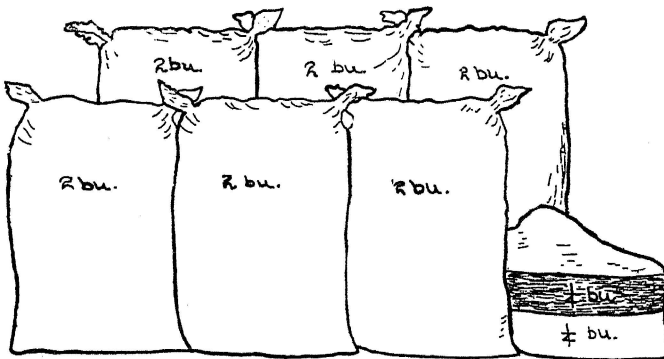




COST OF PRODUCING SOME MISSOURI FARM CROPS



 Total cost of growing an acre of wheat
 Represents the profit above cost

For the period 1910-1917, a group of Missouri farmers found it required about $12\frac{1}{4}$ bushels of wheat out of the $12\frac{1}{2}$ bushels raised on an acre, to pay costs.

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AUGUST, 1919

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Cost of Producing Some Missouri Farm Crops

O. R. JOHNSON, R. M. GREEN

Cost of production studies were begun at the Missouri Agricultural College in 1910 for the purpose of making available for farmers' use, and others interested in farming in the state, as reliable information as possible on farm operating costs. The material for these studies has been furnished by farmers of the state who have kept detailed records of their farm business each year in a simple Farm Diary account book. The Farm Management Department of the College has summarized these books each year and it is from these summaries that studies of farm operating costs in the state are made.

The variation in costs of production from farm to farm is sometimes thought to affect very seriously the usefulness and value of average cost figures. This variation is not haphazard, however. Size and shape of fields, topography, physical condition of the soil, size and kind of equipment used, management of horse labor, and system of land holding are, in the main, determining factors. With these factors virtually the same, the variation in costs per acre is not usually great. Cost per bushel or unit varies, of course, with yield. The need here, as in many lines of work, is for more localized information. Sufficient data have not yet been collected by the College to allow detailed cost studies based on soil type, topography, and the other factors largely determining local variation in the cost per acre of field crops. The figures presented in this publication can be applied, therefore, to certain local communities only after making some allowance for the influence of local conditions. These average figures will come very near to representing conditions on the majority of the farms in central and northwest Missouri, the bulk of the data coming from those sections, as indicated on the map on page 4.

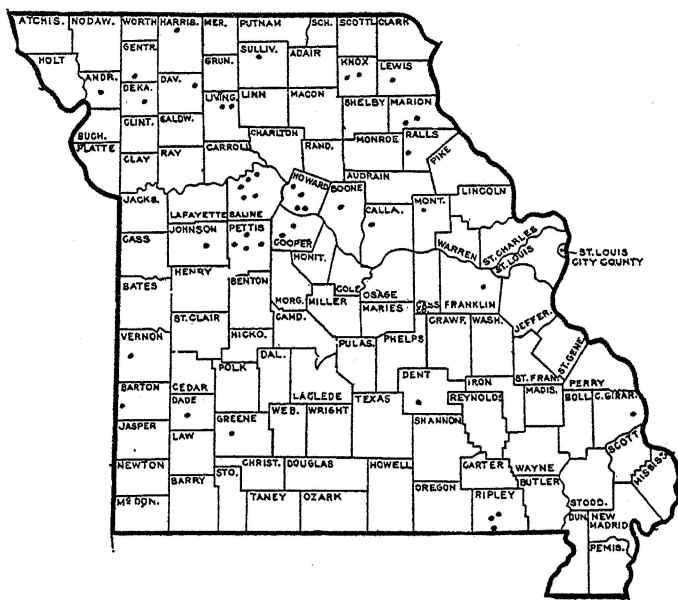
A preliminary report on these studies has been made in Bulletin 125 of this Experiment Station. Additional and more detailed information on the cost of horse labor is presented in Bulletin 152. Detailed cost figures on the various classes of live stock and the various field crops will appear in separate publications from time to time. This publication is intended to give a rather condensed statement of crop production costs as determined up to this time.

