11-1927

Bulletin No. 203 - Cattle Ranching in Utah: Report of a Preliminary Economic Survey of the Ranch Situations as of 1925

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BULLETIN 203 NOVEMBER, 1927

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Report of a Preliminary Economic Survey of the Ranch Situation as of 1925

By

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(Photo by U. S. Forest Service)

UTAH AGRICULTURAL EXPERIMENT STATION

LOGAN, UTAH

(This bulletin is based upon investigations carried on under cooperative agreement between the Bureau of Agricultural Economics and Bureau of Animal Industry, United States Department of Agriculture, and the Utah Agricultural Experiment Station.)

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Cattle Ranching In Utah[1]

By

WILLIAM PETERSON, P. V. CARDON, K. C. IKELER,

GEORGE STEWART, AND A. C. ESPLIN[2]

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[1]A companion study of sheep ranching in Utah, made at the same time as this study of cattle ranching, will be reported in another bulletin in the near future.

[2]Acknowledgment is made to the Office of Farm Management of the Bureau of Agricultural Economics and to E. W. Sheets, V. V. Parr, and E. W. McComas, of the Bureau of Animal Industry, United States Department of Agriculture, for their assistance with the field work and the analysis of the data presented in this bulletin. Mr. McComas was especially active in taking records tabulating data, and preparing part of the manuscript. The following County Agricultural Agents of the Utah Agricultural Extension Service also assisted with the securing of the data: A. L. Christiansen, Hugh Hurst, O. P. Madsen, Morgan McKay, Lew Mar Price, A. E. Smith, and W. J. Thayne.

Especial credit is due Mrs. Annie R. Cranford of the Bureau of Agricultural Economics, and her corps of assistants, who so creditably checked and tabulated the records secured.

The authors are especially indebted to Utah ranchmen who so willingly gave the information pertaining to their ranch organization and practices that has made this publication possible.

In this publication all reference to ranches has been to *group* or *number* of ranch studied. No names are given. Each cooperating rancher, however, has been supplied with a financial statement pertaining to his ranch operations during 1925. From this statement he will be able to compare his operations with those of other ranches reported in this bulletin.

Approved for publication by Director, November 4, 1927.

PART I. INTRODUCTION

DEVELOPMENT OF RANCHING IN UTAH

Pioneer Settlement

The Mexican War ended in 1846, but the treaty of Guadalupe Hidalgo was not signed until 1848. Meantime, Utah was occupied by the Mormon pioneers, who having no land laws to guide them took land according to a plan furnished by Brigham Young. In Salt Lake City 10-acre blocks were divided into 8 building lots of 1¼ acres each. Just at the edge of the city were "five acre lots to accommodate mechanics and artisans; next beyond were 10-acre lots, followed by forty and eighty acres, where farmers could build and reside"[3].

By October, 1848, there had been 863 applications for allotments of various sizes, amounting in total to 11,005 acres. When Brigham Young arrived with his second emigrant train in the fall of 1848, he urged settlers to fence, and accordingly, all the farms were enclosed within one large fence, the area being designated as "the big field".

Previously, however, in the fall of 1847 Thomas Grover decided to pasture his stock for the winter on some grassy flats 12 miles north of Salt Lake City. Though there were Indians nearby, Grover, joined by others next spring, decided to remain here. Thus Centerville was founded, as an outlying tract suitable for grazing purposes[4].

During the next five years, exploration and settlement were undertaken on a vigorous and far-reaching scale. By 1852 there were colonies of settlers at Centerville, Bountiful, Kaysville, Ogden (the site and buildings of which were purchased for about $3000 from Miles M. Goodyear, who held the land under an old Spanish grant), Lynne, Provo, Evansville (Lehi), Battle Creek (Pleasant Grove), American Fork, Payson, Nephi, Manti, Tooele, Grantsville, Fillmore, Parowan, Cedar City, Paragonah, Forts Walker and Harmony, Brigham, Willard, and Wellsville. All of the settlements were near mountain streams which afforded natural irrigation for flat areas of wheat-grass and of giant rye-grass. Grazing for cattle and the possibility of mowing grass with scythes for hay were important factors in choosing the sites for settlement. Provo, for example, was moved in order to afford better facilities in these respects.

During the next few years population increased rapidly and settlement was extended into all other important areas in what is now

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[3]Bancroft, H. H. History of Utah, p. 285. The History Company, San Francisco (1890), pp. 1-808.

[4]*Ibid, p.* 305

the State of Utah. Although in 1856 Utah with a population of about 25,000 people was denied statehood, the on-coming Civil War precipitated the formation of the Territory of Nevada from western Utah in March 1861, two days before the accession of Lincoln to the presidency of the United States. Shortly Nevada was to become a state and to enter on control of her land along with other rights of statehood, before which, however, Utah was reduced to her present boundaries by two additions to Nevada in 1864 and 1866, one to Colorado in 1861, and two to Wyoming in 1863 and 1868 (See Fig. 1).

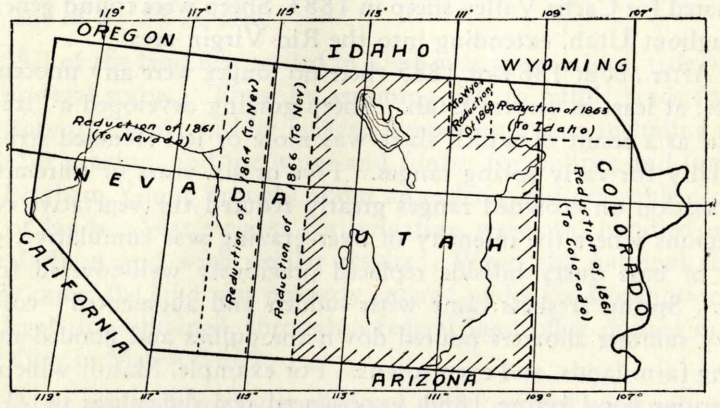

Fig. 1—Map showing the original and present boundaries of Utah, and indicating where various reductions were made during the period 1861 to 1868, inclusive.

In 1865 Utah was reached by the telegraph and in 1869 by the Union Pacific Railroad. By 1870, the Utah Central Railroad connected Salt Lake City with the transcontinental line at Ogden. Mines were opened, settlements grew, and population increased. The census of 1880 showed 9542 farms in Utah, including an area of 655,000 acres of which about 416,000 were cultivated. Alfalfa had become widespread and livestock had multiplied. The first Utah cattle were primarily grade Shorthorns. The overland emigrant trains in '49 and the '50's traded weak and footsore animals of high quality and good breeding for provisions. Thus, Utah obtained good cattle far earlier than would otherwise have been the case. Between 1885 and 1890, all the Utah ranges were fully occupied. It is estimated that there were then 160,000 cattle in Utah largely of Shorthorn, Devon, and Hereford cattle in various crosses on Spanish Longhorns, though

these were never so proportionately numerous in Utah as in the surrounding regions to the east, south, and west.

Beginning about 1870 sheep began to be brought into the state in numbers, though there were a few herds largely from New Mexico previous to that time. Spanish Merinos were introduced from California and fine-wooled rams from Ohio. Long-wooled animals came from Canada, Kentucky, and other parts. In 1883 there were about 450,000 sheep sheared, averaging probably 5 pounds to the fleece. About one-fourth of the wool was used locally by the "woolen factories". The remainder was export wool of fair quality. Since sheep were tax-exempt, capital was rather freely invested, some of the largest herds being in Cache Valley. A profit of about 40 per cent was estimated for Cache Valley sheep in 1883. Sheep were found generally throughout Utah, extending into the Rio Virgin area.

After about 1884 or 1885 there no longer were any unoccupied ranges, at least in central Utah. Sheep grazing developed a "tramp" aspect, as a result of which there was more or less frenzied struggle, especially for early spring ranges. Five or six years of unremitting competition on crowded ranges greatly reduced the vegetative cover. In regions where the intensity of over-grazing was cumulative, great areas of bare dusty hillside replaced previously well-covered forage areas. Spring freshets came with sudden and augmented volume. Heavy summer showers poured down the gullies and flooded neighboring farm lands, and even towns. For example, Manti, which had no serious flood before 1889, experienced real difficulties in 1889, 1893, 1901, and 1906. In 1904 the Manti National Forest was organized and grazing completely prohibited from 1905 to 1909. In 1909 a heavy storm barely flooded Manti whose range had greatly recuperated under protection, whereas unprotected Ephraim Canyon was seriously eroded by the same storm.

Between 1904 and 1907 the other National Forests in Utah were all organized under National Forest protection, premature spring grazing was guarded against and proper distribution encouraged. A few stockmen resented control, but the majority were well pleased to exchange the permit fees for greater security and a mending range. Forage convalescence was slow at first but gradually acquired momentum in which the progressive graziers could see more substanital prospects.

Acquirement of Land

When Utah was settled, and for 15 years later, the Preemption Law governed the acquirement of titles to land. Squatters who set-

tled on land in certain states and territories and built improvements were entitled to the non-competitive right of purchase at $1.25 an acre. At first this did not apply to unsurveyed land, but in 1854 it was made retro-actively applicable to unsurveyed land in any part of the United States, application to be filed within three months after settlement or, if not surveyed, within three months after the filing of the survey plat. Payment was to be made within eighteen months after filing the application. The amount of land that could be pre-empted by one person was limited to 160 acres.

In 1862 the Homestead Law was passed. Five years' residence on land gave complete title without payment of any purchase price. Later it was made possible to secure title at the end of six months by payment of $1.25 an acre.

All of the land first settled in Utah was given a local title which had no legal status. Thus, by assuming title to public lands for the Territory of Deseret and by making temporary grants including privileges for grazing, and for water and timber for milling and lumbering, Brigham Young brought about an orderly and peaceable occupation of lands. Water-rights for irrigation were also handled in the same fashion and with similar results. When the national survey finally came, the land was properly entered under the Preemption Act and legal title obtained, through a federal land office opened in Salt Lake City in March, 1869.

After this date land was alienated under current national regulations, except in a few communities taken under the settlement plan of the Mormon Church. In such cases, grants to individuals were always small, usually 20 acres or less. When the land was later alienated by quarter sections, public sentiment practically compelled the man who secured legal title to deed the squatter claim to the original occupant. Thus, there grew up in all communities to which Mormon settlement extended a preponderantly large number of small land-holdings, frequently 10 or 20 acres in area.

Where such settlement was compact, a number of social advantages devoloped which offset in a fashion the economic disadvantages of small farms and ranches. Later on when more land became a commercial necessity, original settlers who dwelt in small towns obtained a small additional area. If two or three additional tracts were brought under cultivation by cooperative effort, one town-dwelling farmer often had two, three, or more small outlying fields, sometimes in as many different directions. Such a condition still exists in many parts. Nearness to church, to schools, to neighbors, and to

social life generally, even today, is prized highly enough to prevent disintegration of the Utah farm-community "towns", which vary from 1000 to 5000 in population.

Congress passed the Timber Culture Act in 1873. The person who would plant 40 acres to trees and for ten years keep them in a healthy growing condition would be given 160 acres of land. In 1878 the number of acres to be planted to trees was reduced to 10 acres. The number of trees required to the acre was also considerably reduced. Even after the more lenient modifications went into effect, not many claims were made under this plan in Utah, only 10,000 acres being patented.

The Desert Land Acts were more beneficial. As early as 1869 Utah asked Congress for land to be used in promoting irrigation development. Passed in 1877, the act, as amended in 1891 and at several later dates, gave land to settlers who irrigated and improved it. Finally, came the Carey Act which provided donations of about a

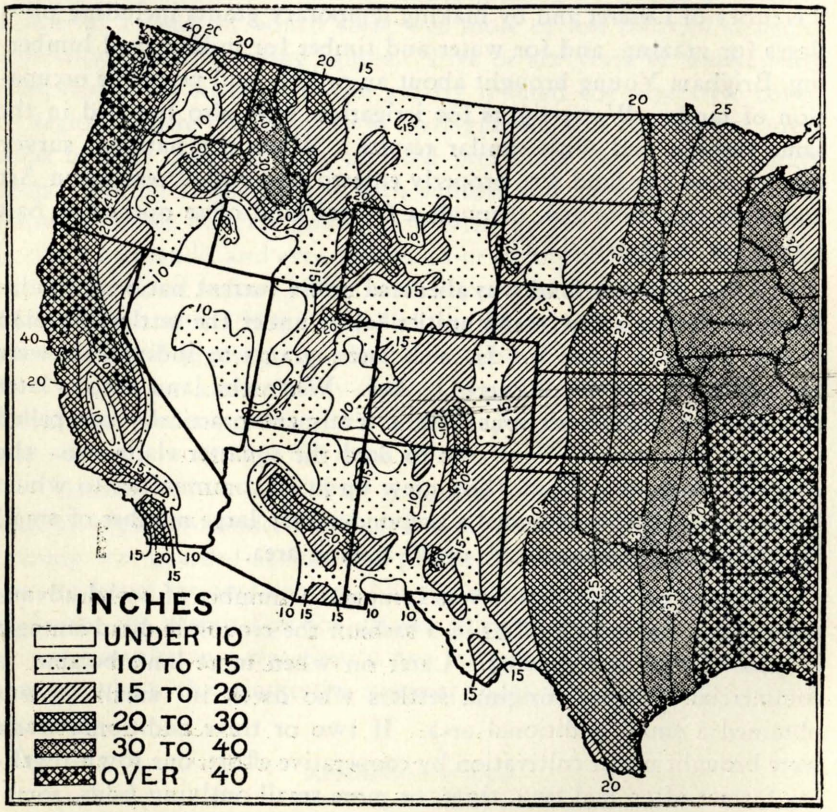

Fig. 2.—Chart of average annual precipitation (rain, snow, sleet and hail) in the western half of the United States, indicating the relative aridity of Utah's climate. (After U. S. D. A.)

million acres of land to a state which would cause the land to be settled, irrigated, and partly cultivated. Federal reclamation is really an enlargement of this act, whereby the U. S. Reclamation Service takes the place of the state.

