

3. On account of the low carrying capacity of the public domain due very largely to improper grazing by stock of nonresident owners, that the land laws be changed to provide for the bulk of the public domain to go into private ownership by means of homesteads of greater acreage than at present and allowing ranch owners to purchase considerable acreage of land near their home ranches. That until this is done the remaining

areas be held from federal control, the two policies to go together.

4. That the calf crop be increased thru controlled pasture breeding and by having the cows on good feed and in good condition in the spring.

5. That quality of stock be improved thru purchase of better bulls now that cattle prices are advancing.

6. That losses from poisonous weeds, disease and predatory animals be minimized by careful control methods.

Roy Templeton, Chairman
Maybell, Colorado
Geo. E. Morton, Secretary
Fort Collins, Colorado

SHEEP

The sheep committee recommends:

1. That there be no material increase in range sheep in this area unless there is a corresponding decrease in range cattle or an increase in available feed. It is the belief of the committee that this area is stocked to the limit of safety, considering present feed supply.

2. That more attention be paid to the irrigation of the hay lands of this area, not only that more hay be produced but also a greater amount of fall grazing on the meadows.

3. That ranchers in the valley with a surplus of feed consider the possibility of utilizing such feed in the wintering of ewe lambs and the sale of these as yearlings in the spring after shearing. That no feed be shipped from the region.

4. That a better grade of bucks be used on range flocks. That 3 bucks be used per 100 ewes or certainly not less than 2½ bucks per 100 ewes. That blackface bucks be preferred where lambs are all to be shipped to market or where ewes are to be bred early for shipment to eastern farms.

5. That a desirable type of ewe for these ranges is a large smooth bodied ewe with one fold only on the neck, produced by crossing Lincoln, Cotswold, Romney or Corriedale blood with the Rambouillets or Merinos. That from 50 to 75 percent of the fine wool blood makes a most desirable type of range ewe.

6. That most satisfactory results are obtained in this section by breeding not earlier than December 1. May lambs make very satisfactory weights by October and over 80 percent sell as killers.

7. That range ewes be sold preferably at five years of age, not later than six years. This area is not well suited to the handling of old ewes.

8. (a) That farm flocks be recommended only where they are restricted in size to accord with the available feed supply on the farm.

(b) That there is an opening for a limited number of purebred farm flocks to produce range bucks, particularly Rambouillets, Hampshires, Cotswolds or Lincolns.

9. That an effort be made to increase the wool clip per ewe by using heavy-shearing bucks and rigid culling of low producing ewes at shearing time. Rambouillet range bucks should shear at least 15 pounds.

10. As there is a heavy loss from coyotes in this section, it is suggested that an effort be made at the next session of the Colorado legislature to levy a special tax of 2 mills on the valuation of range cattle and 4 mills on sheep to provide funds for control of predatory animals. That meanwhile sheepmen assess themselves 5 cents per head to raise funds to employ trappers and hunters for immediate protection against coyotes.

11. That the D. & S. L. Railroad be asked to improve its present facilities for shipping livestock to the extent of cindering their present yards.

12. That wool producers get in touch with the Colorado Cooperative Wool Marketing association for information regarding cooperative selling of wool. Address Central Savings Bank, Denver, Wayne Bowen, Secretary.

Norman Winder, Chairman
Craig, Colorado
Chas. I. Bray, Secretary
Fort Collins, Colorado

DAIRYING

The committee on dairying finds:

That there is no surplus of dairy products in northwest Colorado.

That there is a shortage of dairy feeds.

That the feeding period for dairy cows is nine months.

That there are sufficient feeds to balance a dairy ration with the need possibly of some cottonseed cake.

That there is very little suitable pasture for dairy cows altho sweet clover, rye and brome grass do well on dryland. Natural hay-land pasture has a low carrying capacity.

The average size of dairy herd in the region is ten cows, sizes ranging from three to thirty head.

There are very few purebred dairy bulls in the region.

There is a lack of knowledge on the part of dairymen to handle purebred dairy cows.

There is no blackleg, contagious abortion, or bovine tuberculosis in the region.

Milk and cream of excellent quality are produced, except in the spring when the wild onion menaces the flavor.

There is inadequate shelter for dairy cows in northwest Colorado.

By proper handling of dairy cows and proper feeding the production of dairy products could be increased 50 percent.

There are adequate dairy manufacturing facilities in this region, but a lack of cold-storage facilities.

Large quantities of skimmilk are available for feed since churning cream is sold.

There is a need for more county agents in the territory to help carry out the many recommendations made by this committee.

Most cows freshen in the spring when the price of butterfat is low.

The committee on dairying therefore recommends:

1. That there be a gradual increase in the production of dairy products in northwest Colorado thru the following methods:

   (a) Calf clubs
   (b) Using purebred sires from high-producing cows
   (c) Systematic weeding out of low producers and replacement with high-producing cows

2. That anyone contemplating dairying shall raise enough feed on the farm to properly nourish every animal for a year which is approximately 4 tons of alfalfa, or its equivalent, per head, 1800 lbs. of small grains, oats and barley and by-products of other grains, and 2½ tons of silage (sunflower on high-altitude farms, corn silage where it can be grown.)

3. That dairying be confiend to areas suitable for dairying, and that dairy stock be confined to these farms and not be allowed to run on the open range.

4. That purebred dairy sires from high-producing dams and sires be used on all dairy cows; that bull associations be encouraged; that the user of a scrub or grade bull be looked upon as a menace to the dairy industry in northwest Colorado;

that all grade dairy bulls be vealed; and that no dairy cows be bred to range bulls.

5. That no cow producing less than 200 pounds of butterfat per year be kept for dairy purposes.

6. That each farmer keep a systematic individual record on each cow in his herd, and that county agents and Smith-Hughes teachers supervise this work.

7. That cows be bred to freshen in the fall.

8. That enough hogs and poultry be kept to consume the skimmilk.

9. That all cows brought in pass a satisfactory tuberculosis and contagious abortion test.

10. That onion flavor be eradicated by use of spring pasture or by drylot feeding.

11. That adequate shelter, such as windbreaks, sheds and barns, be supplied to house the animals in cold weather.

12. That there be no increase in the present marketing and dairy manufacturing facilities in northwest Colorado.

13. That northwest Colorado take some definite action to provide much needed cold-storage facilities.

14. That more county agents be employed and maintained in northwest Colorado in order to carry on this work more effectively.

H. K. Bailey, Chairman
Hayden, Colorado
C. A. Smith, Secretary
Fort Collins, Colorado

SWINE

The hog committee finds:

That in this area a large number of farmers have no hogs.

That there is always some grain which spoils, and thousands of gallons of skimmilk are poured out each year and that the farmers who are making use of these by-products are making a success with hogs.

Not enough sows are bred in the area to supply demand for weaner pigs and for those desiring pigs to take care of household and farm waste.

Not enough hogs are raised to ship out in carlots and there is difficulty in marketing just a few hogs.

The increasing demand for hogs on the Pacific coast should make Denver market price continue to be above Omaha.

That there is some barley and rye being shipped out which should be fed to hogs.

That there is not enough use being made of pastures for hogs, and that there is need for more hog pasture.

That there is a lack of well-bred hogs and that much of the stock is deteriorating in quality.

That many pigs are being lost thru inadequate housing of sows at farrowing time.

The hog committee therefore recommends:

1. That enough hogs be kept on dairy and grain farms to take care of by-products and waste.
2. That enough breeding stock be kept in this area to provide pigs for those not keeping sows.
3. That hog raisers get together and work out plans to ship out in carlots by—
   (a) Breeding at approximately the same time
   (b) Increasing number of sows
   (c) Organizing shipping association
4. That each farm keep from three to five hogs to take care of waste or by-products and furnish home supply of meat.
5. That there be more use made of pastures in this area to make more economical production possible.
6. That more pigs be saved per litter by the use of farrowing houses and clean, dry pens.
7. That there be more purebred boars used.

R. I. Gwillim, Chairman
Oak Creek, Colorado
A. C. Allen, Secretary
Fort Collins, Colorado

POULTRY

The poultry committee finds:

That poultry production has an important place in the development of northwest Colorado since the present supply of poultry products is inadequate to meet the local demand.

That sufficient feeds are produced and the climatic conditions are favorable for the production of high-quality poultry products.

That turkey production for the Thanksgiving market is not generally successful on account of the short season in this region.

That the population of this region is increasing.

The poultry committee therefore recommends:

1. That there be a gradual increase in the number of birds raised, but that any material increase in numbers of eggs pro-

duced be brought about thru improvement in quality of stock raised and improved methods of management.

2. That more attention be given to the securing of higher-quality poultry.

3. That both the farm and commercial poultry units be no larger than can be properly handled to secure the best results. Experience has proved, under conditions similar to our own, that farm flocks of 150 laying hens and commercial flocks of not less than 500 laying hens are most successful.

4. That farm poultry breeding flocks be encouraged.

5. That hatcheries to help care for the demand be encouraged.

6. That the production of early chicks be encouraged.

7. That milk be fed to supply animal protein for egg production when it is available.

8. That more attention be given to sanitation in poultry production.

9. That a cash market be developed in the district for poultry and eggs.

10. That storage facilities be established at a convenient point to take care of the surplus production during the flush season.

11. That the production of eggs be the first consideration in poultry development.

12. That an educational poultry program be carried out the coming year as a means of improving the poultry conditions in northwest Colorado.

13. That every farm have sufficient laying hens to provide eggs for the family.

E. Y. Brame, Chairman
McGregor, Colorado
O. C. Ufford, Secretary
Fort Collins, Colorado

GRAINS

The grains committee recommends:

1. In view of the superior quality of wheat that can be grown and the good yields possible, wheat production can be profitably increased two or three fold in the district including Steamboat Springs area, and west including the east half of Moffat County, and in Grand County west of Hot Sulphur.

2. That the types of wheat that should be grown should be adapted to the region, standardizing on Kanred as winter wheat and Marquis as spring wheat, save in the Hayden district

where the spring-wheat acreage may be either Marquis or Defiance.

3. Better yields of better quality can be secured by all small growers, thru use of better seed and the use of seedplots; thru better cultural methods including more summer fallow and good crop rotation and by the use of best smut-prevention methods.

Note: Every grower should have a two to five-acre seedplot to provide seed for the next year's planting. This seedplot should be planted with registered seed and renewed each year.

Since copper carbonate has proved to be the best control against smut in wheat and formaldehyde for smut in oats and barley, we urge no grain be planted before so treating.

4. We find that there is considerable flour shipped into the territory for use by those who do not like the local flour. In view of the fact that the wheats produced here are of the highest type necessary for the best of flours, we urge greater care by local millers in milling of flour and greater use of locally produced flour.

5. We believe that there should be a small expansion in the barley acreage. It is one of the best feed crops, is adapted to practically all of the district and is producing excellent yields. Yield and quality of barley can be greatly increased on the acreage now in barley, by the use of better seed and cultural methods. Barley acreage should be expanded only to meet district feeding needs.

6. In view of the fact that there is usually an oversupply of oats produced, no increase in oat acreage is recommended until district feeding demands are greater. However, the securing of better yields per acre is urged thru the use of good seed and better cultural methods.

7. No increase in rye acreage is recommended. Rye is adapted to regions where the rainfall is insufficient for wheat or barley. A greater use of rye for pasture is recommended, but rye production for grain should not be expanded above local requirements.

8. Corn is becoming an important crop in the western part of this district. More careful seed selection and cultural methods are urged to secure better yields and earlier maturity.

9. With all small grains, more work with variety tests is recommended and also experiments supervised by the Agricul-

tural College to determine best adapted varieties and cultural methods.

W. J. Matthews, Chairman
Hayden, Colorado
Waldo Kidder, Secretary
Fort Collins, Colorado

SEED CROPS

The seed-crops committee recommends:

1. Because of the high quality of seeds produced in Routt, Grand and Moffat counties, the committee on seed crops recommends a gradual increase in the amount of pure alfalfa, small grains, potatoes and other seeds grown in the region to supply local seed demand and the outside market as it develops.

2. That the number of pure-seed growers in Routt and Grand counties be increased to help supply seed demands.

3. That the farmers of the three counties be encouraged and strongly urged to use locally grown registered or certified seed (a) to increase crop yields per acre, (b) to prevent mixtures, (c) as a control for noxious weeds, such as wild oats, and (d) to guard against the introduction of noxious weeds not in the region at the present time.

4. That only the standard proved varieties of oats, wheat, barley, alfalfa and other crops be encouraged as seed crops.

Note: The standard adapted varieties to be recommended at the present time are as follows:

(a) Winter wheat, Kanred; (b) Spring wheat, Marquis and Defiance; (c) Oats, Colorado 37 and Swedish Victory for altitudes below 7000 feet, and Nebraska 21 for altitudes over 7000 feet; (d) Barley, Trebi (bearded) and Colsess (beardless); (e) Alfalfa, Grimm; (f) Potatoes, Cobblers and Triumphs.