THE COST OF PRODUCING CORN

The main items of cost in growing corn are, in about the order of their importance: rent on land, horse labor, man labor, equipment, manure or fertilizer or both, and seed.

RENT ON CORN LAND

A survey of rented corn land in Missouri in 1915 showed that cash rent varied from \$2 to \$5.50 an acre, depending upon the quality of the land. Out of 26,095 acres of corn land rented on the share basis, 11,146 acres, or 43 per cent, rented for one-third of the



Location of farms from which data used in this bulletin were gathered

crop; 6,371 acres, or 24 per cent, rented for two-fifths of the crop; and 8,578 acres, or 33 per cent, rented for one-half of the crop. The relation of the share-rent rate to the yield of corn was as follows:

Acres	Share of crop given	Average yield per acre	Percentage of acres giving different yields
11,146	one-third	27 bu.	92.7%, 20 to 30 bu.
6,371	two-fifths	31 bu.	79.5%, 25 to 35 bu.
8,578	one-half	35 bu.	90.1%, 30 or Above

So far as figuring cost of production is concerned these figures constitute a basis for determining the item of cost, "rent on land," where the land is rented. The question arises, How shall the man who owns his land figure this item of cost? If he figures interest on investment in land, shall it be at 5 per cent, what he could get if he had his money invested in farm mortgages, or shall it be at 7 per cent to 8 per cent, the interest he has to pay on half or less of the value of his farm, if he has it mortgaged? Also, on what basis shall the land be valued—at what it cost, at present market value, or at its productive value? It can readily be seen in the light of these questions that cost of production on owned land, if figured on the "interest on investment in land" basis might be high or low depending on how a number of different factors are interpreted. To some extent, then, costs would likely depend on who figured them. Since rent rates are established on a more or less competitive basis, they are most likely to reflect the agricultural or productive value of the land, and it is this value which constitutes a legitimate part of the cost of production. For this reason it is believed best to figure the cost item, "rent on land," on the basis of share-rent rates even where the land is owned. This method eliminates the personal opinion in appraisal of the land and in the determination of a nominal interest rate. It also includes in the item, "rent on land," such minor overhead expenses as manager's or landlord's oversight and risk, which are not readily determinable as separate items.

LABOR COST ON CORN

Data as to the amount of labor required in producing corn have been secured for the period 1910 to 1917, inclusive. These data come from farmers' cost-account records and were collected as explained in the fore part of this publication. Table 1 shows the aver-

TABLE 1.—LABOR REQUIREMENTS OF AN ACRE OF CORN

	1910-11-12-13		1914		1915		1916		1917		Average	
	Total A., 845 Yield per acre 26.8 bu.	H'r'sc hours	Total A., 776½ Yield per acre 23.8 bu.	H'r'sc hours	Total A., 868¾ Yield per acre 29 bu.	H'r'sc hours	Total A., 851½ Yield per acre 19.4 bu.	H'r'sc hours	Total A., 744½ Yield per acre 39.6 bu.	H'r'sc hours	Total A., 4085¾ Yield per acre 27.8 bu.	H'r'sc hours
Crop labor Manur- ing	23.81	41.82	22.58	41.10	19.78	37.85	20.28	41.40	24.20	45.40	22.09	41.50
	.73	1.19	.46	.72	.49	.89	.72	1.46	.57	.76	.59	1.02
Total hours	24.54	43.01	23.04	41.82	20.27	38.74	21.00	42.86	24.77	46.16	22.68	42.52

age amount of man and horse labor a year put in on an acre of corn during different years and the average for an eight-year period. The yield per acre secured by the farmers keeping these records is also shown.

It will be seen that in general the labor requirements of an acre of corn vary only slightly with the yield. In other words, it takes about as much labor to produce a poor crop as a good one. The higher labor requirements in the case of the better yields is due mainly to the increased work of harvesting. The figures for 1915 seem to be out of line in this respect. The yield that year was next to the highest of those shown and yet the labor put in on an acre runs lowest. The exceptionally rainy season of 1915 accounts for this. Much of the corn on which records were obtained was cultivated only once or twice, yet because there was plenty of rain at the critical time the yield of corn was fairly high.

The average money cost of man and horse labor on these farms is shown in the following summary which dates from 1913. Prior to that date, the number of farmer co-operators was too small to be fairly representative.

