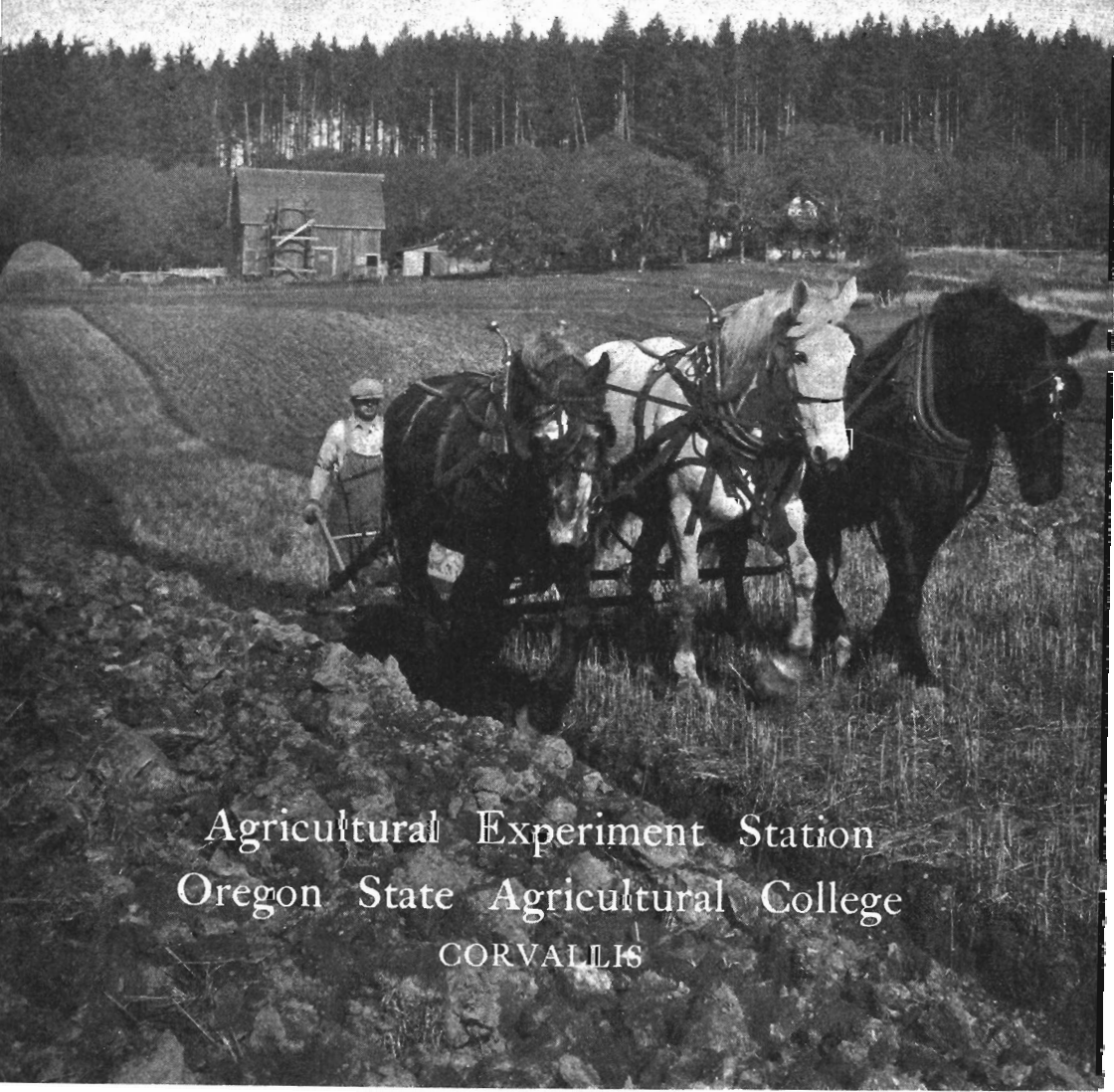


Cost of Horse Labor on Oregon Farms



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SUMMARY

The average cost of horse labor in six important irrigated regions in Oregon was 9.9c per horse-hour, in the Willamette Valley 13.0c, on Eastern Oregon dry-land wheat farms 10.9c, on the State Agricultural College campus and experiment farm 15.1c, and for horses used in the city of Portland, 21.4c.