5. That new varieties be introduced and advocated only after careful and reliable tests have been made to show superiority in yield and quality.

6. In order to establish outside markets for pure seeds, that advantage be taken of exhibits and displays at the Colorado Pure Seed Show and other shows to advertise the superior quality of seeds produced in this altitude.

7. That an association of growers be formed to supervise (a) production, (b) advertising, (c) trials of locally grown seeds in outside areas of consumption, e. g. the Southern States, (d) foster local seed shows, and (e) other work to promote the use of locally grown seed.

8. That a trade mark for the superior products of northwest Colorado be recommended.

Ralph White, Chairman
Craig, Colorado
C. A. Johnson, Secretary
Craig, Colorado

TRUCK CROPS

The truck-crop committee recommends:

1. That there be no increase in the acreage of head lettuce for the present.

2. That more attention be given to growing and handling in an effort to increase the yield and improve the quality, both of which will tend to reduce production costs.

3. That consideration be given to the possibility of growing peas, cauliflower and other vegetables, which may be shipped either with lettuce in mixed cars or in straight carlots.

4. That growers plant their lettuce so that harvesting is extended over as long a period as possible in order that the risks incident to production of this crop may be reduced as much as possible.

5. That some concerted action be taken in an effort to increase the average price received by lettuce growers in this district. In this connection attention should be given to the possibility of organizing the growers of the district in order that pressure may be brot to bear upon all problems of marketing.

6. That arrangements be made to have all lettuce shipped out of the district rigidly inspected and graded by the government inspection service.

Ed. Rich, Chairman
Oak Creek, Colorado
R. A. McGinty, Secretary
Fort Collins, Colorado

POTATOES

The potato committee recommends:

1. That there be no increase in the acreage of market potatoes except as conditions in the future may warrant.

2. That some system of rotation be followed wherein potatoes occupy the land only one year out of five in order that disease injury may be held to a minimum and yields increased.

3. That all potatoes planted in the district be treated before planting in order to further reduce the danger of fungus diseases.

4. That every grower of market potatoes maintain a seed-plot, planted with locally grown certified seed, the potatoes from which are to be used in planting his commercial crop the following year.

5. That growers in each local district determine two or three varieties which are known to be adapted to the conditions of the locality and that only these be grown.

6. That more potato growers of northwest Colorado give attention to organized efforts to standardize varieties and grades of potatoes.

Frank Dresher, Chairman
Craig, Colorado
R. A. McGinty, Secretary
Fort Collins, Colorado

RODENTS

The committee on rodents finds:

That the trend in the number of acres infested with prairie dogs, ground squirrels and other rodents is on the increase in northwest Colorado.

That at the present time there are approximately 1,665,000 acres of land infested with rodent pests in Grand, Routt and Moffat counties. Of this acreage 284,000 consists of crop land, 526,000 consists of privately owned range land and 855,000 consists of public lands.

That the annual loss caused by rodent pests in northwest Colorado is approximately $568,000 in crops figured at $2 per acre and enough range pasture to carry an additional 8000 head of cattle or their equivalent. It is estimated that 35 acres of range now carries one animal and that control of rodents would enable a 20 percent increase.

That at the present time control measures are of a haphazard and individual nature rather than organized. This results in merely a partial or temporary crop protection and costs the individual several times as much per acre as would an organized campaign.

That under organized control methods it is possible to obtain 100 percent relief from rodents on cultivated areas and 95 percent relief on the range.

That a 20 percent increase in the carrying capacity of the range might be expected thru the complete control of rodent pests.

That approximately 10,400 tons of additional feed crops would become available thru rodent control.

The committee therefore recommends:

1. That House Bill 161 of the 26th Colorado General Assembly be transferred from a class 3 to a class 1 appropriation so that state funds may be made available for rodent-control work and that the law may become operative.

2. That the United States government provide additional funds for rodent control.

3. That communities infested with rodent pests organize in order that they may receive the benefits of the Colorado State rodent law should it become operative.

4. That puplicity material be furnished to local newspapers to create more interest and action in rodent-control matters.

5. That letters be sent to our United States senators and representatives urging the need of additional federal appropriation for the control of rodents on public lands, because more than 50 percent of the acreage infested with rodents in this area is public domain which contributes largely as breeding grounds for these pests.

F. R. Carpenter, Chairman
Hayden, Colorado
Tom Iles, Secretary
Axial, Colorado

MORMON CRICKETS

This committee finds:

That the report on the mormon crickets in this region as submitted by F. T. Cowan, junior entomologist, U. S. Bureau of Entomology, is a complete and authoritative report and recommends its adoption.

"The mormon cricket has been present in damaging numbers in Moffat and Rio Blanco counties, Colorado, for a matter of seven or eight years. So great has been the damage done by this insect in Moffat county that the number of farms under cultivation in the infested territory has been reduced from 429 in 1920 to 258 in 1927. Altho a few of these farmers have moved out for various other reasons, it is the opinion of practically everyone concerned that the mormon cricket is directly responsible for a very large percentage of these deserted farms. It is also the opinion of everyone in the county that unless something is done to protect the remaining farmers they also will have to move out. In Rio Blanco County the situation is much the same, except that the infestation is not scattered over so large a territory as it is in Moffat county.

"The crickets made their appearance in Routt county for the first time this year and penetrated to a distance of about eight miles east from the county line. They would undoubtedly have gone much farther had they not been stopped by tin barriers which were purchased and operated by the county. Even so, they damaged all crops in the territory over which they scattered, from 10 to 75 percent.

"The following tables will give an idea as to the extent of the outbreak in those three counties and also the kind of lands included in the infested territories. The data for these tables were obtained at the offices of the county assessors in the three different counties and should be fairly accurate."

County	Total Area	Private	State	Public
Rio Blanco	76,800	18,932	5,120	52,748
Moffat	913,920	83,644	53,760	776,516
Routt	35,840	11,809	10,240	13,791

County	Private Lands Total Acres	Acres Farmed	No. Farms	Value of Crops
Rio Blanco	18,932	2,655	50	*
Moffat	83,644	5,160	258	$75,078.00
Routt	11,809	2,430	35	67,830.00

*—No statistics available.

"Practically all of the infested territory is rough broken country with high hills covered with sage, scrub oak and other low growths. The farming is done in small valleys, basins and plateaus among the hills, a great many of the farms being more or less isolated. The main crops are small grains, corn and alfalfa, the waste land being utilized for grazing.

"Due to the immense amount of land included in the infested territory, it would seem utterly impossible to put on an effective control campaign. Such would be the case if all the infested territory were covered with crickets. Luckily this is not true. The crickets are found in more or less definite bands varying in size from a few acres up to several hundred in extent. It would not be impossible, therefore, to locate these bands early in the spring before they have a chance to spread, and treat them with arsenite dust. The farmers and business men in the infested territory realize that something must be done, and if the necessary funds can be raised to buy materials and dusting apparatus, they are of the opinion that the necessary labor to handle the campaign will be forthcoming.

"We further recommend that a copy of the attached letter be sent to United States Senator Lawrence C. Phipps in order that an item be included in the first deficiency bill to provide federal funds for the control and eradication of mormon crickets in northwest Colorado."

Copy of letter sent to Senator Phipps:

"The Northwest Colorado Agricultural Economic Conference held at the Court House at Steamboat Springs, Colorado, on October 7 and 8 of this year, was attended by representatives of the State University, the Agricultural College, the State Engineer's office, the Bureaus of Biology, Entomology, Forestry, Geological Survey, Public Roads and Agricultural Economics, the entire Board of Directors of the Tunnel League, and the Boards of County Commissioners of Routt, Moffat and Grand counties, as well as by over

50 of the leading stockmen, ranchmen, merchants and bankers of the three counties.

"The object of the conference was to discuss and outline the orderly and progressive development for northwest Colorado.

"The committee on pest and rodent control spent the greater part of two half-days in discussing the matter of the cricket invasion of Routt, Moffat and Rio Blanco counties, and recommend that a letter be sent to you thanking you for your practical interest in this infestation, and the survey of the situation by the U. S. Bureau of Entomology which made a report which you doubtless have and which was read at the meeting.

"They desired further that your attention be called to the data in that report showing that 843,055 acres of the 1,026,560 total acres infested are public lands belonging to the United States government, and to urge you to do all in your power to have included in the next appropriation a fund sufficient to supply calcium arsenite with which to destroy the crickets. The local authorities are pledged to provide the necessary implements with which to use this poison and the settlers in the locality will supply all labor.

"The conference was of the opinion that the danger from the invasion sure to come next spring from the eggs of crickets now laid, was most serious, and that all means available should be used to keep the matter before the public with a view to getting all the help available to control the situation."

F. R. Carpenter, Chairman
Hayden, Colorado
Tom Iles, Secretary
Axial, Colorado

RANGE AND FORAGE

Northwest Colorado is primarily a livestock grazing region. In fact there are about 4,000,000 acres available for grazing. This vast area constitutes 71 percent of the entire area of the three counties. Out of the total deeded farm land, 76 percent is in pasture.

Portions of three national forests are in the region, the Routt, the Arapahoe and the White River. Utilization of the forest reserves as a source of cheap pasture will always be limited very largely to range cattle and range sheep.

These forests within the three counties have an area of 1,145,200 acres. If other timber land is included this area is increased to 1,207,000 acres. Some of the land is not suitable for pasture, some is adapted to cattle grazing while still other land is best utilized by range sheep. It is estimated, however, that 75 percent of the forest and timber land is available for pasture.

From the standpoint of cattle and sheep much of the agricultural land in the region devoted to the production of farm crops provides winter feed for this livestock.

Comparatively little hay is shipped out. Such bulky products cannot be shipped where high frieght rates prevail. The freight rate on hay to Denver from points in this region varies from $5.00 to $6.30 per ton. The records of the Denver and Salt Lake railroad for the years 1921 to 1926 show that an average of 168 cars of hay were shipped out of this region annually. At the same time an average of 190 cars of grain were shipped out each year. Much of this grain, however, is wheat and does not constitute a part of the feed produced in the area. (See table 3).

TABLE 3.—CARLOT SHIPMENTS OF HAY AND GRAIN, DENVER AND SALT LAKE RAILROAD.

	Number cars shipped out	
Year	Hay	Grain
1921	109	214
1922	84	165
1923	205	127
1924	245	173
1925	161	174
1926	202	336

An average of 25 to 30 cars of corn are shipped in annually.

Since the forest reserve figures so prominently in the range problem of the northwest, it is interesting to note the trend in the number of head of livestock of various classes that are pastured on these three national forests. Table 4 gives these data for the Routt National Forest, table 5 for the Arapahoe National Forest and table 6 for the White River National Forest.

TABLE 4.—NUMBER OF HEAD OF LIVESTOCK PASTURED ON THE ROUTT NATIONAL FOREST.

Year	Horses	Cattle	Sheep
1919	525	28,718	84,185
1920	400	28,268	75,689
1921	392	26,399	73,896
1922	413	22,355	75,327
1923	300	19,000	65,000
1924	300	16,500	72,517
1925	150	13,577	106,900

The trend in the number of head of livestock pastured indicates the conservation policy of the United States Forest Service. The tendency has been to decrease the grazing since 1919. At that time and during the period of the World War the national forests were overgrazed to such an extent that this conserva-

tion policy has been necessary in order to recuperate the range and increase the carrying capacity of the forests.

It might also be added that under present conditions there is little likelihood of being able to increase the number of livestock pastured on these forests. That is to say, that any considerable increase in the number of range livestock in this region must necessarily be cared for from farm-grown feeds or pastured on the range outside of the forest reserve.

This overgrazed condition obtains to a greater extent on the uncontrolled range which comprises about 2,850,000 acres or close to two-thirds of all pasture land in the region. Chances for increasing the carrying capacity of this vast area are remote until such time when some supervision can be given to the use of this land for grazing purposes.

TABLE 5.—NUMBER OF HEAD OF LIVESTOCK PASTURED ON THE ARAPAHOE NATIONAL FOREST.

Year	Cattle and horses	Sheep
1918	12,882	35,977
1919	11,961	27,035
1920	12,733	26,950
1921	11,334	17,200
1922	11,588	21,300
1923	10,947	16,500
1924	9,532	15,400
1925	9,817	18,935

TABLE 6.—NUMBER OF HEAD OF LIVESTOCK PASTURED ON WHITE RIVER NATIONAL FOREST.

Year	Horses	Cattle	Sheep
1918	1,315	40,800	40,523
1920	1,188	40,564	43,903
1921	1,172	39,048	41,563
1922	1,140	35,815	35,525
1923	1,005	34,695	40,381
1924	1,047	30,560	39,785
1925	942	30,180	55,838
1926	989	29,322	87,117

IRRIGATION

Irrigation water for crop production in northwest Colorado is supplied by the Yampa River and its tributaries in Moffat and Routt counties and by the upper Colorado River and its tributaries in Grand County. The Yampa River at Steamboat Springs has a flow of 583 second feet (10-year average daily mean) while the Colorado River at Hot Sulphur Springs has a dis-

charge of 1064 second-feet. In so far as available water is concerned the supply is probably the best in the state since only a relatively small portion of this is being used at the present time. The topography of the land, however, makes the utilization of this water for irrigation a difficult problem.