During the last few years the amount of land obtainable by homesteading was increased to 320 acres for dry-farm land and still more recently to 640 acres for grazing homestead. The enlargement of the homestead for dry-farms and for grazing was a step in the right direction, but the size of the homestead is still far too small to permit the development of family home-units. It is probable that grants of 10 to 20 or more sections would have more nearly met the requirements. What happened was for all the land containing water or other "key" resources to be taken under these acts and for the owners of such land to control the remaining public land for grazing by means of water monopoly and other similar advantages. After the "key" lands were gone what was left was not susceptible of passing into private ownership. It lacked important resources necessary to private ownership—chiefly water, but often also accessiblity.

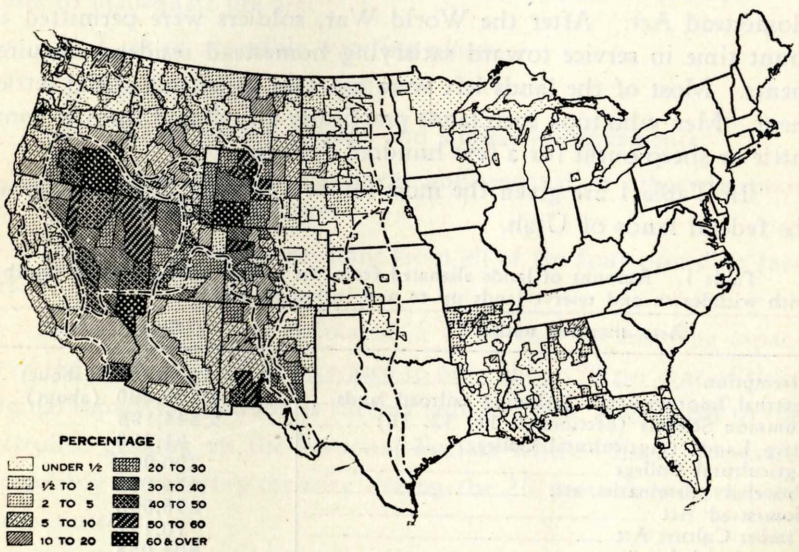

Fig. 3.—Chart of percentage of county area open to homestead entry in each state of the Union. It is plain that the largest percentages are in the intermountain states, of which Utah is representative. (After U. S. D. A.)

Meanwhile, at the time of admission to the Union each state was given grants of school sections. Utah was granted along with a few

other western states 4 sections out of each township. Being admitted late and statehood having been considerably delayed beyond what was normal for other states, many of the sections that would have been school lands were already taken. Lieu lands were then allowed from remaining public lands. The best land was thereby lost to the state, but it was possible by consolidating the lieu lands to obtain the state land in large blocks instead of in isolated sections.

The Morrill Act allowed land for the agricultural colleges, of which Utah got 200,000 acres. The University of Utah was allowed 110,000 acres and additional grants of 100,000 acres each for the School of Mines and the Normal School. Smaller additional grants to the University included the campus.

The Union Pacific railroads were allowed alternate sections for 20 miles on each side of their right-of-way with the privilege of choosing their lands when these alternate sections were already entered. Large areas of good land were thus made available in solid blocks, as lieu lands could be chosen at will on public lands. Mineral lands were excluded from this grant but timber lands were not.

Military bounty lands were allowed before the passage of the Homestead Act. After the World War, soldiers were permitted to count time in service toward satisfying homestead residence requirements. Most of the lands left were too arid to permit actual settlement. Men who took such lands practically all released them to some cattle or sheep outfit for a few hundred dollars.

In Table 1 are given the most important land alienations from the federal lands of Utah.

Table 1. Amount of lands alienated from the federal public domain together with withdrawn and reserve lands up to and including 1923.

Acts alienated under	Acres	
Preemption	1,000,000	(about)
Internal Improvements, including railroad lands	2,500,000	(about)
Common Schools (Sections 2, 16, 32, 36)	5,844,196	
Scrip Lands (Agricultural College)	91,200	
Agricultural College	200,000	
University, Seminaries, etc.	456,080	
Homestead Act	856,090	
Timber Culture Act	10,157	
Desert Land Acts	804,058	
Coal Land Sales	74,070	
Reserves:		
Coal Lands	5,087,444	surface
Phosphate Lands	302,465	subject to
Oil Lands	1,870,608	grazing
National Forests	7,986,624	
Indian Reservations	90,000	
National Monuments	847,000	

While national parks and monuments have been and should be encouraged, there has been a tendency to include unnecessarily large areas of land suited only to grazing. It is here suggested that such grants be not allowed extended encroachment on land that is valuable purely for grazing.

Importance of Livestock Industry in Utah

Although Utah is thought of primarily as an irrigated state, the total land area utilized for irrigation in 1919 was only 1,371,000 acres, or 2.6 per cent of the area of the state. Dry-farming is also usually thought of as an important contributing phase of agriculture, and yet somewhat less than 500,000 acres, or less than 1 per cent of the total area, is so utilized. Most of the remaining land is used for grazing, except 5 million acres that is pure desert, bare rock, or inaccessible and rough slopes[5]. Thus, over 44 million of Utah's 52½ million acres of land is used for grazing. This is about 83.7 per cent of the entire land surface of the state.

Much of this area is only partly used. The chief contributing causes to inadequate use are:

(1) Lack of accessible watering places

(2) Lack of roads and trails

(3) Lack of fences, corrals, and similar improvements

(4) Bad seasonal management and unequal or otherwise poor stocking practices

(5) Injured forage, resultant from all of the four preceding factors.

Barnes and Jardine[6] estimated in 1916 that the carrying capacity of the public lands had decreased to only about 50 per cent of their original capacity. Erosion is further reducing this, as opposed to the controlled grazing on the National Forests which have increased appreciably in carrying capacity during the 20 years they have been under control.

The summary in Table 2 helps to show the relative importance of the grazing industry in Utah.

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[5]This is variously estimated between 1½ and 5 million acres. It has never been determined definitely.

[6]Barnes, Will C., and Jardine, J. T. Livestock Production in Eleven Far Western States. U. S. Dept. Agr. Office Secretary Report 110 (1916), p. 12.

Table 2. Summary of the land tenure and land utilization in Utah.

Tenure	*Acres*	*Percentage*
Privately-owned	9,450,000	18.0
National Forests	7,453,000	14.0
National Monuments	90,000	0.2
Indian Reservations	847,000	1.6
Coal, Mineral Reserves	7,200,000	13.0
Unreserved Public Domain Includes 5,000,000 acres waste (absolute desert, bare rocks, etc.)	26,872,000	51.0
Other Classifications	685,760	1.2
Total Land Area of State	52,597,760	100.0
Utilization	*Acres*	*Percentage*
Irrigation Land	1,371,000	2.6
Dry-farmed Land	500,000	1.0
National Forest (mostly used for grazing)	7,453,000	14.0
Privately-owned Grazing Land	7,532,600	14.5
Coal and Mineral Reserves (largely grazed)	7,200,000	13.7
Public Domain (largely grazed)	26,872,000	51.0
Waste Land (desert, bare rock, etc.)	5,000,000	9.5
Total Used for Grazing Land	44,057,600	83.7

Since the most productive lands are farmed and the least productive grazed wherever possible, the actual relative value of the grazing industry is better shown by the fact that the value of all crops in Utah[7] is $26,603,000, whereas the value of all cattle is $14,521,000 and of sheep $26,063,000, and wool $7,400,000. Of the cattle 71,000 are dairy cattle. These are fully dependent on the farming land, in addition to which about 5 per cent of the other cattle are so dependent. Hogs and poultry are also entirely dependent on farmed land. Thus, as measured in value of dependent agricultural industries, the range livestock industry of Utah represents about 60 per cent of the total direct agricultural returns.

An industry which uses exclusively 83.7 per cent of all land and perhaps 20 per cent of the product of the cultivated land, and which in value is about 60 per cent of the total agricultural product, deserves serious attention.

PURPOSE OF PRESENT STUDY

Appreciating the importance of the range livestock industry in the agriculture of this state and desiring to obtain additional information pertaining to the present organization, practices, economic status, and outlook of typical range livestock ranches in this state, the Utah

[7]Agricultural Census of 1925.

Experiment Station, in April 1926, subscribed to a cooperative agreement with other western state experiment stations and the U. S. Department of Agriculture to undertake a range livestock study in the Southwestern Range Area, which includes Utah[8].

The study, so far as Utah is concerned, was begun about June 1, 1926, when representatives of the Utah Experiment Station and the U. S. Department of Agriculture began taking from ranchers in various parts of the state records of operations for the calendar year 1925. From the cattle records thus obtained data have been assembled which constitute the basis of the present report. A similar report based upon records obtained from sheep ranches will be published at an early date.

SOURCE AND CLASSIFICATION OF DATA

The data presented in this report were secured by personal interview with owners and operators of cattle ranches. Wherever feasible, figures were secured from books or memoranda, but in some cases only ranchmen's estimates were available. Information was secured only from men who had been engaged in range cattle production over a period of years and who were able to describe changes they had made in business management or in practices and could give reasons therefor. Such information has been studied in connection with the survey data covering the year 1925.

This being a range livestock study, no records were taken from farms, although it is recognized that in the aggregate large numbers of beef cattle are to be found on the farms of this state. Seven records were excluded from summary studies because they were from ranches operating either strictly steer outfits or herds of registered cattle.

The ranches and range outfits in this study include over 22,000 head of cattle with a total value of over $691,000. Based on the 1925 agricultural census, it is estimated that the cattle covered by this report represent over 5 per cent of the number of cattle in Utah, exclusive of yearling dairy heifers and dairy cows two years old.

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[8]The memorandum of agreement defines the Southwestern Range Area as including Nevada, Utah, New Mexico, Arizona, and that part of Texas lying west of Pecos River. The objects of the cooperative study of range livestock production are defined in the memorandum of agreement as follows:

"To make a study of range livestock production, to determine the practices in connection with range livestock production which are being generally followed in the area. The data collected and analyzed will be supplemented with available information regarding the comparative advantages and disadvantages, of livestock production in other areas, and probable market and economic trends. The results of this study will be of value to livestock producers in planning and adjusting their business to present and future conditions."

PART II. DISCUSSION OF SURVEY DATA

The cattle ranches included in this study fall naturally into two major divisions: (a) Those using no public domain in winter and (b) those making winter use of public domain. Ranches in each of these divisions may use the Forest Reserve in summer, but those of the first division are obliged to winter their stock exclusively on owned or leased land, whereas ranches of the second division have access to the open ranges of the public domain, to supplement their owned or leased land.

Obviously, this important difference in winter practice may exert a decided influence on general ranch operation and at the same time determine in large measure the relative success of ranching enterprises. In recognition of this difference in winter practice as an important factor in an economic survey of the range cattle industry of Utah, it was decided to classify all ranches studied according to their use or non-use of public domain in winter and to adhere to this classification in discussing the survey data secured.

In accordance with this plan all ranches are thrown into Division A, if they make no use of public domain in winter, or into Division B, if winter use of public domain is made. The ranches in each main division are then further classified according to the number of breeding cows: Into Group 1 are thrown all ranches with 34 to 100 breeding cows; into Group 2, all ranches with 101 to 200 breeding cows; and into Group 3, all ranches with 201 to 500 breeding cows. These three groups take care of all ranches in Division A, but in Division B a fourth group is required for the ranches with 501 to 1000 breeding cows.

Sixty-two cattlemen supplied records of their operations, but as 7 of them use only registered stock or operate outfits where steers are used almost exclusively, it was deemed best to limit this study to 55 strictly range cattle ranches, 36 in Division A and 19 in Division B. The ranches in Division A are divided among groups as follows: Group 1, 19 ranches; Group 2, 13 ranches; and Group 3, 4 ranches. In Division B, Group 1 contains 3 ranches; Group 2, 8 ranches; Group 3, 4 ranches; and Group 4, 4 ranches.

The survey data secured from the cattlemen interviewed are treated from an economic standpoint under the following major headings in the order named: Land utilization, ranch investment, ranch indebtedness, inventory, ranch expenses, labor requirements, and financial summary. This treatment is supplemented by a sum-

mary of correlation studies designed to show how profits in the cattle business, as shown by the survey data, are affected by some of the more important profit-producing factors. Following the statement of correlations is a discussion of herd management on Utah cattle ranches as disclosed by the records taken.

LAND UTILIZATION

The amount and value of owned land together with the manner in which the land is utilized are shown in Table 3. The average total income from all sources other than cattle is included, since this indicates the relative degree to which the enterprise is diversified, which is a problem ,in part at least, of land utilization.

Table 3. Amount and value of owned land. on cattle ranches, acres of crops grown, and the amount of income from all sources other than cattle—Utah 1925.

Size of Ranch by Number of Cows Breeding	Number of Ranches	Owned Land			Acres Cropped Land			Income from Sources Other than Cattle
		Total Acres	Total Value	Value Per Acre	Irrigated	Dry Farm	Hay	
Division A—Ranches Using No Public Domain in Winter								
34—100	19	629	$11761	$ 18.60	82	34	68	$ 805
101—200	13	1442	27156	18.80	183	30	148	1091
201—500	4	6148	59015	9.60	414	430	822	2961
Division B—Ranches Using Public Domain in Winter								
40—100	3	208	$ 6362	$ 30.50	99	——	73	$ 346
101—200	8	1290	16108	12.50	98	38	84	1232
201—500	4	2146	11669	5.40	69	84	129	286
Over 500	4	328	5128	15.60	72	——	68	18

The total acres of owned land increases regularly with the size group in Division A, and also in the three smaller size groups of Division B. The larger ranches which use the public domain in winter own an astonishingly small area of land. The fact that upwards of a thousand head of cattle are run with only 328 acres of owned land brings out the first suggestion of how completely the ranchmen are using public land.