* * *

The average number of hours of work per horse annually was 825 in the irrigated regions, 753 in the Willamette Valley, 746 on the dry-land wheat farms, 1,928 for the College horses, and 2,504 for the city horses.

* * *

The chief factor affecting the cost per horse-hour was the number of hours that the horse worked during the year, the cost being less for horses that worked more hours. Hence the biggest opportunity to reduce the cost of horse labor is to increase the amount of work per horse.

* * *

On some farms this can be done by eliminating extra horses that are not really needed. On other farms it can be done by carefully planning and reorganizing the cropping system to reduce the number of horses required. On still other farms profitable enterprises can be added to the farm business to keep busy the horses that must be kept any way.

* * *

Other means of reducing horse-labor costs are by selling horses when they pass their prime and having colts to take their places, and by keeping the horses on pasture as much as possible not only to save hay and grain but also to reduce the amount of chore labor.

The Cost of Horse Labor on Oregon Farms

By

H. E. SELBY, B. W. RODENWOLD, and H. D. SCUDDER

In the ten years from 1919 to 1929 the number of horses on Oregon farms decreased from 303,000 to 181,000, about forty percent. This decrease has been caused partly by the decrease in the raising of horses to supply the city market, which has largely disappeared, and partly by the replacement of work horses on farms with tractors and trucks.

In spite of this great decrease, however, horses are still the most important source of power on the farm, and doubtless will continue to be for some time. Cost-of-production investigations show that horse labor makes up from 5 to 15 percent of the cost of farm products. The cost of this item, and the means of reducing it, are therefore important enough to merit serious consideration.

This bulletin presents (1) costs of horse labor in 1926 in six important irrigated regions in Oregon and in the Willamette Valley, (2) costs of horse labor on Eastern Oregon dry-land wheat farms in 1921 and 1922, (3) costs of city horse labor, 1924 to 1928, for a representative city user of horses, (4) costs of horse labor on the experiment farm and campus at Oregon State Agricultural College, 1916-1927.

COST OF HORSE LABOR IN THE IRRIGATED REGIONS AND IN THE WILLAMETTE VALLEY

These costs were obtained in connection with a state-wide survey of the cost of producing forage crops in Oregon. The data are for the year 1926 and were obtained in personal interviews with 147 farmers in six important irrigated regions in Eastern and Southern Oregon and with 49 farmers in the Willamette Valley.

The irrigated regions in which the study was conducted, and the number of farms covered in each region, are as follows: Malheur county, 29 farms; Union and Baker counties, 17 farms; Umatilla county, 19 farms; Deschutes and Crook counties, 32 farms; Klamath county, 24 farms; and Josephine and Jackson counties, 26 farms. Each of these regions was given equal weight in determining the average costs in the irrigated regions.

Average cost of horse labor. A summary of the average annual costs of keeping a work horse and of the cost of an hour of horse labor, in the irrigated regions and in the Willamette Valley, is given in Table I. In the

Note: The authors are indebted to many farmers throughout the state for their willing cooperation in giving the information presented in this bulletin; also to the Portland-Damascus Milk Company, and to James D. Huston the capable superintendent of their stables, for the data upon costs of city horse labor. E. B. Starkey, Research Fellow, assisted in obtaining the data in the irrigated regions and in the Willamette Valley.

irrigated regions the total annual cost of a work horse amounted to \$80.96 per year. In the Willamette Valley it was \$97.85, or practically a hundred dollars. The average costs per horse-hour were 9.9c and 13.0c respectively.

The horses worked during the year an average of 825 hours per horse in the irrigated regions and 753 hours per horse in the Willamette Valley. As will be brought out in the following pages the amount of work per horse is an important factor affecting the cost. The average weight of the horses in the irrigated regions was 1,429 pounds, and in the Willamette Valley 1,419 pounds.