At present there are around 90,000 acres of land in the three counties under irrigation. In some portions of Routt and Grand counties the rainfall is usually sufficient to grow crops without the aid of irrigation water.

There will probably always be plenty of water for irrigating as much land as will ever be brought under the ditch in this section of the state. The determining factor will be the cost of canal and ditch construction and maintenance. This is particularly true of the so-called bench lands and lands with a pronounced sloping topography.

At present most of the irrigation systems are privately owned and are subjected to very little supervision in the use of water. In many cases, due to inadequate storage, shortage of water occurs for late irrigations. On account of the topography of much of the land now under irrigation, the consolidation of small ditches would entail more expense than would be justified by such a move.

It has been the general practice in the region to flood the native-hay meadows in the spring and to leave the water on all summer until the crop is cut. Not only has this practice taken more water than is necessary but in a number of cases it has been a detriment to the land and has meant lower yields.

The probability of the extension of the Denver and Salt Lake railroad to Salt Lake was considered. Such a development would probably justify some development of new irrigation systems. Under such conditions it might be profitable to spend considerably more money in running water to land not now served by irrigation water.

At the present time much land leveling is needed in this section if water is to be applied properly to the crop.

The expansion of the feed or cash-crop area, except as the hay acreage might be displaced, will depend very largely on the further extension of irrigation districts and the building of new canals and ditches. Any decrease in hay acreage will mean greater dependence of livestock on farm crops other than hay for winter feed. It seems probable, therefore, that if the acreage of crops other than hay be increased, new land must be brought under cultivation and under the ditch. The type of crops grown on this new land will also determine very largely how much expense can be charged to this land and still have it

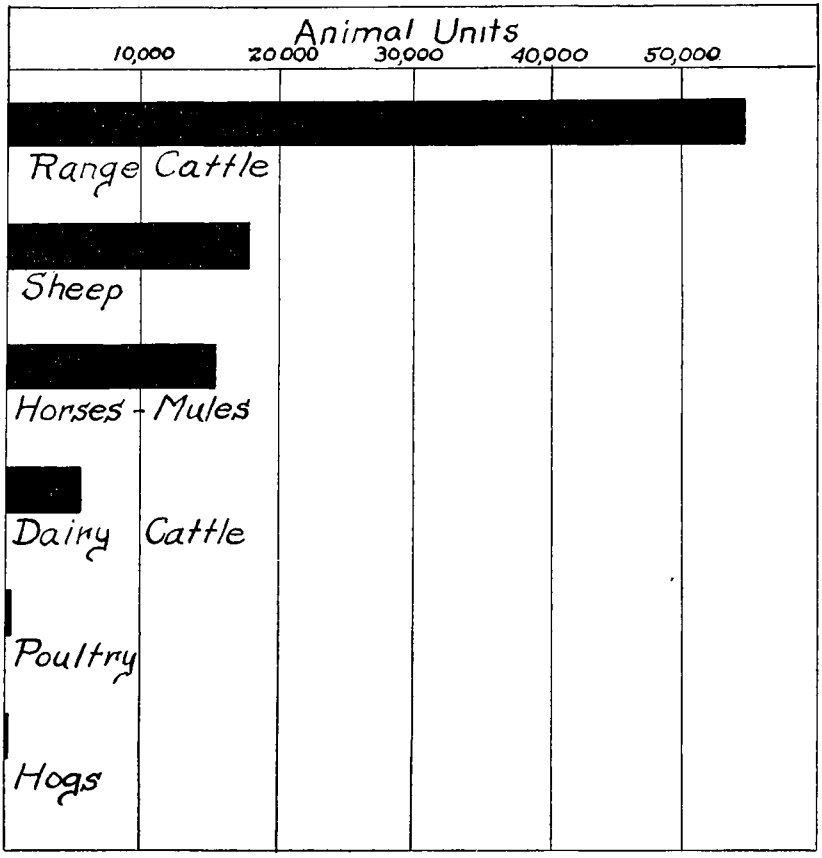
return a profit. For this purpose crops would need to be grown that give a high return per acre such as truck crops.

This does not include portions of Moffat County where crops are produced on non-irrigated land. Here rainfall and cultural methods of conserving moisture will be the determining factors.

LIVESTOCK

In order to get the proper perspective of the livestock industry in northwest Colorado it is necessary to make some comparison of the number of head of various classes to see their relative importance in the agriculture of the region.

Chart I shows this relative importance by a comparison of the number of head on farms at the present time. So that sheep, hogs and poultry may be compared with cattle, and with

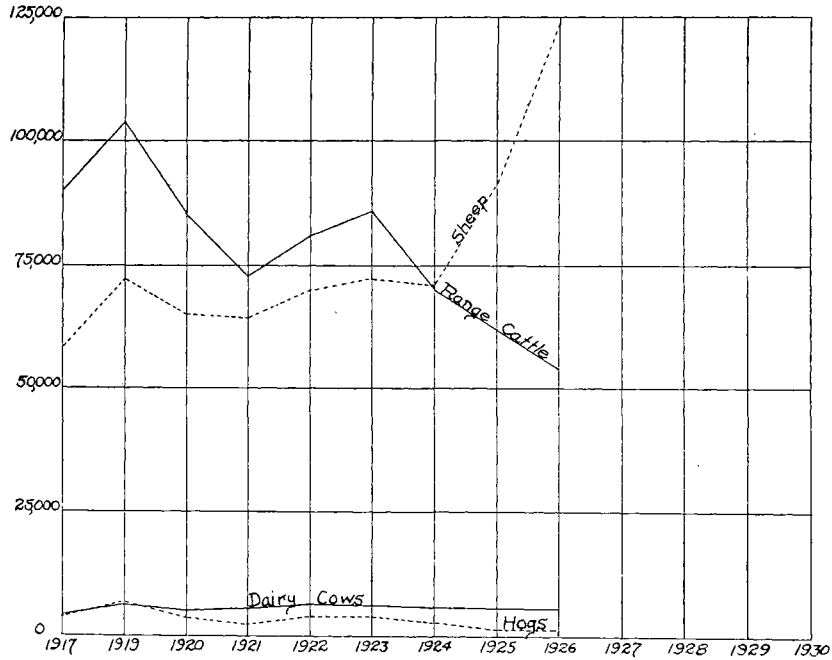


I.—The relative importance of livestock in northwest Colorado

horses and mules it has been necessary to convert these classes of livestock to the same unit. This was done by using the animal unit; that is, one mature head of cattle or one horse equals an animal unit. Six sheep equal an animal unit while it takes five hogs or 100 head of poultry to equal the same unit.

It will be seen that range cattle are the most important livestock in this region with around 55,000 units. Sheep come next with close to 20,000 animal units, horses and mules next, followed by dairy cattle, poultry and hogs in the order named.

Not only is it necessary to get the relative importance of various kinds of livestock, but some attention must be given to the trend in the numbers from year to year and some consideration given to the causes of the decreases or increases as the case may be.



II.—The trend in numbers of livestock in northwest Colorado, 1917-1926

Chart II shows the trend in the number of cattle, sheep, hogs and dairy cows in northwest Colorado. The general trend of cattle since 1917 has been downward,, showing some recovery during 1918 to 1919 and again from 1921 to 1923. From around 85,000 in 1917, the number has decreased to 55,000 head in 1926. This chart shows actual numbers of head for all classes of livestock.

Sheep in this area reached a peak in 1919 and decreased sharply the following year and continued to decrease to 1921. From this point the trend is upward, replacing cattle to some extent from 1924 to 1926.

Dairy cows have shown very little change in numbers during this period, only a slight increase taking place. On the other hand, hogs have shown a decrease after reaching a peak in 1919.

Another check on what has been taking place in the livestock industry, not only in Colorado but in this particular region, is the receipts of livestock at Denver over a period of years. From the Denver Stock Yards 1927 year book are secured the figures presented in table 7.

TABLE 7.—DENVER LIVESTOCK RECEIPTS

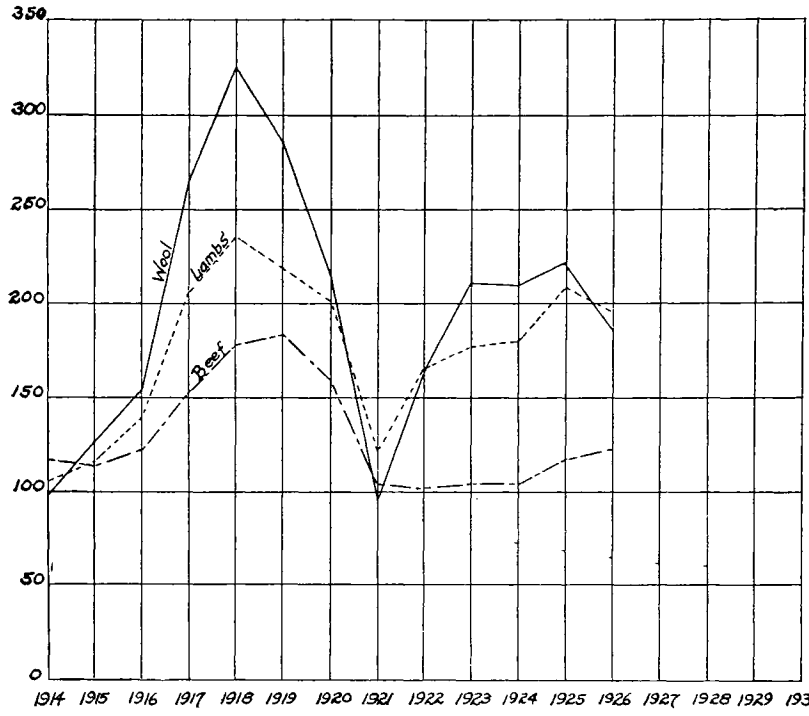
Year	Cattle	Calves	Sheep	Hogs
1914	406,900	35,800	692,200	255,600
1915	395,900	28,400	765,200	343,700
1916	552,100	49,300	1,409,000	466,700
1917	616,000	37,400	2,059,900	351,900
1918	675,700	52,600	1,651,800	383,500
1919	766,100	57,600	2,087,200	367,600
1920	570,400	46,200	2,078,700	341,200
1921	436,500	45,000	1,467,900	334,100
1922	586,700	69,500	1,866,800	395,200
1923	561,300	58,600	1,856,600	495,300
1924	571,700	58,600	2,039,700	569,000
1925	526,600	60,200	2,357,000	467,400
1926	472,700	56,400	1,825,900	497,000

Denver is the market for livestock shipped out of this territory. Cattle receipts reached the peak in 1919, calves in 1922, sheep in 1919 and again in 1925, while the largest run of hogs occurred in 1924.

These receipts of cattle and sheep indicate what took place after the war period. Cattle show a decrease from that period while sheep have made some recovery from the slump which occurred in 1921.

The price relationship between wool and lambs and beef throws some light on the reasons for shifting from cattle production to sheep production. (Chart III.)

Since 1914 beef prices have been relatively below wool and lamb prices ,the highest price for beef being 180 compared with the pre-war price of 100, while wool reached 325 and lambs 235 compared with pre-war prices of 100. This disparity has brought about a change or shifting from cattle production to sheep production as evidenced by all figures, regional, state and national.



III.—The United States price relationship of wool, lambs and beef, 1914-1926

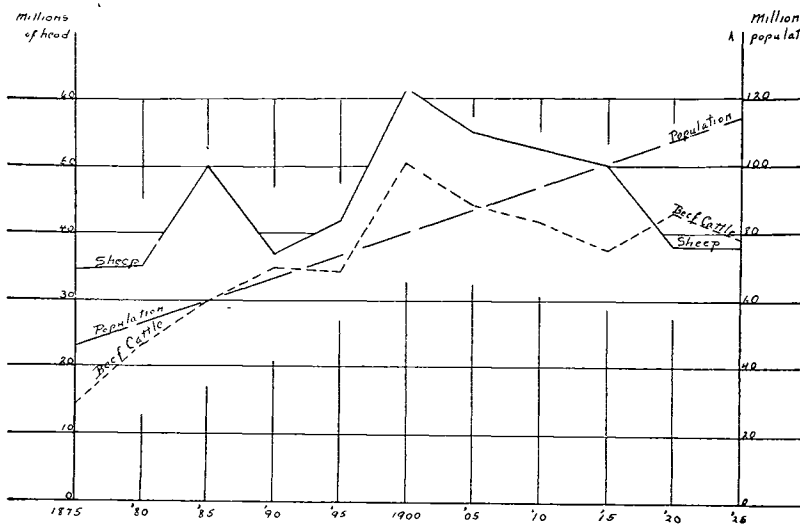
CATTLE

Northwest Colorado is a range-cattle country. While some warming up for market has been practiced, very little if any fattening is done in the region.

