

TEXAS AGRICULTURAL EXPERIMENT STATION

A. B. CONNER, DIRECTOR
College Station, Brazos County, Texas

BULLETIN NO. 413

JULY, 1930

DIVISION OF FARM AND RANCH ECONOMICS
IN COOPERATION WITH BUREAU OF AGRICULTURAL ECONOMICS
AND BUREAU OF ANIMAL INDUSTRY, UNITED STATES
DEPARTMENT OF AGRICULTURE

PLANNING THE RANCH FOR GREATER PROFIT

A STUDY OF PHYSICAL AND ECONOMIC FACTORS AFFECTING
ORGANIZATION AND MANAGEMENT OF RANCHES IN
THE EDWARDS PLATEAU GRAZING AREA

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**In cooperation with U. S. Department of Agriculture.

A detailed study of physical and economic factors affecting the organization and management of ranches in the Edwards Plateau grazing area has been made on 31 ranches for the period 1925-1928, inclusive. In this area, comprising approximately 25,000,000 acres of land, a unique system of diversified grazing is practiced, in which cattle, sheep, and goats are combined. The main objective of this bulletin is to call attention to the opportunities of increasing ranch incomes through adjustments in the kinds and numbers of livestock grazed and through improvements in methods of production.

Average production and production requirements of the ranches studied, and prices likely to prevail during the next 4-6 years have been used to determine the probable income from a given ranch organization. An actual ranch of 16 sections, stocked at the rate of 50 animal units per section, 33 of cattle, and 17 of goats, showed a probable net income of \$405.00 per section. A revision of this organization to include 15 units of cattle, 27 units of sheep, and 8 units of goats showed a net income of \$765.00 per section. A further adjustment of the organization of this ranch by increasing the total animal units from 50 to 58, or 15 units of cattle, 35 units of sheep, and 8 units of goats, showed a net income of \$950.00 per section. These differences in probable income per section indicate the possibilities of increasing ranch incomes through adjustments in the kinds and numbers of livestock.

Three factors—per cent of young raised, fleece weights, and death losses in the breeding herd—accounted for approximately 50 per cent of the variations in income per section of ranches studied. The number of calves raised per 100 cows varied from 46 to 89, lambs per 100 ewes from 53 to 82, and kids per 100 does from 52 to 80. Death losses in the breeding herds varied from 0 to 8 per cent for cattle, from 1 to 20 per cent for sheep, and from 4 to 15 per cent for goats. Wool clips ranged from 7 to 10 pounds per head and mohair from 4½ to 7½ pounds per head. These are averages of results secured over a four-year period. It is evident from these figures that much can be done to increase ranch incomes by improvements in those methods and practices of handling livestock which are responsible for the variation in these factors. These methods and practices center about such problems as: management of the range, supplemental feeding, breeding and culling, control of parasites and diseases, etc., and will be made the subject of further study in the near future.

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PLANNING THE RANCH FOR GREATER PROFIT

A Study of Physical and Economic Factors Affecting Organization and Management of Ranches in the Edwards Plateau Grazing Area

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The Edwards Plateau grazing area comprises all, or a part, of 40 counties, totaling roughly 25,000,000 acres—an area equal in size to that of Tennessee. The importance of the area is further emphasized by its relatively large numbers of cattle, sheep, and goats, particularly sheep and goats. According to the 1925 Census its cattle population was 20 per cent of that of the State, sheep 88 per cent, and goats 90 per cent. Information on production trends since 1913 show a steady and substantial increase for sheep and goats and a slight decline for cattle.

The area is unique for its diversified ranching. The grazing of cattle, sheep, and goats together on the same ranch is the usual practice. This is made possible very largely by the variation in vegetation and the topography of the area. The vegetation consists of a mixture of grass and brush, which furnishes grazing for cattle and sheep and browse for goats. Also much of the surface is too rough and stony for cattle range but almost ideal for goats. Thus a combination of cattle, sheep, and goats permits a much more efficient utilization of the range than could be obtained by the grazing of any one or two of these types.

The practice of grazing cattle, sheep, and goats together on the same ranch makes it necessary for the individual ranchman to decide what combination or proportion of these three types of livestock is likely to give him the best returns over a period of years. It is also necessary for him to adjust or modify his basic combination from time to time in order to take advantage of changes in price relationships of products sold.

It is a matter of common observation that ranchmen in the area make changes in the proportions of livestock grazed practically every year. The effect of these changes upon ranch income depends quite largely upon the soundness of the information on which they are based. Too often changes are made in the light of past experiences and prices instead of future price prospects as indicated by supply and demand facts. The chief objective of this publication is to present a method of measuring

*The authors wish to express appreciation of the cooperation of ranchmen, accountants, and warehousemen who supplied much of the data on which this Bulletin is based. Acknowledgment is also due Messrs. V. V. Parr and G. S. Klemmedson, representatives of the Bureau of Animal Industry and Bureau of Agricultural Economics, U. S. Department of Agriculture, and various members of the Experiment Station Staff who have made helpful suggestions from time to time.

the probable effect of such changes. This approach should help ranchmen to more accurately anticipate the ultimate effect of proposed changes on income and consequently enable them to plan their ranches for greater profits.

SOURCES OF INFORMATION

Beginning with 1925 the Texas Agricultural Experiment Station in cooperation with the Bureau of Agricultural Economics and the Bureau of Animal Industry began a detailed study of the problems of ranch organization and management in the Edwards Plateau. The study extended over a period of four years. Arrangements were made with a group of ranchmen in Sutton, Edwards, Crockett, Schleicher, Kimble, and Val Verde Counties to secure a complete financial record of each of their ranches and in addition pertinent information on certain management phases. The records covered the operations on 23 ranches in 1925, 27 in 1926, 27 in 1927, and 29 in 1928. The details of these records consist of inventories, expenses, receipts, production of livestock and livestock products, death losses, rate of stocking, feed and labor requirements, and miscellaneous overhead costs. They were collected at regular intervals by a field man who was stationed in the area.

In addition to the ranches on which detailed records were secured during the period 1925-1928, survey records were taken on 15 selected ranches in 1928. This was done with a view of checking and supplementing detailed figures relative to per cent of calf, lamb, and kid crop, shearing weights for wool and mohair, the kinds and amounts of feed fed, etc.

Prices received by ranchmen for products sold and prices paid by them for feed and other items purchased were secured from ranchmen, wool warehouses, and feed stores. Price quotations for both wool and mohair on the Boston market have been examined. Also special price studies and price outlook data, showing production trends and price cycles for the livestock enterprises involved, have been reviewed.

Data from the Agricultural Census of 1925 have been used to show the proportions of cattle, sheep, and goats in the area by counties. Special tabulations from the same source have been used to show the variation in organization of individual ranches and of ranches of different sizes. The numbers of livestock assessed as given in the State Comptroller's Reports, for the period 1913-1928, have been used to indicate production trends. Weather records, soil surveys, and Texas Station Bulletin No. 297 have been very useful as sources of descriptive material.

These data have been used in determining basic figures in the production of livestock and livestock products, production requirements in terms of labor, feed, materials, etc., and average prices and price relationships that may reasonably be expected during the next few years. This information, with adjustments to meet the conditions of individual ranchmen, will serve as a basis for measuring the returns that

may be reasonably expected over a period of years from a given organization or the probable effect of a change in this organization.

To clearly understand the problems of management confronting ranchmen of the area, one must first know the conditions under which they

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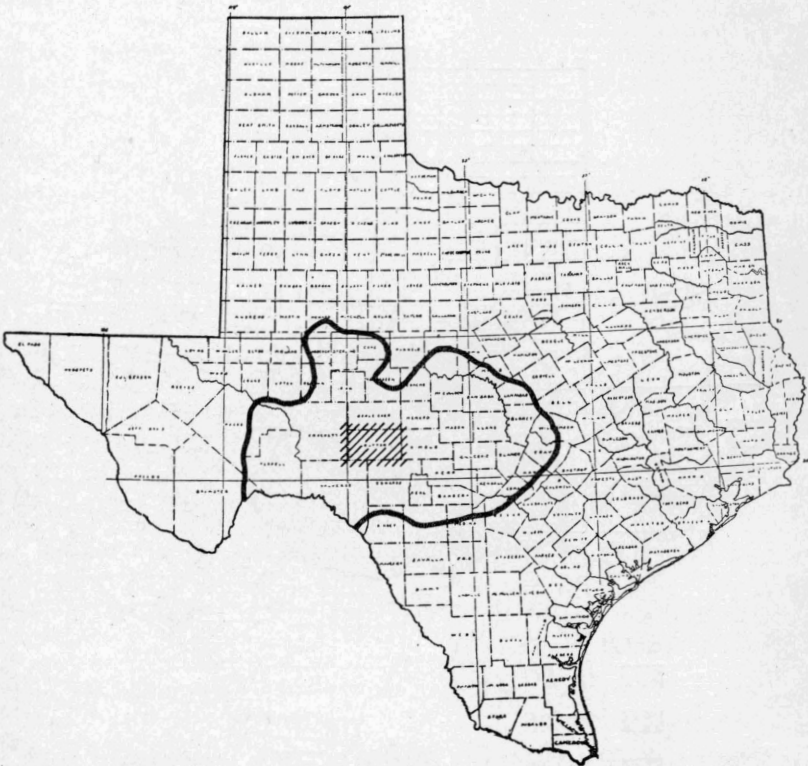


Figure 1.—The portion of the State referred to in this Bulletin as the Edwards Plateau grazing area is roughly indicated above by the heavy line. The shaded portion shows the locality in which detailed organization data were secured.

are operating and the influence of these conditions on the organization of their ranches. For this reason a brief description of the area is given, featuring its natural resources and their relation to the organization and operation of ranches.

PHYSICAL FEATURES OF THE AREA

The area comprises all of the Edwards Plateau and adjoining lands of a stony nature on which cattle, sheep, and goats are grazed. In the main it consists of the frayed or dissected portion of the high plains, known in Texas as the Llano Estacado. Its surface is characterized by alternating ridges and valleys or draws, which give it a rough, broken

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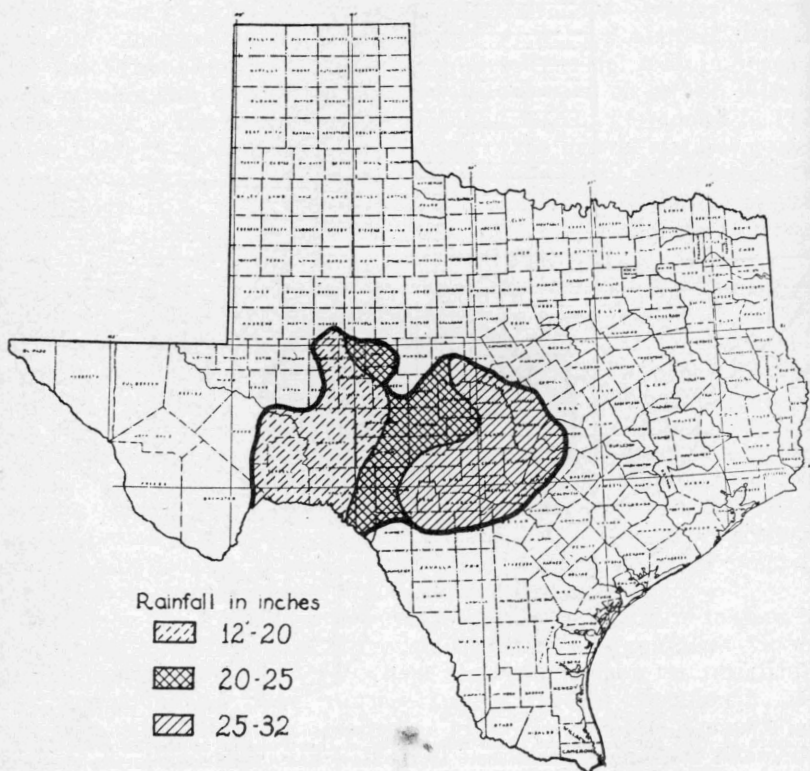


Figure 2.—Mean annual rainfall of area. (U. S. Weather Bureau.)

appearance. The ridges or divides broaden in places into considerable areas of nearly level land, which no doubt represent the old plateau as it appeared before it was cut by erosion. The numerous streams which cross or have their source in the plateau flow eastward and southeastward. The valleys of these streams at some point in their course widen into

broad, open basins. Where rainfall and soil conditions are favorable, farming communities have developed.

The altitude of the area averages about 2,000 feet and varies from less than 1,000 feet along the south and east sides of the Plateau to nearly 3,000 feet in the extreme northwest part. The mean annual rainfall in different parts of the area is indicated in Figure 2. It averages about 30 inches in the eastern part and becomes rapidly less and more erratic to the west.

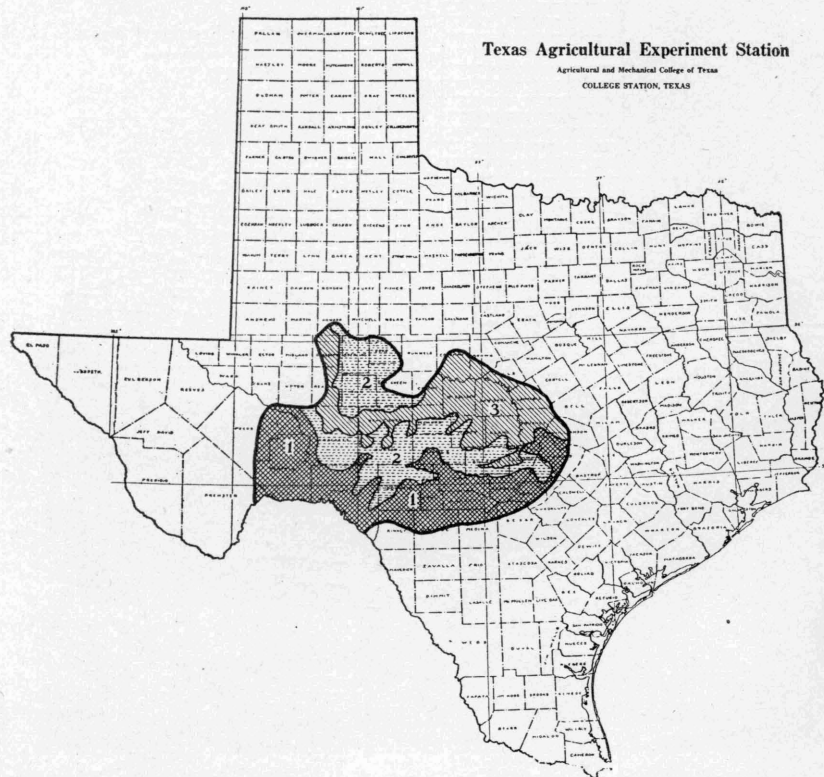


Figure 3.—Classification of land of area—(1) rough, stony land; (2) moderately rough and rolling stony land; and (3) comparatively smooth land. (Map prepared by W. T. Carter, Chief, Division of Soil Survey, Texas Agricultural Experiment Station.)