TABLE I. SUMMARY OF COST OF HORSE LABOR ON OREGON FARMS IN 1926

Items	Irrigated regions		Willamette Valley	
	Annual cost per horse	Cost per horse-hour	Annual cost per horse	Cost per horse-hour
Feed and pasture	\$51.34	6.2c	\$62.15	8.2c
Chore labor	6.71	.8	8.27	1.1
Interest on value of horses (5%).....	3.76	.5	3.60	.5
Depreciation of horses	10.10	1.2	11.74	1.6
Use of barn	4.77	.6	7.81	1.0
Harness	3.76	.5	3.82	.5
Veterinary, medicine, shoeing .....	.52	.1	.46	.1
TOTAL COST	\$80.96	9.9c	\$97.85	13.0c

Very little of the cost of horse labor is actual cash expense. The farmer raises the feed, cares for the horses himself, and the items of interest and depreciation upon the horses, barn, and harness, are not, of course, paid in cash, but are so-called overhead charges. But all of these items might be converted into cash by the farmer if he were not keeping the horses. They are actual costs to him, therefore, and any reduction in them means money in his pocket in the long run.

Variation in cost of horse labor. Although the average costs of horse labor, as given above, are valuable and useful in many ways, we should not forget that the costs on individual farms vary a great deal both above and below this average. Some idea of this variation may be obtained from Table II. On 45 percent of the farms in the irrigated regions the cost was less than ten cents per horse-hour, while on 18 percent of the farms it was more than fifteen cents. A similar situation was found in the Willamette Valley.

TABLE II. VARIATION IN COST PER HOUR OF HORSE LABOR ON DIFFERENT FARMS

Cost per horse-hour	Percentage of farms	
	Irrigated regions	Willamette Valley
Less than 5c	3	0
5c to 10c	42	23
10c to 15c	37	47
15c to 20c	8	12
20c to 25c	6	10
Over 25c	4	8
Total	100	100

On farms with horse-labor costs that are far above the average it is usually possible to make worth-while reductions in this item that mean actual dollars and cents in the farmer's pocket. Some of the reasons for the large variation in cost, and ways in which it may be reduced, are given in the analysis of the cost items, and the discussion of means of reducing cost, which follow.

Explanation and analysis of cost items. *Feed and pasture.* The largest item in the cost of horse labor, making up 63 percent of the total, is the value of feed and pasture. From each farmer were obtained estimates of the amounts of hay, grain, and pasture consumed by his work horses during the year and the values at prevailing market prices. The average amounts and values are given in Table III. Interest at 5 percent upon the average feed inventory is included in the feed cost.

TABLE III. AVERAGE AMOUNTS AND VALUES OF FEED AND PASTURE

	Irrigated regions			Willamette Valley		
	Amount per horse per year	Value per horse per year	Cost per horse-hour	Amount per horse per year	Value per horse per year	Cost per horse-hour
Hay	3.8 tons	\$37.56	4.5c	3.2 tons	\$33.82	4.5c
Grain	254 lbs.	3.74	.5	1,334 lbs.	20.01	2.6
Pasture	4.6 mos.	8.79	1.1	3.9 mos.	6.82	.9
Interest on feed inventory (5%)..	.....	1.25	.1	.....	1.50	.2
TOTAL FEED COST		\$51.34	6.2c		\$62.15	8.2c

The average price at which hay was charged in the irrigated regions was \$9.94 per ton. The average price of grain, which was mostly oats and barley, was \$1.55 per hundred pounds. In the Willamette Valley the average price of hay was \$10.65 per ton, and grain, which was mostly oats, averaged \$1.50 per hundred pounds.

It will be noticed that much less grain was fed in the irrigated regions than in the Willamette Valley. Out of the 147 farmers in the irrigated regions 63 percent fed no grain at all. This marked difference in feeding of grain makes the biggest part of the difference between the two costs. The amounts of hay and pasture were very nearly the same and there was not much difference in the average market values of feed and pasture.

Chore labor. Estimates were obtained of the amount of time required daily in feeding and caring for the horses, when they were working and when they were idle. This work was charged at thirty cents per hour.

Interest on value of horses. Interest was computed at 5 percent upon the present values of the horses, which averaged \$75 in the irrigated regions and \$72 in the Willamette Valley. Values ranged from \$10 to \$200 per horse.

Depreciation of horses. After feed cost, the next largest item of cost is depreciation in value of the horses. This is an item that is difficult for some people to understand and one that is often overlooked.

The average estimate of the average life of a work horse was eighteen years. It was assumed, therefore, that the number of years of remaining usefulness for each horse was the difference between its present age and eighteen, and depreciation was computed by dividing the value of the horse by this number of remaining years of usefulness.