Due to the post-war slump in cattle prices, preceded by the over-expansion of the cattle industry, beef cattle in northwest Colorado have shown a decrease from 1919 to 1926, with a slight recovery from 1921 to 1923. (Chart II.) From 1924 to 1926 some shift has taken place from beef cattle to sheep.

Taking the trend of beef cattle in the United States compared with the growth in population from 1875 to 1925, beef cattle have hardly kept the pace. Altho exceeding the population growth from 1895 to 1900, since 1905 the cattle line has remained much below the population line. (See chart IV.)

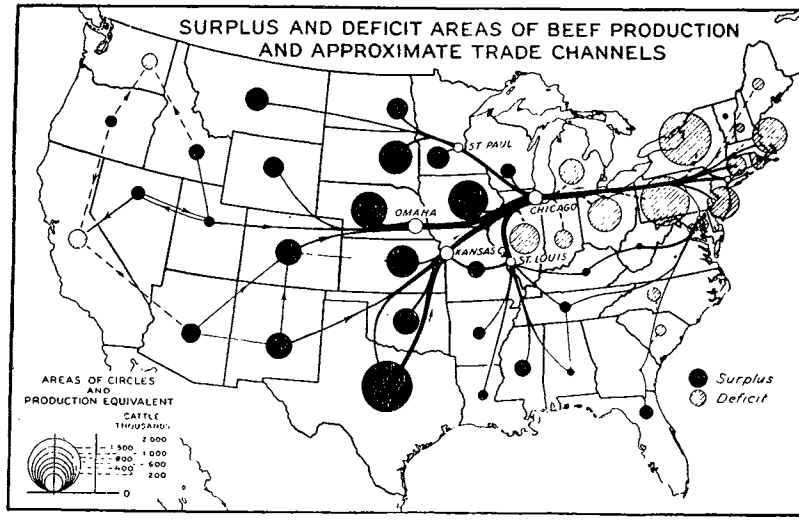
However, there has been no great shortage of beef for several reasons. First, more beef is being produced per animal than formerly and, second, the per capita consumption of beef has decreased. The per capita consumption of beef and veal in 1927



IV.—The relationship between beef, sheep and population in the United States, 1875-1925

(65.4 lbs.) was the lowest since 1916 with the exception of 1921 when it dropped to 62.9 lbs.

Something of the cattle-marketing problem is indicated by map II, "Surplus and Deficit Areas of Beef Production and Approximate Trade Channels." Practically all of the beef-cattle



II.—Surplus and deficit areas of beef production in the United States and approximate trade channels

production occurs in states west of Chicago, while most of the beef for consumption moves to states east of Chicago. Very few Colorado cattle move west to the Pacific coast markets. In the case of cattle from northwest Colorado, except some grass-fat cattle, it is necessary to move them to feedlots before reaching the packers as killers.

The cattle trend in this area can also be studied from the reports of shipments of cattle and calves into and out of the region. Table 8 gives these figures, the number of head received being those delivered to the Denver and Salt Lake Railroad, while those shipped out are the cattle and calves received by the Denver Stock Yards from the Denver and Salt Lake Railroad.

TABLE 8.—SHIPMENTS OF CATTLE AND CALVES, DENVER AND SALT LAKE RAILROAD

Year	Number received	Number shipped out
1904	100	5,110
1905	5,751	15,322
1906	4,657	18,662
1907	5,129	16,142
1908	14,473	27,641
1909	11,370	36,327
1910	18,519	45,687
1911	11,845	28,751
1912	15,545	42,292
1913	12,732	31,806
1914	30,258	38,837
1915	14,736	42,766
1916	17,538	46,065
1917	16,534	37,308
1918	18,331	36,927
1919	21,467	66,874
1920	9,273	40,937
1921	7,223	20,412
1922	3,551	29,025
1923	3,062	39,007
1924	4,254	35,735
1925	3,645	34,428
1926	3,020	26,407

From a low point of 20,412 head shipped out in 1921, the number had increased to 39,007 in 1923 and decreased to 26,407 in 1926. The annual shipments of cattle and calves into the region have fallen off over 1,000 head from 1924 to 1926.

At various times in the past the cattle industry in the United States has depended to some extent upon export trade. In 1915, 6.6 percent of the total beef production was exported. In 1918 this had increased to 9.7 percent. Since that time, however, the export trade in beef has dwindled down to much less

than one percent and ceases to be a factor in the beef-cattle industry at the present time. (See table 9.)

It is of interest to note in this same table how Colorado's total cattle have followed the same general trend as all cattle in the United States. The United States peak was in 1919, while Colorado's did not come until the following year. Colorado has shown a gradual decrease to 1926. However, from 1926 to 1927

TABLE 9.—TREND IN ALL CATTLE—COLORADO, UNITED STATES AND PERCENT EXPORTED

Year	Colorado	United States	Percent of beef exported
1910	1,128,000	62,600,000	1.6
1911	1,133,000	60,500,000	1.4
1912	1,089,000	60,000,000	.09
1913	1,093,000	56,500,000	.07
1914	1,135,000	56,600,000	1.6
1915	1,201,000	58,300,000	6.6
1916	1,315,000	61,900,000	4.6
1917	1,437,000	64,500,000	5.4
1918	1,526,000	67,400,000	9.7
1919	1,689,000	68,500,000	4.6
1920	1,757,000	67,100,000	2.4
1921	1,683,000	65,500,000	.08
1922	1,604,000	66,000,000	.06
1923	1,614,000	67,200,000	.06
1924	1,540,000	64,500,000	.05
1925	1,465,000	62,200,000	.05
1926	1,377,000	59,100,000	.05
1927	1,418,000	56,900,000	.05

there was a slight increase in the number of all cattle in Colorado. This, however, is due not to any increase in beef cattle, but to an increase in dairy cattle.

However, in comparing the trend of dairy cows in the United States with that of other cattle, which means beef cattle, it will be noticed that for eight years, 1920 to 1927, the number of dairy cows has not changed materially. Beef cattle, on the other hand, have shown a gradual decline in numbers during the same period. (See table 10.)

Some of the beef-cattle problems of this area are: A low carrying capacity of the public domain due to improper grazing in the past; a low percentage of calf crop; a lack of high-quality breeding stock; and a high death rate among cattle from poisonous weeds, from diseases and from predatory animals.

TABLE 10.—THE UNITED STATES TREND OF DAIRY COWS AND OTHER CATTLE

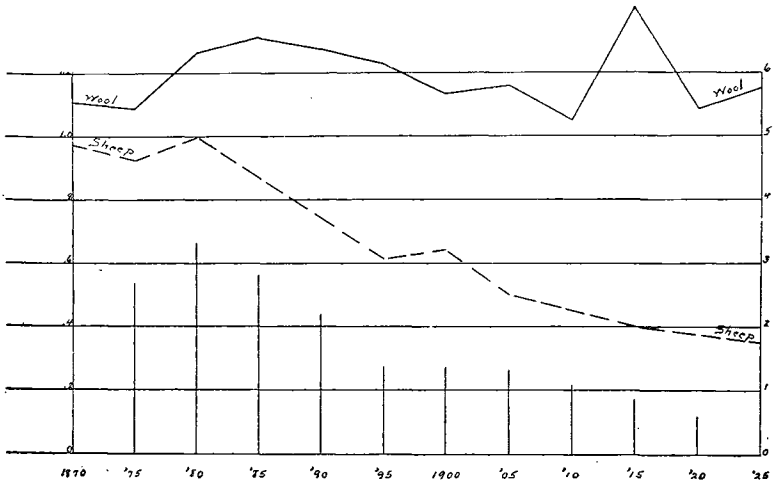
Year	Dairy Cows	Other Cattle
1910	20,600,000	41,200,000
1911	20,800,000	39,700,000
1912	20,700,000	37,300,000
1913	20,500,000	36,000,000
1914	20,700,000	35,900,000
1915	21,300,000	37,100,000
1916	22,100,000	39,800,000
1917	22,900,000	41,700,000
1918	23,300,000	44,100,000
1919	23,500,000	45,000,000
1920	21,400,000	47,500,000
1921	21,400,000	45,800,000
1922	21,800,000	45,500,000
1923	22,000,000	44,200,000
1924	22,300,000	42,200,000
1925	22,500,000	39,700,000
1926	22,100,000	37,000,000
1927	21,800,000	35,100,000

SHEEP

A glance at chart II, page 29, shows that while cattle have been decreasing in northwest Colorado, sheep have been increasing, especially from 1924 to 1926. This can be explained by the unfavorable cattle prices during the same period and the favorable prices for wool and lambs. Some liquidation of the cattle industry is still evident (1927) in some sections where an over-expansion took place during the war period. The shipments of sheep over the Denver and Salt Lake Railroad from 1906 to 1926 are shown in table 11.

The peak of inbound shipments occurred in 1917 while the outbound peak came two years later in 1919. In 1921 the low point was reached with only 62,153 head shipped out and 214 head shipped in. The outbound shipments then show a steady increase for four years and a decided jump in 1926 to 135,505 head.

Checking up on the national situation, there has been a decrease in the number of head per capita since 1880 when there were as many sheep in the United States as people. In 1925, however, census figures show approximately one sheep for every three people. In spite of this decrease in the number of sheep, wool production has not varied except during the war period. This shows clearly that fewer sheep are producing more pounds of wool in heavier fleeces. (See chart V.)



V.—The trend in the number of sheep per capita in the United States and the pounds of wool produced per capita, 1870-1925

TABLE 11.—SHIPMENTS OF SHEEP, DENVER AND SALT LAKE RAILROAD

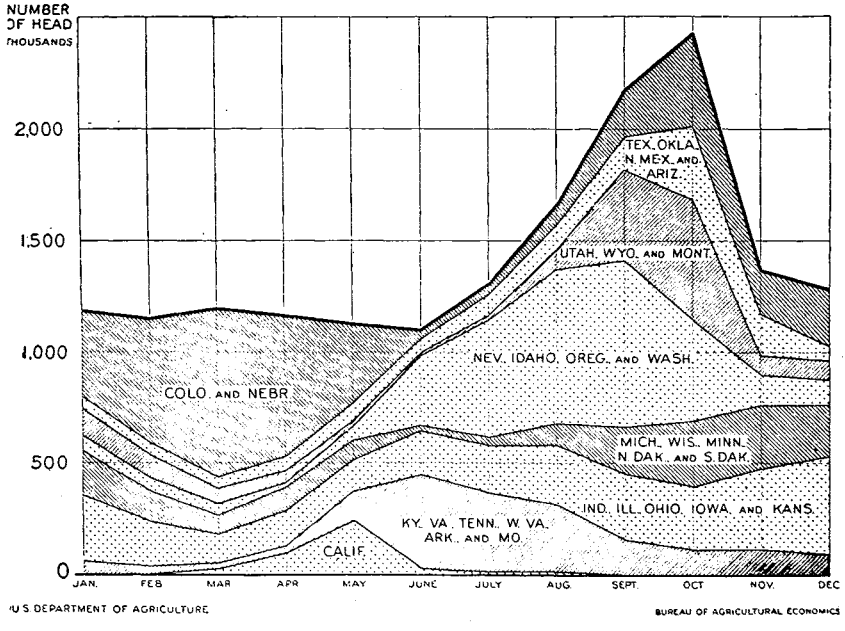
Year	No. Head Received	No. Head Shipped Out
1906	3,165	3,219
1907	864	8,810
1908	4,954	10,521
1909	6,766	21,313
1910	3,908	23,098
1911	1,255	37,544
1912	8,592	25,744
1913	1,255	22,138
1914	1,686	19,074
1915	341	51,095
1916	7,699	92,900
1917	42,335	103,079
1918	35,856	115,751
1919	4,802	143,400
1920	22,939	81,648
1921	214	62,153
1922	2,740	66,501
1923	5,867	75,272
1924	5,839	80,844
1925	7,198	81,016
1926	5,561	135,505

Wool shipments from northwest Colorado have shown a steady increase during the last six years, 1922 to 1927. From 152,000 pounds of wool shipped out in 1922, the shipments have increased to 1,102,000 pounds in 1927. (Table 12.)

TABLE 12.—WOOL SHIPMENTS, DENVER AND SALT LAKE RAILROAD

Year	Pounds of Wool
1922	152,000
1923	132,000
1924	208,000
1925	328,000
1926	792,000
1927	1,102,000

There is a well-defined period during the year when Colorado and Nebraska fat lambs have very little competition from other sources. Chart VII gives the movement of lambs to market from the principal production areas. December to May takes in the Colorado movement of fat lambs with the peak coming in March. Comparing this volume with shipments from other states, it will be seen that during March over 50 percent of the entire lamb movement comes from Colorado and Nebraska, most of the remainder originating in the cornbelt and states to the north and west of this area.