On the ranches not using public domain in winter there is a normal increase in total value of owned land with the size of unit, varying from less than $12,000 invested in land for the small units to $59,000 for the larger units. There is an extremely low investment in owned land on all of the ranches using public domain in winter, the largest ($16,000) occurring on the ranches with about 200 cattle. That units of upwards of a thousand cattle are operated

by men who have scarcely $5000 invested in land makes clear the strategic value both of the National Forests and of the public domain.

The value of all owned land including farm land varies from slightly over $5 an acre in Group 3, Division B, where the land is largely grazing land to somewhat more than $30 an acre in Group 1 of Division B, where the land is about half irrigated. The other acre values are intermediate in all other size groups, varying from about $10 to about $19 an acre.

The proportion of cropped land in Division A is respectably large, especially in Group 3 where there are more than 400 acres of irrigated land to the ranch and a smilar area of dry-farmed land. The irrigated land is chiefly hay, though grain and sugar-beets are important on many of the ranches. The dry-farm crop is almost entirely winter wheat. The hay yields varied from 2½ tons an acre in Group 1 to 2 tons in Group 2 and 1 ton in Group 3, being principally alfalfa in the first two groups and grass and wild hay in the third group.

On those ranches using public domain in winter there is no real attention given to crops, even to hay, except in Groups 1 and 2 where acre-yields of 2½ tons of alfalfa were secured. In Group 4, 68 acres of hay land produced 81 tons to be used by more than a thousand cattle.

Table 4. Amount of grazing land on cattle ranches that is owned, that is obtained by leasing, and the amount of National Forests and on the public domain together with the average grazing area per head of cattle and the total and per capita amounts of hay fed—Utah 1925.

Size of Ranch by Number of Breeding Cows	Number of Ranches	Acres Grazing Land Utilized						Hay Fed (tons)	
		Owned	Leased	Forest	Public Domain	Total	Per Head All Cattle	Total	Per Head
Division A—Ranches Using No Public Domain in Winter									
34—100	19	513	550	1366	844	3389	30.3	160	1.4
101—200	13	1232	298	1925	2134	5802	23.5	289	1.3
201—500	4	5304	660	2831	6690	16329	21.7	781	1.0
Division B—Ranches Using Public Domain in Winter									
40—100	3	109	——	1398	9509	11115	90.4	113	0.9
101—200	8	1154	64	1844	11864	15062	59.7	193	0.8
201—500	4	1994	1170	5401	18388	27106	73.7	243	0.7
Over 500	4	256	2560	8876	52359	64123	55.0	90	0.1

The income from sources other than cattle are appreciable in Division A, varying from about $800 in Group 1 to more than $2900 in Group 3, which is largely accentuated by one ranch with $12,000 from this source of income. Sugar-beets and winter wheat are the chief sources of income, though dairy products and other livestock are of importance on a number of the ranches. These supplementary incomes are partly geographic, being almost wanting in southern and southeastern Utah.

The various types of grazing land used for cattle and the relative proportionate amount of each type are shown in Table 4. The total hay fed and the amount per head of cattle are also given, together with the average number of grazing acres per head.

The ranches in Division A produced about half or slightly more than half the total forage used either as hay or pasturage, using in the aggregate somewhat less than 25 acres of grazing land for each cow and feeding about 1.2 tons of hay per head. The ranches which made use of the public domain on which to winter the cattle produced about 20 per cent of the total forage used on the group of farms with smallest number of cattle . The proportion of feed decreased with the size of the unit until in the largest units considerably less than 1 per cent of all feed used was produced on owned land with about 3 or 4 per cent added by the leasing of grazing land. The National Forests furnished roughly about one-third of the remainder and the public domain about two-thirds. There is feeding in Groups 1, 2, and 3, but to a very small extent. In Group 4 feeding may be said to have disappeared except for work animals. Apparently the bulls get no hay in these larger units, which are all in southern Utah.

DISTRIBUTION OF RANCH INVESTMENT

Land

Due primarily to greater land investment (Table 5), the total investment on ranches using no public domain in winter is much higher than on those using public domain. The larger outfits of Group 4 of Division B for this reason show only a slightly higher total investment than those of Group 2, Division A.

As the size of outfit increases among the ranches using no public domain in winter, the percentage of owned grazing land increases, according to the records, from 48 to 89 per cent; whereas among

Table 5. DISTRIBUTION OF INVESTMENT ON UTAH CATTLE RANCHES—1925

Size of Ranch by Number of Breeding Cows	Number of Ranches	Total Ranch Investment	Amount								Percentage of Total Investment					
			Land	Improvements	Range Cattle	Work Stock	Other Livestock	Equipment	Feed and Supplies	Land	Improvements	Cattle	Work Stock	Other Livestock	Equipment	Feed and Supplies
DIVISION A—RANCHES USING NO PUBLIC DOMAIN IN WINTER																
34—100	19	$22079	$11761	$3422	$ 4246	$ 590	$ 400	$ 934	$ 726	53.27	15.50	19.23	2.67	1.81	4.23	3.29
101—200	13	43400	26864	4948	8175	648	535	1504	726	61.90	11.40	18.84	1.49	1.23	3.47	1.67
201—500	4	96893	59015	3962	28252	1322	1402	1773	1168	60.90	4.09	29.16	1.36	1.45	1.83	1.21
DIVISION B—RANCHES USING PUBLIC DOMAIN IN WINTER																
40—100	3	$13797	$ 6362	$2737	$ 3051	$ 455	$ 569	$ 592	$ 31	46.11	19.83	22.11	3.30	4.13	4.29	.23
101—200	8	30240	16108	2431	7883	549	756	1103	1410	53.27	8.04	26.07	1.81	2.50	3.65	4.66
201—500	4	28382	11669	3544	10385	1117	520	1011	136	41.11	12.49	36.59	3.94	1.83	3.56	.48
Over 500	4	49281	5128	6897	34222	1308	696	1025	5	10.41	14.00	69.44	2.65	1.41	2.08	.01

Total investment on ranches using no public domain in winter is considerably higher for each group than where public domain is used in winter. This is due primarily to the greater investment in land. Improvements, on the other hand, represent a slightly larger percentage of total investment on those ranches using public domain in winter than on those not using it. Very little difference is found with respect to investment in equipment. The percentage of total investment represented by cattle in nearly every instance increases as the investment in land decreases. Ranches using no public domain in winter, as a rule, show a higher percentage of total investment in work stock, "other livestock", and feed and supplies.

winter users of public domain the percentage of owned grazing land decreases with the size of outfit from 100 to only 9 per cent. This indicates a tendency on the part of the ranchers in Division A to increase their land holdings in keeping with the expansion of their enterprises, while on the other hand ranchers in Division B seem more interested in keeping their land investment at a minimum. As more grazing land is required, they lease it.

Among the ranchers who use no public domain in winter the acquisition of title to more acres may result from a belief that land ownership insures greater stability in operation than does leasing at high rates for short terms—conditions which the leasor is obliged to accept if he leases land under present conditions. It appears also that these ranchmen find range ownership profitable from the standpoint of grazing control for the maintenance of carrying capacity, since without control the carrying capacity of the public domain is gradually decreasing.

Improvements

The figures under "Improvements" in Table 5 represent the total investment in dwellings, other buildings, fences, and water. The records show that as a rule the dwelling represents approximately half of each ranch's investment in improvements, while other buildings, fences, and water combined account for the other half. Of these, other buildings account for the highest investment, fences for the next, and water for the least.

Improvements in one group account for as much as 19.83 per cent of the total investment per ranch, whereas it amounts to only 4.09 per cent in another group. Among the ranches not using public domain in winter, the percentage for the three groups of ranches decreases regularly with the size of outfits, being 15.50 for Group 1, 11.40 for Group 2, and 4.09 for Group 3. There is also a decrease in percentage as the average size of outfit increases in Division B, although the decrease is less regular and not so great.

On the whole, improvements represent a slightly larger percentage of total investment on ranches using public domain in winter than on those not using it.

While water as a rule calls for the smallest part of the investment in improvements, a notable exception to this rule should be considered. In this case, involving the development of water under desert range conditions, water represents an investment of $15,000, or nearly three-fourths of the total in improvements. This unusual investment immediately prompts a question as to whether or not it

was justified by results, and whether or not more water development on desert ranges should be encouraged among ranchmen. The opinion of the man who in this instance developed water would indicate that his was a profitable investment, and his record among other things shows a larger calf crop than is shown by that of any other ranch in this group (Group 4, Division B), but it is plain that other factors may have influenced his calf crop. A discussion of distribution of stock watering-places on the range appears on page 42.

Equipment

The amount of money invested in equipment (Table 5) is consistently higher by $300 to $600 on ranches not using public domain in winter than on those using it, but the percentage of total investment in equipment is only slightly different—a shade in favor of the domain-using groups. This supports the belief that regardless of the type of ranching, certain equipment is necessary, and the percentage of the total investment thus represented depends upon the size of the outfit. It may be as much as 5 per cent on small ranches, to as little as 2 per cent on the larger ranches.

Range Cattle

As might be expected, investment in range cattle in the different groups of ranches, whether or not the use of public domain is involved, increases in fair proportion to the number of breeding cows, in dollars as well as in percentage of total investment. As between comparable groups in the two divisions, Table 5 shows that range cattle represent only 4 to 7 per cent more of the total investment among ranches using public domain in winter than among ranches not using it in that season.

It is noteworthy that the larger ranches, Group 4 of Division B, show a cattle investment averaging nearly 70 per cent of the total, with only 10 per cent of their investment in land and about 14 per cent in improvements. All other groups have at least 41 per cent of their investment in land, which necessitates a corresponding reduction in cattle investment.

Work Stock

The amount of money invested in work stock (Table 5) is higher in all comparable groups of Division A than in Division B, but the percentage investment in work stock is consistently lower among the groups of Division A. Apparently more work stock is required on the ranches of these groups for the production of winter feeds, which accounts for the greater money investment in work ani-

mals; but since the total ranch investment is greater among these ranches, the percentage investment in work stock is lower than on ranches of the groups using public domain in winter.

Other Livestock

The investment in livestock other than range cattle and work stock (Table 5) is so small in every group that it would comprise a factor of minor, almost negligible, importance in any consideration of the distribution of investment were it not for the fact that the group averages as tabulated hide certain significant variations which should not be overlooked. While some ranches have no investment in "other livestock", including mainly dairy cattle, work horses, sheep and swine, other ranches have considerable; and wherever this investment amounts to as much as 9 per cent of the total investment in livestock the return on the total ranch investment approximates 5 per cent. Furthermore, the small ranches of Group 1, Division A, show less loss where "other livestock" is prominent than where it is lacking.

These facts suggest that ranchmen could well consider the extent to which "other livestock" might be used in connection with cattle ranching in Utah, especially on the smaller ranches.

Feed and Supplies

Ranches not using public domain in winter have a larger investment in feed and supplies than ranches using it as shown in the last column of Table 5. An exception to this rule appears in Group 2, Division B, which is explained as resulting from the fact that this group of ranches, all using public domain in winter, are fortunately located with respect to supplies of irrigation water and are thereby enabled to produce their required hay and grain. This is not true in the case of either Group 3 or Group 4. Ranches in Group 1, on the other hand, because of limited summer range, are obliged to use crop land for pasture during the growing season, leaving very little land for the production of winter feed.

RANCH INDEBTEDNESS

So many different factors in one way or another are responsible for indebtedness in ranch operation, that it is next to impossible to make comparisons on this plane with any degree of certainty that all factors have been given due consideration. Not the least important is the human factor—the reaction of the operator to conditions confronting him often determining his burden of indebtedness.

Nevertheless, a review of indebtedness data appearing in the records taken during this survey reveals certain points worthy of attention. In the first place, all indebtedness reported is for either land

or cattle, that for land in the case of Groups 1 and 3, Division A, and Group 3, Division B, being greater than the indebtedness for cattle. The reverse is true for Group 2, Division A, and Groups 2 and 4, Division B. In Group 1 of the second division indebtedness is the same for cattle as for land.

The average total indebtedness for Group 1, Division A, is 70 per cent higher than for the first group of Division B, and the interest rate is 2 per cent higher. The indebtedness per acre is no greater among the ranches not using public domain in winter, but many more acres are involved. The cattle indebtedness per head is considerably less among the ranches not using public domain in winter even though their investment in cattle is 30 per cent greater. This suggests that as a rule the smaller rancher who does not use public domain in winter has been assuming indebtedness for land in order to be in a position to take better care of his cattle, whereas the small rancher using public domain in winter has been borrowing for cattle, not land, purchases. Indeed, it might almost be said that the same difference is apparent as between all comparable groups of ranches. Cattle indebtedness is uniformly higher where public domain is used in winter, and the head-debt increases regularly with the size of ranch. Where public domain is not used in winter, the head-debt decreases as the size of outfit increases.

Although there is little difference in the total land indebtedness of Group 2, it is notable that the average acre-debt of the groups using no public domain in winter is only $1.61 as against $4.50 in the other group. This probably results from the fact that the average size of ranch in the former group is more than twice that of the latter.

In Group 3 the total indebtedness is much the same, but those ranches using public domain in winter show a higher cattle debt than land debt. The reverse is true where no public domain is used in winter.

In Group 4 of the ranches using public domain in winter one heavily involved ranch brings the average ranch indebtedness for the group to a startlingly high point. Without this ranch, the group average falls in line with averages for the other groups of Division B. Even the heavily involved ranch, according to information gathered subsequently, is reducing its indebtedness at a rate satisfactory to the creditors.