The average age of the horses in the irrigated regions was 10.8 years, and in the Willamette Valley 12.6 years.

Use of barn and harness. The charge for use of the barn is the percentage of the total barn cost that was used for the work horses. It includes 5 percent interest upon the value of the barn, depreciation based upon the probable remaining life of the barn, and repair expense incurred during the year. The average investment in barn per horse was \$46 in the irrigated regions and \$70 in the Willamette Valley.

The charge for use of harness was computed in the same way. The investment in harness averaged \$14 per horse in both the irrigated regions and the Willamette Valley.

Veterinary, medicine, shoeing. These items are the actual cash expense incurred during the year.

Relation of amount of use of work horses to cost of horse labor. The outstanding factor affecting the cost of an hour of horse labor is the number of hours that the horse works during the year. The relation of this factor to the annual cost per horse and to the cost per horse-hour is shown in Table IV. It will be seen that although the annual cost per horse increases as the amount of work increases, the cost per horse-hour decreases very decidedly. The average cost per horse-hour for horses working less than 600 hours per year is practically twice as much as for horses working more than 1,000 hours.

TABLE IV. RELATION OF AMOUNT OF USE OF WORK HORSES TO COST OF HORSE LABOR

Hours of labor per work horse annually	Irrigated regions			Willamette Valley		
	Number of farms	Annual cost per horse	Cost per horse-hour	Number of farms	Annual cost per horse	Cost per horse-hour
Less than 600.....	53	\$68.21	14.3c	17	\$82.74	18.9c
600 to 1,000.....	55	79.38	10.6	23	96.99	12.6
Over 1,000.....	39	93.07	7.3	9	128.16	9.7
Average	147	\$80.96	9.9c	49	\$97.85	13.0c

When one stops to think, the reason for this big difference in cost when the horses are used more is quite evident. There is not so much difference in the total annual cost of keeping a horse whether one uses him or not. He will eat a little less, perhaps, but not in proportion to the amount he is used. He would live a little longer, perhaps, but not enough to decrease the annual interest and depreciation charges very much.

We can see, therefore, that the more we use a work horse the less the cost per hour of horse work will become. It follows that a farmer who is keeping twice as many horses as he really needs is just about doubling his horse labor cost—and there are more who are doing this than one might think. Of course, the nature of farm work is such that there are rush seasons when a number of horses are needed and then slack seasons when none are needed and a farmer must either keep or hire enough horsepower to handle his operations in the critical rush seasons. But there are many farmers who would do well to consider the possibility of changing their cropping systems somewhat so as to reduce the necessity for so

many horses at certain seasons and thus make it possible to farm with fewer horses. A systematic crop rotation is very helpful toward this end.

Many farmers eliminate the necessity for keeping too many horses by combining with their neighbors in operations requiring more horses, such as haying and harvesting. It is sometimes possible to hire extra horses when needed, which is far cheaper than keeping them the year round for only a short period of use. Often, however, all the horses in the community are needed at the same time.

On farms that are large enough a tractor is often a profitable investment simply because it replaces horses that must be kept only for the peak labor loads of the year. The elimination of these high-cost horses greatly reduces the average cost of the horse labor on the farm.

TABLE V. RELATION OF SIZE OF FARM TO AMOUNT OF USE OF WORK HORSES

Acres of crops per farm	Irrigated regions			Willamette Valley		
	Number of farms	Horses per farm	Hours per horse	Number of farms	Horses per farm	Hours per horse
Less than 50.....	53	2.7	666	6	3.0	546
50 to 100.....	56	4.3	742	14	3.7	643
100 to 150.....	22	5.6	952	13	3.9	756
Over 150.....	16	7.8	974	16	4.7	878
Average.....	147	4.3	825	49	4.0	753

The more efficient use of horses on larger farms is one of the facts that has been brought out in nearly all studies of the farm organization. Table V shows that the farms in this study are no exception to this. As the number of acres of crops per farm increases, the amount of use of the work horses during the year also increases.

Other means of reducing horse-labor cost. Organizing the farm business to require the minimum number of horses and keeping the number down to this minimum probably offers the greatest opportunity for reduction of horse-labor costs. There are other means of keeping it down, however, that are worth consideration.