VI.—Sheep and lambs, origin of U. S. market receipts by months, 1925

Some lambs, especially in years of good pasture, move direct to the packers. The rest go into feedlots to be fattened. The tendency has been lately to produce a lamb much heavier than

the Colorado and Nebraska farmer desires for feeding purposes. Most of the feeder lambs from this section move into the cornbelt feedlots for a short feed before they are sent to the packers.

The largest fat lamb market is Chicago. Here the price of fat lambs influences prices in other markets. On this account it is interesting as well as necessary to compare Chicago prices of Colorado fat lambs with the prices received at Denver for feeders. As a matter of fact, the estimate of what the feeder will receive for his fat lamb when they move to market determines very largely what he will pay for feeder lambs, since the spread in price between feeder lambs and fat lambs is the most important factor affecting the problem of lamb feeding. Table 13 shows the top feeder-lamb prices at Denver and the top Colorado fat-lamb prices at Chicago.

The price of feeder lambs in Colorado is usually controlled by Colorado and Nebraska farmers who feed lambs. In 1926, however, this was not the case. The scarcity of hogs in the cornbelt, coupled with the low prices for fat cattle, put the cornbelt lamb feeder in competition with the Colorado and Nebraska lamb feeder and caused the price of feeder lambs to go beyond what the prospective fat-lamb price seemed to justify at that time.

Some of the problems that confront the range-sheep industry in northwest Colorado are: Too few high-grade bucks; low wool production per ewe; too many range ewes over five years old; a high death loss from coyotes; a need for better livestock shipping yards; and the need for more cooperative wool selling.

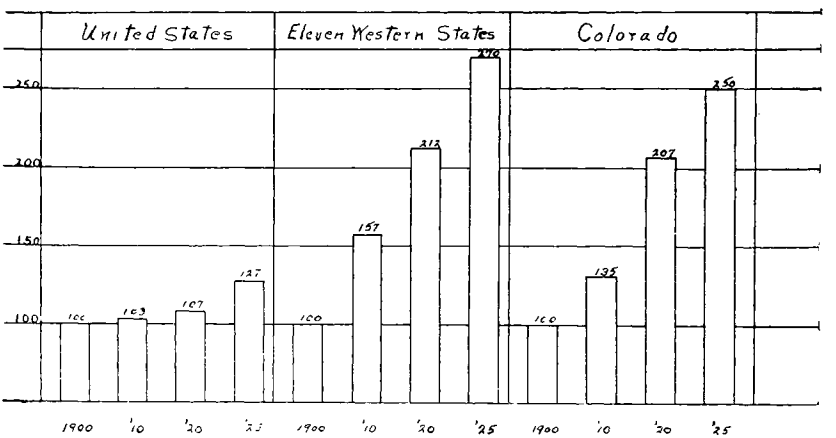
TABLE 13.—DENYER TOP FEEDER-LAMB PRICES AND CHICAGO TOP FOR COLORADO FAT LAMBS

	1923		1924		1925		1926		1927	
Yr.	Denver	Ch'go	Denver	Ch'go	Denver	Ch'go	Denver	Ch'go	Denver	Ch'go
Jan.	$....	$15.25	$13.40	$13.75	$17.25	$19.00	$15.10	$16.00	$13.40	$....
Feb.	....	15.40	14.50	16.00	17.30	18.75	14.25	14.85	13.30	....
Mar.	....	15.50	15.00	16.80	15.00	18.15	12.75	14.50	....	17.00
Apr.	....	15.25	....	17.10	12.00	16.25	14.65	16.10	....	15.25
May	....	17.00	....	17.40	....	16.35	14.90	16.00	....	15.25
June	....	....	11.00	....	....	....	....	....	13.25	....
July	....	....	11.00	....	12.25	....	13.65	....	12.50	....
Aug.	....	....	11.75	....	14.30	....	13.65	....	13.10	....
Sept.	....	....	12.50	....	15.25	....	13.30	....	13.55	....
Oct.	....	....	13.25	....	15.20	....	13.25	....	....	....
Nov.	....	....	14.25	....	15.35	....	13.50	....	....	....
Dec.	....	....	16.00	....	15.75	....	12.60	....	....	....
Yearly top	....	....	16.00	....	17.30	....	15.10	....	13.55	*17.25

*(to June)

DAIRYING

Dairy cows in northwest Colorado have shown only a slight increase from 1917 to 1926. (Chart II, Page 29.) A check-up of dairy production in this region shows no over-production of dairy products, a ready market being available for all cream produced.

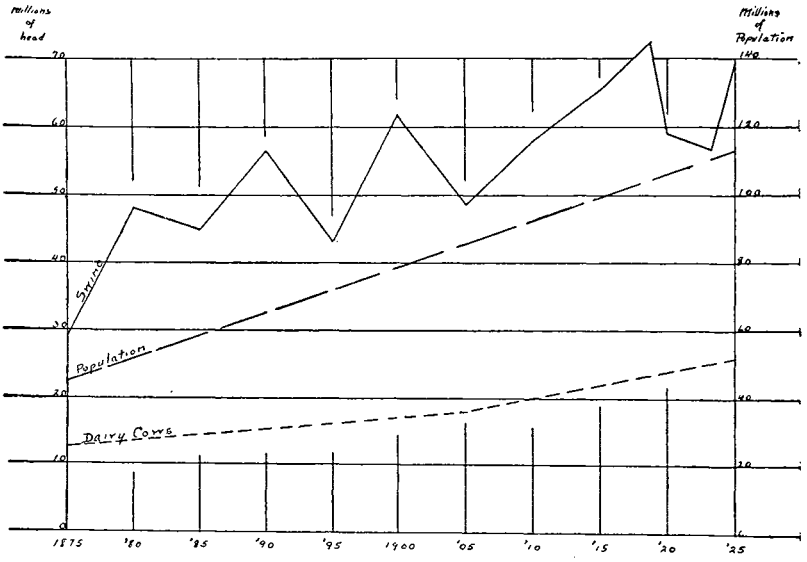


VII.—The trend of dairy production in the United States, the eleven western states and Colorado

Dairy cows in Colorado showed a peak of 264,000 head in 1919. This dropped to 202,000 in 1921 and has increased to 240,000 in 1927. Comparing these figures with the trend in the United States, it is seen that the peak occurred in the same year, but that a decrease has occurred since 1925. (Table 14.) This increase in dairy production has spread over the eleven western states, showing a decided increase from 1920 to 1925. (See chart VII.)

Dairy production is mainly butter in the western states with the exception of some areas adjacent to cities. This is accounted for both by lower production costs and by the shifting of market-milk production to sections which formerly produced butter. Another influence has been the rapid growth of population on the Pacific coast, creating good butter markets for western states butter.

A glance at chart VIII reveals that since 1905 dairy cows in the United States have almost kept pace in their trend with the increase in population. The generally favorable prices for dairy products compared with prices of other farm products have encouraged this movement. Then, too, the increased consumption of dairy products has tended to prevent any great over-produc-



VIII.—The trend of dairy cows, swine and population in the United States, 1875-1925

TABLE 14.—NUMBER OF DAIRY COWS, COLORADO AND THE UNITED STATES

Year	Colorado	United States
1910	145,000	20,625,000
1911	164,000	20,823,000
1912	167,000	20,699,000
1913	172,000	20,497,000
1914	186,000	20,737,000
1915	205,000	21,262,000
1916	219,000	22,108,000
1917	237,000	22,894,000
1918	254,000	23,310,000
1919	264,000	23,475,000
1920	202,000	21,427,000
1921	202,000	21,408,000
1922	206,000	21,788,000
1923	209,000	22,063,000
1924	217,000	22,255,000
1925	224,000	22,523,000
1926	224,000	22,150,000
1927	240,000	21,818,000

tion. The serving of milk in public schools together with national advertising has helped to bring about an increase in the per capita consumption.

While there is an abundance of certain kinds of dairy feeds in the region, some feeds necessary for balancing rations are

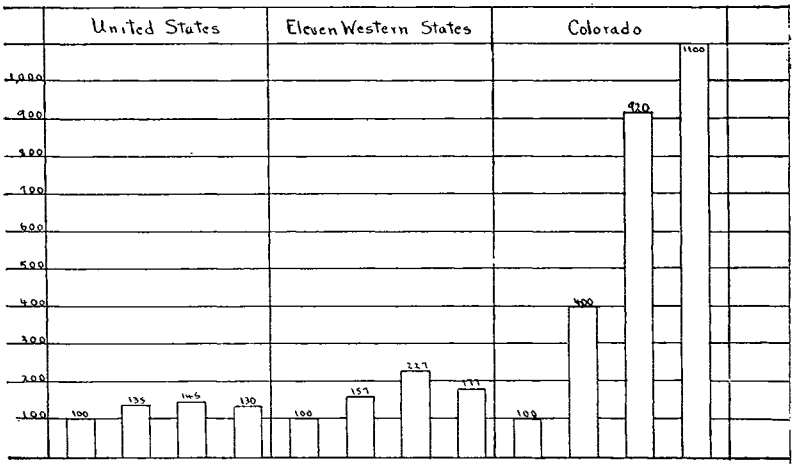
lacking. As a result economical feeding is not practiced generally. This situation is further augmented by the scarcity of irrigated pastures, altho these do well in this section and furnish cheap dairy feed. It has been estimated that the total production of dairy products could be increased 50 percent thru improved feeding. This is very important, especially since the feeding period lasts nine months. At the present time there seems to be adequate dairy manufacturing facilities in the region, practically all of the products being consumed locally.

During periods of low butterfat prices, shipments of cream from northwest Colorado are greatest. This is due to the general practice of having dairy cows come fresh in the spring. The region is free from blackleg, contagious abortion or bovine tuberculosis.

The number of cows actually milked in this region is difficult to estimate. Many of the range cows are being milked, a practice which is gaining favor among some ranchmen. To put the situation in the words of a prominent cattleman, "the dairy cow, during the last few years, has been the cattleman's meal ticket." Whether this will continue when cattle prices improve is uncertain. In the opinion of some men the practice has come to stay.

SWINE

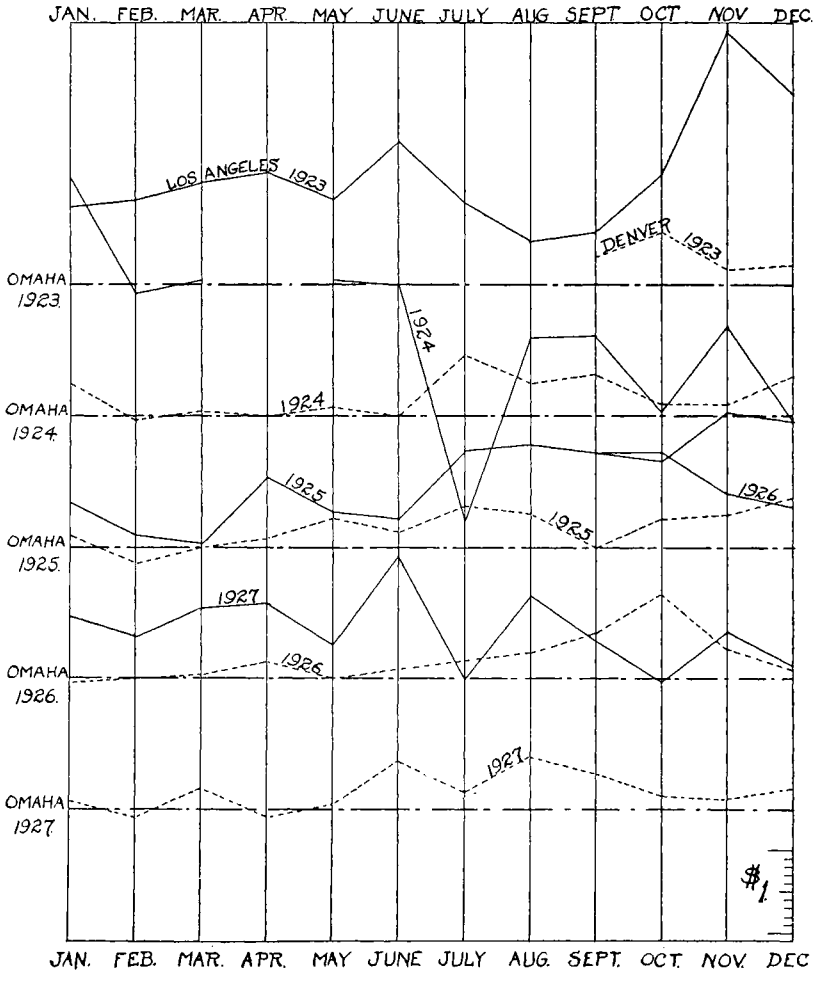
This region has not been an important hog-producing section of the state. Many farms having feed suitable for hogs do not have any hogs. The trend of hog production is indicated in



IX.—The trend of hog production in the United States, the eleven western states and Colorado, 1900-1925

chart II, page 29. It will be seen that the number of hogs have decreased from 1919 to 1926 after showing a slight recovery during 1921 to 1923. On the other hand, hog production in Colorado has increased materially since 1910. A comparison of Colorado's growth in this industry with that of the United States and the eleven western states is seen in chart IX.