The Utah cattle ranch records as a whole, according to E. W. Sheets, Chief of the Animal Husbandry Division, U. S. Department of Agriculture, "show a higher ratio of operator's equity to total ranch investment than those in the other western range states where studies of this kind have been completed."

Table 6. OPENING INVENTORY OF CATTLE AND WORK STOCK ON CATTLE RANCHES AND VALUE PER HEAD.

Size of Ranch by Number of Breeding Cows	Number of Ranches	Range Cows		Heifers				Steers						Bulls		Milk Cows		Total Number of Cattle	Work Stock	
				Two's		Yearling		Yearling		Two's		Three's								
		Number	Average Value	Number	Average Value	Number	Average Value	Number	Average Value	Number	Average Value	Number	Average Value	Number	Average Value	Number	Average Value		Number	Average Value
DIVISION A—RANCHES USING NO PUBLIC DOMAIN IN WINTER																				
34—100	19	55	$35.20	12	$33.40	17	$20.40	16	$22.00	15	$34.00	3	$44.40	2	$92.40	2	$57.20	122	6	$80.60
101—200	13	121	32.70	20	27.60	26	21.00	38	24.40	24	30.40	8	42.70	4	79.90	3	55.20	244	10	65.60
201—500	4	256	42.60	62	40.80	82	22.10	123	27.30	206	37.70	4	63.00	12	109.00	6	75.00	751	27	56.80
DIVISION B—RANCHES USING PUBLIC DOMAIN IN WINTER																				
40—100	3	64	$24.00	—	——	12	$18.20	22	$19.30	21	$28.10	1	$30.00	2	$67.50	3	$60.00	125	7	$67.40
101—200	8	114	29.90	30	$26.70	28	18.70	30	24.40	22	37.60	21*	59.00	4	86.90	4	58.60	253	11	46.60
201—500	4	200	28.10	32	25.70	44	18.80	40	22.00	30	32.10	14	40.00	7	87.90	—	——	367	19	57.00
Over 500	4	689	24.90	38	20.00	128	16.10	165	19.90	54	27.00	17*	33.00	74	96.20	—	——	1165	30	45.10

* Includes 4-year-old steers.

The average value of range cows is higher for all groups of ranches using no public domain in winter than for ranches not using it. Indeed, with few exceptions, this relation is maintained for all types of cattle classified in the opening inventory. So far as number of heifers, steers, and bulls is concerned, the inventory shows little regularity among ranches of the different groups. It is noteworthy, however, that the ranches using public domain in winter carry relatively more steers 3 and 4 years old than the ranches using no public domain in winter. Group 3 of Division A, on the other hand, shows a comparatively large number of yearlings and 2-year-old steers.

OPENING INVENTORY OF CATTLE AND WORK STOCK

It is notable that the average number of cattle per ranch for each group remained about the same at the end of the year as it was at the beginning. An almost total lack of any steers over three years old is apparent in the records (Table 6), and all groups show a relatively small number of 3-year-olds, while the "one's" outnumber the "two's". Among the heifers, "one's" are more numerous than "two's" because on most ranches some 2-year-old heifers with calf were reported with the cow herd. The number of 2-year-old heifers was seldom given separately.

Due to a slight but definite upward trend in cattle values during the year under study (see Figure 4), net increases in inventory are

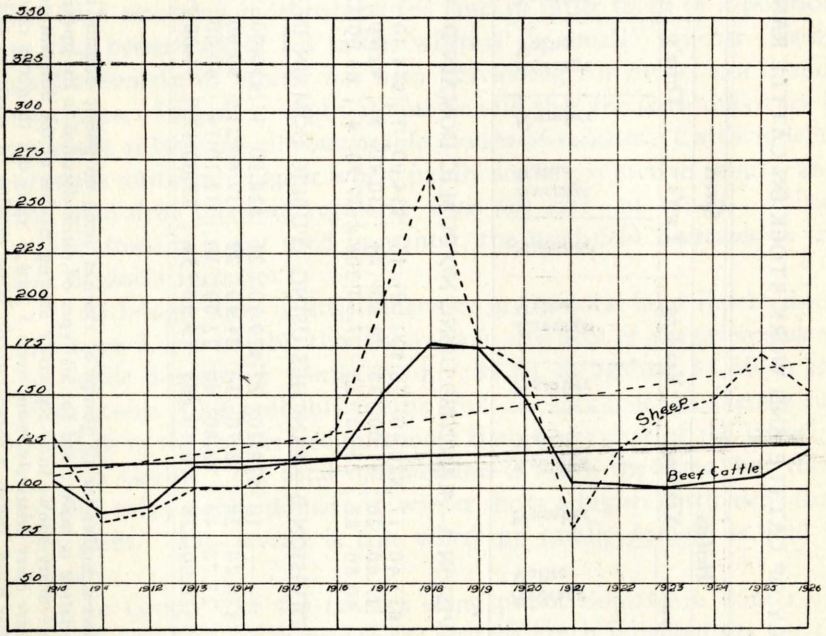

Fig. 4—Index numbers of prices per cwt. paid to producers of beef cattle and sheep in Utah, 1910 to 1926, incl. (1910 to 1914=100). Based on reports from U. S. Department of Agriculture. (Courtesy W. P. Thomas, Utah Experiment Station.)

noted for Groups 1 and 2, Division A, and for Groups 1 and 4, Division B. Decreases exceed increases in inventory in the other groups.

The average value of cows on the closing inventory of ranches in Division A was $5 to $7 per head higher than on ranches in Division B; the average value of 2-year-old heifers, $7 to $12 higher; 1-year-old heifers, $1 to $8 higher; 1-year-old steers, $4 to $12

higher; and the 2-year-old steers, $4 to $17 higher. These higher values probably are due more to condition than to breeding, owing to the better feeding practices noted among the ranches of Division A.

Purchases

Cattle purchased, as might be expected, vary with the size of the outfit, but there is no consistency as to either the kind or the number of purchases. No group seems to have confined its purchases to cows, heifers, or steers; and the various groups of ranches, whether or not they use public domain in winter, display no marked regularity as regards the number of different types acquired. When re-stocking, it would seem, Utah range cattlemen generally buy bunches of cattle, including steers of various ages as well as cows and heifers, instead of confining their purchases to steers, cows, or heifers of any given age.

Sales

Sales of cattle increase in proportion to the number of breeding cows, but the general tendency among all groups is to sell 2-year-old steers and cows, with relatively fewer sales of heifers. This is most apparent among the records of the smaller outfits. Culling, according to reports obtained, usually is based on old age, barrenness, off-type, inferior quality, poor conformation, or "shy" breeding, which discloses a tendency to retain for breeding purposes only the more promising young stock.

Table 7. Distribution of cattle losses with total number and value per ranch —Utah 1925.

Size of Ranch by Number of Breeding Cows	Number of Ranches	Cattle Losses				
		Cows (Number)	Calves (Number)	Other Cattle (Number)	Total (Number)	Value (Dollars)
Division A—Ranches Using no Public Domain in Winter						
34—100	19	2	1	3	6	$ 211.00
101—200	13	7	5	5	17	479.40
201—500	4	10	6	17	33	1237.60
Division B—Ranches Using Public Domain in Winter						
40—100	3	5	1	4	10	225.00
101—200	8	6	4	6	16	404.80
201—500	4	11	6	5	22	503.80
Over 500	4	94	34	22	150	3195.00

Livestock Consumed

Meat consumed on the ranches included in this study constitutes a small item on the inventory of each group. Generally speaking, consumption is higher on the ranches using public domain in winter —two beeves and two hogs, against one beef, a mutton and a hog— but the difference is slight and likely to be variable.

Death Losses

Death losses are in proportion to the size of outfit (Table 7), and the total number of head lost averages very nearly the same for all comparable groups. The largest outfits among the ranches using public domain in winter suffered heavier losses proportionately than any other group in either Division.

Cattle losses are classified under seven headings. Most ranchmen report one or two causes of loss, but 7 report three causes and 4 report five causes.

Twenty-two ranchers report loss due to poison plants; 20 ascribe losses to accidents, principally bogging; 14 report disease— usually blackleg; 12 indicate loss from calving; 11 from predatory animals; and 12 from other causes, as theft, straying, and bloat.

As might be expected, two of the three groups in Division A report less loss in proportion to the number of dollars invested in cattle than in the corresponding groups in Division B. Only one group (Group 3) in Division B shows less loss than the corresponding group in Division A. The reason for this exception is not clear, although Group 3 in Division B reports no loss from feed shortage and much less loss from calving, accidents and disease. Moreover, the ranchmen in Group 2, Division B, report taking steps to avoid heifers being bred before they are two years of age. Group 3 in Division A and Groups 3 and 4 in Division B, all of which show more profit than other groups for the year's business in 1925, report fewer losses from what might be termed, under present conditions, preventable causes.

In the first three groups in each division, the percentage loss based on ratio of value of cattle lost to value of cattle at opening inventory, decreases as the size of the outfit increases. The percentage loss in Group 4, Division B, is largest.

From all causes, the 55 records report losses of 1347 head of cattle averaging $25.95 per head, or totaling nearly $35,000. Many

of these losses are preventable, or at least might be materially reduced without incurring undue expense. This applies particularly to losses from blackleg and, to some extent, loss of young heifers from calving when in poor condition. Suggestions for reducing cattle loss from poison plants are contained in available bulletins published by the United States Department of Agriculture and may be secured upon request.

Aid in eradication of predatory animals may be obtained by making application to the U. S. Biological Survey, Salt Lake City, Utah.

LABOR REQUIREMENTS

The average total labor requirement on ranches not using public domain in winter is notably higher than on those using public domain (Table 8). The paid labor requirement alone is more than enough higher to offset the somewhat lower family labor requirement of ranches using public domain in winter. The operator requirement on the other hand is practically the same for all groups whether or not the use of public domain is taken into account.

Table 8. Labor requirements by number of months, the total value of all labor and the percentage of total labor represented by paid, family, and operator labor on cattle ranches—Utah 1925.

Size of Ranch by Number of Breeding Cows	Number of Ranches	Number of Months				Value per Ranch of all Labor Per Year	Percentage of Total Value			
		All	Paid	Family Unpaid	Operator		All	Paid	Family Unpaid	Operator
Division A—Ranches Using no Public Domain in Winter										
34—100	19	23	6	6	10	$1734	100	31	22	47
101—200	13	32	13	8	11	2706	100	45	22	33
201—500	4	66	48	6	12	5845	100	73	8	19
Division B—Ranches Using Public Domain in Winter										
40—100	3	14	——	7	7	$1075	100	——	51	49
101—200	8	29	5	12	12	2116	100	21	38	41
201—500	4	32	13	10	10	2792	100	39	32	29
Over 500	4	44	24	9	11	3796	100	67	13	20

The greater labor requirement of ranches not using public domain in winter results from the obvious fact that ranch operations involving maximum feed production and winter feeding cannot be effected with as little labor as those operations in which feed production and winter feeding are kept at a minimum.

In keeping with requirements, the cost of all labor on the ranches not using public domain in winter is considerably higher than on the other ranches. The greater costs in all instances, however, apply to paid labor and operator labor. Family labor is higher in all groups of ranches where public domain is used in winter.

In percentage of all labor, paid labor is consistently higher where no public domain is used in winter; family labor is higher where public domain is used in winter; and operator labor remains about the same for all comparable groups of ranches.

DISTRIBUTION OF RANCH EXPENSES

Total expenses for all groups of ranches using no public domain in winter are higher considerably than for those using public domain in winter (Table 9). The differences are accounted for chiefly by greater cash expenses and by greater depreciation on buildings and equipment.

Total cash expenses are divided between (a) purchases and (b) other cash expense. Under "purchases," Table 9, shows that the ranches in Groups 1 and 2 in Division A spent more for cattle than Groups 1 and 2 in Division B, whereas Group 3 in the second division spent much more for cattle than the third group in Division A. Group 3 in Division B also spent more for cattle than Group 4 of the same division. The amount spent for "other livestock" is nominal for all groups. The smaller size ranches using no public domain in winter purchased more feed but less salt than those using public domain in winter. The reverse is true as regards Group 3.

The expense of hired labor is seen to run notably higher for all groups in Division A than for comparable groups in Division B, owing to greater labor requirements (page 27). Land leases constitute a cash expense for the smaller ranches not using public domain in winter, which either is not encountered by, or else is much less for, the smaller outfits using public domain in winter. The larger average cash expense for leases in Group 3 of Division B, which used public domain in winter, is due to the greater need for land upon which to handle the larger number of cattle purchased. Forest Reserve cattle fees are in proportion to the number of cattle run by each group.

Taxes are about the same for all ranches in the first two groups of each division, but they are nearly three times as much for ranches of Group 3 of Division A as for Group 3 of Division B, due to the fact that the latter group has only about one-fifth as much owned land.