The values of horses of different ages seem to indicate that the market value of a horse does not decrease in proportion to the decrease in the remaining years of usefulness that can be expected from it. This may be seen in Table VI. Horses from 13 to 15 years of age, which have passed the half-way point in their useful life, are worth practically two-thirds as much as young horses.

TABLE VI. RELATION OF AGE OF WORK HORSES TO THEIR MARKET VALUE

Age yrs.	Number of horses	Average value
4 to 6.....	61	\$104
7 to 9.....	113	95
10 to 12.....	97	74
13 to 15.....	68	66
16 to 18.....	47	43
19 to 21.....	24	35
Over 21.....	19	16
Average (11.6 years).....	429	\$74

From this it would seem that it would be profitable for a farmer to use his horses up to say 10 to 14 years of age, and then sell them and have colts coming on to take their places.

TABLE VII. RELATION OF AMOUNT OF PASTURE TO AMOUNT OF CHORE LABOR

Months of pas- ture per year	Irrigated regions		Willamette Valley	
	Number of farms	Chore labor per horse-hour	Number of farms	Chore labor per horse-hour
Less than 6 months	74	.9c	31	1.3c
More than 6 months	73	.6	18	.7
Average	147	.8c	49	1.1c

At the rate at which pasture is commonly valued considerable saving can be made in feed cost by replacing hay and grain with pasture to as great an extent as possible. Keeping the work horses in the pasture when not working also makes a considerable saving in the chore labor necessary in caring for them. Table VII compares horses that were in pasture for less than six months with those that were pastured for more than six months. There was a difference in cost of chore labor between these two groups of .3c per horse-hour in the irrigated regions and .6c per horse-hour in the Willamette Valley.

COST OF HORSE LABOR ON EASTERN OREGON DRY-LAND FARMS*

Costs of horse labor on dry-land wheat farms in Sherman county for 1921 and 1922 were obtained in connection with a three-year study of the cost of producing wheat in that region. A summary of these costs is given in Table VIII. As there have been no great changes in any of the cost items since 1922, it is probable that these costs are still approximately correct for the Eastern Oregon dry-land farm.

TABLE VIII. AVERAGE COST OF HORSE LABOR ON SHERMAN COUNTY WHEAT FARMS, 1921-1922

Number of records..... 198
Number of horses.....3,512
Hours of labor per horse annually 746

Items	Amount per horse annually	Price per ton	Annual cost per horse	Cost per horse-hour
	<i>lbs.</i>			
Hay (wheat hay)	2,848	\$15.14	\$21.57	2.9c
Straw (fed)	662	3.29	1.09	.1
Chaff (fed)	4,118	5.10	10.49	1.4
Grain	650	36.90	11.98	1.6
Grain pasture			1.38	.2
Other pasture			9.01	1.2
Total feed			\$55.52	7.4c
Chore labor (30c per hour)			8.63	1.2
Interest on horses at 5% (Average value \$106).....			5.31	.7
Depreciation of horses			4.46	.6
Harness and building charge			6.36	.9
Salt, veterinary, medicine, shoeing .....			.94	.1
TOTAL COST			\$81.22	10.9c

*U. S. Dept. of Agri. Bul. 1,447. Cost of Using Horses, Tractors and Combines on Wheat Farms in Sherman County, Oregon, by R. S. Washburn and H. D. Scudder.

In Table IX is shown the relation in this region of the amount of use of work horses to cost. The same relationship is shown as in Table IV, further emphasizing the important point, which has been discussed, that as horses are used more, the cost per hour becomes less.

TABLE IX. RELATION OF AMOUNT OF USE OF WORK HORSES TO COST
Sherman county, 1921-1922

Hours of labor per work horse annually	Number of farms	Annual cost per horse	Cost per horse-hour
Less than 600	60	\$77.38	15.6c
600—1,000	107	80.62	10.5
1,000 and over	31	88.72	7.8
Average	198	\$81.22	10.9c

COST OF HORSE LABOR USED FOR CITY WORK

The horse, once supreme in city transport, has now become almost a rarity on city streets. That he still is found in city work at all, is owing largely to his superior merits in economy and efficiency for certain types of city hauling, based to a considerable degree on his dependability and his intelligence in cooperating with his driver in the work to be done.