One of the outstanding characteristics of the area is the stony nature of its soils. They are mostly shallow and heavy and are derived from limestone. An important exception is the central basin, or Llano-Burnet area. Here the soils have been formed chiefly from the weathering of granite and sandstone, and are lighter in texture than the typical soils of the Plateau.*

*Reconnaissance Soil Survey of South-Central Texas.
Reconnaissance Soil Survey of West-Central Texas.

Classification of the Land and Vegetation of the Area

A classification of the land of the area has been made as shown in Figure 3. This classification is based largely on the condition of the surface or the proportion of smooth land to rough broken land. In this classification the land is divided roughly into three classes, each comprising approximately one-third of the area. The rough, stony lands,

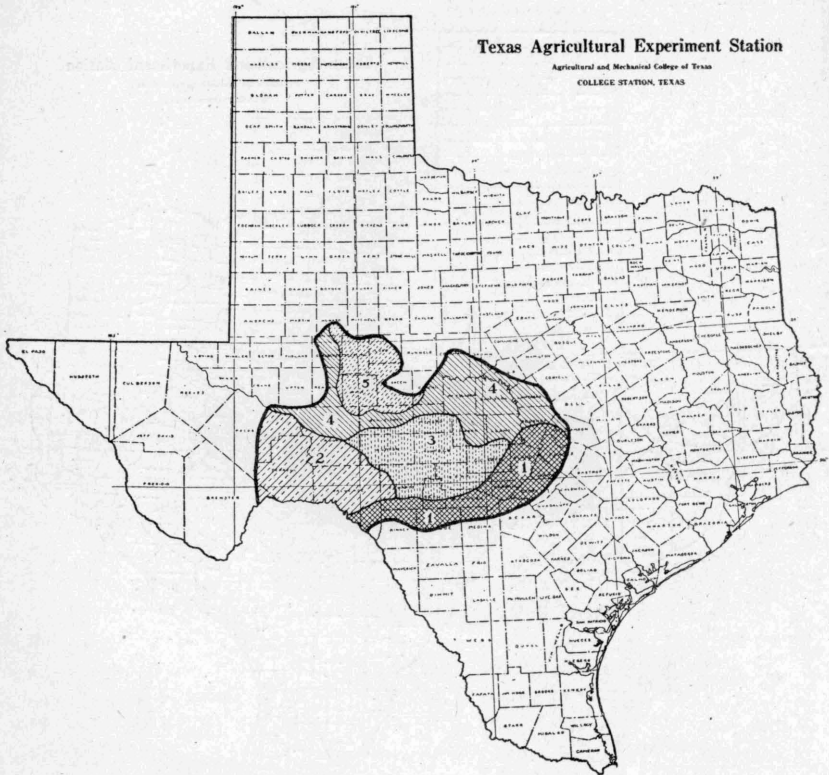


Figure 4.—Area subdivided on the basis of characteristic vegetation—(1) oaks and cedar, (2) sotol and lechuguilla, (3) live oak and shin oak, (4) grasses, and (5) gray oak and catclaw. (Map prepared by V. L. Cory, Range Botanist, Texas Agricultural Experiment Station.)

or the more eroded and broken lands, occupy the southern portion, while the more smooth and less stony land is mostly in the northern part of the area. The remainder of the area, which is largely the central part, is classed as moderately rough, rolling, stony land.

The principal grasses growing on the Plateau are curly mesquite and buffalo. Both of these grasses make a thick, compact turf for summer grazing. They also cure well and provide good grazing during the winter

months and periods of drought. The mesquite grass is well distributed over the area, while buffalo grass grows mostly in the northwestern part, very little being found in the eastern half of the area. Other grasses of some importance are the grama grasses, tobosa grass, and needle grass. The grama grasses and tobosa grass are confined pretty much to the western and southwestern portion of the area, while needle grass is distributed rather generally.*

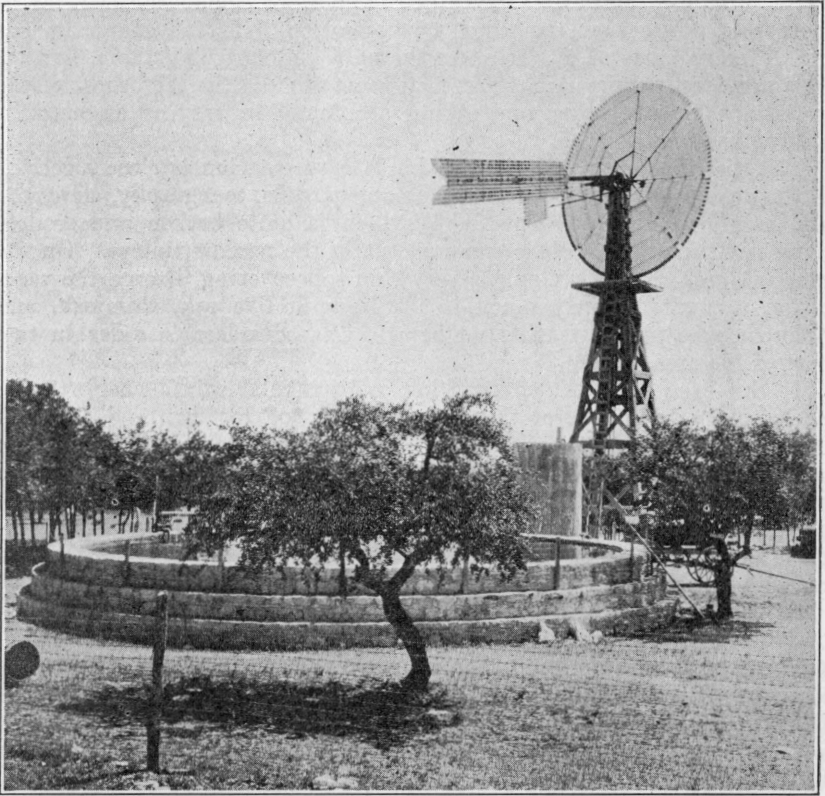


Figure 5.—Most common type of water supply. The major portion of the area is a high, dry plateau. This handicap has been overcome by bored wells, which furnish an ample supply of water and have contributed much to the present development of the area.

The vegetation which distinguishes this area from every other grazing region in the State is the live oak and shin oak brush. These low growing oaks form dense clumps and thickets and are found in varying amounts throughout the area. They furnish excellent browse for goats

*Texas Station Bulletin No. 297, Chapter 3, pages 64-68.
U. S. D. A. Technical Bulletin No. 68, pages 6-11.

and are utilized to a certain extent by cattle and sheep, especially when other vegetation is scarce. They also provide protection for the livestock against cold winds.

There are numerous other plants and shrubs of minor importance such as sumac, catclaw, mesquite, sotol, lechuguilla, sacahuiste, prickly pear, and many varieties of weeds which add greatly to the carrying capacity of the area. A rough division of the area, based on the characteristic vegetation, is shown in Figure 4. It should not be inferred from this figure that the kinds of vegetation listed as characterizing the different parts of the area are the only kinds growing there, nor are they necessarily more important than some others. In fact, most of the important grasses, trees, and shrubs are found in varying amounts in all five divisions.

The distribution of the various kinds of vegetation is closely related to the physical features of the area; namely, soils, topography, elevation, and rainfall. In Sub-area No. 1, which is quite broken and eroded, there is comparatively little grass except in the narrow valleys. On the rocky slopes, which have only a very thin soil covering, if any, the vegetation is limited pretty much to brush, with live oak, shin oak, and Spanish oaks predominating. There is also considerable cedar in this part of the area.

In Sub-area No. 2 the effect of low and irregular rainfall begins to be noticeable. As a general thing very little good live oak and shin oak brush are found west of the 20-inch rainfall line. This portion of the area is badly broken and eroded. It is traversed by rather wide valleys or canyons. Sotol and lechuguilla form the principal vegetation on the slopes of these valleys, while grass predominates on the more level portions of the valleys and divides. Utah juniper or cedar is also found rather generally on the divide land.

In Sub-area No. 3 there is more smooth, level land with a somewhat better soil covering generally. Consequently grass makes up a larger part of the total vegetation than in No. 1. It is in this portion of the area that live oak and shin oak brush are found at their best. Here, as in other sub-areas, the brush grows mainly on the rough, broken slopes, while the grass is the principal vegetation in the numerous narrow valleys and on the level divides.

Going from the south to the north and from east to west in the area the land gradually becomes less broken, with large areas of smooth grassland becoming more numerous. The live oak and shin oak brush also become more sparse to the north and west. From Schleicher County west in Sub-area No. 4 the land is rather smooth and practically treeless. It has the highest elevation of any part of the Plateau. The vegetation is chiefly a mixture of grasses, including buffalo grass, needle grass, burro grass, tobosa and grama grass, with a scattering of mesquite trees.

That portion of Sub-area No. 4 to the east of Schleicher County is

characterized by wide valleys or basins and mesquite flats separated by rough, broken ridges. The ridges are covered with oak brush and resemble the broken portion of Sub-area No. 2, while the basins and flats have a heavy turf of grass with mesquite trees liberally distributed over them.

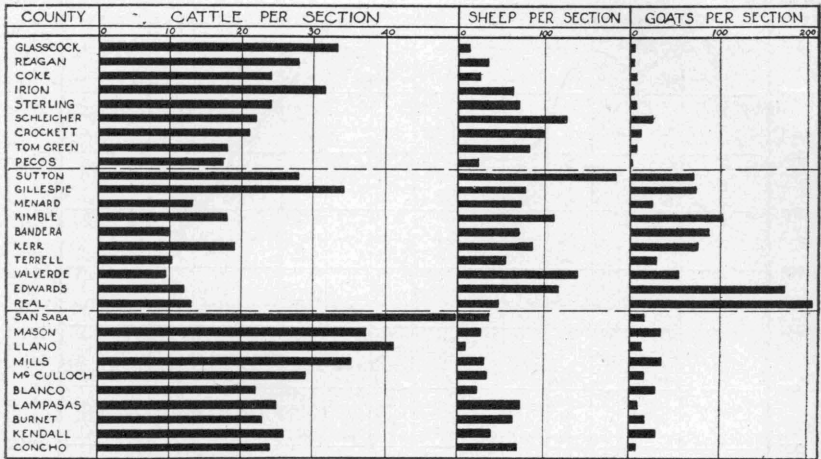


Figure 6.—Average number of cattle, sheep, and goats per section in each county of the area. (U. S. Census, 1925.)

Sub-area No. 5 is another stony, hilly, and broken brush-covered area. The brush differs, however, from that in Sub-area No. 3. Gray oak and catclaw take the place of the live oak and shin oak and the sub-area as a whole is less densely covered with brush than is Sub-area No. 3. The grass in this portion of the area is mostly grama, buffalo, and needle grass.

RELATION OF PHYSICAL FEATURES OF AREA TO DISTRIBUTION OF CATTLE, SHEEP, AND GOATS

The numbers of cattle, sheep, and goats per section for each county in the area as given in the Agricultural Census of 1925 are indicated in Figure 6. An examination of this figure along with Figure 4, showing the distribution of vegetation over the area, reveals a close relationship between the distribution of livestock and that of vegetation. While all of the counties have some of each, there are significant variations in the proportions of the three types of livestock in different parts of the area. In those counties lying north and west of Sutton County, where there is very little live oak and shin oak or good browse of any kind, goats are of minor importance compared with either cattle or sheep, while cattle are somewhat more important than sheep. In the central and southern parts of the area where brush, and especially live oak and

shin oak make up a large proportion of the vegetation, sheep and goats are most numerous and cattle occupy a secondary position. Much of the range in this portion of the area is rough and broken in character and is less accessible to cattle than to sheep and goats. In the north-

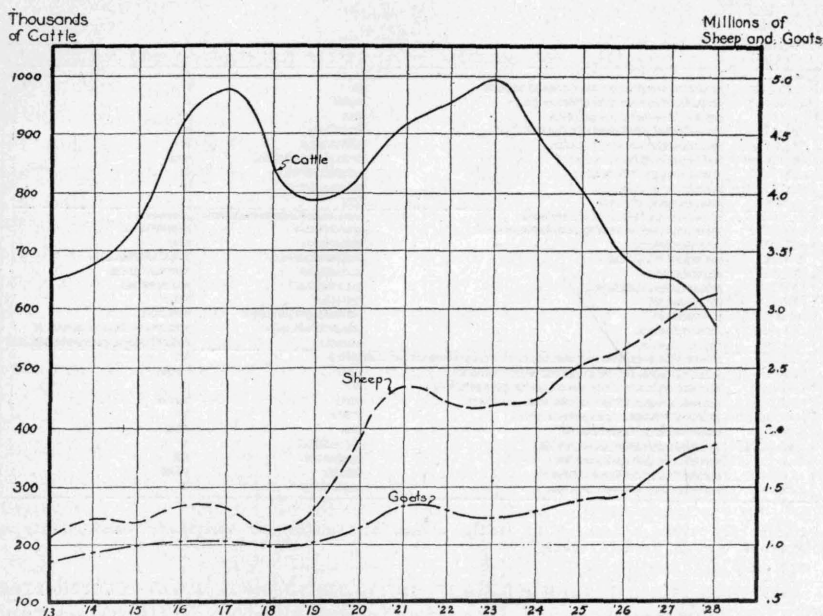


Figure 7.—Trend in production of cattle, sheep, and goats in the area as indicated by numbers assessed—1913 to 1928. (Comptroller's Reports, Texas.)

eastern part of the area the situation is reversed and sheep and goats are of secondary importance to cattle. There is only a moderate amount of browse in these counties.