Table 9. DISTRIBUTION OF EXPENSES ON CATTLE RANCHES—UTAH 1925

Size of Ranch by Number of Breeding Cows	Number of Ranches	Purchases				Other Cash Expense						Total Cash	Decrease in Inventory			Depreciation on Buildings and Equipment	Unpaid Family Labor	Total Expenses	Ratio of Cash Expense to Total Expense
		Range Cattle	Other Livestock	Feed	Salt	Total Hired Labor	Land Leases	Forest Reserve Cattle Fees	Taxes	Repairs	Misc.		Range Cattle	Sheep	Other Livestock				
DIVISION A—RANCHES USING NO PUBLIC DOMAIN IN WINTER																			
34—100	19	$ 256	$ 32	$ 86	$ 9	$ 540	$142	$38	$ 292	232	$318	$ 1945	——	94	——	$300	$378	$ 2717	71.6
101—200	13	1437	3	152	21	1215	162	47	488	297	325	4147	——	——	8	438	596	5189	79.9
201—500	4	2943	46	885	84	4271	60	62	1612	540	496	10999	——	——	——	358	450	11807	93.2
DIVISION B—RANCHES USING PUBLIC DOMAIN IN WINTER																			
40—100	3	$ 158	$ 40	$ 35	$23	——	——	32	283	156	148	875	——	——	3	$175	$550	$ 1603	54.6
101—200	8	446	3	112	49	449	68	46	452	137	244	2006	322	35	3	412	810	3588	55.9
201—500	4	5655	96	1072	34	1097	210	130	571	263	241	9369	——	——	——	305	900	10574	88.6
Over 500	4	3015	12	152	213	2551	76	210	850	803	443	8325	——	——	——	534	510	9369	88.9

Greater cash expense and greater depreciation on buildings and equipment account for the higher total expense on ranches using no public domain in winter. The expense of hired labor runs notably higher in Division A than in Division B. Land leases constitute a cash expense for the smaller ranches not using public domain in winter, which either is not encountered by, or else is much less for, the smaller outfits using public domain in winter. Forest reserve cattle fees are in proportion to the number of cattle run on Forest ranges. Taxes vary in fair proportion to the amount and character of owned land and the kind of improvements. A greater cash expense for repairs is found on ranches using no public domain in winter.

Table 10. DISTRIBUTION OF RECEIPTS ON CATTLE RANCHES—UTAH 1925

Size of Ranch by Number of Breeding Cows	Number of Ranches	Sales								Increase in Inventory			Feed and Supplies	Total Receipts
		Range Cattle	Cattle Products	Sheep and Wool	Other Livestock	Wheat	Other Crops	Other Income	Total Sales	Range Cattle	Sheep	Other Livestock		
DIVISION A—RANCHES USING NO PUBLIC DOMAIN IN WINTER														
34—100	19	$ 1755	$ 85	$ 302	$ 79	$ 156	$ 181	$ 2	$ 2560	$ 586	$—	$ 21	$ 196	$ 3363
101—200	13	4702	226	84	58	312	405	——	5787	1462	51	——	38	7338
201—500	4	16668	505	218	156	5	——	76	17628	630	32	17	226	18533
DIVISION B—RANCHES USING PUBLIC DOMAIN IN WINTER														
40—100	3	1436	301	——	45	——	——	——	1782	195	——	$ 112	——	2089
101—200	8	3388	229	218	51	135	595	3	5219	——	——	——	163	5382
201—500	4	12712	——	21	25	50	189	——	12997	122	15	107	121	13362
Over 500	4	10652	——	——	18	——	——	——	10670	3627	——	6	5	14308

Total sales of cattle average higher for ranches using no public domain in winter than for those using it, due more to higher prices received than to greater number sold. It is notable also that the ranches using no public domain in winter, because of greater diversity in operation, show, as a rule, larger cash sales of sheep and wool, "other livestock", and crops, thus swelling the total cash receipts to considerably more than are recorded for the ranches using public domain in winter. Increases in inventory make total receipts favor, even more strikingly, the ranches using no public domain in winter.

The ranches using no public domain in winter show a greater cash expense for repairs, which would be expected in view of the greater investment in improvements and equipment.

The ratio of cash expense to total expense is 17 per cent higher for Group 1, Division B; 24 per cent higher for Group 2 of the first division, and 4.6 per cent higher for Group 3 of Division A. The ratio is almost identical for Groups 3 and 4 of Division B.

DISTRIBUTION OF RANCH RECEIPTS

Total ranch receipts average uniformly higher for ranches not using public domain in winter than for ranches using it, the difference being $1324 for Group 1, $1956 for Group 2, and $5171 for Group 3 (See Table 10). Group 4 averages only $946 more per ranch than Group 3 of the same division.

Cash Sales

The difference in total receipts favoring ranches not using public domain in winter are traceable chiefly to greater cash sales, especially cattle sales. While the number of cattle sold is lower in a few instances, the total cash received is uniformly high, owing to the higher prices usually received for most animals sold. In a number of instances, the ranches not using public domain in winter not only received higher prices, but they made larger sales, thus averaging considerably higher in cash sales than the corresponding groups of ranches which use public domain in winter.

Comparing Group 1 of the two divisions, it is found that ranches using public domain in winter sold an average of 6 more steers than ranches not using public domain in winter. In Groups 2 and 3, on the other hand, the sales are reversed, with 5 and 4 more head for the respective groups being sold from the ranches not using public domain in winter.

Singularly enough, Group 4, including the largest outfits using public domain in winter, sold only 7 more steers on the average than the ranches in Group 3 of the other division, which use no public domain in winter. Furthermore, it is notable that the bulk of the steers sold by Group 4 were yearlings, whereas the steer sales of Group 3, Division A, were mostly two-year-olds. Group 4, it is well to remember, represents relatively large-scale operation on land lying for the most part within public domain, whereas Group 3, Division A, operates with a considerable area of owned and leased land.

The steer sales not only average higher among the groups of ranches not using public domain in winter, but the average price is uniformly higher, probably attributable to the general practice among these groups of providing more feed for their yearling and 2-year-old steers.

The cow sales are higher on an average for all groups of ranches not using public domain in winter, but for the first two groups the price per head averages $6 less than for the comparable groups using public domain. The head-price is reversed in Group 3, where ranches not using public domain in winter average $6 higher than ranches using public domain. The average sale price per cow in Group 4 of Division B is lower by $6 than Group 3 of the same division, and $25 lower than in Group 2 of the same division, which shows the best group average price per head. The cows sold from the ranches in Group 4 probably were in poorer flesh than those in the other groups, as they were taken from public domain whose carrying capacity was known to be low throughout the year.

Miscellaneous livestock sales, although of less relative importance, also averaged higher for ranches not using public domain in winter. The records of other sales, including grain, hay and miscellaneous, disclose so much variation that the averages are of doubtful value except as indicators of the nature of sales made.

Total non-cash receipts, derived from increases in inventory, also range higher for the ranches not using public domain in winter. Cattle increases are significantly higher; horses lower in the first two groups and higher in the third; and sheep increases notably higher in all groups. These average increases in inventory, however, can be considered only as having a suggestive value, since the records show wide variations among ranches within the same groups.

FINANCIAL SUMMARY

Table 11 presents a financial summary for ranches in each of the three groups which use no public domain in winter, and Table 12 presents a directly comparable summary for all ranches which use public domain in winter. The figures appearing in the first part of each table constitute a summary of data already presented in preceding tables. The figures referring to "net cash income", and those below this item, will be discussed further.

Net Cash Income

The average ranch in each group of each division shows a net cash income varying from $345 for Group 4, Division B, to $5904

Table 11. Financial Summary for Utah Cattle Ranches
Year Ending December 31, 1925.
Ranches using no public domain in winter

ITEMS	Number of Breeding Cows		
	34—100	101—200	201—500
Number of Ranches	19	13	4
a. Total Investment	$22,079	$43,400	$96,893
Total Indebtedness	3,399	860	11,142
b Net Worth	18,680	42,540	85,751
RECEIPTS:			
Sales: Range Cattle	1,755	4,702	16,668
Sheep, Wool, and Pelts	302	84	218
Other Stock	79	58	156
Stock Products	85	226	505
Crops and Miscellaneous	339	717	81
Total Cash Receipts	2,560	5,787	17,628
Increase in Inventory:			
Range Cattle	586	1,462	630
Sheep	——	51	32
Other Stock	21	——	17
Feed and Supplies	196	38	226
Total Receipts	3,363	7,338	18,533
EXPENSES:			
Purchases: Cattle	256	1,437	2,943
Sheep	——	——	——
Other Livestock	32	3	46
Feed and Salt	95	173	969
Total hired labor	540	1,215	4,271
Leases	142	162	60
Forest Fees, Cattle	38	47	62
Forest Fees, Sheep	——	——	——
Taxes	292	488	1,612
Repairs	232	297	540
Miscellaneous	318	325	496
Total Cash Expenses	1,945	4,147	10,999
Decrease in Inventory:			
Range Cattle	——	——	——
Sheep	94	——	——
Other Stock	——	8	——
Feed and Supplies	——	——	——
Deprec. on Bldgs. and Equipment	300	438	358
Unpaid Family Labor	378	596	450
Total Expenses	2,717	5,189	11,807
CASH RECEIPTS LESS CASH EXPENSES	615	1,640	6,629
c. Interest paid on borrowed capital	207	64	725
NET CASH INCOME	408	1,576	5,904
d. TOTAL RECEIPTS LESS TOTAL EXP.	646	2,149	6,726
e. Value of Operator's Labor	816	898	1,124
f. RETURN ON TOTAL INVEST. (d-e)	—170	1,251	5,602
% RETURN ON TOTAL INVEST.	— .8	2.9	5.8
g. RET. ON OPERATOR'S EQUITY (f-c)	—377	1,187	4,877
% RET. ON OPERATOR'S EQUITY	—2.0	2.8	5.7
h. Returns due to increase in market value of cattle during the year	605	1,309	2,986
i. RETURN ON TOTAL INVESTMENT DISREGARDING INCREASE IN MARKET VALUE DURING YEAR (f-h)	—775	58	2,616
% RETURN ON TOTAL INVESTMENT DISREGARDING INCREASE IN MARKET VALUE DURING YEAR	— 3.5	— .1	2.7

Table 12. Financial Summary for Utah Cattle Ranches
Year Ending December 31, 1925.
Ranches using public domain in winter

ITEMS	Number of Breeding Cows			
	40-100	101-200	201-500	501-1000
Number Ranches	3	8	4	4
a. Total Investment	$13,797	$30,240	$28,382	$49,281
Total Indebtedness	2,000	3,125	14,366	30,625
b. Net Worth	11,797	27,115	14,016	18,656
RECEIPTS:				
Sales: Range Cattle	1,436	3,988	12,712	10,652
Sheep, Wool and Pelts	———	218	21	———
Other Stock	45	51	25	18
Stock Products	301	229	———	———
Crops and Miscellaneous	———	733	239	———
Total Cash Receipts	1,782	5,219	12,997	10,670
Increase in Inventory:				
Range Cattle	195	———	122	3,627
Sheep	———	———	15	———
Other Stock	112	———	107	6
Feed and Supplies	———	163	121	5
Total Receipts	2,089	5,382	13,362	14,308
EXPENSES:				
Purchases: Cattle	158	446	5,655	3,015
Sheep	———	———	———	———
Other Livestock	40	3	96	12
Feed and Salt	58	161	1,106	365
Total Hired Labor	———	449	1,097	2,551
Leases	———	68	210	76
Forest Fees, Cattle	32	46	130	210
Forest Fees, Sheep	———	———	———	———
Taxes	283	452	571	850
Repairs	156	137	263	803
Miscellaneous	148	244	241	443
Total Cash Expenses	875	2,006	9,369	8,325
Decrease in Inventory:				
Range Cattle	———	322	———	———
Sheep	———	35	———	———
Other Stock	3	3	———	———
Feed and Supplies	———	———	———	———
Deprec. on Bldgs. and Equip.	175	412	305	534
Unpaid Family Labor	550	810	900	510
Total Expenses	1,603	3,588	10,574	9,369
CASH RECPTS. LESS CASH EXP'S	907	3,213	3,628	2,345
c. Int. paid on borrowed capital	120	240	886	2,000
NET CASH INCOME	787	2,973	2,742	345
d. TOTAL RECEIPTS LESS TOTAL EXP'S.	486	1,794	2,788	4,939
e. Value of Operator's Labor	525	857	800	734
f. RET. ON TOTAL INVEST. (d-c)	—39	937	1,988	4,205
% RET. ON TOTAL INVST.	—0.3	3.1	7.0	8.5
g. RET. ON OPERATOR'S EQUITY (f-c)	—159	697	1,102	2,205
% RETURN ON OPERATOR'S EQUITY	—1.3	2.6	7.9	11.8
h. Returns due to increase in market value of cattle during the year	304	354	166	7,489
i. RETURN ON TOTAL INVESTMENT DISREGARDING INCREASE IN MARKET VALUE DURING YEAR (f-h)	—343	583	1,822	—3,284
% RETURN ON TOTAL INVESTMENT DISREGARDING INCREASE IN MARKET VALUE DURING YEAR	2.5	1.9	6.4	—6.7

for Group 3, Division A. The next to the lowest cash income, $408, is shown for Group 1, Division A; whereas the third lowest, $787, is for Group 1, Division B. The cash income for Group 2, Division A, is $1576; for Group 2, Division B, it is $2973; and for Group 3, Division B, it is $2742. In other words, the largest outfits using public domain in winter show a lower net cash income than the smallest outfits using no public domain in winter. The highest average net cash income is shown by ranches running 201 to 500 breeding cows and using no public domain in winter.

Return on Total Investment

It is to be noted that the small ranches in Group 1 of each division lost money on their total investment, while the larger ranches in the other groups made money, from 2.9 per cent for Group 2, Division A, to 8.5 for Group 4, Division B. The percentage return on total investment, therefore, further substantiates the apparent fact that the smaller outfits are carrying too high an overhead. The large outfits using public domain and carrying a comparatively low overhead show the highest return on total investment.

Return on Operator's Equity

The smaller ranches in Group 1 of each division show a still greater loss when the return on the operator's equity is considered. The ranches in Groups 2 and 3 show relatively little change as regards percentage return, but the large outfits in Group 4 of Division B, with low investment and with public domain available for winter use, show a return of 11.8 per cent on operator's equity.

The position of these large ranches is not so favorable if the returns due to increase in the market value of cattle during the year are disregarded. Indeed, the increase in market value saved these ranches from an average loss of 6.7 per cent on total investment.

Disregarding returns due to increase in market value during the year, the ranches showing the highest percentage returns on total investment are those running 201 to 500 cattle and using public domain in winter.