There is little question that the horse still has a limited place in the city, based on cost of power alone, particularly for short-haul work where frequent starting, stopping, standing, and waiting is a part of the job. Motor-trucking costs mount whenever the machine stands still, starts, or stops.

Little information on the cost of city horse labor is available. Hence a study has been made of the records and experience of the Portland-Damascus Milk Company, covering the use of horses for retail milk delivery in the city of Portland, Oregon, an example of the value and cost of horse labor under modern city conditions. Table X summarizes the average cost of the labor of 30 horses for a period of five years.

TABLE X. SUMMARY OF COST OF CITY HORSE LABOR

For 30 horses of the Portland-Damascus Milk Co. working 313 days (8 hours) per horse per year, 1924-1928.

Items	Tons per horse per year	Price per ton	Annual cost per horse	Cost per horse-hour (2,504 hrs.)
Hay	3.65	\$22.00	\$80.30	3.2c
Oats (rolled)	2.4	36.50	87.60	3.5
Bran .....	.5	33.50	16.75	.7
Carrots .....	.1	16.00	1.60	.1
Salt (brick) .....	.01	75.00	.75	---
Total feed			187.00	7.5c
Labor on horses (389 man-hours at 56c).....			218.00	8.7
Interest on horses at 5% (average value \$118)....			5.90	.2
Depreciation (2% on original value of \$125).....			2.50	.1
Use of barn			34.52	1.4
Harness cost			14.57	.6
Shoeing			61.00	2.4
Bedding (1,833 cu. ft. shavings, \$6.65 per 1,000)			12.17	.5
Veterinary, supplies, etc.			8.10	.3
Total			\$543.76	21.7
Less credit for manure			8.33	.3
TOTAL NET COST			\$535.43	21.4c

Why does city horse labor cost more? Comparisons with the cost of horse labor on the farm given in previous tables show that the cost per hour of horse labor in the city, even when managed with more than average efficiency, is about double the cost on the farm.

The annual cost per horse in the city is more than five times that of the horse on the farm. It is only because these city horses work an average of 8 hours per day for 313 days in the year that their cost per hour compares so favorably with that of horses on the farm.

Examination and comparison of some of the items of cost indicate clearly why city horse costs are logically and naturally higher than on the farm.

Feed. No more hay is fed per horse in the city than on the farm, but this hay must be baled, shipped in from the country, and delivered to the barn, and must be of high quality, and its cost per ton therefore is two to three times the cost of hay used on the farm. Most of this hay is shipped in from Eastern Oregon and is either timothy, or timothy and alfalfa, or timothy and other grass hays mixed, or occasionally well-made cheat hay from the Willamette Valley.

From four to eight times as much grain is fed the city horse, since he must work six days per week the year around. Only rolled oats of the best quality is used. Since these horses never see a pasture the bran and carrots are used to help maintain good condition.

Labor. This is the largest item of cost, being about 30 times the labor cost of caring for the horses on the farm. Three men and a foreman, each working an eight-hour shift, are required to care for these 30 horses 24 hours per day throughout the year. The horses have their breakfast about midnight and leave the barn for work beginning at 2 o'clock in the morning.

Interest and value. The higher average value for these horses (\$118) is due to the fact that they are carefully selected for age, weight, uniform color, conformation, soundness, and disposition. They range in weight from 1,300 to 1,600 pounds, and in age from about 5 to 12 years.

Depreciation. This is low because of the system followed. The horses are purchased at 5 to 6 years of age at an average of about \$125 per horse. They are used from 5 to 6 years, until they begin to get sore-footed from city streets, and then are sold for farm use at an average of about 10 percent less than their original purchase price. A few months on the farm puts them in good condition again, and they make excellent farm horses.

Use of barn. This cost is naturally much higher, since the barns must be located in the heart of the city. This cost includes actual rental, electric current for lighting and grooming, and city water.

Harness. This cost is made up of depreciation and interest on harness and blankets, repairs, harness oil, and soap, and is higher because the harness is kept in good condition and used throughout the year. The average life of a harness well cared for under these conditions is 10 years.