TRENDS IN NUMBERS OF LIVESTOCK

Since the 1925 Census was taken, however, there has been considerable change in the numbers of cattle, sheep, and goats in the area. The numbers of cattle have been reduced while the numbers of sheep and goats have been increased. The change has been rather general throughout the area, although it has been much more marked in the northeastern part. In Figure 7 the trend in the numbers of cattle, sheep, and goats from 1913 to 1928 is indicated. It will be noted that sheep and goats have increased almost continuously since 1913, while the numbers of cattle have been decreasing since 1923. The decline in numbers of all kinds of livestock in the area from 1917-1919 was apparently due to drought conditions during 1917 and 1918. This decline was only temporary—the trend continuing upward as the range

returned to normal. The big change in the proportions of cattle, sheep, and goats in the area has occurred since 1923. The decrease in the numbers of cattle and the continued increase of sheep and goats have been largely due to a lower purchasing power of cattle relative to

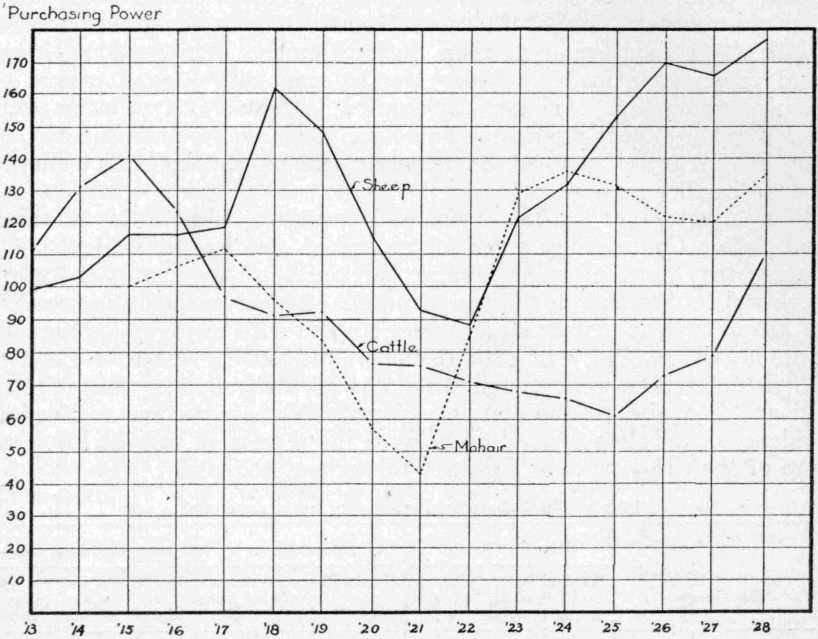


Figure 8.—Showing purchasing power of cattle and sheep, 1913 to 1928, and mohair, 1915 to 1928. Base used—average price, cattle and sheep, 1910-1914, mohair, 1915; index, all commodities, Bureau of Labor Statistics, 1910-1914 base. (For details, see Table 20 in the Appendix.)

sheep, wool, and mohair. The relative purchasing power of cattle, sheep, and mohair is shown in Figure 8. The purchasing power of wool has followed the purchasing power of sheep very closely.

SIZE AND ORGANIZATION OF RANCHES

The distribution of ranches by size groups and the proportion of the ranch area represented by each size group in Edwards and Sutton Counties are shown in Table 1. These data were secured by special tabulations from the 1925 Agricultural Census and include all ranches enumerated in these two counties.

In Edwards County 74 per cent and in Sutton County 54 per cent, or an average of 68 per cent of all ranches so called, were less than eight sections in size. These figures seem to indicate a predominance of small ranches in the area. However, when the proportion of the total area represented by the groups of different sizes is considered, a different

picture is obtained. Sixty-three per cent of the land in ranches in Edwards County and 86 per cent in Sutton County was operated in units of eight sections or more in size.

It will be noted that there were many more small ranches in Edwards County than in Sutton County. This is at least partly due to the fact that the southern half of Edwards County is more rough and broken and has less good grassland than Sutton County. The resulting lower land values have made it easier for the man with limited capital to acquire ownership. Another explanation is that this type of land is best adapted to goat production and since goats require close supervision they are not as well adapted to large-scale production; hence the tendency toward smaller ranches.

The numbers of cattle, sheep, and goats per section in Edwards and Sutton Counties are given for groups of each size in Table 2. Although they lie side by side, the proportions of cattle, sheep, and goats were widely different in the two counties. On the average, the ranches in Edwards County were more lightly stocked with cattle and sheep and more heavily stocked with goats than were the ranches in Sutton County. These differences were undoubtedly due to differences in the relative amount of good grassland and browse in the two counties and are further evidence of the close correlation between the vegetation and the distribution of the three types of livestock throughout the area.

Table 1—Distribution of ranches and ranch area by size groups*

Size Groups	Edwards County			Sutton County			Average of two counties		
	Number of ranches	Per cent of all ranches	Per cent of ranch area	Number of ranches	Per cent of all ranches	Per cent of ranch area	Number of ranches	Per cent of all ranches	Per cent of ranch area
Less than 1 section.....	35	11.3	.6	16	12.3	.3	51	11.6	.5
1— 3.9 sections.....	120	38.6	14.6	27	20.8	3.8	147	33.4	9.8
4— 7.9 sections.....	75	24.2	21.8	27	20.8	9.1	102	23.2	16.2
8—11.9 sections.....	47	15.2	24.2	21	16.1	13.6	68	15.5	19.5
12—19.9 sections.....	17	5.5	13.1	20	15.4	19.0	37	8.4	15.7
20—31.9 sections.....	12	3.9	16.0	9	6.9	15.6	21	4.7	15.8
32 and over sections.....	4	1.3	9.7	10	7.7	38.6	14	3.2	22.5
Total.....	310	100.0	100.0	130	100.0	100.0	440	100.0	100.0

*Special tabulations from U. S. Census of 1925.

Table 2—Average number of cattle, sheep, and goats per section on ranches of different sizes*

Size Groups	Edwards County			Sutton County			Average of two counties		
	Av. No. per section *			Av. No. per section			Av. No. per section		
	Cattle	Sheep	Goats	Cattle	Sheep	Goats	Cattle	Sheep	Goats
1— 3.9 sections.....	12.1	100	292	19.2	178	156	13.3	113	269
4— 7.9 sections.....	10.8	130	176	16.4	198	104	12.2	146	156
8—11.9 sections.....	12.8	120	174	29.8	190	80	18.0	141	145
12—19.9 sections.....	13.7	123	168	28.2	212	61	21.5	171	110
20—31.9 sections.....	18.2	117	125	33.3	181	64	24.8	145	98
32 and over sections.....	4.5	121	135	28.9	190	44	23.0	174	66
Average.....	12.4	119	178	28.1	194	65	19.4	152	128

*Special tabulations from U. S. Census, 1925.

These data also suggest the variations in the proportions of cattle, sheep, and goats on ranches of different sizes. In both counties the larger ranches carried more cattle and sheep and fewer goats than did the smaller ranches. The tendency was for slightly more sheep, many more cattle, and decidedly fewer goats on the large ranches as compared to the small ones. It has previously been pointed out that ranches tend to be smaller in the more rough, broken, and brush-covered areas; also, that it is this type of land which is best utilized by goats. These points at least partly explain the different proportions of cattle, sheep, and goats on large and small ranches. The large ranches tend to go with the more smooth land, which in turn has more grass as compared to browse than the rough land and consequently is better adapted to cattle and sheep.

When individual ranches are compared, rather extreme variations in the proportions of cattle, sheep, and goats are observed, even within rather narrow limits of size. This is illustrated in Figure 9, in which the livestock organization of individual ranches ranging from 8 to 12 sections in size is given. It will be noted that some ranches have large numbers of goats per section, no sheep, and very few cattle, while others representing the other extreme have relatively large numbers of sheep and cattle and very few, if any, goats. However, most of the ranches included at least two of the three types of livestock common to the area in their ranch organization. Variations similar to the above were found within groups of other sizes, the only difference being that more of the smaller ranches had large numbers of goats per section and very few, if any, sheep and cattle; whereas more of the larger ranches were heavily stocked with sheep and cattle and had fewer goats per section.

Here again the variations in the combinations of cattle, sheep, and goats may be explained, in part at least, by differences in topography and vegetation. However, another factor of perhaps equal importance is the way individual ranchmen respond to changing economic conditions. Some ranchmen are more alert to their opportunities than others. They respond readily to changing economic conditions and seek to take advantage of every new situation. Other ranchmen are less price-sensitive. They are influenced more by their likes and dislikes or by custom and established ways of doing things, and make changes in their organization very slowly.

ORGANIZATION OF RANCHES STUDIED, AND CHARACTER OF CHANGES TAKING PLACE DURING THE PERIOD

It will be observed from Table 3 that with but few exceptions cattle, sheep, and goats were included in the organization of each ranch. The yearly averages of the rate of stocking for the group show a decrease in cattle from 25 to 18 units per section, while sheep and goats remained practically constant, averaging slightly above 28 and 7 units, respectively. This differs from the recent trends in numbers of livestock

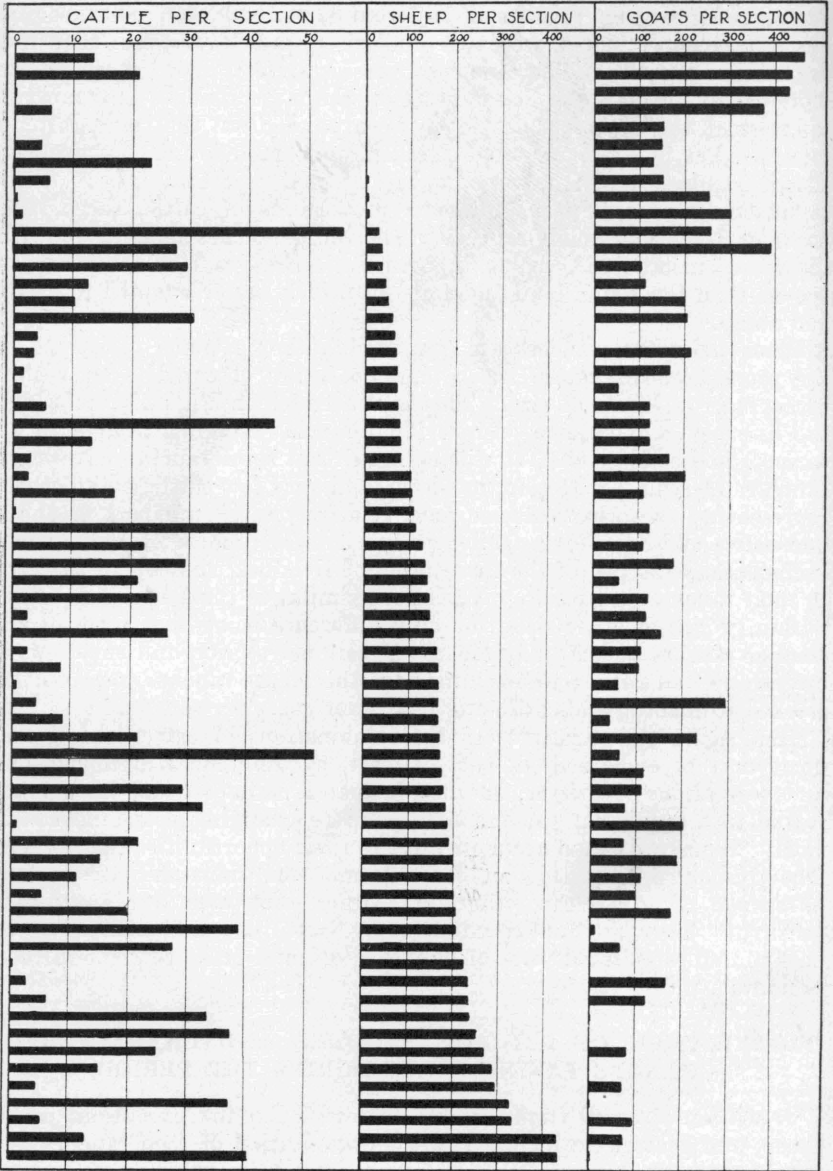


Figure 9.—Showing the variation in livestock organization of individual ranches ranging from 8 to 12 sections in size. (Special tabulations, U. S. Census, 1925.)

for the entire area, particularly in the case of sheep and goats. A plausible explanation of this difference is that the section of the area represented by these ranches had reached a maximum stocking at or previous to the beginning of these records, while the border counties were not stocked to capacity with sheep and goats.