HOW PROFITS ARE AFFECTED BY SOME OF THE MORE IMPORTANT PROFIT-PRODUCING FACTORS.

In order to determine somewhat accurately the relationship between certain of the more important profit-producing factors and the percentages of profit, coefficients of correlation were calculated. For the cattle records, correlation studies were made of the percentages of

profits: (1) with the number of breeding cows, (2) with the percentage of the total investment that is in cattle, (3) with the size of investment, (4) with the value of owned land, (5) with total months of labor, (6) with the diversity of income, and (7) with the percentages of calf crop.

Only two factors showed direct correlations with profit on cattle ranches, and these were with the number of breeding cows and with the total number of all cattle[9], yearlings and over, including steers and bulls. It is fairly definite that profits tended to increase rather decidedly as the number of cows and as the number of all cattle increased. The suggestion is clearcut that the ranches with the larger herds are making better profits, many of the men having too few cattle to be able to hope to make good profits, even as cattle profits have gone the last few years.

There is a rather high direct correlation[10], and a very high indirect correlation, between profits and the percentage of the total investment that is in cattle. There seems to be too much overhead investment in the small outfits. That is, capital may be either productive or non-productive, and on cattle ranches cattle is the principal form of productive investment. That ranch tends strongly to be profitable which has 25 per cent or more of its total investment in cattle, and 35 to 45 per cent is still more profitable. When less than 25 per cent of the investment is in cattle it is extremely difficult to earn profits. Small ranches rarely get more than 25 per cent of the investment in cattle. Therefore, very small ranches usually fail to make profits.

Size of investment shows a low direct correlation with percentage profits. A somewhat more complicated study in the form of the correlation ratio[11] showed a high relationship. It is, therefore, likely that some ranches used their investments so wisely as to derive profit from the investment, whereas others actually lost because of fairly large amounts of capital. Apparently some operators are much more skillful managers of capital than are others.

The value of owned land showed about the same relations to percentage profits[12] as did the size of investment, that is, capital in land was used profitably by some but not by others. At least, high land investments did not tend uniformly to yield large profits. It

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[9] $r = +.269 \pm .086$ and $+.373 \pm .078$ for the number of breeding cows and for the number of all cattle, respectively.
[10] $r = +.423 \pm .075$; eta $= .687 \pm .048$
[11] $r = +.095 \pm .091$; eta $= .511 \pm .067$
[12] $r = -.015 \pm .092$; eta $= .467 \pm .070$

seems that certain recently purchased land has been obtained at prices too high to pay profits on grazing.

The total months of labor, including that of the operator, gave a lower direct correlation, but a fairly high indirect correlation[13]. The suggestion is rather pointed that some ranches are using labor much more effectively than are others and that there are enough poor in this respect to hide any general tendency of the percentage of profits to move either up or down with the amount of labor used. The correlations indicate that there can be little doubt that some ranches are wasting labor rather extravagantly.

It is also very noticeable that there is a most decided relation between diversity of income[14] and profits. There is a fairly strong tendency for those ranchmen who make good incomes to have other sources of income than cattle sales. This is not regular, however, possibly on account of certain areas not being able to diversify even if they chose. It is worth notice that every one of 16 ranches not located in southern or eastern Utah and which earned a net income of $1000 or more had, in addition to cattle sales, one to several sources of income each of $500 or more. Chief among these sources are dry-land wheat, sugar-beets, dairy products, and livestock other than cattle. The suggestion to diversify where geographically possible is so definite and strong as to deserve serious attention on the part of cattle owners. However, since some of the least profitable ranches had other enterprises than cattle, it is necessary to point out that indiscriminate branching out without regard to how the added enterprises fit in, may become principally a method of spending.

One of the surprises revealed by these studies is the general lack of correlation[15], either direct or indirect, between the percentage calf crop and percentage profit. This is due in part to the fact that there was systematically a lower calf crop on the ranches grazing on the public domain in winter. When this tendency is corrected by calculating the relative calf crop for each group the correlation with profits is still very low[16]. When the normal calf crop as reported by the operator for a period of years is used there seems to be some direct correlation[17]. The data available in the survey are not as yet sufficient to explain this seeming discrepancy. A continued record for several years is really necessary in order to separate these complexly

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[13] $r = -.007 \pm .096$; eta $= .440 \pm .073$
[14] $r = +.244 \pm .107$
[15] $r = +.099 \pm .090$; eta $= .300 \pm .083$
[16] $r = +.173 \pm .088$
[17] $r = +.480 \pm .086$

related factors and to find which is definitely affecting profits to an extent great enough to govern practice.

MANAGEMENT OF THE HERD

Thirty-eight of the 55 cattle ranches studied report use of the Forest Reserve, for summer grazing in most cases. Of the 21 ranches reported as having lost money in 1925, 14 report using the Forest Reserve; and of these 14, 6 also report using public domain for cattle. Most of these 21 ranches are running less than 100 breeding cows.

The Forest Service formerly had a policy of making room for new permittees by repeated reduction in the number of cattle a ranchman might run on the forest. The policy was carried out to the point where a change in management, particularly in the case of those with small numbers of cattle (less than 100 breeding cows), was imperative. These ranchmen formerly used the National Forest allotment for all classes of cattle, but repeated reductions made it necessary to run only the breeding herd there, and, either through lease or purchase, to provide land for steers to graze. Many of these small operators, having been so located that it was impossible to secure additional grazing land for that part of their stock no longer allowed on the forest, are now obliged to run their steers on home pastures in the summer. This practice, however, is limited by the acreage which must be used for winter feed production.

To offset this difficulty, various plans for the consolidation and cooperative grazing of small herds are being tried in the hope that some suitable and practicable plan may be discovered.

Ranchmen who have access to public domain for winter range and who supplement it with sufficient winter feed, so as to keep all stock in good thrifty condition, are in a somewhat stronger position than those with no range other than the limited amount available in summer on the forests.

However, records from ranchmen who operate outfits with more than 100 breeding cows on owned or leased land exclusively, where operations can be controlled, generally show higher calf crops and usually greater percentage of profit than records from ranches dependent to any great extent upon uncontrolled public domain.

The day of producing cattle on the public domain exclusively is practically at an end in Utah because of the increase in number of ranchmen, the reduction in carrying capacity of the range, and the increased competition offered by range sheep.

Labor

The amount of labor per breeding cow varies from 0.4 of a month in Group 1 of Division A to 0.06 in Group 4 of Division B. Furthermore, the decrease in labor per breeding cow continues in each division as the size of herds forming the groups increases. Group 1 in Division B indicates less labor per breeding cow than Group 3 in Division A. It is also worthy of note that as the size of the groups increases in both divisions, there is a corresponding increase in the amount of cash labor compared with the total amount of cash expense, which further emphasizes the need of economy in the use of labor (See page 27).

Breeds of Range Cattle

Fifty-four of the 55 cattle ranch records show something concerning the breeding of the stock used on ranches. Thirty-two show cattle which are mostly of Hereford breeding, 5 mostly Shorthorn and 17, because of use of both Hereford and Shorthorn bulls, show herds classed as mixed. One ranch reports a mixture of Galloway, Hereford, and Shorthorn breeding.

Various reasons are given by ranchmen for crossbreeding, but the principal one is to obtain more scale—increase in size and heavier bone—in their steers. Invariably where the practice of crossbreeding to obtain more scale is reported, the cross is made by using purebred Shorthorn bulls on grade Hereford cows.

The method of obtaining increased size in offspring results in a lack of uniformity in the herd, especially in small herds where the breeder, because of small numbers, has difficulty in making effective selection of heifers for replacement cows. The lack of uniformity attendant on crossbreeding, as reported, probably accounts for relatively low prices obtained for steers by the ranches following this practice.

The use of registered bulls with plenty of scale and good bone, and the more careful selection of heifers for replacement, combined with adequate feeding of young stock so as to avoid stunting during the growing period, will give more satisfactory results than the kind of crossbreeding reported.

Practice of Handling Steers

As indicated on page 31, many ranches in Utah carry their steers till they are long two's. Unfortunately, the records indicate that few ranchmen attempt to run their steers separate from the cow herd. Only

three ranchmen report that they keep steers separate from the breeding herd in the summer time, yet it is notable that the ranchman, who had the highest calf crop reported in this study and whose crop is normally very high, states he has found it to be good practice to keep steers separate from the breeding herd in both summer and winter.

In some areas running steers separate from the breeding herd all year would be impractical at present. Nevertheless, it appears that a lower calf crop may be expected where considerable numbers of steers are run on the same range with the breeding herd.

Number of Cows Per Bull

A wide variation is apparent in proportion of bulls to cows on the ranches studied. In Division A and also in Division B, Group 1 has 24 cows per bull; in Division A, Group 2 has 33, whereas Group 2 in Division B has 31; in Division A, Group 3 has 30 and Division B, Group 3 has 37 cows to 1 bull; Group 4, in Division B, however has only 10 cows per bull. Topography of the range and climatic conditions may account for a part of this difference, and variation in practices with regard to time of breeding may be offered as additional explanation. Rough, broken, or heavily timbered range as a rule requires a higher proportion of bulls to cows than level or rolling, open, well-watered range that is properly fenced. Again, the ranchman who has a considerable number of his cows bred in fall, winter, or spring at ranch headquarters or operates entirely on fenced range, obtains a higher calf crop with a smaller proportion of bulls to cows. It should be noted, however, that this proportion is figured on the number of breeding cows and bulls on hand in 1925, and some of the ranches studied were still a little short of the normal number of serviceable bulls.

Number of Months Bulls are Kept in Breeding Herd

Eighteen out of all records showing calf crops of 60 per cent or more report the number of months bulls are kept in the herd. Five of these reporting bulls kept in the herd less than 9 months report over 74 per cent calf crop, whereas most of those permitting bulls to run with the cows all year report calf crops around the lower limit. Ranchmen reporting cows bred at all seasons of the year show larger calf crops obtained where bulls are well fed during the winter and early spring and either kept from the cows for a few weeks or given access to fenced pasture when not on summer range.

Age at Which Bulls are Purchased and Placed in Herd

It appears that most Utah ranchmen buy bulls as two's or short two's for use on the range. A limited number, however, are purchasing yearlings and in this manner obtain a better selection as well as giving the bull a chance to become accustomed to the range before he is ready for service. Moreover, yearlings are usually obtained at a lower cost than bulls which are older. Twenty-two of the 55 ranchmen whose ranch businesses were studied report a practice of exchanging bulls with neighbors whenever feasible. This is not always practicable, because of the proximity of the two ranges and lack of natural boundaries. The practice of exchanging is worthwhile when suitable type registered bulls have given good service for two or three years and are still young enough to be effective.

Age Bulls and Cows are Culled

Of the 18 ranchmen reporting a calf crop of 60 per cent or more, 15 cull bulls before they are 7 years old and of these 13 cull them before they are 6 years old. Of these 18, 14 report the age at which cows are culled. Seven cull before cows are 9 years old, and 6 others cull before their cows are 11 years of age.

Range bulls lose their greatest usefulness at from 6 to 8 years of age, depending upon the topography of the range, the amount of service they give, and the amount of care they receive when not running with the cows.

On most ranges in order to avoid inbreeding the bulls are normally used only from two to three years. But some ranchmen whose ranges are badly broken or forested rather heavily avoid a low calf crop by keeping a bull at ranch headquarters from fall until spring in order to breed cows which were not bred during the summer This is a means of securing a larger calf crop, and winter breeding has its advantages in connection with summer grazing on the forest. However, it has two disadvantages: (a) It makes it difficult to shape up a uniform bunch of cattle for sale, especially in the case of the man with less than 100 breeding cows, and (b) it necessitates extra labor in feeding and caring for the fall and winter calves.

Conditioning Bulls

According to ranchmen's reports in this study the conditioning of bulls is not a common practice. Only 10 report having fed so as to condition their bulls, although proper feeding is a widely recognized means of increasing the calf crop. Most of these 10 ranchmen re-

port high normal calf crops, and those whose crop last year was over 54 per cent report a practice of providing feed at the rate of over ½ ton of hay per head of cattle owned, even when public domain is used during the winter. When public domain is not used during the winter most of these ranchmen use about a ton per head of cattle owned. It also appears significant that where bulls are reported conditioned and the number of cows per bull limited to not over 26, the calf crop is reported at about 65 per cent.

Dehorning

Thirty-seven ranchmen report having adopted the practice of dehorning all classes of cattle. Seven dehorn only steers and heifers. Eleven ranchmen's records contain no information regarding dehorning practice.

Castration

The data do not indicate any set practice regarding time of year or age at which range calves are castrated. Several ranchmen report castrating only at branding time—spring and fall, or both. The practice of breeding cows at all seasons of the year and of running breeding cattle on the public domain has made branding calves advisable whenever they were found. Both operations have usually been performed when the calf was found. Best results are reported when calves are castrated if possible before they are 4 months old.

Shelter

During the winter, a great many range herds in this state have access to some form of natural shelter, such as that afforded by timber or broken country. Twenty-three of 55 ranchmen state they have provided artificial shelter, such as barns, sheds, or windbreaks. This shelter is used principally for young stock or for cows which have been brought in from the range in poor condition.

Water

Only 6 ranchmen report their ranges to be poorly watered, whereas 21 say their supplies are adequate. The ranchmen who were interviewed gave very little information regarding development of stock watering places. Similar range cattle production studies in Texas, on the other hand, indicate that range yields best returns when watering places are not over 1½ miles apart. On this basis, a very large part of Utah range is not really well watered at present.