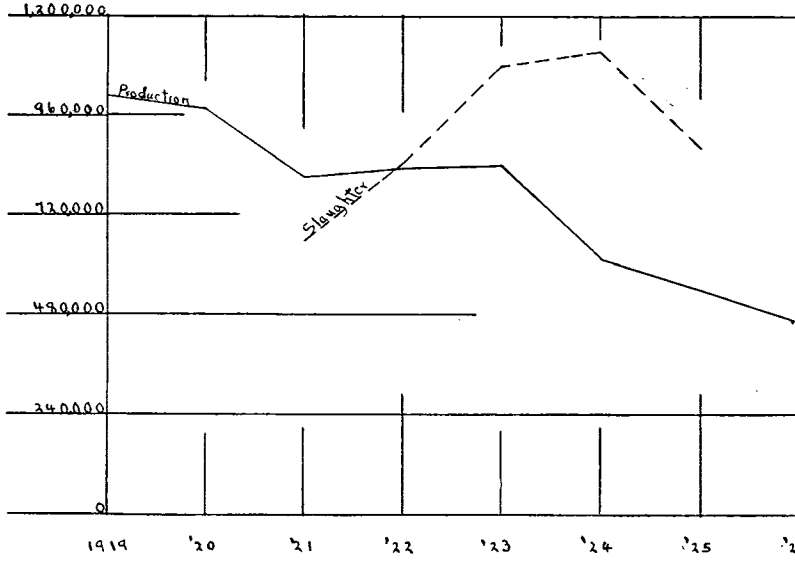
From 1920 to 1925 both the United States and the eleven western states have shown a decrease, while Colorado has experienced a tremendous increase.



X.—Trend in prices of hogs at Omaha, Denver and Los Angeles, 1923-1927—(Omaha price is the constant)

This situation has been brought about very largely thru the increasing demand from California markets. This demand has caused the Denver market to be a much better hog market than formerly. Several years ago Omaha prices determined the Denver price of hogs. Now, however, the Denver price is usually above the Omaha price. At the same time the Los Angeles price is usually sufficiently higher than the Denver price to justify shipping hogs weighing 160 to 200 pounds to Los Angeles. (See chart X.)

While the population in the Pacific coast cities is increasing at a rapid rate, the hog production in California is decreasing rapidly. The trend of hog slaughter on the other hand is upward as shown by chart XI.



XI.—The trend in hog production in California and the slaughter of hogs in San Francisco and Los Angeles, 1919-1925

One factor, particularly, must be considered. Western cornbelt states, especially Nebraska and Kansas, ship large numbers of hogs west. A situation that would find the cornbelt with a corn shortage and a good supply of hogs would tend to demoralize the California market. In such a case the cheapness with which Colorado could produce pork together with the frieght rate differential, would determine whether she could compete with Nebraska and Kansas farmers in pork production.

From 1923 to 1926 the number of hogs in Colorado has been decreasing. January 1, 1927, however, showed the same num-

ber on farms in Colorado as on January 1, 1926. In the United States numbers of hogs have also decreased from 1923 to 1926. In 1927, however, a decided increase in numbers occurred. (Table 15.)

Hog production in the United States depends to some extent upon export trade. If production is increased in countries taking our cured pork and lard, or if the purchasing power of our foreign customers is decreased the result will be lower prices for hogs in the United States.

As a matter of fact exports have shown some decrease since 1923. The percentage of pork exported is the lowest in 18 years. Shipment of hogs out of northwest Colorado have decreased decidedly from 1924 to 1926, from 3,240 head to 296 head. (Table 16.)

TABLE 15.—NUMBER OF SWINE—COLORADO, UNITED STATES AND EXPORTS OF PORK AND PORK PRODUCTS

Year	Colorado	United States	Percent exported
1910	179,000	58,200,000	9.7
1911	215,000	65,600,000	11.7
1912	211,000	65,400,000	11.5
1913	205,000	61,200,000	11.3
1914	205,000	58,900,000	9.7
1915	256,000	64,600,000	14.6
1916	320,000	67,800,000	14.2
1917	352,000	67,500,000	15.7
1918	387,000	71,000,000	20.9
1919	406,000	74,600,000	14.2
1920	450,000	59,300,000	15.4
1921	414,000	56,100,000	15.7
1922	455,000	58,300,000	13.3
1923	592,000	68,400,000	14.5
1924	575,000	65,900,000	12.8
1925	492,000	55,600,000	12.0
1926	443,000	52,100,000	11.1
1927	443,000	54,400,000	9.6

Some of the hog problems in northwest Colorado are: Not enough hogs are kept to supply local consumption at the present time; insufficient feeder pigs are produced to supply the demand; there is always difficulty in shipping hogs out of the region due to the lack of sufficient numbers to make carlot shipments; inadequate housing is causng the loss of too many pigs at farrowing time; there is need for better-quality hogs thru the use of better boars.

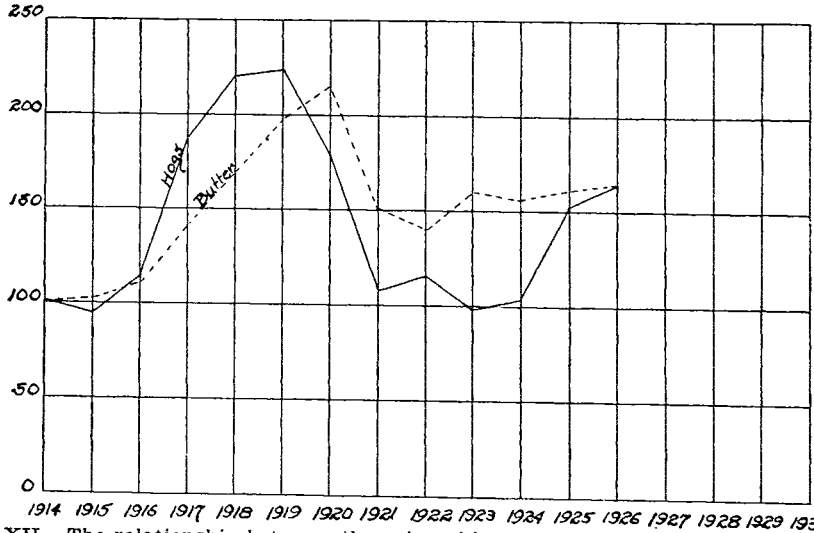
Cheaper production is possible thru the utilization of more pastures suitable for pork production. Some barley is being

shipped out of the territory that might be fed to hogs at a profit and large quantities of skimmilk are poured out which could be utilized profitably for hog feed.

TABLE 16.—SHIPMENTS OF HOGS—DENVER AND SALT LAKE RAILROAD

Year	No. head received	No. head shipped out
1907	16	..
1908	..	..
1909	..	83
1910	2	110
1911	..	1
1912	7	240
1913	..	31
1914	80	255
1915	..	1,755
1916	1	4,580
1917	..	2,591
1918	..	1,710
1919	..	4,878
1920	..	2,730
1921	35	314
1922	..	1,563
1923	6,141	2,429
1924	4,067	3,240
1925	185	625
1926	..	296

Hogs fit in well with dairying where cream is the main product. In fact there is a direct relationship between the two industries from a price standpoint. This is brought out in chart XII.



XII.—The relationship between the price of hogs and butter from 1914 to 1926

From 1914 to 1921 the general trends of butter and hog prices were very much the same. For the following two years the trends were opposite, butter going down and hogs going up, then hogs dropping and butter rising in price. From there to 1926 both trends were upward, coming together in 1926.

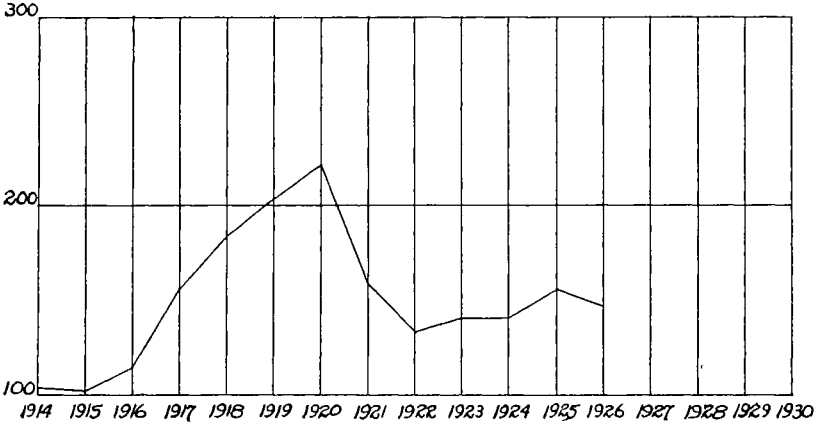
Skimmilk on farms producing cream can be profitably utilized in this region thru the production of pork.

POULTRY

There are not enough poultry products produced in northwest Colorado at the present time to supply the local demand. From November to April it is necessary to ship in eggs to meet the consumptive demands of this area.

In 1925 Colorado was not producing enough eggs to supply the state, producing only 82 percent of her egg requirements. Table 17 gives the relationship of egg production to population in the eleven western states.

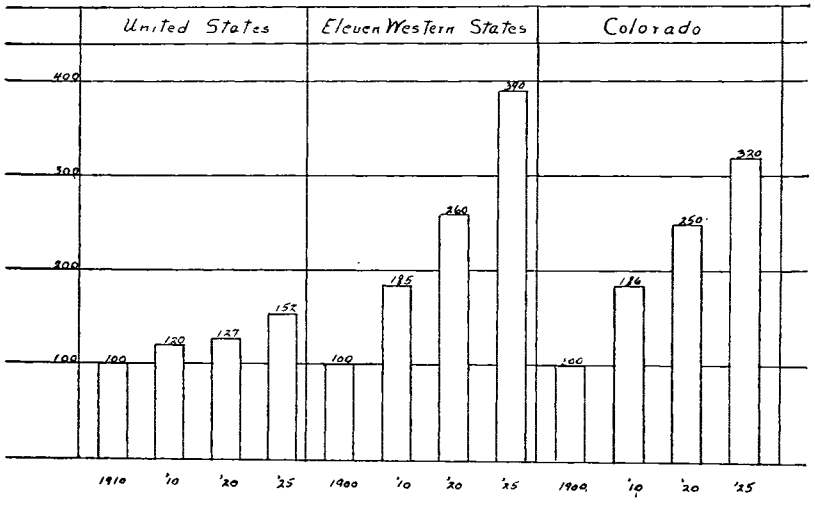
The growth of egg production from 1900 to 1925 is also indicated. The entire group of states produced a little surplus in 1925, the three Pacific coast states producing a surplus of 16 percent. There has been only one agricultural census year since 1900 that Colorado has kept pace with her population in the production of eggs.



XIII.—Egg prices in the United States from 1914 to 1926 (1910-14 equals 100)

Poultry durng the last 13 years has enjoyed better relative prices than most farm products. It will be seen in chart XIII that egg prices have remained on a favorable basis during this period. This condition has encouraged a rapid growth in the production of poultry products.

The extent of this rapid increase can best be pictured, probably, by comparing the trend in the United States, the eleven western states and in Colorado. (Chart XIV.)



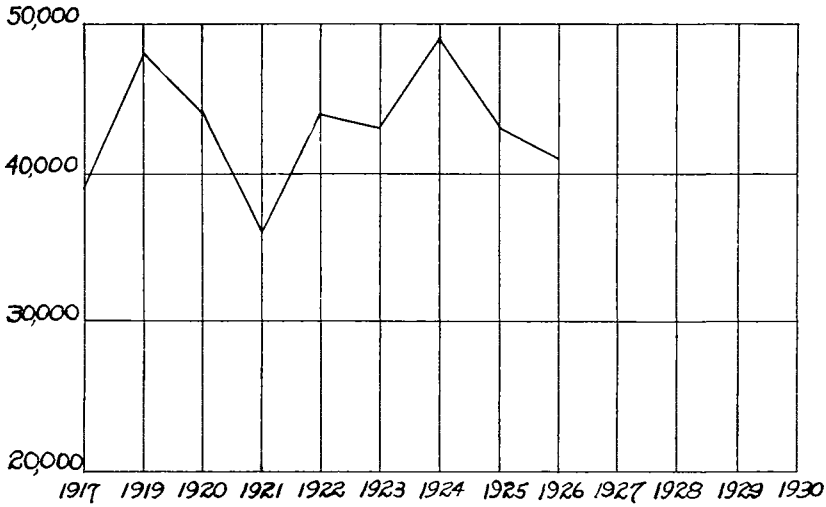
XIV.—Poultry production in the United States, the eleven western states and Colorado, 1900 to 1925

TABLE 17.—RELATIONSHIP OF EGG PRODUCTION TO POPULATION

State	1900	1910	1920	1925
Colorado	62	78	100	82
Utah	72	105	85	85
California	97	142	123	111
Oregon	110	98	125	114
Washington	85	84	105	133
New Mexico	25	54	57	50
Arizona	39	50	57	41
Three Pacific states	104	96	120	116
Eleven western states	85	90	113	103

From 1900 to 1925 an increase of 52 percent has occurred in poultry production in the United States. In the eleven western states there has been during the same period, an increase of 290 percent, while in Colorado an increase of 220 percent has been made.