Table 3—Yearly rate of stocking with cattle, sheep, and goats per section on 21 ranches for a period of four years†

Ranch No.	Cattle units per section*				Sheep units per section				Goat units per section			
	1925	1926	1927	1928	1925	1926	1927	1928	1925	1926	1927	1928
10.....	36.42	27.60	25.23	31.83	12.02	8.12	.....	1.22	12.94	10.41	14.28	17.79
4.....	52.51	56.11	57.90	53.09	10.18	18.38	22.62	26.22	16.82	18.28	2.75	.....
23.....	41.61	34.80	37.45	29.91	24.27	17.83	18.59	21.05	.....	.....	.....	.....
3.....	8.77	22.26	30.28	25.59	18.63	25.37	20.50	22.81	23.58	13.09	14.09	19.55
24.....	27.87	22.96	34.57	31.52	18.24	24.50	21.28	24.00	11.79	12.61	14.92	10.77
6.....	29.31	29.90	20.78	27.05	18.99	20.56	23.32	32.90	13.30	16.89	12.40	12.37
1.....	28.20	27.88	26.69	19.51	25.28	28.64	23.25	26.82	.....	.....	.....	.....
17.....	27.46	24.90	6.28	10.58	30.20	29.26	30.91	34.45	.....	.....	.....	.....
2.....	32.60	27.22	19.77	16.79	27.80	32.79	33.24	31.33	11.53	12.65	14.25	12.26
14.....	23.70	26.99	16.25	25.81	32.04	28.43	35.19	32.66	.33	3.24	6.44	2.95
15.....	16.90	8.97	2.93	2.21	31.86	32.85	28.15	35.64	7.91	9.31	10.08	8.55
12.....	16.86	18.92	13.16	3.73	31.84	37.98	30.93	32.20	4.33	4.62	5.48	6.02
9.....	15.45	15.28	19.38	22.83	29.18	32.50	36.86	35.38	8.49	9.26	9.99	10.49
21.....	10.58	16.47	18.25	16.00	33.56	34.52	34.88	28.48	16.56	19.41	17.74	16.29
19.....	.....	.....	.....	.....	45.51	33.10	31.98	30.46	11.69	13.56	3.39	4.27
16.....	26.60	19.56	3.16	3.13	38.04	45.26	32.35	28.17	11.22	12.79	11.29	14.93
22.....	43.59	22.78	17.41	18.24	29.27	37.48	42.28	36.45	10.38	10.92	13.31	22.87
5.....	32.95	17.90	17.43	21.51	41.85	34.79	36.68	36.49	1.96	7.07	9.25	6.84
13.....	29.54	22.14	18.45	15.75	38.28	40.36	34.30	40.60	.....	2.66	3.63	6.16
11.....	36.27	22.27	15.37	17.90	34.69	45.62	41.90	42.97	.....	1.91	10.50	7.01
7.....	12.65	12.41	6.80	6.00	37.76	40.67	45.20	43.77	7.01	6.24	4.58	5.19
Average..	25.63	22.98	18.27	18.14	28.57	28.56	27.72	28.66	6.79	7.31	7.25	7.01

*The terms "cattle units," "sheep units," and "goat units" as used in the table above and throughout this Bulletin refer to carrying capacity units which are based on the nutrition requirements of the different types and classes of livestock. A carrying capacity unit is the amount of forage or dry matter required to maintain a range mother cow with average weights and gains for a period of one year. The following ratios have been used in converting the different types and classes of livestock to the unit basis: cows 1.00 unit; bulls 1.25; calves .58; yearling heifers .87; two-year heifers 1.04; yearling steers .96; two-year steer 1.06; three-year steer 1.14; ewes .15; rams .17; lambs .08; yearling ewes .11; yearling wethers .11; wethers .16; does .13; bucks .15; kids .05; yearling does .10; chevrons .12. The methods used in deriving these units is explained in Texas Station Bulletin No. 297.

†Four-year average rate of stocking on 31 ranches studied is given in Table 13 in the Appendix.

In sharp contrast with the high degree of uniformity in the combination of livestock is the extreme variation in their proportions from ranch to ranch and from year to year. Although all three types of livestock are found on the majority of ranches, extreme variations in their proportions exist from ranch to ranch. Furthermore, changes in the proportions of livestock are made on individual ranches from year to year. The nature and extent of these yearly changes in individual ranches are well illustrated by Ranches Nos. 3, 15, 22, and 11 in Table 3. These changes, although quite varied in character, represent for the most part, attempts on the part of ranchmen to adjust their production to price changes and changes in price relationships between the different types of livestock. Undoubtedly the degree of success attained by ranchmen in keeping the organization of their ranches adjusted to changes in price relationships explains much of the variation noted in ranch incomes.

RETURNS OBTAINED FROM RANCHES STUDIED

The period 1925 to 1928, covered in this report, was favorable to incomes somewhat above the average. Range conditions, with the exception of the spring of 1925, were for the most part good. Cattle, goats, and sheep contributed to the income roughly in the proportions of 1, 2, and 5, respectively. The principal products sold were calves, lambs, goats, wool, and mohair. Cattle prices turned up sharply in 1925 to reach a peak in 1928. The prices for both sheep and goats remained relatively high throughout the period. Wool prices were highest for the period in 1925 and gradually declined to lower levels. The average price received for all wool during the period was 35 cents per pound. Mohair sold for a satisfactory price, averaging about 62 cents per pound.

The size of ranch, gross receipts, expenses, and net income per ranch and per section are shown for 31 ranches in Table 4. These ranches ranged in size from one to 46 sections. They are arrayed on the basis of net returns per ranch, beginning with the highest. As might be

Table 4—Yearly average net income per ranch and per section, 31 ranches, 1925-1928†

Ranch No.	Number years records	Size in sections	Average yearly gross income per ranch	Average yearly total expenses per ranch	Average yearly total net income per ranch*	Average yearly gross income per section	Average yearly expenses per section	Average yearly net income per section
17.....	4	46.79	\$ 83,473	\$ 26,863	\$ 56,611	\$ 1,784	\$ 574	\$ 1,210
18.....	2	45.26	51,421	27,549	23,872	1,136	609	527
12.....	4	14.79	31,553	10,261	21,292	2,133	694	1,440
29.....	2	20.70	31,301	10,774	20,527	1,512	520	992
23.....	4	32.50	36,209	16,513	19,696	1,114	508	606
9.....	4	10.50	27,938	8,509	19,429	2,661	810	1,850
19.....	4	14.24	39,720	21,333	18,387	2,789	1,498	1,291
2.....	4	10.59	23,614	7,029	16,586	2,230	664	1,566
10.....	4	16.50	24,795	8,419	16,376	1,503	510	992
6.....	4	13.00	27,067	10,727	16,339	2,068	820	1,248
14.....	4	12.00	21,325	7,130	14,196	1,788	598	1,190
3.....	4	11.00	19,963	7,077	12,886	1,815	643	1,171
13.....	4	9.60	17,315	5,316	11,998	1,804	554	1,250
24.....	4	12.00	20,127	8,580	11,547	1,677	715	962
21.....	4	15.75	24,939	13,800	11,139	1,583	876	707
25.....	2	7.55	15,376	4,357	11,019	2,037	577	1,459
15.....	4	9.00	15,698	4,901	10,798	1,738	543	1,196
27.....	3	9.49	16,884	6,150	10,734	1,779	648	1,131
30.....	1	6.00	12,934	3,461	9,473	2,156	377	1,579
31.....	1	9.00	15,540	6,794	8,745	1,727	755	972
16.....	4	7.00	12,506	4,586	7,919	1,794	658	1,136
11.....	4	6.00	12,106	4,559	7,547	2,018	760	1,258
26.....	3	6.00	12,029	4,832	7,197	2,005	805	1,199
28.....	2	4.00	11,330	4,400	6,930	2,833	1,100	1,732
20.....	3	4.00	8,469	3,431	5,038	2,128	862	1,266
5.....	4	5.00	8,348	3,773	4,574	1,670	755	915
22.....	4	3.00	5,965	2,233	3,733	1,988	744	1,244
8.....	3	3.00	6,528	3,416	3,111	2,183	1,142	1,041
7.....	4	2.00	7,002	4,013	2,990	3,501	2,006	1,495
1.....	4	4.00	6,421	4,044	2,378	1,605	1,011	594
4.....	4	1.25	3,254	2,236	1,019	2,603	1,788	815
Average.....		12.00	\$ 21,000	\$ 8,292	\$ 12,712	\$ 1,786	\$ 701	\$ 1,085

*Amount remaining after current expenses, depreciation, and estimated value of the labor performed by the operator and members of his family have been deducted. All ranches have been figured on an ownership basis. Taxes on real estate, and depreciation on permanent improvements have been charged instead of lease charges. In order to place ranches on a more comparable basis, interest paid has not been deducted.

†For detailed statement of expenses, receipts, and investments per ranch see Tables 11 and 12 in the Appendix.

expected, there is a wide variation in this figure ranging from \$56,000 to \$1,000. The average income of individual ranches from 1 to 3.9 sections, inclusive, ranged from \$1,000 to \$4,000; from 4 to 7.9 sections, \$2,500 to \$11,000; 8 to 11.9 sections, \$9,000 to \$19,000; 12 to 19.9 sections, \$11,500 to \$21,000; and 20 to 46 sections, \$20,000 to \$56,000.

While the return per ranch has a strong tendency to follow size of ranch, an examination of Table 4 reveals outstanding exceptions. For example, the yearly average income of a 2-section ranch amounted to \$2,990, while that of a 4-section ranch amounted to only \$2,378. Another exception of similar proportions is shown in the case of a 14 $\frac{3}{4}$ -section ranch with a yearly average income of \$21,292 and a 32 $\frac{1}{2}$ -section ranch with a yearly average income of \$19,696. It is quite evident that factors other than size of ranch influence the size of income.

The more significant variation in ranch income is that of net income per section. It is at least the more useful figure in comparing the relative efficiency of various ranch organizations since it eliminates to a large extent the variable of size and places all ranches on a fairly comparable basis. The net income per section ranged from \$1,850 to \$527, with an average of \$1,085. The existence of such wide differences calls for explanation. The inquiry is reduced to one of finding the significant factors which cause ranch incomes per section to vary and a consideration of what practical use can be made of such information in planning and operating ranches for greater profits.

From the records secured an attempt was made to roughly determine the relative influence on ranch income per section of such factors as *prices received, per cent of young, death losses, wool and mohair clip, and the rate of stocking with cattle, sheep, and goats*. A sample of 61 individual operations (complete business transactions of a ranch for one year) were selected from more than 100 with the view of making them as comparable as possible, particularly in organization. The income per section for these 61 operations ranged from \$2,000 to \$44. The multiple correlation method was used to show the relation of these factors to the variation in income per section. To state it briefly, this analysis indicated that these factors accounted for 73 per cent of the variation in incomes per section. The percentage determination of each was as follows:

	Per cent
1. Wool and mohair clip (pounds per head)	26 ✓
2. Prices received	16
3. Per cent young (calf, lamb, and kid crop)	13
4. Death losses	9
5. Rate of stocking with cattle	1
6. Rate of stocking with sheep	7
7. Rate of stocking with goats	3

No attempt was made to determine the influence of such factors as the individual differences in managerial ability of ranchmen, the variation in quality and condition of the range from ranch to ranch, and differences in prices paid for feed, supplies, and breeding stock.

The data available are inadequate to a complete and comprehensive discussion of the relation of these factors to ranch income, and especially so in regard to the relation of ranch methods and practices to these factors. It is quite apparent, however, that the group of ranches having relatively high incomes per section are characterized by a fairly well balanced proportion of cattle, sheep, and goats. Their rate of stocking is above the average, death losses are low, shearing weights are high, and the per cent of young relatively high. A further study of ranch methods and practices is necessary to more accurately measure their relation to the principal factors affecting ranch incomes.

The major emphasis of the detailed study was that of ranch organization. For this reason this Bulletin will discuss more particularly the possibilities of increasing the ranch income by improving the organization of the ranch and present a method of measuring the probable effect of contemplated changes.

INFORMATION NEEDED IN RANCH PLANNING

The existence of extreme variations in the combination and proportions of livestock and income per section from ranch to ranch has been noted. Attention has also been called to the relatively large number of ranchmen who make changes in the proportions of livestock grazed practically every year. In view of the dynamic nature of prices, it is fairly safe to assume that ranchmen will continue to modify their basic plans from year to year. Furthermore, the effectiveness of these changes will depend upon the adequacy and soundness of the information upon which they are based.

This naturally leads to the need of a brief statement as to what such information should include. To begin with, it is necessary for the ranchman to know about what can be expected in the production of livestock and livestock products. For example, in a cattle, sheep, and goat combination what percentage of young raised and what weights of fleece can reasonably be expected? Following this is the need for information relative to production requirements. Specifically this refers to such requirements as labor, feed, replacements, death losses, etc. Finally, in order to evaluate the probable effect of a given change, prices for items bought and products sold are needed.

Standard figures for these items are presented in Tables 5, 6, and 7. These data are based largely upon records secured from cooperating ranchmen during the four-year period 1925-1928. In arriving at prices for products sold consideration has been given to available information on production and price trends of the various products included.

Livestock Production and Production Requirements

The production and production requirements of livestock shown in Table 5 are not averages for the entire number of ranches included in the study, but represent rounded averages for a comparable group selected from them. Ranches which did not include all three types of range livestock in their organization or were unusual in other respects were eliminated.

Table 5—Livestock production and production requirements†

	Cattle	Sheep		Goats
	Per mother cow	Per mother ewe	Wethers per head	Per mother doe
Production:				
Calves raised.....	.70			
Lambs raised.....		.75		
Kids raised.....				.65
Wool (12 mo. Ave.).....		8 lbs. per fleece.....	Mixed ages (mostly 2's and 3's) 9.5 lbs. yearlings 8.0 lbs.	
Mohair (12 mo. Ave.).....				grown goats 6.0 lbs. yearlings 2.3 lbs. kids 1.3 lbs.
Spring clip.....				
Fall clip.....				
Production Requirements:				
Labor.....	1.8 days.....	.45 days.....	.2 days.....	.45 days—add .25 days where kidding by hand
Feed:				
1. Cake.....	90.0 lbs.....	8.0 lbs.....	5 lbs.....	.5 lbs.
Salt.....	60.0 lbs.....	8.0 lbs.....	3 lbs.....	6.0 lbs.

†For complete statement by ranches see Tables 14, 15, and 16 in the Appendix.

The number of young raised, the labor required, the cake and salt fed have been figured on a mother animal basis. In other words, the figures given in Table 5 were derived by dividing the total number of calves, lambs, and kids raised; the total amounts of labor required; and the total amounts of cake and salt fed to each type of livestock by the number of mother animals of each type. In the case of wethers production and requirement data were figured on a per head basis. The figures on feed requirements are averages for a period of years. The amount of feed fed will vary widely from year to year, depending on the condition of the range. Some years very little if any feeding is done, while in other years large amounts of feed are fed.

Herd Requirements, Replacements, Death Losses, and Culls

In making budgets or projecting ranch plans into the future it is quite necessary to be able to approximate closely the herd requirements in bulls, rams, and bucks. Likewise it is necessary to know about what replacements will be needed, death losses expected, and culls to be sold. Information of this kind is provided in Table 6.