Table 13. TOTAL AMOUNT OF FEED FED ON RANCH AND QUANTITY PER HEAD OF CATTLE[1]—UTAH 1925

Size of Ranch by Number of Breeding Cows	Number of Ranches	Total Number of Cattle [3]	Hay (tons)			All Roughage		All Grain [2]		Misc. Concentrates	
			Alfalfa	Non-Legume	Misc. Roughage	Total Tons	Tons per Head	Total Pounds	Pounds per Head	Total Pounds	Pounds per Head
DIVISION A—RANCHES USING NO PUBLIC DOMAIN IN WINTER											
34—100	19	122	130	30	9.4	169.4	1.38	8731	71.5	368	3.0
101—200	13	244	216	73	32.9	321.9	1.32	23640	96.9	———	———
201—500	4	750	153	628	———	781.0	1.04	28224	37.6	———	———
DIVISION B—RANCHES USING PUBLIC DOMAIN IN WINTER											
40—100	3	125	95	18	———	113.0	.90	15504	124.0	———	———
101—200	8	253	178	15	15.0	208.0	.82	16696[4]	66.0	1330	5.2
201—500	4	367	232	11	———	243.0	.66	6832	18.6	———	———
Over 500	4	1165	68	12	———	80.0	.06	11208	9.6	———	———

[1]Total amount of feed used for all classes of livestock divided by number of cattle on hand at beginning of year.

[2]Not including wheat

[3]Number of cattle in opening inventory

[4]Includes 139 bushels rye

With a wider distribution of stock watering places more effective use of the range could be made, since grazing would not then need to be restricted to time of limited snowfall or other short periods of temporary water supply.

Winter Feeding

A wide difference in feeding practice exists among range cattle producers in Utah. This varies from feeding all classes without winter range to complete dependence on grazing land for wintering stock.

Much of this variation is traceable to differences in winter climate as well as to accessibility of winter range. In southern Utah where winters are relatively mild, as in Washington and Kane Counties, practically no winter feeding is practiced. But in parts of northern Utah, heavy snowfall and relatively severe winters may oblige ranchmen to feed from November to April. The average feeding period for all ranches considered in this report is about 3 months.

Practically all ranchmen plan to feed cattle unable to keep in fair condition in winter and early spring while on pasture or open range. As shown previously (page 16), the successful ranchmen feed hay on the basis of at least one ton per head of all cattle wintered. Some fenced grazing land is also used. Those who use the public domain in winter, and report profits for 1925, feed hay on the basis of ½ ton or more per head of all cattle wintered. These amounts of hay appear rather small, but it must be borne in mind that on most of the ranches only a part of the herd is fed, so those animals which receive hay are given more than ½ ton or 1 ton per head. The number of animals fed is not constant during the winter, and frequently only those found in poor condition are fed for a few weeks or until they recover. These then are turned out to graze and their places taken by others. It is impossible to state how much feed goes to each animal. Where grain crops are produced stock cattle usually have access to the straw, but very few estimates of the amount eaten could be obtained.

Of course, the ideal system is to maintain good flesh on all animals all the time, but this is admittedly impractical under all conditions at present. The practice of providing an adequate supply of hay for weanling calves and for yearlings which are fed apart from bulls and other cattle is commended by several ranchmen who have found it profitable. When both alfalfa and wild hay are available for

feeding it seems best to feed alfalfa to the weanlings and the yearlings and the native or the grain hay to the older cattle[18].

Marketing Steers

The heaviest movement of beef cattle from Utah ranges takes place in the fall, although in the southern part of the state a considerable number are shipped in the spring and in a small area there is a limited summer sale from irrigated pastures. The season cattle are usually marketed is indicated on 30 of the records under study. Of these, 14 market in the fall exclusively, 6 in the fall and winter, and 5 in the spring and again in the fall. One ships in the summer, another in the winter, and one in the summer and fall. Most of these sales are made either on the ranch or at the loading point. A few ranchmen sign sale contracts in fall or spring for delivery in spring or fall, respectively, but this can no longer be termed a general practice.

The records indicate that the selling of 2-year-old steers is the prevailing practice in this state. Eighteen ranchmen report that they sell two's exclusively, 7 sell yearlings and two's, 5 sell yearlings, two's and three's, 8 sell two's and three's only, 2 sell two's, three's and four's, and 2 sell one's, two's, three's and four's. The number of three's and especially four's is quite small proportionately, and in many cases these are animals which escaped at gathering time the year previous.

The range in sale price of two's, from $30 to $63, indicates more than a difference in selling ability. For years buyers of Utah cattle have recognized the difference in quality and scale between cattle raised on ranges in the extreme southern part of the state and sold at 2 years of age or older and those from other sections of Utah where the carrying capacity of range is higher. However, efforts at herd improvement and in the adoption of better management methods have been made by those able to remain in business since the drouth and the depression of 1920-21.

Examination of the data secured indicates that in some sections it may be possible to secure better returns by marketing steers as yearlings and in others by marketing them as long two's. Those who produce feed near the loading point or market and have a surplus are in a position to fatten at least some of their steers or "warm them up" and thus secure a higher return. This study indicates that such a

[18]Wyoming reports an experiment in which weanling calves made about a pound of gain per day when fed at the rate of 16 pounds of alfalfa hay per head per day. It requires 2500 pounds of native hay to produce 100 pounds' increase in weight in these young cattle as compared with 1500 pounds of alfalfa. (Wyo. Agr. Exp. Sta. Bul. No. 134 (1923).

practice might prove profitable. Nine ranchmen, for example, fattened their 2-year-old steers and obtained from $63 to $103 per head.

Distance to Shipping Point

A wide variation from less than 1 mile to 125 miles is apparent in the distance from summer range, or from headquarters, to the shipping point. Twenty-three of 55 ranchmen report the distance to shipping point or else to market as 30 or more miles and, of these, 10 report 75 miles or more.

Calf Crop

"Calf crop", in the main, means the ranchman's count at branding time. Obviously, it is impossible to obtain an accurate count of calves dropped throughout the year when cows are ranging over the public domain. The calf crop reported in 55 records studied varies from approximately 19 to 84 per cent.

It has been noted that ranchmen frequently use only the cows over 3 years old in figuring calf crop percentages, whereas an appreciable number of these 2-year-old heifers drop calves. In this study, the calf crop percentage is based on the number of cows and all 2-year-old heifers when the ranchman reports that his yearling heifers ran with the cows and bulls.

Where cattle ran on the public domain in winter reports usually show a lower calf crop than where cattle were kept under fence during the winter, and the average calf crop for all ranches in Division B is 9 per cent lower than the average for Division A. Furthermore, the calf crop on the ranches which made a profit in 1925 is reported to have been about 9 per cent greater than on ranches failing to show a return on investment.

The 1925 calf crop on 6 of the ranches which lost money is shown to be about 25 per cent lower than the figure reported as normal. The percentage calf crop ranges from approximately 19 to 82 per cent on the 21 ranches which lost money, and only 7 of these show over a 50 per cent crop. On the other hand, in the 34 ranches which show a profit, the crop ranges from 34 to 84 per cent, with 15 of these ranches reporting over a 50 per cent calf crop.

Cattle run entirely on the public domain show a calf crop markedly below 50 per cent, in several instances not above 33⅓ per cent.

The calf crop is influenced perhaps more by short range feed conditions than by any other factor excepting the number of active bulls used on the range. The ranches which operated with controlled grazing area in 1925 show more favorable results than those making rather extensive winter use of the public domain.

Table 14. COST OF CARRYING A COW, JANUARY 1—DECEMBER 31, 1925

Items	Units	Ranches using no public domain in winter — Size of ranch by number of breeding cows				Ranches using public domain in winter — Size of ranch by number of breeding cows					Average of all Ranches
		34-100	101-200	201-500	Average of group	40-100	101-200	201-500	Over 500	Average of group	
Number of ranches	No.	19	13	4	36	3	8	4	4	19	55
Total cattle in herd	No.	121	243	746	235	123	252	368	1,166	448	309
Cows in breeding herd	No.	66	134	333	120	64	144	266	769	289	179
Calves raised	No.	35	64	184	62	37	63	100	255	107	77
Calf crops	%	52.6	47.4	55.2	51.3	57.3	43.7	37.6	33.2	37.1	43.0
Hired labor	Dols.	4.63	5.15	5.93	5.29	—	1.84	3.07	2.40	2.28	3.80
Purchased feed	Dols.	.81	.73	1.35	.97	.49	.66	3.09	.35	.92	.95
Taxes	Dols.	2.51	2.07	2.24	2.25	2.38	1.85	1.59	.80	1.27	1.77
Leases	Dols.	1.22	.68	.08	.62	—	.28	.59	.07	.21	.41
Miscellaneous	Dols.	5.05	2.85	1.53	2.98	.84	.75	1.77	1.37	1.60	2.30
Current cash expenses	Dols.	14.22	11.48	11.13	12.11	5.71	6.38	10.11	4.99	6.28	9.23
Interest paid	Dols.	1.77	.27	1.01	.94	1.01	.98	2.47	1.88	1.73	1.33
Total paid out	Dols.	15.99	11.75	12.14	13.05	6.72	7.36	12.58	6.87	8.01	10.56
Amt. crop sale per cow	Dols.	2.90	3.05	.01	1.94	—	2.99	.67	—	.85	1.40
Net cash cost per cow	Dols.	13.09	8.70	12.13	11.11	6.72	4.37	11.91	6.87	7.16	9.16
Depreciation on buildings and equipment	Dols.	2.58	1.85	.50	1.57	1.83	1.79	1.38	3.02	2.38	2.16
Death loss	Dols.	2.06	2.09	1.69	1.94	1.47	1.68	.86	.51	.90	1.24
Unpaid labor	Dols.	10.23	6.33	2.19	5.93	9.02	6.83	4.75	1.17	3.55	4.76
Interest on owner's equity at 6½ per cent	Dols.	10.40	11.72	7.75	9.97	6.43	7.22	2.54	1.14	3.12	6.57
Total net cost	Dols.	38.36	30.69	24.26	30.52	25.47	21.89	21.44	12.71	17.11	23.90

NOTE: This cost statement was computed on a per head basis, assuming that the cows should bear a share of the expenses of the ranch, determined by the ratio of number of cows to the total number of cattle on the ranch. The relatively small amount of income from crops was considered as a deduction from the cost. It should be remembered that there are some items of cost that are slightly greater for breeding cows than for other classes of cattle, for example:—supplemental feed, death loss and extra labor for range riding in connection with branding and castration. Therefore, the cost of carrying a cow in 1925, if determined from complete accounts, would be slightly greater than shown in this table. Depreciation on the breeding herd was not included but would probably average from $1 to $3 per head. This cost statement should be considered only as an approximate statement of the facts, due to the lack of more complete data on the details of the business.

Weaning

On many ranches and ranges in Utah calves are dropped at all times of the year, and weaning is accomplished by separating the calves from the cows in the fall, almost regardless of age. This results in much variation as to the age of calves when weaned, as shown by the survey records. Some calves are weaned when only 4 months old and others not until they are 11 months. A large number of the records, however, indicate that ranchmen aim to wean calves at from 6 to 8 months of age.

Forty-one of the ranchmen keep weaned calves separate from the breeding herd in winter, and 9 report that they allow the weaned calves to run with the other cattle at this time of the year. In all but Group 2, Division A, the percentage calf crop is lower on ranches where the weaned calves are not kept separate from the herd during the winter than on those where the calves are kept separate.

Cost of Carrying a Cow

Cost data secured from this survey are summarized in Table 14 which shows the cost of carrying a cow in 1925. The total net cost is shown to have averaged $23.90 for all ranches. On ranches using no public domain in winter the total cost averaged $30.52 against $17.11 for ranches using public domain in winter.

In each division of ranches, the cost of carrying a cow decreased with the increase in number of breeding cows per ranch.

EXAMPLES OF HOW RANCH BUSINESS MAY BE STUDIED

Successful operation of a ranch, as well as any other business enterprise in these days, is seldom accomplished without taking inventory from time to time, usually once each year, and carefully analyzing these inventories. In order to show how a ranch business is studied, the financial statements of two of the Utah ranches are given below and each is reviewed as carefully as is possible with the facts at hand. These comments are offered to show how a ranchman may study his own business.

The first financial statement (Table 15) applies to ranch "100", which is believed to represent a rather large number of Utah beef cattle producers with less than 100 breeding cows, hence are operating on a comparatively small scale.

Table 15. Financial Statement Utah Cattle Ranch Number 100

January 1 to December 31, 1925

Total Investment		$18,588
Distribution	per cent	
Land	34	
Improvements	24	
Range Cattle	11	
Work Stock	3	
Other Livestock	4	
Machinery and Equipment	24	
Feed and Supplies	0	
Total Indebtedness		5,045
Net Worth		13,543
Receipts:—		
Sales:—Range Cattle		1,440
Stock Products		788
Crops and Miscellaneous		453
Total Cash Receipts		2,681
Increase in Inventory		
Range Cattle		578
TOTAL RECEIPTS		3,259
Expenses:—		
Purchases:		
Cattle		510
Other Stock		7
Feed and Salt		94
Total Hired Labor		350
Forest Fees		90
Taxes		175
Repairs		620
Miscellaneous		218
Total Cash Expenses		2,064
Decrease in Inventory		
Other Livestock		75
Depreciation on Buildings, Machinery and Equipment		662
Unpaid Family Labor		450
TOTAL EXPENSES		3,251
Cash Receipts less Cash Expenses		617
Interest paid on Borrowed Capital		325
Net Cash Income		292
TOTAL RECEIPTS LESS TOTAL EXPENSES		8
Value of Operator's Labor		900
Return on Total Investment		-892
Percentage Return on Total Investment		-4.8
Return on Operator's Equity		-1217.0
Percentage Return on Operator's Equity		-9.0

The preceding financial statement is for the Utah ranch termed "Number 100", for the purpose of discussion. It was selected from the 19 ranches with less than 100 breeding cows per ranch, which in this study comprise the smallest size group using no public domain in winter, because the percentage calf crop was high and the winter feeding practice good. Moreover, this is one of the ranches which formerly handled a larger number of cattle, but elimination of accessible public domain, reduction in size of grazing permit on the Forest Reserve, and lack of privately-owned range at moderate lease charge have been factors contributing toward excessive reduction in numbers.