Year	Labor cost	
	Per man hour	Per horse hour
1913	12.5 cents	7.9 cents
1914	12.8 cents	8.2 cents
1915	14.1 cents	7.7 cents
1916	16.3 cents	9.0* cents
1917	17.0 cents	12.0* cents

*These figures represent a summary of only part of the records for these two years. For this reason the figures quoted are only to the nearest decimal. They are, however, accurate enough for all practical purposes.

These figures for man labor apply to regular labor hired by the month. Harvest labor averaged year by year almost exactly double this regular rate. In figuring costs this proportion has been accurate enough for practical purposes. Other day labor ran 25 per cent higher than regular labor. There is considerable variation between the northern and southern halves of the state in wages paid man labor. In any given section, therefore, the prevailing cost of man labor per hour might vary a cent or two either way from the averages expressed here.

The cost per hour of horse labor is obtained by dividing the actual number of hours horses worked into their cost of keep. A full

report of horse-labor-cost studies will be found in Bulletin 152 of the Missouri Experiment Station.

EQUIPMENT COST ON CORN

The equipment cost arises from the interest on investment in machinery, depreciation of machinery, cost of repairs, machine oil, and such expenses. The annual cost from this source is apportioned to the different farm enterprises on the basis of the number of horse hours put in on each enterprise. This, of course, is where horse-power machinery is used. Where other power is used, the equipment cost on such machinery is determined separately and charged to the particular enterprises on which it is used.

The equipment cost as determined on the cooperating farms for 1912 and 1913 together, and for 1914 was as follows:

Year	Equipment cost per hour of horse labor	Machinery investment per acre
1912-13	2.28 cents	\$3.24
1914	2.25 cents	2.72

Equipment costs during the last few years would be higher only to the extent that repairs, machine oil, and new implements to replace old ones are higher. As the average farm is making use of much old machinery and only a few machines are replaced in any one year, the equipment cost has not materially increased except for the farmer just starting in, and who has had to buy all his equipment at high prices.

While the machinery investments may appear at first to be rather low, it must be remembered that they are "present-worth values" and not "original-price values." Because a large part of the machinery on the average farm at any time is old machinery, the value per acre is lower than the cost of equipment the first year of operation.

MANURE COST

The manure cost is made up of the cost of labor in putting the manure on the field and the cost or value of the manure. The amount of labor expended per acre on the average is shown in Table 1. This does not mean that farmers were able to manure an acre in this time. Because they manured only parts of fields and not any parts of some, the average time per acre for all acres in corn was the amount shown.

Most of the manure used was that produced on the farm. It was valued at seventy-five cents to a dollar a load. While these values do not, of course, reflect the possible crop value to be derived from the manure, they were perhaps high enough for farm conditions. It is to be remembered that on the farm where stock is kept and the



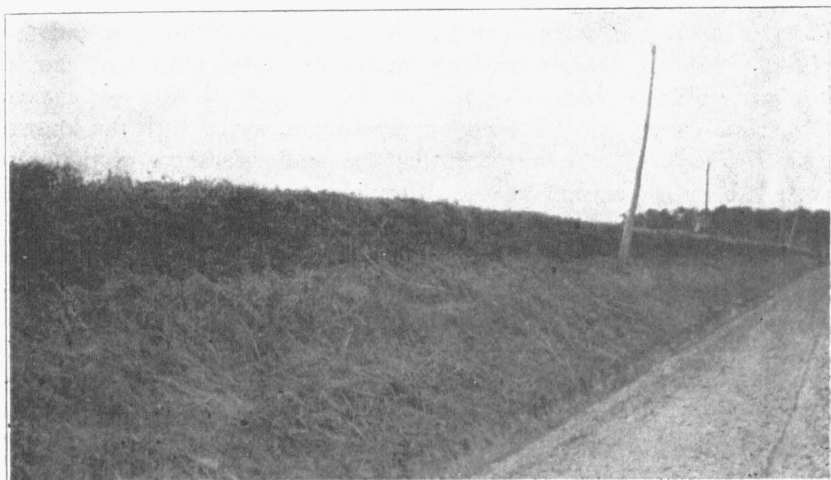
The untrimmed hedge row is no small factor in increasing corn costs by decreasing the yield

market for the sale of manure, if there is any market, is very limited, it is worth something to have a place to put the manure. Also, it is to be remembered that different crops utilize the manure to different degrees with a given season, and that variation in seasons will modify or even nullify for a year the values to be expected. As the handling of this item in the accounts for these farms is a matter of crediting stock with the value of manure and charging crops with an equal sum, it is thought best to avoid decreasing any crop profit or increasing any crop loss by what might be too high a valuation for manure. Many farmers make it a practice to charge against the crops only the labor of applying the manure.