Table 6—Requirements, replacements, death losses, and sales for breeding herd and miscellaneous costs and requirements

	Cattle	Sheep	Goats
Requirements:			
Bulls, rams, and bucks.....	4 bulls per 100 cows.....	3 rams per 100 ewes.....	3 bucks per 100 does
Replacements:			
Cows, ewes, and does.....	24 2-yr. heifs. per 100 cows	30 1-yr. ewes per 100 ewes	23 1-yr. does per 100 does
	25 1-yr. heifs. per 100 cows		
Bulls, rams, and bucks.....	25 per 100 bulls.....	25 per 100 rams.....	25 per 100 bucks
Death Losses:*			
Cows, ewes and does.....	4 per 100 cows.....	7 per 100 ewes.....	10 per 100 does
Heifers, 1-yr. ewes, and 1-yr. does.....	1 per 100 2-yr. heifers.....	2 per 100 1-yr. ewes.....	3 per 100 1-yr. does
Bulls, rams, and bucks.....	5 per 100 bulls.....	13 per 100 rams.....	13 per 100 bucks
Culls Sold:			
Cows, ewes, and does.....	19 per 100 cows.....	21 per 100 ewes.....	10 per 100 does
Bulls, rams, and bucks.....	20 per 100 bulls.....	12 per 100 rams.....	12 per 100 bucks

Miscellaneous expenses per section.....	\$ 115.00
Saddle horses per section.....	1 head
Expense per horse.....	\$ 30.00

*Death losses of wethers, 3.5 per cent.

Prices for Items Bought and Products Sold

The basic prices used are stated in Table 7. These prices are based upon the prices which have prevailed in the area during the past few years, price trends, and a study of conditions likely to influence prices during the years just ahead. These prices are not to be taken as predicted prices for any particular year or group of years, but rather as average prices and price relationships which seem most likely to prevail in the area over the next 4-6 years. In planning a long-time ranching system the ranchman is more interested in the price relationships and price trends that are likely to prevail for the period than for any given year.

Table 7—Prices for items bought and products sold†

Items bought	Products sold
Cake..... \$ 40.00 per ton	Calves..... \$35.00 per head
Hay..... \$ 18.00 per ton	Cull cows..... \$30.00 per head
Salt..... \$.90 per cwt.	Cull bulls..... \$70.00 per head
Freight..... \$.50 per cwt.	Lambs..... \$ 5.50 per head
Wool bags and twine..... \$.70 each (25 fleeces of 12 mo. wool to bag) (100 fleeces of mohair to bag)	Cull ewes..... \$ 6.00 per head (mixed)
Shearing:	Cull rams..... \$15.00 per head (5's past)
Sheep..... \$.10 per head—20c for rams	Wool..... \$.33 per pound
Goats..... \$.07 per head—14c for bucks	Kids (shorn).... \$ 3.00 (mixed)
Labor:	1-yr. chevons..... \$ 3.00
Regular..... \$40.00 per mo. and \$15.00 per mo. board	Cull does..... \$ 3.00 (5's past)
Extra day labor..... \$ 2.50 per day and \$0.50 per day board	Cull bucks..... \$15.00 per head
Bulls for replacement.... \$150.00	Mohair grown 50c per lb. yearling and kid 60c per lb.
Rams for replacement..... \$ 35.00	
Bucks for replacement.... \$ 40.00	

†For average prices received by cooperating ranchmen see Tables 17 and 18 in the Appendix. For prices of wool and mohair at a representative warehouse over a period of years see Table 19.

An examination of the trend of cattle prices* in the United States shows a rather definite cyclical movement. The peaks and depressions of these cycles have followed each other with a rather high degree of regularity. They are characterized by sharp peaks and relatively wide depressions indicating a short period of high values and a longer period of low values. In the United States high points in the purchasing power of cattle were reached in 1885, 1899, 1915, and low in 1894, 1905, and 1925. Interpreting the future by the past, we should expect cattle prices to reach another high in 1930 or 1931 and then decline for a period of 6 to 8 years.

The cyclical movement of sheep prices† is not as definite as that of cattle. However, peaks and depressions have occurred with sufficient regularity to warrant serious consideration by ranchmen in planning changes. In the past, high points in the purchasing power of sheep have been reached in the United States in 1892, 1899, 1908, 1911, 1918, and 1929 and low points in 1895, 1903, 1909, 1912, and 1922. If no important changes are made in the tariff on wool, indications are that sheep may be expected to decline for the next two or three years.

In the past wool and sheep prices have tended to move together. Wool prices apparently reached a low point during 1930 and may be expected to improve during the next three to five years.

During the past fifteen years the trend of mohair prices‡ has closely paralleled that of wool. The production of mohair in the United States has increased from a pre-war average of approximately 4,000,000 pounds to slightly above 16,000,000 pounds in 1929. The production for 1929 is about equal to the average consumption of this country for the past six years. If production continues to increase to a point in excess of domestic consumption the tariff will no longer be effective and world prices will prevail.

It is thought well to make clear at this point that the data presented do not apply generally, but must be modified to fit the situation of individual ranchmen for a given time. In other words, the figures given should be considered as a kind of standard—an average with the extremes eliminated. This furnishes the ranchman not only with a basis of comparison, but suggests the items which should be included in planning changes. For example, it is necessary for the ranchman who wishes to use this method of measuring the probable effect of a proposed change to check each item in the standard figures and substitute, where necessary, figures based on his individual experience. It is recognized that wide variations exist in production, and production requirements between individual ranches. The thing of greatest importance

*California Experiment Station Bulletin No. 461, "Economic Aspects of the Beef Cattle Industry."

†California Experiment Station Bulletin No. 473, "Economic Aspects of the Sheep Industry."

‡Unpublished data, Bureau of Agricultural Economics, U. S. Department of Agriculture.

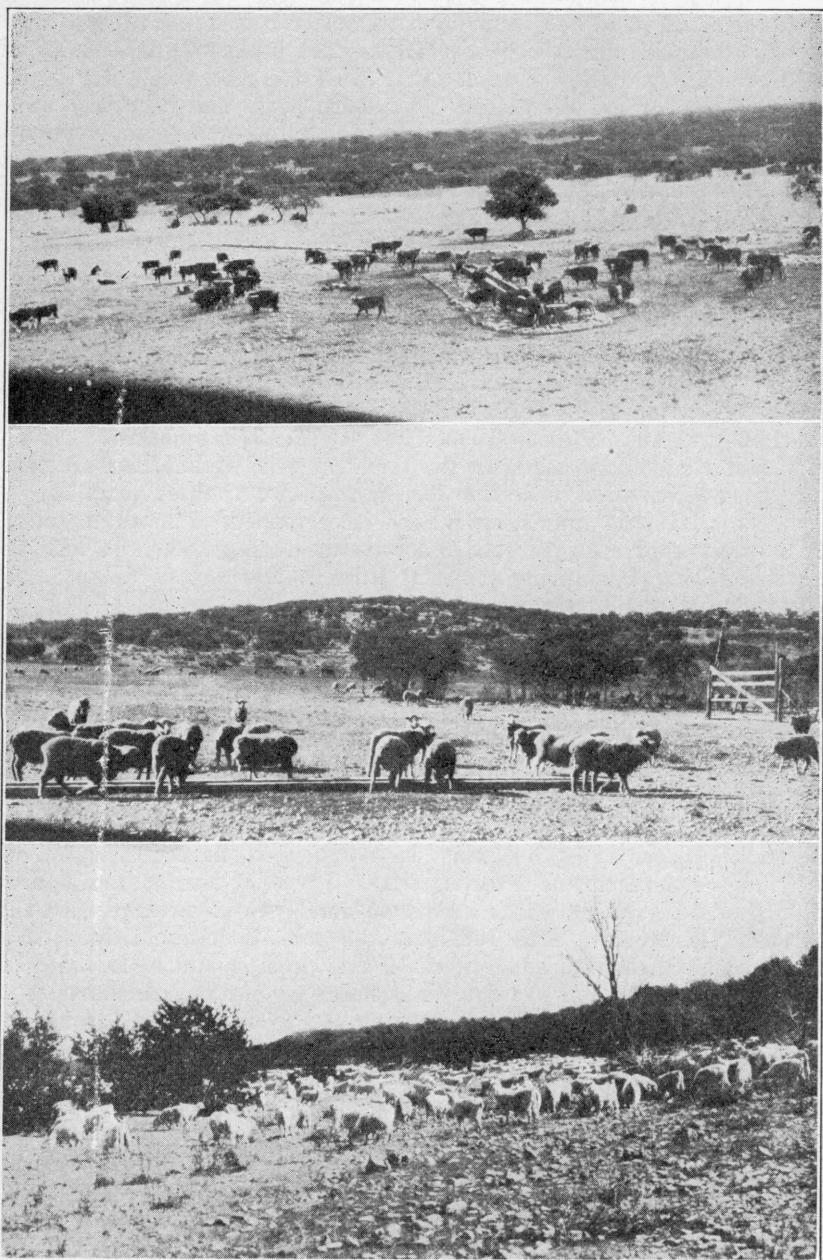


Figure 10.—Cattle, sheep, and goats are grazed in combinations for the best utilization of the range. Cattle predominate on the smooth, open grasslands; sheep are more numerous on the moderately rough, rolling lands; while goats are found in greatest numbers on the rough, broken, and brushy lands.

is that the ranchman, in planning changes, use production, production requirements, and prices approximating as closely as possible those of his ranch.

BUDGETING TO DETERMINE THE MOST PROFITABLE COMBINATION OF LIVESTOCK

The importance of ranch planning has already been stressed. The kind of information needed in making changes in ranch plans has been presented and explained. The next step is to illustrate the use of such information by relating it to organization problems of actual ranches.

Before the details of this illustration are presented, attention should again be called to the fact that certain physical factors such as soils, surface, climate, and vegetation set fairly definite limits on the kinds and numbers of livestock which can be grazed. According to a study made by V. L. Cory on the Ranch Experiment Station in Sutton and Edwards Counties,* grazing formed more than $\frac{3}{4}$ of the feeding time of cattle, about $\frac{4}{5}$ of that of sheep, and less than $\frac{2}{3}$ of that of goats. Browsing formed about $\frac{1}{12}$ of the feeding time of cattle, $\frac{1}{10}$ of that of sheep, and over $\frac{1}{2}$ of that of goats. This indicates that cattle and sheep are keen competitors in grazing, while goats compete to a much less extent. While cattle and sheep are keen competitors on the range, they are to some extent complementary. For example, sheep utilize a great many weeds that cattle leave untouched. They also better utilize short grasses. On the other hand, cattle better utilize taller and more mature growths, especially needle grass, which would not be utilized by sheep and otherwise tend to become a pest in the pastures. Goats, however, utilize the browse of the range with relatively little competition from either cattle or sheep. Any one of the three types of livestock may be substituted for either of the others to the extent that they compete for the same vegetation. Thus, at any particular time sheep may be substituted for a large portion of the cattle and vice versa, while goats can be substituted to a much more limited extent for either. In this way physical limits are set, within which price relationships operate to determine the most profitable combinations of the three types of livestock.

The results from a given combination of livestock or the effect of a change in such a combination may be closely approximated by budgeting. The ranch budget may roughly be defined as a systematic method of estimating how well a given combination of livestock will pay. It is calculated on the basis of the production, production requirements, and prices expected for the years just ahead. The ranch budget should state as concisely as possible the livestock organization, the production, the expenses, and the receipts of the particular ranch budgeted. The steps to be taken are given in detail as follows:

*"Activities of Livestock on the Range," Texas Station Bulletin No. 367.

1. Record the livestock combination planned.
2. Estimate the production of the different types of livestock, the number needed for replacement, and the number to be sold.
3. State the feed requirements and other expenses of livestock making a distinction between home-grown and purchased feeds.
4. Indicate the expected value of livestock and livestock products to be sold, and the expected cost of feeds, and other materials purchased. Allocate labor costs if possible.
5. In addition to direct costs for livestock, include estimates on the expense side for all repairs, taxes, ranch insurance, and other overhead items.
6. Summarize the expected expenses and receipts and indicate the net returns.

A ranch has been chosen from the group studied in detail to which the budgeting method will be applied in order to more clearly illustrate its use in ranch planning. The ranch used in the illustration contains 16.5 sections of land. The vegetation consists mainly of a mixture of curly mesquite and buffalo grass, and live oak, shin oak, and other brush, and is fairly typical of the range in this area on which cattle, sheep, and goats are grazed together. It is stocked at the rate of approximately 33 units of cattle, and 17 units of goats per section. The breeding herds consisted of 15 cows, 6 two-year heifers, 6 yearling heifers, and .6 bulls; and 73 does, 30 yearling does, and 2 bucks per section. In addition to the breeding herds and the annual increase, 30 chevons per section were carried.

Table 8—Detailed budget, **actual organization** 16.5—section ranch
 50 animal units per section (33 cattle and 17 goats)
 Section A: Organization, Production, and Sales

Livestock and livestock products	Number	Production	Death oss	Replacements raised	Replacements purchased	Sales	
						Amount	Sales
Cattle:							
Cows.....	250	75 (culls).....	10.0			75 (culls)	\$ 2,250.00
Replacements:							
2-yr. heifers.....	86		1.0	85			
1-yr. heifers.....	87		1.0	86			
Bulls.....	10	2 (culls).....	.5		2.5	2 (culls)	140.00
Calves.....		175		87		88	3,080.00
Total cattle.....							\$ 5,470.00
Goats:							
Does.....	1200	258 (culls).....	120.0			258 (culls)	\$ 774.00
Replacements:							
Yearling does.....	390		12.0	378			
Bucks.....	36	4 (culls).....	5.0		9.0	4 (culls)	60.00
Kids.....		780		780			
Yearling chevons.....	390	378	12.0			378	1,134.00
Mohair.....		8586 lbs. grown hair				8586 lbs.	
		1794 lbs. yrl. hair..				1794 lbs.	
		1014 lbs. kid hair...				1014 lbs.	5,977.80
Total goats.....							\$ 7,945.80
Grand total.....							\$13,415.80

Table 8 (Continued)—Detailed budget, **actual organization 16.5**—section ranch
Section B: Expenses*

Item	Cattle		Goats		Total	
	Amount	Cost	Amount	Cost	Amount	Cost
Labor.....	450 days	\$ 823.50	540 days reg. 300 days kid- ding	\$ 1,537.20	1,290 days	\$ 2,360.70
Feed:						
Cake.....	22,500 pounds	450.00	600 pounds	12.00	23,100 pounds	462.00
Salt.....	15,000 pounds	135.00	7,200 pounds	64.80	22,200 pounds	199.80
Freight on feed and salt.....	37,500 pounds	187.50	7,800 pounds	39.00	45,300 pounds	226.50
Freight on wool and mohair.....			11,394 pounds	56.97	11,394 pounds	56.97
Shearing.....			72 bucks			
Wool bags and rwine.....			4,350 other	314.85		314.85
Replacements:			45 bags	31.50	45 bags	31.50
Bulls and bucks.....	2.5 bulls	375.00	9 bucks	360.00		735.00
Miscellaneous expense.....						1,897.50
Horse expense.....						480.00
Total.....		\$ 1,971.00		\$ 2,416.32		\$ 6,764.82

*Depreciation, taxes, and interest not included.