Shoeing. These horses are shod regularly once a month with rubber pads under the shoes at a cost of \$5 per horse per shoeing, with an additional cost of \$1 per horse per year for frost nails used when pavements are icy.

Bedding. Planing-mill shavings are used at the rate of about 1,800 cubic feet per horse per year.

Veterinary, supplies, etc. Veterinary services and medicine, including a weekly dose of baking soda, hydrated lime for the stable floors, an annual whitewashing of the walls, the use of electric clippers and grooming machine, minor supplies, such as currycombs, brushes, barn brooms, scoop-shovels, forks, ropes, etc., are included.

The constant good care these horses receive keeps them in excellent condition with very little sickness or injury and they seem to enjoy their work.

Barn manure sold. The apparently low value received from the sale of the manure produced in this stable is due to the fact that it is sold at a nominal price with the requirement that it must be removed daily from the storage bin by the purchaser.

COST OF HORSE LABOR ON THE STATE COLLEGE EXPERIMENT FARM AND CAMPUS

Careful records of the cost of horse labor used on the experimental farm and the campus at the State Agricultural College have been kept by the department of Animal Husbandry for the past twelve years. A summary of these costs, for an average of 17 horses for the 12 years 1916-1927, is shown in Table XI.

The College horse-labor costs are comparable to those of commercial organizations that use horses rather than to costs under farm conditions. Feed and bedding are charged at purchase prices rather than at farm selling prices. Also a heavy shoeing expense is necessitated by constant travel over pavements and graveled roads. Another factor is that these horses are much heavier than average farm horses, the average weight being about 1,700 pounds. It is interesting to note, however, that in spite of the much higher costs per horse, because of the large number of hours worked during the year the costs per horse-hour are very close to those for farm horses in the Willamette Valley shown in Table I, and in proportion to the size of the horses are actually less.

TABLE XI. AVERAGE COST OF HORSE LABOR ON STATE COLLEGE
EXPERIMENT FARM AND CAMPUS, 1916-1927
Average number of horses, 17.
Hours of labor per horse annually, 1,928 hours

Items	Average amount per horse annually	Annual cost per horse	Cost per horse-hour
Hay	6,517 lbs.	\$ 50.46	2.6c
Oats	5,085 lbs.	105.46	5.5
Other grain	178 lbs.	2.86	.1
Pasture	13.3 days	.95	.1
Total feed		\$160.19	8.3c
Bedding		8.27	.4
Labor		40.75	2.1
Use of harness		13.75	.7
Shoeing		19.68	1.0
Veterinary		1.00	.1
Use of barn		20.00	1.0
5% interest on value (as work horses) ..		7.50	.4
Depreciation (as work horses)		20.00	1.0
TOTAL COST		\$291.14	15.1c

In Table XII are compared the average costs per year for each year during the twelve-year period, and in Table XIII is shown the relation of the amount of use to cost, again emphasizing that the more a horse is used the less it costs—per hour.

TABLE XII. ANNUAL COSTS OF HORSE LABOR AT THE STATE COLLEGE, 1916-1927

Year	Number of horses	Hours of labor per horse	Annual cost per horse	Cost per horse-hour
1916	12	1,845	\$222	\$0.12
1917	14	2,044	273	.13
1918	15	1,892	326	.17
1919	14	1,955	351	.18
1920	14	2,040	362	.18
1921	17	1,941	272	.14
1922	19	1,850	301	.16
1923	19	2,113	290	.14
1924	20	1,896	281	.15
1925	21	1,946	286	.15
1926	20	1,753	260	.15
1927	19	1,856	274	.15

TABLE XIII. RELATION OF AMOUNT OF USE OF WORK HORSES TO COST, AT THE STATE COLLEGE, 1916-1927

Hours used per six months	Number of records	Average number of hours used	Feed cost		Total cost	
			Per horse (6 mos.)	Per hour	Per horse (6 mos.)	Per hour
Less than 500	33	352	\$54	\$0.15	\$116	\$0.33
500—699	43	619	69	.11	134	.22
700—899	79	805	78	.10	144	.18
900—1,099	103	997	83	.08	150	.15
1,100—1,299	103	1,196	84	.07	152	.13
1,300 and over	48	1,367	85	.06	153	.11
Average	409	964	\$80	\$0.08	\$145	\$0.15