SEED COST

Some of the seed corn used was valued at feed corn prices as it was regular crib corn. The most of it, however, was better than the run of feed corn and not a few of the farms were using high-class seed corn. The seed cost per acre year by year is shown in

Table 2. A bushel of seed was used to each 7 or 8 acres. Making use of the foregoing data the following dollar costs per acre and per bushel of corn were obtained.



The loss of corn along the hedge row is much less when the hedge is kept well trimmed

TABLE 2.—COST OF PRODUCING CORN

	1910-11- 12-13	1914	1915	1916	1917	Average
Man labor	\$ 3.22	\$ 3.13	\$ 3.02	\$ 3.58	\$ 4.46	\$ 3.47
Horse labor	3.30	3.37	2.91	3.73	5.45	3.69
Seed .....	.28	.29	.30	.32	.41	.32
Equipment .....	.95	.93	.95	1.14	1.36	1.07
Use of land (rent)	6.39	6.25	6.10	6.83	10.04	7.01
Manure cost .....	.40	.34	.36	.46	.48	.42
Total cost per acre....	\$14.54	\$14.31	\$13.64	\$16.06	\$22.20	\$15.98
Yield per acre, bu.....	26.8	23.8	29.0	19.4	39.6	27.8
Cost of a bushel.....	\$0.54	\$0.60	\$0.47	\$0.83	\$0.56	\$0.57

In arriving at the "use of land" cost on the share-rent basis, it is assumed that, on the average, established rent rates are equitable and that the landlord's share of the crop costs, in terms of interest on investment, taxes, and upkeep, is, therefore, the same per bushel or unit as the tenant's share. If this be true, it is possible to arrive at the cost of "use of land" by multiplying what would be the landlord's share of the crop by the cost per unit of what would be the tenant's share. The cost of the tenant's share can be arrived at readily because his costs are operating costs. When the tenant gives two-

fifths of his crop for rent, it means that his total operating expenses will have to be borne by only three-fifths of the crop.

This method of arriving at the "use of land" charge has to recommend it the fact that it is based upon known quantities; namely, costs of operation, which can be made a matter of record, and the share of the crop that experience and practice have dictated should compensate for operation costs. In the case of owners this makes the unknown quantity, interest on investment, agree with the known quantity, rent. The assumption that the landlord's share of the crop costs the same per unit as the tenant's is best substantiated by the fact that established rent rates are the result of a more or less long experience satisfactory to both landlord and tenant.

The rent rate used in determining "use of land" in Table 2 was two-fifths "delivered," as the average yield for the eight-year period under discussion was twenty-eight bushels per acre (see Table 2).

"Use of land" has to be calculated, of course, only in the case of the farmer who owns his land. The "share" tenant will figure costs by dividing his share into operating costs only. The "cash" tenant will charge as "use of land" what he actually pays plus risk. In other words, the "cash" tenant will figure his rent on the share-rent basis in order to include "risk in ownership." In all cases "risk in operation" and managerial ability of operator are included in profit.

THE COST OF PRODUCING OATS

In the order of their importance, rent on land, man labor, horse labor, threshing-machine expense, seed, equipment expense, twine, and manure expense, make up the principal items of cost in the production of oats. In many cases oats are not threshed but are fed in the sheaf, thus avoiding threshing expense. Also, a considerable acreage on the farms studied was used for hay. The figures presented in this discussion apply, however, to oats threshed for grain.