Section C: Summary of Receipts and Expenses.

Receipts	Total	Expenses	Total
Cattle (Section A).....	\$ 5,470.00	Cattle (Section B).....	\$ 1,971.00
Goats (Section A).....	7,945.80	Goats (Section B).....	2,416.32
		Other Expenses:	
		Miscellaneous (Section B).....	1,897.50
		Horse Expense (Section B).....	480.00
Total receipts.....	\$ 13,415.80	Total expenses.....	\$ 6,764.82
Total net returns.....	\$ 6,650.98		
Net returns per section.....	\$ 403.62		

Handwritten calculations:

$$\begin{array}{r}
 1650 \\
 \hline
 646 \\
 \hline
 96000 \\
 96000 \\
 \hline
 10,56000
 \end{array}$$

Table 9—Detailed budget, revised organization, 16.5—section ranch
50 animal units per section (15 cattle, 27 sheep, and 8 goats)

Section A: Organization, Production, and Sales

Livestock and livestock products	Number	Production	Death loss	Replacements raised	Replacements purchased	Sales	
						Amount	Value
Cattle:							
Cows.....	130	26 (culls).....	5.0			26 (culls)	\$ 780.00
Replacements:							
2-yr. heifers.....	32		1.0	31			
1-yr. heifers.....	33		1.0	32			
Bulls.....	5	1 (cull).....	.25		\$ 1.25	1 (cull)	70.00
Calves.....		91		33		58	2,030.00
Total cattle.....							\$ 2,880.00
Sheep:							
Ewes.....	1800	403 (culls).....	126.0			403 (culls)	\$ 2,418.00
Replacements:							
Yearling ewes.....	540		11.0	529			
Rams.....	54	7 (culls).....	7.0		14.00	7 (culls)	105.00
Lambs.....		1350		540		810	4,455.00
Wool.....		19152 pounds.....				19,152 lbs. wool	6,320.16
Total sheep.....							\$13,298.16
Goats:							
Does.....	700	86 (culls).....	70.0			86 (culls)	\$ 258.00
Replacements:							
Yearling does.....	161		5.0	156			
Bucks.....	21	3 (culls).....	3.0		6.00	3 (culls)	45.00
Kids.....		455		161		294	882.00
Mohair.....		4809 lbs. grown hair				4809 lbs.	
		370 lbs. yrl. hair.....				370 lbs.	
		592 lbs. kid hair.....				592 lbs.	2,981.70
Total goats.....							\$ 4,166.70
Grand total of sales (Cattle, sheep and goats).....							\$20,344.86

Section B: Expenses*

Item	Cattle		Sheep		Goats		Total	
	Amount	Cost	Amount	Cost	Amount	Cost	Amount	Cost
Labor.....	234 days	\$ 428.22	810 days	\$1482.30	315 da. reg. 175 da.kid.	\$ 896.70	1534 days	\$2807.22
Feed:								
Cake.....	11700 lbs.	234.00	14400 lbs.	288.00	350 lbs.	7.00	26450 lbs.	529.00
Salt.....	7800 lbs.	70.20	14400 lbs.	129.60	4200 lbs.	37.80	26400 lbs.	237.60
Freight on feed and salt.....	19500 lbs.	97.50	28800 lbs.	144.00	4550 lbs.	22.75	52850 lbs.	264.25
Freight on wool and mohair.....			19152 lbs.	95.76	5771 lbs.	28.85	24923 lbs.	124.61
Shearing.....			4 rams 2340 other	244.80	42 bucks 2177 other	158.27		403.07
Wool bags and twine.....			96 bags	67.20	23 bags	16.10	119 bags	83.30
Replacement to B. Herd:								
Bulls, rams and tucks.....	1.25 bull	187.50	14 rams	490.00	6 bucks	240.00		917.50
Miscellaneous expense.....								1897.50
Horse expense.....							16 hd.	480.00
Total expense.....		\$1017.42		\$2941.66		\$1407.47		\$7744.05

*Depreciation, taxes, and interest not included.

Table 10 (Continued)—Detailed budget, revised organization, 16.5—section ranch

Section B: Expenses*

Item	Cattle		Sheep		Goats		Total	
	Amount	Cost	Amount	Cost	Amount	Cost	Amount	Cost
Labor.....	234 days	\$ 428.22	1048 days	\$1917.84	315 da. reg. 175 da. kid.	\$ 896.70	1772 days	\$3242.76
Feed:								
Cake.....	11700 lbs.	234.00	18640 lbs.	732.80	350 lbs.	7.00	30640 lbs.	613.80
Salt.....	7800 lbs.	70.20	18640 lbs.	167.76	4200 lbs.	37.80	30640 lbs.	275.76
Freight on feed and salt.....	19500 lbs.	97.50	37280 lbs.	186.40	4550 lbs.	22.75	61330 lbs.	306.65
Freight on wool and mohair.....			24800 lbs.	124.00	5771 lbs.	28.85	30571 lbs.	152.85
Shearing.....			70 rams 3030 other	317.00	42 bucks 2177 other	158.27		475.27
Wool bags and twine.....			124 bags	86.80	23 bags	16.10		102.90
Replacement to B. Herd:								
Bulls, rams and bucks.....	1.25 bull	187.50	18 rams	630.00	6 bucks	240.00		1057.50
Miscellaneous expense.....								1897.50
Horse expense.....								480.00
Total expense.....		\$1017.42		\$3802.60		\$1407.47		\$8604.99

*Depreciation, taxes, and interest not included.

Section C: Summary of Receipts and Expenses

Receipts	Total	Expenses	Total
Cattle (Section A).....	\$ 2,880.00	Cattle (Section B).....	\$ 1,017.42
Sheep (Section A).....	17,232.00	Sheep (Section B).....	3,802.60
Goats (Section A).....	4,166.70	Goats (Section B).....	1,407.47
		Other Expenses:	
		Miscellaneous (Section B).....	1,897.50
		Horse expense (Section B).....	480.00
Total receipts.....	\$ 24,278.70	Total expenses.....	\$ 8,604.99
Total net returns.....	\$ 15,673.71		
Net returns per section.....	\$ 949.92		

A complete budget for this organization, using the standard figures given in Tables 5, 6, and 7 as a basis, is shown in Table 8. The net returns of approximately \$400 per section is indicated. This is far below the return which may reasonably be expected from a ranch of this type when the production, production requirements, and prices used prevail. The question is raised as to what are some of the fundamental weaknesses of this organization. Two are at once apparent. No sheep are included in the livestock combination and the rate of stocking, or the number of animal units carried, is low compared with the normal carrying capacity of the ranch. For the most part, ranches which have realized average incomes or above during the past few years have had a well balanced combination of cattle, sheep, and goats. This suggests the possibility of increasing the income from this ranch by changing the livestock combination. The rate of stocking will be held constant (50 units), but the combination changed to 15 units of cattle, 27 units of sheep, and 8 units of goats per section. The calculated results of this

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change are shown in Table 9. This shows a net return per section of \$765.00 or an increase of \$360.00 per section over the actual organization. It is not claimed that the revised combination is the best possible to be derived, but it is apparent that it will give decidedly better returns than the actual organization being followed.

The low number of animal units grazed on this ranch suggests the possibility of increasing the income by increasing the rate of stocking. With this in mind let us see what would be the probable effect of increasing the number of animal units grazed by 8. In this case a combination of 15 units of cattle, 35 units of sheep, and 8 units of goats will be budgeted. The results are shown in Table 10. The net returns per section from this combination amount to \$950.00, an increase of \$185.00 per section over a combination of 15 units of cattle, 27 units of sheep, and 8 units of goats. It is not to be inferred from this illustration that 58 animal units is the best possible rate of stocking for ranches generally. This should be determined by such factors as the composition of the range, its condition, the topography of the land, the size of the pastures, water facilities, experience of the ranchman, etc. It is significant in this connection, however, that the ranches on which all three types of livestock were grazed were stocked at an average rate of 61 units per section. The ranch used in the above illustration is judged to be at least equal in carrying capacity to the average of the ranches studied.

In planning adjustments, each ranchman should use, in so far as it is possible, production and production requirement data for his own ranch. The data used as a basis for the above illustration represent average accomplishments, whereas the results secured on individual ranches vary widely. For example, the actual production of the ranch used in this illustration is materially above the standard but at the same time the production requirements are considerably higher than the requirements shown in the standard. If actual production and labor requirements were used in Tables 8 and 9, the returns per section would be \$560 as compared with \$405 when standard figures were used. This represents a difference of \$155 per section due to a difference in production and production requirements. However, when actual production and requirements are applied to the revised organization as given in Table 9, the returns per section are \$830 or \$270 per section in favor of the revised organization.

Up to this point the chief emphasis has been on the possibilities of increasing ranch income by improvements in organization. Before closing, we should like to call attention again to additional opportunities of increasing the ranch income through improved methods and practices in handling livestock. The possibilities in this connection are indicated by the wide variations in such factors as per cent of young, death losses, and shearing weights. For example, on the 21 ranches from which records were secured for a period of four years the average number of calves raised per 100 cows varied from 46 to 89, the number of lambs

per 100 ewes from 53 to 82, and the number of kids per 100 does from 52 to 80. On the same group of ranches death losses in the breeding herds varied from 0 to 8 per cent for cattle, from 1 to 20 per cent for sheep, and from 4 to 15 per cent for goats, while the wool clip for mature animals ranged from 7 to 10 pounds per head, and mohair from $4\frac{1}{2}$ to $7\frac{1}{2}$ pounds per head. It has been previously pointed out in a discussion of ranch income that these three factors accounted for approximately 50 per cent of the variation in income per section on the ranches studied. It is evident from these figures that much can be done to increase ranch income by improvements in the methods and practices of handling livestock. However, when practices are equally good, returns are greater on well organized ranches. Maximum returns depend upon the maintenance of the best possible combination of livestock with respect to range utilization and price relationships, and the effectiveness of the methods and practices followed.

SUMMARY

The extent of the Edwards Plateau grazing area is approximately 25,000,000 acres. Physical factors such as soils, climate, topography, and vegetation are such that most of the area is devoted to grazing. Cattle, sheep, and goats are the principal types of livestock produced and are generally grazed together on the same ranch.

A rather close relationship was found to exist between the distribution of livestock in the area and the vegetation and topography. In those counties lying north and west of Sutton County, where there is very little live oak and shin oak or good browse of any kind, goats are of minor importance compared with either cattle or sheep, while cattle are somewhat more important than sheep. In the central and southern parts of the area, where brush, and especially live oak and shin oak, makes up a large proportion of the vegetation, sheep and goats far exceed cattle in importance. Much of the range in this portion of the area is also less accessible to cattle than to sheep and goats because of its rough, broken character. The situation is reversed in those counties lying north and east of Gillespie County. Here cattle are much more important than either sheep or goats. Browse makes up a small proportion of the vegetation in these counties.

A high degree of uniformity in the practice of grazing cattle, sheep, and goats together on the same ranch was revealed, both by a special tabulation from the Census of 1925 and by data from the 31 ranches studied in detail during the period 1925-1928. In sharp contrast to this uniformity of livestock combination was the wide variation found in the proportions of each type from ranch to ranch, and in the case of the ranches studied in detail, the obvious and almost universal tendency of this proportion to change on each ranch from year to year.

The net income per section of the ranches studied showed a wide variation, ranging from \$1,850 to \$527 and even more extreme variations

when individual operations were considered instead of an average of the period studied. Such wide differences not only challenge one for a satisfactory explanation, but suggest the possibility of materially increasing ranch incomes.

Such factors as per cent of young raised, wool and mohair clip, death losses, prices received, and the rate of stocking of cattle, sheep, and goats accounted for approximately 73 per cent of the variation in net income per section. The first three of these factors accounted for almost 50 per cent of the variation in income. The number of calves per 100 cows varied from 46 to 89, lambs per 100 ewes 53 to 82, and kids per 100 does 52 to 80. Death losses in the breeding herds varied from 0 to 8 per cent for cattle, from 1 to 20 per cent for sheep, and from 4 to 15 per cent for goats. Wool clips ranged from 7 to 10 pounds per head and mohair from 4.5 to 7.5 pounds per head. It is evident from these figures that much can be done to increase ranch incomes by improvements in those methods and practices of handling livestock which are responsible for the variation in these factors.

The primary objective of this Bulletin is the presentation of a satisfactory method of planning and testing the effect of contemplated changes in the livestock organization of ranches. The method used and the results which may be expected from certain changes are illustrated in the case of one of the actual ranch organizations studied in detail. This organization consisted of 33 units of cattle, no sheep, and 17 units of goats per section. Two major weaknesses were apparent. First, the livestock combination was poor in that sheep were left out, and second, the rate of stocking was considerably below the normal carrying capacity of the ranch. Two changes have been planned in an effort to improve the organization of this ranch. The first change was to reduce cattle to 15 units, goats to 8 units, and substitute 27 units of sheep, retaining the total number of units (50). The next change was to increase the total units from 50 to 58 by increasing sheep by 8 units; thus resulting in the following three organizations:

1. 33 units of cattle, no sheep, and 17 units of goats (actual).
2. 15 units of cattle, 27 units of sheep, and 8 units of goats (revised).
3. 15 units of cattle, 35 units of sheep, and 8 units of goats (revised).

These were budgeted, showing a net income per section of \$405, \$765, and \$950, respectively.

APPENDIX

The following tables include the basic data from which the standard figures given in Tables 5, 6 and 7 were largely derived. Tables 11 and 12 relate to the financial phases of the business. Tables 13 to 16 show the average rate of stocking and the physical requirements of production on each of the co-operating ranches. Tables 17 to 20 have to do with price factors.