In 1917 there was close to 40,000 head of poultry in northwest Colorado. In 1919 this had approached 50,000 head while the low point of 36,000 head was reached in 1921. Another peak was reached in 1924, while since that time a rapid decrease has taken place. (Chart XV.)



XV.—The trend in the number of poultry in northwest Colorado, 1917-1926

The need for better storage facilities is apparent in this region, as well as better housing to increase egg production.

There is an abundance of feed suitable for the production of poultry products in this territory and an expanding local market for these products

There are no commercial poultry flocks in the region at the present time, altho climatic conditions in certain parts of the area are favorable for quality production.

Too much production occurs at the flush period which demonstrates the need for earlier chicks that are produced within the region.

To produce enough eggs for local consumption the year round, it would seem advisable for farmers in this region to give some attention to the establishing of more farm flocks of good producing hens.

CROPS

The crop situation in northwest Colorado can best be shown thru a study of the utilization of agricultural land devoted to the production of farm crops. The crops produced in this region have been divided into grain crops, cultivated crops and hay crops. The total cropped area amounts to about 165,000 acres in the three counties. (See table 18.)

One-fourth of the cropped land produces hay, half of which is timothy and clover. One-fourth of the hay acreage is alfalfa and the balance is native and other hay which includes some

grain cut for hay. Grain crops occupy about 40 percent of the cropped land, while the cultivated crops take around 6 percent of the total.

The table further emphasizes a former statement which called attention to the fact that this region is essentially a grazing area where a large part of the cropped land is devoted to the production of winter feed for range livestock.

Colorado as a whole is fairly well supplied with hay for livestock. A comparison of feed conditions in this state with conditions in the eleven western states shows that only four of the states exceeded her in the amount of hay per animal unit produced in 1924. Table 19 also gives the trend of the feed situation in relation to the number of livestock from 1900 to 1925 according to the United States census.

TABLE 18.—USE OF CROPPED LAND IN NORTHWEST COLORADO

Crop		Acres	Total Acres
Grain crops	Oats	17,00	
	Wheat	16,000	
	Rye	.7,000	
	Barley	5,000	45,000
Cultivated crops	Lettuce	5,000	
	Corn	2,500	
	Potatoes	2,000	
	Miscellaneous	500	10,000
Hay crops	Timothy and clover	55,000	
	Alfalfa	25,000	
	Native	10,000	
	Other	20,000	110,000
Total cropped land (acres)			165,000

TABLE 19.—TONS OF HAY PER ANIMAL UNIT—ELEVEN WESTERN STATES

	Tons of hay per animal unit			
State	1900	1910	1920	1925
Montana	.45	.77	.57	.88
Idaho	.84	1.32	1.54	1.59
Wyoming	.27	.46	.62	.82
Colorado	.80	1.19	1.03	1.10
New Mexico	.10	.17	.21	.26
Arizona	.17	.20	.34	.27
Utah	.76	1.15	1.04	1.13
Nevada	.67	.72	.97	.68
Washington	.99	1.65	1.66	1.56
Oregon	.71	1.01	1.24	1.08
California	1.21	1.31	1.34	1.26

Even with this relatively adequate supply it frequently happens that range cattle and sheep are roughed thru the winter without sufficient feed to bring them thru in good condition.

Checking up the feed-crop acreage of the region, a considerable fluctuation is evidenced. Oats acreage reached its peak in 1922, rye in 1922, barley in 1920, corn in 1923, other hay in 1925, while alfalfa has shown a fairly rapid increase since 1917. (See table 20.)

Comparing the acreage of 1917 to that of 1926 all feed crops except barley have increased in acreage. The largest increase occurred in the case of alfalfa, from 3,000 acres in 1917 to 24,800 acres in 1917 to 24,800 acres in 1926. Rye acreage showed an increase around 5,000 acres; oats, about 1,500 acres; corn, 1,500 acres; and other hay, 5,000 acres. Barley has shown a decreased acreage for the same period of 2,000 acres.

Comparatively little feed is shipped out of the area, something like 190 cars of all grain including wheat. Some years a considerable amount of hay is carried over only to be consumed the next year or the year following when the hay crop is short. At the present time the balance between the number of livestock fed hay and the hay supply of the region is fairly even.

TABLE 20.—TREND IN THE FEED CROPS ACREAGE —NORTHWEST COLORADO

Year	Oats	Rye	Barley	Corn	Alfalfa	Other hay
1917	14,600	750	6,400	600	3,000	78,400
1919	17,000	4,400	7,200	2,200	7,100	64,000
1920	16,800	6,600	7,300	5,400	8,700	59,000
1921	17,500	6,500	6,000	5,200	10,900	58,800
1922	18,700	8,200	5,800	3,400	13,800	63,100
1923	16,200	4,700	5,200	7,100	15,800	58,000
1924	15,300	2,900	4,500	4,600	21,300	72,400
1925	15,500	3,500	3,900	2,900	24,600	99,700
1926	16,000	5,400	4,300	2,100	24,800	83,700

GRAINS

Wheat, oats, rye and barley are the principal grain crops produced in northwest Colorado. It might be stated that there is no section in the state that produces a better-quality grain than is grown in this territory. Grain from this section carries away many of the blue ribbons from the Colorado State Seed Show and the State Fair. About 25 percent of the cropped area is devoted to the production of grain, all grain crops having increased since 1917 with the exception of barley. (See table 21.)

Wheat occupies one-third of the grain acreage, oats one-third, while the balance is almost equally divided between rye and barley.

Good yields are obtained in the territory from all grains especially where the rainfall equals or exceeds 14 inches. A sur-

vey of the region, however, shows that there is need for standardization of grain varieties as well as the need for more attention to pure seed. There is opportunity for greater production of higher quality wheats which can be profitably produced and which are at a premium.

TABLE 21.—TREND IN THE ACREAGE OF GRAIN CROPS —NORTHWEST COLORADO

Year	Wheat	Oats	Rye	Barley
1917	8,900	14,600	750	6,400
1919	31,800	17,000	4,400	7,200
1920	34,600	16,800	6,600	7,300
1921	31,400	17,500	6,500	6,000
1922	29,400	18,700	8,200	5,800
1923	19,700	16,200	4,700	5,200
1924	16,600	15,300	2,900	4,500
1925	15,000	15,500	3,500	3,900
1926	15,000	16,000	5,400	4,300

SEED CROPS

On account of the high quality of seed produced in Routt, Moffat and Grand counties, especially alfalfa, small grains and potatoes, this section of the state has many possibilities in the production of pure seed.

The Colorado Pure Seed Show, the registration and certification service of the state together with very favorable field tests from areas outside the state, have caused the industry in the state to make rapid strides in the last few years.

Every farmer is, or ought to be, interested in planting pure seed of high germination which plays such an important part in crop production by insuring good crop yields of high quality.

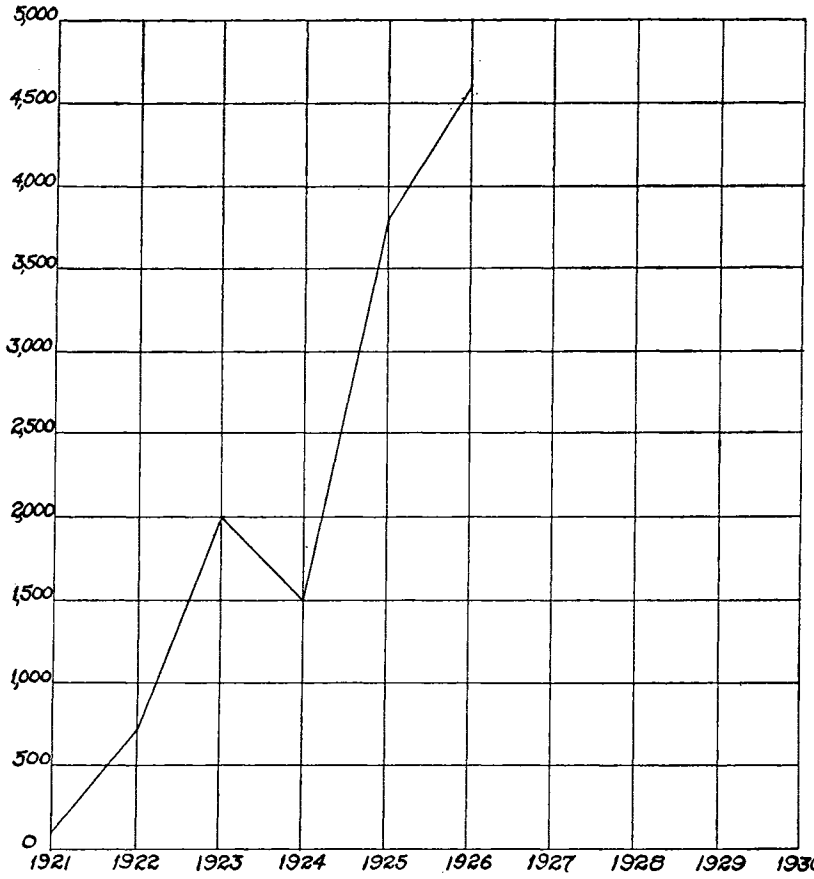
The southern states constitute a good market for Colorado-grown seed. It is necessary, however, to secure further field tests in these states before the trade can be built up to where it should be.

Standardization of a few varieties is also necessary instead of trying to produce all the varieties grown. In this connection the following varieties which have been tested out have been found to be well adapted to the region.

Crop	Varieties
Winter wheat	Kanred
Spring wheat	Marquis and Defiance
Oats (below 7000 ft.)	Colorado 37 and Swedish Victory
Oats (above 7000 ft.)	Nebraska 21
Barley	Trebi (bearded), Colsess (beardless)
Alfalfa	Grimm
Potatoes	Cobblers and Triumphs

TRUCK CROPS

The principal truck crop produced in northwest Colorado is lettuce. The acreage in lettuce in this section has increased from 100 acres in 1917 to about 4600 acres in 1926. (Chart XVI.) This has been a phenomenal growth. The carlot shipments from this territory from 1922 to 1926 are shown in table 22.



XVI.—Trend of lettuce acreage in northwest Colorado, 1921-1926

Almost 1000 cars of lettuce were shipped out in 1925, while 858 cars were shipped during 1926. This reduction in cars, however, was due to a smaller yield in 1926. As a matter of fact the acreage in 1926 showed a 25 percent increase over 1925.

Indeed the head-lettuce industry in the entire state has made rapid strides in the last three years, 1924 to 1926. In 1924 there was a reported acreage of 5,600 acres; in 1925 this had

jumped to 10,500 acres, an increase of 87.5 percent; while in 1926 a further increase of 26 percent took place, reaching a total of 13,240 acres. (See table 23.)

In 1924 Colorado stood second in acreage of late lettuce; New York was first and New Jersey third. By 1926, however, Colorado had moved into first place in late-lettuce acreage, with New York second and Washington and New Jersey competing for third place.

In checking up the shipments of all lettuce from the principal shipping states, Colorado ranked fourth in 1921 and in 1926. California came first, shipping over 27,000 cars in 1926. Arizona shipped close to 5000 cars, New York 3000 cars, while Colorado shipped 2,795 cars in 1926.