The 106 acres comprising this ranch are located in a fertile valley adjacent to a national forest reserve. Forty-five acres of alfalfa provide 225 tons of hay, which is more than sufficient winter feed for the livestock which use the entire ranch for late fall, winter, and early spring pasture. Seven acres of wheat provide bread grain, feed for the poultry and for family pork production in addition to 4.5 tons sold locally. Thirty-six acres were in pasture during the year. This ranch has a grazing permit for 75 cattle on the National Forest Reserve.

The breeding herd is composed of 34 high-grade range cows and 2 registered bulls. In the year 1925 an 82 per cent calf crop was obtained. Cattle death loss was a little under 5 per cent.

Cattle sales consisted in 18 cows, 15 calves and short yearlings and eight 2- and 3-year old steers. These cattle brought $1440, after having been drifted 85 miles to the railroad loading point and some of them shipped 500 miles to market. The sale of stock products, such as butter, cream, eggs, and hides, yielded $788, while crops, principally wheat, were sold for $453. The increase in inventory of cattle amounted to $578. This gives a total receipts figure of $3259 for 1925.

The expenses totaled $3251. This amount included the purchase of 15 cows with calves at side and 8 steers for $510, feed, salt and two feeder hogs for $101, paid labor for $350, taxes and forest fees $265, repairs and miscellaneous items $838, a decrease in inventory of stock other than range cattle of $75, depreciation on buildings, machinery and equipment $662, and unpaid family labor $450.

Cash receipts less cash expenses leave $617, but total receipts less total expenses leave only $8 as payment for the operator's labor, which he had estimated at $900.

A careful analysis of the data and study in the light of experience and other known facts leads to the conclusion that the number of

breeding cows on this ranch is too small to meet the fixed overhead charges and allow the operator a return for his labor under ordinary conditions.

Two possible solutions are offered: (1) Leasing additional grazing land to enable the ranchman to operate not less than 100 breeding cows and to sell principally long 2-year-old cattle. (2) To increase the breeding herd to 50 cows and fatten at least 20 weanling calves for baby beef. The production of baby beef is based on the assumption that feed and railroad or trucking facilities are practicable. This ranch is situated in a community where food, machinery and supplies are transported from Salt Lake City by truck. It is feasible for these trucks to make the journey to Salt Lake in a day: hence, the shrinkage in weight of the cattle in transit need not be excessive. A rate of 25 or 30 cents per hundred weight for the hundred and fifty or sixty mile trip to market, that would induce the ranchman to ship by truck, would make it possible for the truck company to haul both to and from Salt Lake at particular periods.

Proposition number one is merely a case of expansion of the business as it is now being operated. However, with proposition number two, 50 cows should produce 40 calves, and hence it would be possible to maintain the herd and to sell annually 5 fat cows, 5 fat long 2-year-old heifers, 6 long yearling steers in the fall, and 20 fat yearlings in April or May. This ranch should be able to provide the 19 tons of alfalfa hay, produce about 27 tons of barley and fatten 20 high grade uniform quality calves, weighing 400 pounds at weaning time, without additional labor or equipment expense. With a feeding period of about 7 months, figuring 2 3-8 pounds gain per head per day, it should be possible to produce good quality baby beeves weighing around 900 pounds. If these yearlings bring $75 per head and the 17 other cattle sell for $740, a total of $2240 will be received from cattle sales.

This sum added to the $788 from stock products and $233 from sale of crops, fruit, etc., make a total cash receipts figure of $3251. After deducting total cash expenses, $2064, there remains $1187 to meet interest on borrowed money, depreciation on buildings, machinery and equipment, unpaid family and operator labor. This return would be somewhat larger if the charges for depreciation on buildings and equipment, which appear a little high, were reduced.

The second financial statement (Table 16) which is from ranch "200", with a little over three hundred breeding cows, represents a size of cattle business which should yield a reasonable return over a period of years, when properly managed. The system of management although fairly satisfactory, may still be improved.

Table 16. Financial Statement Utah Cattle Ranch Number 200
January 1 to December 31, 1925

Total Investment:		$54594
Distribution of Investment	per cent:	
Land	56.0	
Improvements	7.0	
Range Cattle	31.0	
Work Stock	1.7	
Other Stock	1.3	
Machinery and Equipment	3.0	
Feed and Supplies	0.0	
Total Indebtedness		28570
Net Worth		26024
Receipts		
Sales:—Range Cattle		17080
Total Cash Receipts		17080
Increase in Inventory:—Range Cattle		3871
Feed and Supplies		42
TOTAL RECEIPTS		20993
Expenses:		
Purchases:—Range Cattle		7063
Feed and Salt		2060
Total Hired Labor		4800
Forest Fees		150
Taxes		2500
Repairs		250
Miscellaneous		490
Total Cash Expenses		17313
Decrease in Inventory:—Range Cattle		
Other Livestock		30
Depreciation on Buildings, Machinery and Other Equipment		236
Unpaid Family Labor		
TOTAL EXPENSES		17579
Cash Receipts less Cash Expenses		-233
Interest Paid on Borrowed Capital		2000
Net Cash Income		-2233
TOTAL RECEIPTS LESS TOTAL EXPENSES		3414
Value of Operator's Labor		900
Return on Total Investment		2514
Percentage Returns on Total Investment		4.6
Return on Operator's Equity		514
Percentage Return on Operator's Equity		2.0
Physical Composition		
Owned acreage:—hay 300, oats 20, wheat 15, and grazing land 3165		
Total acres owned		3600
Forest Reserve acreage grazed (estimated)		7050
Public Domain acreage grazed (estimated)		5472
Total acres utilized		16122
Acres per head of cattle		20.5
Number of miles of fence		50
Number of cattle:—breeding cows 307, yearling heifers 100, bulls 12, yearling steers 256, 2-year old steers 309. Total		984
Number of horses:—saddle 8, work 16, unbroken stock 38, stallions 2. Total		64
Number of months labor:—hired 64, operator 12, family 0. Total		76
Number of cattle sold:—fat cows 100, bulls 2, calves 50, steers 300. Total		452

Ranch Number 200 (see Table 16) is one of the four ranches whose average appears as Group 3, Division A, in the tables shown in the text. This ranch with an investment of about $55,000 obtained a 52 per cent calf crop in 1925. It will be noted that the ranch establishment proper was supplemented in 1925 with an allotment on the Forest Reserve carrying a summer grazing permit for 250 head of cattle. In addition, the ranchman reported that he used the public domain for about 100 head of cattle from March to December. The estimate of 5472 acres of public domain is based on an assumption of 73 acres per cow per year carrying capacity in the State of Utah.

An inspection of the financial statement of this ranch discloses rather heavy cash expense. The item of $4800 for paid labor on the ranch is higher than that on similar sized beef cattle outfits studied in other states where some use is made of the public domain. If some sort of control of a part of the public domain existed so it would be possible to maintain fenced grazing areas, a material reduction in paid labor expenses would be possible, judging from studies of a similar nature in Texas. Moreover, under fence, it is possible to have more of the cows bred each season and consequently obtain a larger calf crop than is customary with cattle running at large on the public domain. A 52 per cent calf crop may well be considered low, but according to the ranchman's report, this crop was obtained under rather unfavorable conditions existing in the region during 1924-1925. Nevertheless, even favorable weather conditions must be accompanied by a heavier investment in active bulls of suitable type and breeding, more range riding both during breeding season and during early calving in particular, and a form of range control making possible better seasonal grazing, in order that a materially larger calf crop may be secured. Additional discussion on the subject of "calf crop" appears elsewhere in the bulletin. The need for restocking existed at the beginning of 1925, but the outlay for cattle and feed would not normally be half of the amount expended for these items in the year studied. Moreover, the hay yield was a little below normal in 1925; hence, the normal purchase of hay would be smaller than here given.

The number of cattle sold, particularly cows, was a little larger than normally in 1925, but return per head would generally be somewhat higher than here shown also. Besides, it is well to note that although this ranch had 1.3 per cent of its capital invested in livestock other than work stock or range cattle, no return was reported on this. This 1.3 item represents ordinary range or stock horses. Had this investment been in better quality animals or perhaps some other class of stock, a supplemental income might have been obtained. This

additional income may usually be secured with but little more labor expense.

A balance in the bank or figures in the check book do not necessarily indicate a profit at the end of a year's business. Likewise, a year of business with more cash expended than received does not always indicate an actual loss. A substantial bank balance may be the result of material reduction in inventory of active working capital. Moreover, a very small balance or even none at all may be supported by a substantial increase in inventory. A ranchman should take an inventory at least once a year and study his business.

PART III. SUMMARY

This bulletin reports the results of an economic survey of cattle ranching in Utah as of the calendar year 1925.

The ranches and range outfits in this study include over 22,000 head of cattle with a total value of over $691,000. Based on the 1925 agricultural census, it is estimated that this number of cattle represents over 5 per cent of the cattle in Utah, exclusive of yearling dairy heifers and dairy cows 2 years old.

Fifty-five cattle ranches are considered in two main divisions: Division A, including those ranches using no public domain in winter; and Division B, including those ranches using public domain in winter. Within each of these major groups, the ranches are further classified according to number of breeding cows, as follows: Group 1, less than 100 breeding cows; Group 2, 101 to 200; Group 3, 201 to 500; and Group 4, 501 to 1000 breeding cows.

Land.—Ranches using no public domain in winter show a higher land investment, a higher percentage of owned land, a higher percentage of land in crops, more extensive feeding practices, and a greater income from sources other than cattle, than do those ranches which use public domain in winter.

As a rule, the total acres of owned land increases with the size of ranch, as does the value of owned land. The larger ranches using public domain in winter comprise a notable exception to this rule. These ranches run upwards of 1000 head of cattle with an average of only 328 acres of owned land, representing a land investment of scarcely $5000.

As the size of outfit increases among ranches using no public domain in winter, the percentage of owned-grazing land increases; whereas among winter users of public domain, the percentage of owned-grazing land decreases with the size of outfit.

Equipment.—In all groups of ranches, equipment represents about the same percentage of the total investment.

The larger ranches using public domain in winter show a cattle investment averaging nearly 70 per cent of the total, with only 10 per cent in land and about 14 per cent in improvements. All other groups have at least 41 per cent of their average investment in land, which necessitates a corresponding reduction in cattle investment.

As a rule, most of the indebtedness on ranches not using public domain in winter is land indebtedness, whereas that on ranches using public domain in winter is cattle indebtedness.

The average value of all cattle on the closing inventories of ranches not using public domain in winter was higher than that shown by ranches using public domain in winter, probably due more to condition than to breeding.

Labor.—Ranches using no public domain in winter show a larger labor requirement and a correspondingly greater labor cost. In percentage of all labor, paid labor is consistently higher where no public domain is used in winter; family labor is higher where public domain is used in winter; and operator labor remains about the same for all comparable groups of ranches.

Returns.—Total expenses for all groups of ranches using no public domain in winter are higher considerably than for those using public domain in winter. The same is true of total ranch receipts.

The highest average balance for the year's operations is shown for the larger ranches that use no public domain in winter. The second highest group average is for the larger ranches using public domain in winter. The smaller ranches in each division show a loss.

The percentage return on total investment for all groups of ranches in each division increases steadily with the size of outfit. Groups 1 show negative returns, -0.8 and -0.3 per cent, respectively; Groups 2, 2.9 and 3.1 per cent; and Groups 3, 5.8 and 7.0 per cent return, respectively. The highest average group return on total investment, 8.5 per cent, is shown for the larger ranches using public domain in winter.

When account is taken of returns due to increase in market value of cattle during the year a different situation develops. Disregarding these returns, the percentage return on total investment is -6.7 per cent for the largest outfits (Group 4, Division B); -3.5 for Group 1, Division A; -0.1 for Group 2, Division A; 2.7 for Group 3, Division A; 2.5, 1.9 and 6.4, respectively, for Groups 1, 2, and 3, Division B. Group 4 shows a loss of —6.7 per cent.

Profits.—Calculations were made to determine the relationship between certain important profit-producing factors and the percentages of profits shown for the ranches studied. These calculations strongly indicate:

(a) That profits tended to increase as the number of cows and the number of all cattle increased.

(b) That profits tended to decrease as the percentage of total investment represented by cattle decreased. In other words, the small ranches which lost money seem to have been carrying too much overhead with too small an investment in cattle.

(c) That high land investment did not tend uniformly to yield high profits, or, in brief, capital in land was used profitably by some but not by others.

(d) That some ranches are using labor much more effectively than are others, while some seem to be actually wasting it.

(e) That there is a fairly strong tendency for these ranchmen who make good profits to have other sources of income than cattle. This is not regular, however, and therefore may be interpreted as merely emphasizing the importance of diversification where geographically possible.

(f) That there is a general lack of correlation between the percentage of calf crop and the percentage of profits—a surprising disclosure calling for continued records over a period of several years.

Herd Management.—The practices of ranchmen in the management of their herds are considered under the following headings: labor, breeds of cattle, handling steers, cows per bull, number of months bulls are kept in the breeding herd, age of bulls kept with herd, age at which bulls and cows are culled, the conditioning of bulls, dehorning, castration, shelter, water, winter feeding, marketing steers, distance to shipping point, death losses, calf crop, and weaning.

The total net cost of carrying a cow through the year, 1925, is shown to have averaged $23.90 for all ranches studied. On ranches using no public domain in winter, the cost averaged $30.52 per cow against $17.11 for ranches using public domain in winter. In each division of ranches, the cost of carrying a cow decreased with the increase in number of breeding cows per ranch.

To show how a ranchman may study his own business, financial statements of two typical ranches are presented and analyzed.