Table 11—Average expense and net income per section for cattle, sheep, and goats, and average net income for each ranch, 1925-1928*

Ranch No.	Number years records	Cattle		Sheep		Goats		Total per section		Net income per ranch
		Expense per section	Net income per sec.	Expense per section	Net income per sec.	Expense per section	Net income per sec.	Expense per section	Net income per sec.	
1.....	4	\$ 626	\$ —64	\$ 385	\$ 659			\$ 1011	\$ 595	\$ 2378
2.....	4	185	225	340	917	\$ 139	\$ 424	664	1566	16586
3.....	4	173	271	252	477	219	423	644	1171	12886
4.....	4	1096	000	469	638	297	236°	1788	815	1019
5.....	4	165	183	487	562	103	170	755	915	4574
6.....	4	203	230	512	763	104	255	819	1248	16339
7.....	4	464	—92	1330	1527	212	60	2006	1495	2990
8.....	3	297	—14	835	1050	32	13†	1142	1041	3111
9.....	4	172	127	414	969	225	754	811	1850	19429
10.....	4	263	391	101	155‡	197	524	510	992	16376
11.....	4	225	189	471	964	85	140°	760	1258	7547
12.....	4	181	85	453	1181	60	173	694	1439	21292
13.....	4	174	129	353	1054	37	94°	554	1250	11998
14.....	4	220	119	335	961	56	146°	598	1190	14196
15.....	4	79	2	354	884	109	309	542	1195	10798
16.....	4	124	2	402	710	132	424	658	1136	7919
17.....	4	221	152	353	1058			574	1210	56611
18.....	2	168	209	349	227	91	91	608	527	23872
19.....	4			1328	1028	170	263	1498	1291	18387
20.....	3	114	461	522	655	264	581	862	1266	5038
21.....	4	180	91	466	286	231	330	877	707	11139
22.....	4	198	353	391	437	155	455	744	1245	3733
23.....	4	305	163	203	443			508	606	19696
24.....	4	304	153	271	474	141	336	716	963	11547
25.....	2	160	184	262	815	155	460	577	1459	11019
26.....	3	69	10	632	1024	104	166	805	1200	7197
27.....	3	113	26	490	975	46	130	649	1131	10734
28.....	2	238	79	662	1327	200	326	1100	1732	6930
29.....	2	158	6	324	878	38	107	520	991	20527
30.....	1	157	99	336	1232	83	247	576	1578	9473
31.....	1	208	193	340	412	207	367	755	972	8745
Av. for period....		\$ 215	\$ 150	\$ 412	\$ 754	\$ 134	\$ 294	\$ 701	\$ 1085	
Av. for 1925....		223	142	424	632	138	173	723	876	
Av. for 1926....		189	147	356	497	116	313	623	871	
Av. for 1927....		241	138	429	884	128	260	728	1159	
Av. for 1928....		211	173	448	1057	156	416	737	1463	

*"Expenses" include current expenses, depreciation, and a labor allowance of \$60 per month for unpaid labor. In order to make the ranches comparable all have been placed on an ownership basis. Taxes on real estate and depreciation on permanent improvements have been charged instead of lease charges.

†One-year average. ‡Two-year average. °Three-year average.

Table 12—Distribution of investments of 31 ranches studied, average 1925-1928

Ranch No.	Average size in sections	Average investment in:						Average total investment	
		Land	Improvements*	Equipment	Horses and horse equipment	Cattle	Sheep		Goats
1.....	4.00	\$ 32656	\$ 4596	\$ 958	\$ 472	\$ 4371	\$ 5995	\$ 49048	
2.....	10.59	86878	12164	3370	744	6762	22147	136525	
3.....	11.00	75312	10263	1596	810	7898	13792	117650	
4.....	1.25	9262	4786	1975	236	1634	1377	19762	
5.....	5.00	39384	4105	2001	244	2736	11042	61179	
6.....	13.09	84828	11617	3534	1185	10806	35394	152072	
7.....	2.00	16038	5280	2731	212	503	8080	33117	
8.....	2.99	29424	3131	2703	415	1330	10308	47468	
9.....	10.50	69650	12055	2864	808	6088	28030	133324	
10.....	16.50	120079	10557	2848	1226	16960	3761	165393	
11.....	6.00	46448	6251	1192	371	3880	15418	75092	
12.....	14.79	96671	23815	3529	1087	10680	44935	183277	
13.....	9.60	80282	8772	2136	564	6267	21276	120150	
14.....	11.93	104494	15470	1709	1088	8088	26356	158592	
15.....	9.03	72219	11600	1232	794	2154	19699	110561	
16.....	6.98	63412	11878	2498	549	1810	14934	98817	
17.....	46.79	299430	17868	.....	419	31831	70051	419599
18.....	45.26	292670	55564	4399	2900	28340	56154	446729	
19.....	14.24	91150	22850	9971	246	.....	56979	185576
20.....	3.98	31122	5642	2052	287	2536	8487	53526	
21.....	15.75	124500	19382	4242	1927	7881	34612	200577	
22.....	3.00	23981	5096	1103	442	3445	8350	44015	
23.....	32.50	226000	26974	2568	854	51493	27976	335865	
24.....	12.00	81389	12460	3131	821	19661	16960	140956	
25.....	7.55	48330	7561	1225	572	4605	18130	83895	
26.....	6.00	52882	11320	2114	623	1128	14671	83631	
27.....	9.49	60740	7732	1525	583	2195	18806	92942	
28.....	4.00	31915	2628	1338	155	2408	10692	50828	
29.....	20.70	146042	15893	278	1050	15110	34210	214848	
30.....	6.00	49992	608	940	460	3810	11685	73891	
31.....	9.00	76925	7580	3414	565	4640	13940	111569	
Av. per section...		\$ 7171	\$ 1025	\$ 202	\$ 61	\$ 730	\$ 1842	\$ 275	\$ 11306

*Dwellings not included.

Table 13—Average rate of stocking with cattle, sheep, and goats, 1925-1928

Ranch Number	Average size in sections	Cattle per section			Sheep per section			Goats per section			Total units per section	
		Cows	*Total No. head	Units	Ewes	*Total No. head	Units	Does	*Total No. head	Units		
1.....	4 00	12	26	26	.....	173	26	.....	.....	.....	52	
2.....	10 59	12	24	24	.....	209	31	.....	53	98	13	68
3.....	11 00	10	22	22	.....	83	146	22	85	135	18	62
4.....	1 25	31	55	55	.....	57	129	19	70†	97	13	84
5.....	5 00	11	22	22	.....	151	250	37	16	48	6	65
6.....	13 09	12	27	27	.....	83	154	23	80	107	14	64
7.....	2 00	4	9	9	.....	161	279	42	32	44	6	57
8.....	2 99	23	34	34	.....	103	308	46	†	11	1	81
9.....	10 50	9	18	18	.....	140	223	33	41	74	10	61
10.....	16 50	14	30	30	.....	8†	47	7	57	107	14	49
11.....	6 00	12	23	23	.....	180	275	41	31†	50	6	69
12.....	14 79	5	13	13	.....	116	222	33	22	39	5	51
13.....	9 60	10	22	22	.....	171	254	38	18†	28	4	63
14.....	11 93	11	23	23	.....	125	214	32	8	25	3	58
15.....	9 03	4	8	8	.....	116	214	32	32	69	9	49
16.....	6 98	10	13	13	.....	140	240	36	57	97	12	61
17.....	46 79	9	17	17	.....	127	208	31	.....	.....	.....	48
18.....	45 26	8	16	16	.....	63	136	20	18	36	5	41
19.....	14 24	.....	.....	.....	.....	108	235	35	34	63	8	43
20.....	3 98	6	10	10	.....	168	246	37	9	136	18	65
21.....	15 75	7	15	15	.....	138	223	33	97	136	18	66
22.....	3 00	11	26	26	.....	150	242	36	75	110	14	76
23.....	32 50	19	36	36	.....	.....	136	20	.....	.....	.....	56
24.....	12 00	15	29	29	.....	101	153	23	55	96	12	64
25.....	7 55	6	24	24	.....	4	181	27	85	104	14	65
26.....	6 00	15	21	21	.....	184	281	42	21	41	5	68
27.....	9 49	5	8	8	.....	169	236	35	19	30	4	47
28.....	4 00	8	20	20	.....	231	300	45	32	45	6	71
29.....	20 70	10	21	21	.....	95	180	27	21	27	4	52
30.....	6 00	.....	19	19	.....	164	249	37	27	46	6	62
31.....	9 00	9	16	16	.....	146	179	27	92	112	14	57
Average for period.....	.....	10	21	21	.....	99	190	28	32	54	7	56
Average for 1925.....	.....	14	24	24	.....	92	185	28	32	50	6	58
Average for 1926.....	.....	11	22	22	.....	96	187	28	35	54	7	57
Average for 1927.....	.....	9	18	18	.....	94	189	28	30	55	7	53
Average for 1928.....	.....	8	18	18	.....	114	199	30	30	55	7	55

*Equivalent number of mother animals,

†One-year average.

‡Three-year average.

Table 14—Average calf, lamb, and kid crop, shearing weights, and death losses in breeding herds, 31 ranches, 1925-1928

Ranch Number	Number years records	Per cent calf, lamb, and kid crop						Method of Kid-ding*	Average shearing weights, 1927-1928				Per cent death loss in breeding herd		
		Calf crop		Lamb crop		Kid crop			Mature Sheep (12 Mo.)	Grown Goats (12 Mo.)	Yrs. goats Spring Clip	Kids Fall Clip	Cattle	Sheep	Goats
		Marked	Raised	Marked	Raised	Marked	Raised								
1	4	71	70					9.9†				3.7	5.1†		
2	4	66	63	84	81	69	66	Loose	7.8	6.7	2.6	1.0	4.0	6.2	6.8
3	4	87	87	66	51	67	62	Hand	7.2	6.9	2.2	1.1		14.4	10.2
4	4	90	89	79	77	66	56	Hand	9.0				1.7	1.2	2.0
5	4	56	56	61	55	83	80	Loose	7.5	6.6	2.6	1.3		20.3	
6	4	73	73	69	66	72	69	Loose	7.9	5.5	2.1	1.2	2.1	6.6	5.8
7	4	85	85	77	75	57	57	Hand	10.0	6.8	3.3	2.5		3.4	8.9
8	3	59	59	62	60				7.6				.7	3.9	
9	4	71	70	77	76	70	67	Hand	8.9	7.0	2.4	2.6	1.4	4.4	3.6
10	4	82	81			87	80	Hand		7.6	3.1	1.5	2.0	7.3	5.2
11	4	85	84	81	79	82	76	Hand	7.2	4.6	2.0	1.3	1.2	8.6	15.0
12	4	49	47	83	80	70	68	Loose	8.9	7.3	1.9	2.0	8.0	3.5	13.2
13	4	83	83	80	78	77	76	Loose	7.9	5.9	2.2	1.2	.8	7.8	7.8
14	4	60	58	83	76	96	92	Loose	8.9	6.6	1.8	1.3	1.8	4.2	9.2
15	4	46	46	80	76	75	67	Both	8.9	7.2	2.1	1.1	6.1	8.9	15.1
16	4	51	48	82	74	74	70	Hand	7.0	6.0	2.1	2.0	4.9	13.1	7.3
17	4	71	70	88	82				8.0				1.1	4.5	
18	2	64	64	81	74	76	70	Both					.8	3.1	7.2
19	4				58		51	Loose						13.9	23.0
20	3			89	86				7.0	6.7	2.0	1.2		7.3	5.6
21	4	78	78	64	58	67	52	Hand	10.3†	4.5	1.5		7.8	10.8	11.9
22	4	65	65	64	53	62	56	Loose	6.3	6.5	2.3	1.3	2.2	5.6	9.0
23	4	63	63						10.4†				5.2	2.3	
24	4	89	82	75	69	73	63	Hand	8.1	5.6	2.3	.9	3.4	7.8	7.1
25	2	78	76			82	78	Both	7.4†	5.6				2.9	1.7
26	3	74	74	88	84	72	61	Loose	7.6	6.5	2.6	1.4	3.8	3.9	11.9
27	3	62	60	85	82	86	83	Loose	7.2	5.0	2.2	1.4	2.0	4.4	8.6
28	2	90	90	86	86	77	76	Loose	8.4	5.2	2.4	1.4	3.8	2.8	7.0
29	2	79	77	93	91	92	89	Loose	9.4	6.2		1.9	3.0	4.1	6.3
30	1			91	85	79	70	Loose	8.2	5.7	2.5	2.3	.9	10.0	5.9
31	1	72	72	64	55	41	39	Hand	9.3	5.2	2.9			6.0	31.2
Average for period		72	71	79	75	72	65		8.3	6.2	2.3	1.4	2.9	7.0	9.6
Average for 1925		66	64	73	67	53	48						4.4	9.9	13.6
Average for 1926		74	72	81	77	80	72						1.7	8.0	7.7
Average for 1927		76	75	78	76	79	74		7.9	6.0	2.1	1.2	3.1	6.2	5.4
Average for 1928		74	73	82	79	76	67		8.7	6.5	2.5	1.5	1.9	4.4	11.6

*"Kidding by Hand" as used here includes all methods where kids are not allowed to run loose in the pasture at all times. Average kid crop raised from 15,000 does kidded loose, 68 per cent. Average kid crop raised from 24,000 does kidded by hand, 63 per cent.

†Wethers. ‡One-year average.