TABLE 22.—CARLOT SHIPMENTS OF PERISHABLES— DENVER AND SALT LAKE RAILRAOD

Year	No. cars potatoes	No. cars lettuce
1921	86	...
1922	74	113
1923	81	467
1924	48	283
1925	167	951
1926	149	858

TABLE 23.—TREND IN LATE-LETTUCE ACREAGE— PRINCIPAL STATES

State	1924	1925	Incr. over 1924	1926	Incr. over 1925
	(acres)	(acres)	(pct.)	(acres)	(pct.)
Colorado	5,600	10,500	87.5	13,240	26.0
New York	6,290	6,820	8.4	7,200	5.5
Washington	1,400	1,450	3.5	2,440	68.0
New Jersey	2,060	2,200	6.8	2,400	9.0
Idaho	1,420	1,500	5.6	1,200	—20.0
New Mexico	250	1,400	460.0	1,030	—26.0
Oregon	300	300	.0	360	20.0
Wyoming	200	110	—45.0	210	90.0
Pennsylvania	70	70	.0	80	14.0
Total acres	68,660	86,020	25.3	106,100	23.3

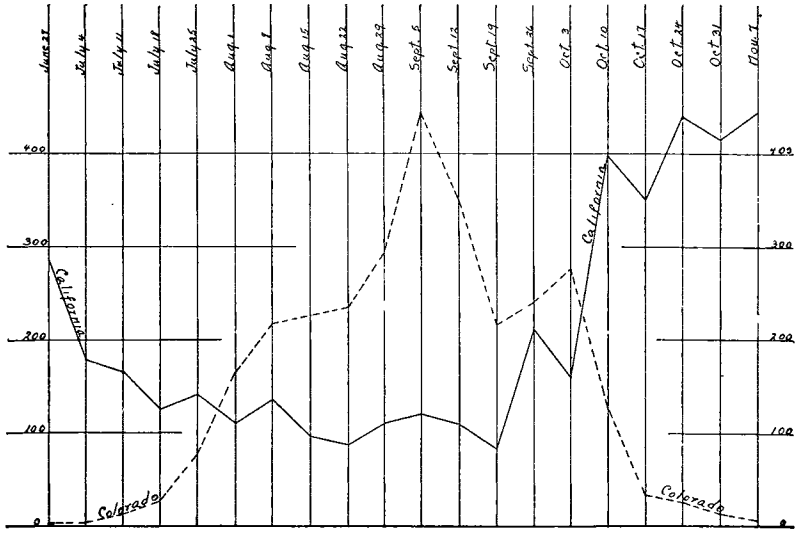
Table 24 gives the figures showing the trend in the carlot shipments of lettuce from principal states, 1921 to 1926.

Colorado head lettuce has a wide distribution in the United States. The distribution of 2,117 cars of Colorado lettuce in 1926 is shown in table 25.

St. Louis received the largest number, taking about 30 percent of the carlot shipments; Denver came second with 528 cars;

while Chicago held a close third with 486 cars. A number of these cars were doubtless diverted and were consumed in the adjoining territory. Then too, some lettuce is unloaded and goes to make up cars of mixed vegetables. This is particularly true of Denver receipts. It will be noticed that 74 cars of Colorado lettuce were received at New York City in 1926, while Pittsburg, Philadelphia, Detroit and Memphis were also markets for this product.

Colorado lettuce has a definite market season that has very little competition from other production regions. A comparison of the shipments of California and Colorado lettuce is contained in chart XVII.



XVII.—Shipments of cars of head lettuce from Colorado and California during 1925

The lettuce season in Colorado extends from June to November, the largest movement occurring from July to October, reaching the peak the last of August and the first of September. A glance at the chart shows that as the shipments of Colorado

TABLE 24.—TREND IN THE CARLOT SHIPMENTS OF LETTUCE

State	Number of cars shipped					
	1921	1922	1923	1924	1925	1926
California	9,850	9,744	15,113	18,480	21,618	27,401
Arizona	168	678	1,108	2,049	3,519	4,846
New York	3,240	3,167	3,817	3,698	3,821	3,015
Colorado	234	812	1,436	1,036	3,096	2,795
Washington	635	812	1,081	674	820	898
Idaho	180	889	1,241	532	501	381

TABLE 25.—RECEIPTS OF COLORADO LETTUCE AT PRINCIPAL CITIES, 1926

City	No. of Cars
St. Louis	607
Denver	528
Chicago	486
Kansas City	98
Lincoln	74
New York City	74
Pittsburg	72
Detroit	68
Omaha	47
Philadelphia	40
Memphis	25

lettuce increase, California lettuce shipments decrease and when California shipments increase, Colorado shipments decrease. The shipments from other western states do not compete to any great extent with Colorado lettuce on the principal markets.

The trend in the acreage in northwest Colorado has been largely due to speculators entering the industry with little or no experie nce in lettuce production. For this reason, lettuce yields have frequently been unsatisfactory and the quality has also suffered.

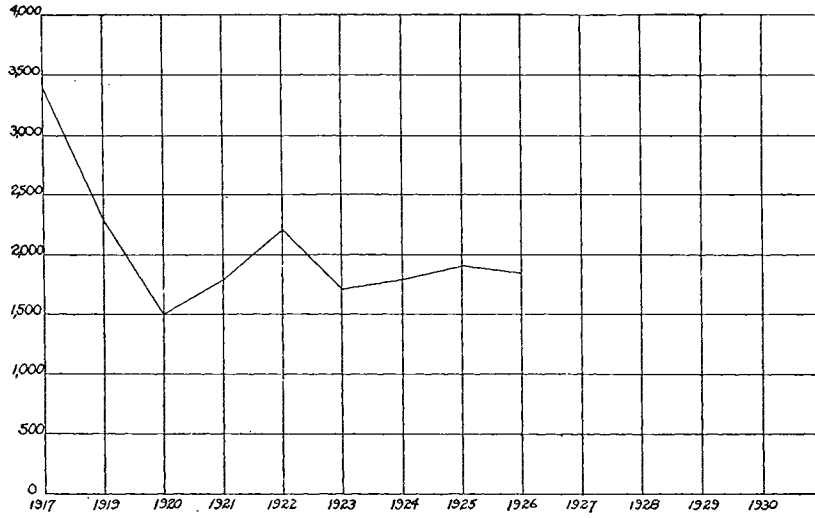
One-crop farming in the lettuce industry does not pay in the long run. A small acreage in rotation with other crops adapted to the region seems to be the best solution of lettuce production in this region where more attention can be given cultural practices that will produce higher yields of lettuce with better quality.

POTATOES

The potato acreage in northwest Colorado has decreased during the period 1917 to 1926. (Chart XVIII.) From around 3400 acres in 1917, it fell to 1500 acres in 1920, recovering to 2200 acres in 1922 and showing 1800 acres for 1926.

The shipments out of the territory are shown in table 22, page 53. This has varied from the low point of 48 cars in 1924 to 167 cars in 1925. In 1926 the shipments of potatoes amounted to 149 cars.

It will be seen that this territory has not been an important potato-production area. However, excellent seed potatoes can be grown in this region. As a matter of fact the freight rate is against shipping out a commercial crop except during years of unusually high prices. The seed crop, returning a higher price per hundred pounds, will come more nearly paying the freight rate and leaving a fair return to the producer.



XVIII.—Trend in the potato acreage in northwest Colorado, 1917-1926

Triumphs and Cobblers give a good yield of high-quality seed in this territory. The need for certified seed in Colorado alone will not be met for a number of years should every grower decide to plant seed that is of high quality and carries certification.

Much effort needs to be spent in this region along the line of crop rotation, seed selection and seed treating as a means of keeping down potato diseases and of increasing potato yields.

RODENTS

The number of acres infested by prairie dogs, ground squirrels and other rodents in northwest Colorado is on the increase. At the present time this area amounts to over one and one-half million acres.

An estimate of the loss to crops alone, figured at $2.00 per acre, a very low estimate, is $568,000 annually. This does not include the damage done to range pasture. The latter damage is sufficient to carry 8000 more head of cattle or their equivalent in other classes of livestock.

Much of the work now carried in an attempt to control these rodents is of a haphazard nature, chiefly by individuals, so that any marked results in their control are lacking. Only by organized efforts can any hope of relief be obtained.

Not only is this individual effort ineffective as a control measure, but considerably more money is being spent per acre

at the present time than would be necessary under an organized plan.

On account of the lack of sufficient appropriation, the United States Biological Survey has not been able to cooperate with the Extension Service of the Agricultural College in rendering much assistance during the last year. Should present appropriations be made available, a definite campaign might be worked out for carrying some control measures in this territory.

It is stated by the United States Biological Survey that it is possible to effect a 100 percent relief from rodents in the cultivated areas of the region and a 95 percent relief on the range.

MORMON CRICKETS

Last summer a serious outbreak of mormon crickets occurred in Moffat and Routt counties. Two hundred and ninety-three farms were affected with an estimated crop loss of close to $150,000. In addition 64,000 acres of state land and around 800,000 acres of public land were infested. The outbreak would have become more serious had it not been stopped with tin bariers and poison.

A brief report of the situation by F. T. Cowan, junior entomologist of the Bureau of Entomology, U. S. Department of Agriculture is contained in the recommendations in the forepart of this bulletin.

Here again, as in the case of rodents, is needed concerted efforts on the part of farmers, county officials, state and government workers, if the mormon cricket is to be controlled in this region.

Some organized plan must be worked out before the spring of 1928 so that any outbreak this next crop year may be brought under control as speedily as possible.

Directory of Northwest Colorado Agricultural Economic Conference

Name	Address	Committee
H. G. Aanes	Oak Creek	Potato
James Ainsley	Granby	Sheep
A. C. Allen	Fort Collins	Hogs
Henry Apple	Steamboat Springs	Hogs
Robert Arnett	Steamboat Springs	Hogs
E. C. Arnold	Steamboat Springs	Cattle
H. K. Bailey	Hayden	Dairying
Dr. W. S. Bashor	Hayden	Sheep
F. W. Beier, Jr.	Denver	Sheep
J. I. Birkett	Hayden	Dairying
G. C. Black	Hayden	Dairying
J. A. Blair	Glenwood Springs	Range and forage
E. Y. Brame	McGregor	Poultry
Chas. I. Bray	Fort Collins	Sheep
F. R. Carpenter	Hayden	Rodents and Mormon crickets
Kenneth Chalmers	Hartsel	Sheep
L. M. Chambers	Steamboat Springs	Irrigation
H. B. Chapman	Hayden	Poultry
B. F. Chase	Steamboat Springs	Irrigation
D. C. Clow	Craig	Dairying
Pat Cullen	Steamboat Springs	Cattle
D. J. Davis	Craig	Rodents and Mormon crickets
Fred Deberard	Kremmling	Cattle
G. W. Dunkley	Dunkley	Cattle
F. M. Drescher	Craig	Potato
P. S. Elting	Hot Sulphur	Seed crops
F. E. Erwin	Hayden	Dairying
Depue Falck	Washington, D. C.	Grain
Frank Farnsworth	Denver	Dairying
Wm. Fay	Steamboat Springs	Range and forage
Philo Gehring	Parshall	Dairying
E. H. Godfrey	Oak Creek	Truck crops
D. W. Green	Denver	Rodents and Mormon crickets
R. I. Gwillim	Oak Creek	Hogs
Eben Hamilton	Craig	Irrigation
E. L. Harsh	Stillwater	Poultry, truck crops
J. G. Heintz	Craig	Seed crops
Judge E. C.Herrick	Craig	Grain

Name	Address	Committee
T. S. Iles	Axial	Rodents and Mormon crickets
C. A. Johnson	Craig	Seed crops, potato
Waldo Kidder	Fort Collins	Grain
T. M. Kirkpatrick	Craig	Dairying
L. L. Laythe	Denver	Rodents and Mormon crickets
C. A. Lee	Fort Collins	Range and forage
J. V. Leighou	Hot Sulphur	Range and forage, sheep
W. H. Leonard	Fort Collins	Seed crops
Harry Lines	Oak Creek	Poultry
Dr. C. A. Lory	Fort Collins	General
W. J. Matthews	Hayden	Grain
R. A. McGinty	Fort Collins	Potato
E. Merritt	Washington, D. C.	General
T. J. Mitchell	Kremmling	Irrigation
Pat Moffat	Craig	Cattle
L. A. Moorhouse	Fort Collins	General
G. E. Morton	Fort Collins	Cattle
A. T. Polhamus	Granby	Potato
Roy Polhamus	Troublesome	Rodents and Mormon crickets
W. W. Putnam	Denver	Range and forage
A. Powell	Yampa	Range and forage
Ed Rich	Oak Creek	Range and forage
Charles C. Riester	Steamboat Springs	Dairying
R. W. Schafer	Fort Collins	General
Glenn Sheriff	Hot Sulphur	Range and forage
John Sinden	Steamboat Springs	Poultry
A. M. Smith	Hayden	Potato
Chas. Smith	Fort Collins	Dairying
Moroni A. Smith	Hayden	Sheep
Oscar Stanton	Washington, D. C.	Range and forage
C. C. Stearns	Hayden	Rodents and Mormon crickets
Geo. C. Steele	Parshall	Dairying
H. C. Stickles	Oak Creek	Rodents and Mormon crickets
J. H. Strasser	Oak Creek	Poultry
T. H. Summers	Fort Collins	General
Carl Taussig	Scholl	Cattle
Roy Templeton	Maybell	Cattle
D. W. Thomas	Denver	General, range & forage
O. C. Ufford	Fort Collins	Poultry

Name	Address	Committee
Mrs. Bert Dove Vestering	Lay	Potato
Chas. Vestering	Lay	Poultry
Ernest Wagner	Hayden	Dairying
A. V. E. Wessells	Steamboat Springs	Irrigation
M. S. Wheeler	Steamboat Springs	Range and forage
Ralph White	Craig	Seed crops
Dr. D. L. Whittaker	Hayden	Grain
Norman Winder	Craig	Sheep
Geo. A. Wood	Hayden	Hogs
J. C. Wood	Steamboat Springs	Hogs
P. B. Woodhead	Hot Sulphur	Range and forage
K. G. Yama	Oak Creek	Dairying