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Table 15—Average labor requirements of cattle, sheep, and goats as estimated by ranchmen, 1925-1928

Ranch Number	Average size in sections	Av. total days labor per year	Av. total days labor per year per section	Av. No. cows per year	Av. No. days labor per cow*	Av. No. ewes per year	Av. No. days labor per ewe*	Av. No. does per year	Av. No. days labor per doe*	Av. No. days extra kidding labor
1.....	4.00	296	74	43	3.43	917†	.16			
2.....	10.59	1080	102	128	1.44	1161	.51	566	.53	
3.....	11.00	1377	125	96	3.08	915	.43	935	.37	.30
4.....	1.25	256	205	39	4.64	71	1.58	88	.70	
5.....	5.00	524	105	75	.97	756	.45	127	.87	
6.....	13.09	1219	93	158	1.54	1089	.60	726	.44	
7.....	2.00	712	356	8	15.34	322	1.47	64	1.72	
8.....	2.99	488	163	39	2.03	645	.62	84	.32	
9.....	10.50	760	72	88	.94	1466	.21	435	.85	
10.....	16.50	1679	102	227	2.58	1122†	.26	937	.64	.37
11.....	6.00	690	115	70	2.21	1081	.41	173	.55	.16
12.....	14.79	1401	95	70	3.48	1713	.58	308	.50	
13.....	9.60	811	84	119	2.11	1640	.31	145	.51	
14.....	11.93	822	69	129	1.64	1488	.34	126	1.07	
15.....	9.03	694	77	40	1.79	1049	.42	293	.53	
16.....	6.98	475	68	65	.92	976	.29	397	.30	
17.....	46.79	2571	55	416	1.87	5927	.30			
18.....	45.26	2032	45	379	2.12	2840	.86	820	.98	
19.....	14.24	2024	142			1537	1.06	492	.82	
20.....	3.98	528	133	22	1.21	668	.47	790†	.24	
21.....	15.75	1982	126	118	2.47	2163	.44	1524	.25	.24
22.....	3.00	85	28	32	.39	450	.11	224	.11	
23.....	32.50	1499	46	623	1.22	4628†	.16			
24.....	12.00	937	78	132	1.95	1217	.28	657	.28	.23
25.....	7.55	822	109	146†	.97	1985†	.20	642	.41	
26.....	6.00	744	124	72	.99	1076	.54	122	1.10	
27.....	9.49	651	68	45	3.12	1602	.27	173	.46	
28.....	4.00	720	18	33	2.71	923	.54	128	.98	
29.....	20.70	1221	59	202	.79	1960	.48	427	.26	
30.....	6.00	511	85	109†	.70	985	.31	162	.79	
31.....	9.00	1226	136	78	2.86	1313	.36	830	.31	.33
Average for period.....					1.87		.45		.50	.28

*Total days labor charged to each type of livestock divided by number of mother animals of each type.
†Dry stock.

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Table 16—Average amounts of feeds and salt fed to livestock, allocated on the mother animal basis, 1925-1928

Ranch Number	Average number cows	Cake, Lbs. per cow	Hay, Lbs. per cow	Grain, Lbs. per cow	Salt, Lbs. per cow	Average number ewes	Cake, Lbs. per ewe	Hay, Lbs. per ewe	Grain, Lbs. per ewe	Salt, Lbs. per ewe	Average number does	Cake, Lbs. per doe	Hay, Lbs. per doe	Grain, Lbs. per doe	Salt, Lbs. per doe
1.	46	1069.73	160.33	374.21	79.00	1036*	2.66			3.61	650	.38		.10	5.50
2.	154	39.09	61.89		42.44	1265	9.98		.13	7.06	650				6.08
3.	88	56.50			142.66	1048	16.94			7.61	1053				5.14
4.	42	199.70	190.48		60.74	182	2.51	19.18	4.11	5.28	120	12.45	16.60		2.63
5.	76*	13.11			31.52	818	5.50	2.75	.34	5.93	344*	.44		.70	4.89
6.	160	122.62	140.91	3.29	61.13	1242	48.24	139.68	24.23	9.08	758	14.98			6.62
7.	10†	1239.02	780.49		77.00	292	46.84	22.24	22.02	12.09	72				1.12
8.	50	40.00			40.24	790	8.65			6.60	201*	20.74	10.23	1.87	6.54
9.	103	46.80			58.67	1575	20.80			6.97	445				4.78
10.	328	136.22	1.90		31.45	1360*				2.96	978				10.79
11.	78	204.19		1.44	61.06	1122	13.12		1.27	7.97	182			.24	14.40
12.	96	47.23			89.72	1902	9.92	5.47	2.23	15.99	329				6.51
13.	180	97.86	36.75		30.79	1724	1.04			6.27	113				13.46
14.	163	97.86			54.43	1544	.99	1.39	.16	7.97	132	5.05			6.76
15.	40	79.93	8.16		64.63	1258	1.69	.42		6.53	332	.22		.13	5.22
16.	74	13.54			21.85	1066	9.73	5.39	2.87	5.55	426	1.47			7.44
17.	724	154.83	181.93		44.91	6462	30.11	54.99	1.87	9.47	851	15.23	.71	.28	6.63
18.	393				57.27	3001	107.52	26.57	2.37	6.80	525	13.80			2.31
19.	88*		80.68		8.81	791	11.12	1.90	.76	3.95	718*	.64		.07	4.70
20.	171	94.80	110.95		36.84	2355	9.87	27.81	.10	5.85	1562				9.60
21.	43	28.90			116.65	470	23.11			3.44	235				4.10
22.	639	183.33	128.56		40.40	4479*	7.31			4.64	753	.66			4.05
23.	24	159.82	507.27		47.10	1204	30.01		.34	2.37	691		1.28		11.17
24.	136*	34.80			36.58	2323*			.60	10.69	130				6.50
25.	78				37.54	1117	1.67	.02		5.38	181				1.97
26.	49	129.05		4.32	58.43	1776	1.67			10.79	327				6.46
27.	39	12.99			57.14	959	3.20		2.47	5.22	440				5.42
28.	236	208.63			80.74	2106	4.06			1.92	166				5.83
29.	106*	59.43			25.47	1035				7.77	987	2.73	.60	.18	5.14
30.	80	110.00			62.50	1331		24.34	1.56	7.08		5.26	.49	.20	6.52
31.					50.55		16.72	12.27	1.72	6.52		.86	1.67	.08	6.58
Average for period.....		111.10	74.36	5.05	37.31		50.18	22.32	1.19	7.08		2.73			5.83
Average for 1925.....		96.66	106.45	4.70	37.31		60.18	22.32	1.19	7.08		5.26	.49	.20	5.14
Average for 1926.....		62.10	45.00	1.73	50.74		6.94	10.24	2.08	6.52		.86	1.67	.08	6.52
Average for 1927.....		160.05	37.40	11.23	50.23		6.08	10.92	1.76	6.30		.89		.03	6.58
Average for 1928.....		166.15	103.56	3.98	85.58		9.28	7.32	1.73	11.07		3.68	.15	.40	6.27

*Dry stock—not included in averages.
†Principally milk cows—not included in averages.

Table 17—Average net price received by ranchmen for calves, lambs, and kids, 1925-1928*

Ranch Number	Calves					Lambs					Kids					
	1925	1926	1927	1928		1925	1926	1927	1928		1925	1926	1927	1928		
1	\$ 25.00	\$ 30.00	\$ 30.00	\$ 41.11												
2	12.50	22.50		35.00												
3			30.00	42.50		\$ 6.20										
4	20.00	27.50	30.00	40.00		7.35										
5				37.18		6.00										
6	27.50	30.00	27.50	45.00		5.50										
7						7.24										
8	8.75			45.00		5.75										
9	10.00			41.01		29.72										
10	25.00			45.00		6.55										
11	22.50					5.83										
12				14.18		6.57										
13						5.44										
14	15.25	30.00		40.00		5.32										
15				15.00		6.79										
16	21.25			32.50		6.00										
17	19.40	20.59		42.38		7.33										
18						5.75										
19						6.49										
20						6.28										
21						4.82										
22				39.00		5.91										
23				38.75		6.41										
24	30.00	30.00	30.00	45.11		6.00										
25	26.00	35.00		45.00		6.50										
26		27.50	28.00			5.76										
27		25.17														
28						5.85										
29						5.99										
30						5.93										
31				46.92		10.85										
				40.00												
Average for year.....	\$ 20.89	\$ 24.11	\$ 26.02	\$ 42.18		\$ 6.73	\$ 5.82	\$ 6.71	\$ 7.06	\$ 2.92	\$ 3.02	\$ 3.85	\$ 4.80			

*Price per head.

Table 18—Average net price per pound received by ranchmen for wool and mohair, 1925-1928

Ranch Number	Wool						Mohair									
	1925		1926		1927		1928		1925		1926		1927		1928	
	Long wool	Short wool	Long wool	Short wool	Long wool	Short wool	Long wool	Short wool	Old hair	Yrl. and kid hair	Old hair	Yrl. and kid hair	Old hair	Yrl. and kid hair	Old hair	Yrl. and kid hair
1	\$.52		\$.40		\$.37		\$.43		\$.55	\$.70	\$.63	\$.78	\$.63	\$.63	\$.61	\$.84
2	.50		.36		.37		.39		.57	.70	.64	.78	.53	.62	.68	.80
3	.55	\$.26	.35		.38		.44		.62	.70	.59	.70	.53	.64	.68	.83
4	.45	.41	.36	.30	.38		.36		.50	.68	.58	.77	.53	.64	.69	.75
5	.45	.26	.36	.30	.37	\$.30	.36		.57	.60	.60	.71	.52	.60	.69	.75
6	.45		.30		.36		.43		.57	.64	.64	.77	.53	.64	.68	.76
7	.52		.40		.36											
8	.51		.34		.37		.40		.56	.72	.64	.77	.64	.64	.68	.80
9	.54	.40	.28	.28	.37		.40		.56	.74	.63	.78	.53	.63	.68	.80
10	.47	.36	.30	.28	.37	.22	.40		.53	.62	.30	.76	.53	.63	.70	.82
11	.47	.38	.38	.29	.38	.34	.35	.38	.53	.62	.55	.70	.62	.64	.66	.77
12	.48	.41	.36	.28	.34		.40		.53	.63	.64	.77	.53	.63	.69	.75
13	.40	.42	.25	.25	.36	.41	.33		.55	.70	.63	.78	.53	.62	.68	.74
14	.40	.37	.30	.30	.37	.30	.43		.53	.70	.64	.77	.53	.62	.67	.80
15	.43		.35		.38		.42	.35	.53	.70	.64	.78	.53	.63	.67	.79
16	.43	.39	.27	.28	.40	.33	.42		.54	.68	.59	.75	.54	.63	.67	.76
17	.43	.26	.34	.27	.38	.38	.42	.36	.55	.67	.64	.77	.64	.62	.67	.80
18	.48	.48	.36	.27	.38	.30	.39	.36	.55	.71	.63	.81	.53	.86	.69	.85
19	.49	.37	.40	.31	.38		.37		.59	.69	.62	.62	.53	.62	.66	.76
20	.50	.40	.40	.32	.37	.43	.34		.53	.68	.60	.74	.53	.63	.69	.82
21	.35	.27	.35	.27	.37	.32	.39									
22	.35	.27	.36	.27	.37	.30	.40	.34								
23	.36	.41	.36	.27	.36	.42	.41									
24	.36	.41	.36	.27	.36	.41	.38									
25	.39	.39	.38	.27	.38	.27	.38	.34								
26	.39	.39	.38	.27	.38	.27	.38	.34								
27	.39	.39	.38	.27	.38	.27	.38	.34								
28	.39	.39	.38	.27	.38	.27	.38	.34								
29	.39	.39	.38	.27	.38	.27	.38	.34								
30	.39	.39	.38	.27	.38	.27	.38	.34								
31	.39	.39	.38	.27	.38	.27	.38	.34								
Average.....	\$.47	\$.39	\$.36	\$.28	\$.37	\$.32	\$.40	\$.35	\$.55	\$.70	\$.62	\$.76	\$.53	\$.63	\$.68	\$.80

Table 19—Average price per pound received for wool and mohair by a leading warehouse within the area, 1917-1929

Year	Wool			Mohair			
	12 month wool	8 month wool	4-Mo. (Fall) wool	Spring		Fall	
				Grown hair	Yearling hair	Grown hair	Kid hair
1917.....	\$.500	\$.4850	\$.4400	\$.45*		\$.48*	
1918.....	.460	.5430	.4300	.68		.65	
1919.....	.515	.5050	.4800	.53		.55	
1920.....	.180	.2200	.2000	.44		.46	
1921.....	.200	.1800	.2200	.43		.45	
1922.....	.470	.4100	.3300	.44		.47	
1923.....	.380	.4000	.3200	.54	.64	.42	.85
1924.....	.440	.4400	.5200	.60	.85	.64	.76
1925.....	.400	.4400	.4000	.50	.60	.59	.70
1926.....	.350	.3100	.2625	.59	.76	.59	.76
1927.....	.390	.3275	.3350	.52	.62	.53	.63
1928.....	.375	.4200	.3475	.66	.77	.64	.76
1929.....	.315	.3250	.1893	.51	.61	.46	.56

*Grown hair and yearling hair and grown hair and kid hair were sold together until 1923.

Table 20—Prices, relative values, and purchasing power of cattle and sheep in the United States, and wool and mohair at Boston, 1913-1928*

Year	All commodity index-Jan. each year	Cattle			Sheep			Wool†			Mohair‡		
		Value dollars per head Jan. 1	Relative value	Relative purchasing power	Value dollars per head Jan. 1	Relative value	Relative purchasing power	Price cents per Lb.	Relative price	Relative purchasing power	Price cents per Lb.	Relative price	Relative purchasing power
1913.....	102	26.36	114	112	3.94	101	99	56	93	91			
1914.....	100	31.13	132	132	4.02	103	103	59	98	98			
1915.....	100	33.38	141	141	4.50	116	116	71	118	118	35	100	100
1916.....	115	33.53	142	123	5.17	133	116	84	140	134	43	122	106
1917.....	156	35.88	152	97	7.13	183	118	157	260	167	61	174	112
1918.....	188	40.88	173	92	11.82	304	162	182	304	162	63	180	96
1919.....	202	44.22	187	92	11.63	299	148	178	297	147	59	169	84
1920.....	237	43.21	183	77	10.46	269	115	160	267	112	48	134	57
1921.....	173	31.36	133	77	6.28	161	93	85	142	82	26	75	43
1922.....	141	23.80	101	71	4.80	123	88	125	208	148	42	120	85
1923.....	159	25.67	108	68	7.53	194	122	141	235	148	72	205	129
1924.....	154	24.44	103	67	7.91	203	132	142	236	153	73	210	136
1925.....	163	23.94	101	62	9.70	249	153	140	233	143	75	215	132
1926.....	159	27.43	116	73	10.51	270	170	115	192	121	68	194	122
1927.....	150	29.87	126	84	9.71	250	166	110	183	122	63	181	120
1928.....	149	38.95	165	110	10.25	263	177	116	193	130	71	202	135

*Base price, average 1910-1914 for cattle, sheep, and wool and average 1915 for mohair.

†Average price fine Territory Scoured (Boston quotations).

‡Average price domestic combing (Boston quotations).