RENT ON OATS LAND

A survey of 6,087 acres of rented oats land made in 1915 showed that 79 per cent of it rented for one-third of the crop, 4 per cent rented for two-fifths, and 17 per cent rented for one-half. As these figures show, the common share-rent rate is either one-third or one-half the crop. There is no close relation between share-rent rate and yield per acre as in the case of corn. What the land will yield in corn generally determines the share-rent rate. The share-rent rate

on oats is then, in general, whatever it would be if the land were in corn, except that very little of it rents for two-fifths. This means then that land which would rent for corn at one-third or two-fifths, rents for oats generally at one-third, and land that would rent for corn at one-half rents for oats at one-half. However, a much smaller proportion of "one-half corn land" ever goes to oats than in the case of the "one-third corn land." This is shown by the fact that in the survey of rented land previously mentioned there were on the low-priced land 43 per cent as many acres of oats renting at one-third as acres of corn renting at one-third, while on the high-priced land there were only 12.1 per cent as many acres of oats renting at one-half as acres of corn renting at one-half. Where oats land rents at one-half the landlord usually pays his half of the threshing costs and often furnishes the seed. There is some land that would rent for corn at one-half that rents for small grain at one-third where the landlord furnishes only land. On the other hand, some land that would rent for corn at one-third rents for small grain at one-half where the landlord furnishes seed and pays one-half the threshing expense.

LABOR COST ON OATS

The labor requirements for an acre of oats, as handled on the farms included in this study, are shown in Table 3. It will be noticed that there was not much variation in the amount of man labor required, altho yields varied considerably. Since the yield of oats depends so much on the season making them fill there is usually about as much straw to cut and handle when the grain yield is light as when it is heavy. The variation in horse labor is due very largely to the difference in method of seeding. Horse labor is generally reduced where the oats are broadcasted instead of drilled.

TABLE 3.—LABOR REQUIREMENTS OF AN ACRE OF OATS

	1910-11-12-13		1914		1915		1916		1917		Average	
	Total A., 325 Yield per acre 26.1 bu.		Total A., 216¾ Yield per acre 20 bu.		Total A., 200 Yield per acre 19.6 bu.		Total A., 212½ Yield per acre 20.6 bu.		Total A., 283½ Yield per acre 42.8 bu.		Total A., 1237¾ Yield per A. 26.18 bu.	
	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours
Crop	10.08	18.92	10.11	19.70	10.04	17.55	9.20	20.59	10.20	14.91	10.02	17.83
labor												
Manur- ing ....	.06	.10	.04	.06	.04	.08	.06	.12	.04	.06	.05	.09
Totals	10.14	19.02	10.15	19.76	10.08	17.63	9.26	20.71	10.24	14.97	10.07	17.92

THRESHING RATE

The average machine charge was $2\frac{1}{2}$ to 4 cents a bushel for threshing. In this case the man owning the machine usually furnished about four men and a team. The farmers exchanging labor furnished the rest of the help.

SEED EXPENSE

The average rate of seeding was from 2 to $2\frac{1}{2}$ bushels to the acre. The cost per acre varied from year to year, depending on the price of oats.

OTHER EXPENSES

The equipment expense varied by years from 43 cents to 56 cents an acre. The expense for manure was small enough on oats to be almost negligible. In addition to these costs, there are such miscellaneous costs as twine, coal for threshing, sack rent, insurance, etc.

Table 4 shows the dollar costs per acre and per bushel of oats as determined on the farms included in this study.

TABLE 4.—COST OF PRODUCING OATS

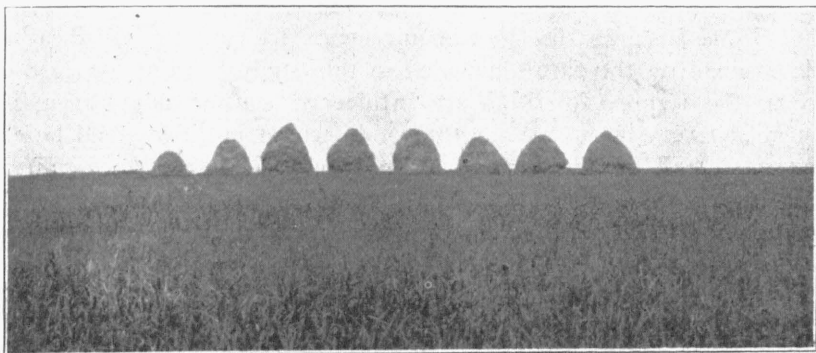
	1910-11- 12-13	1914	1915	1916	1917	Average
Man labor	\$2.02	\$2.06	\$2.27	\$2.40	\$2.77	\$2.32
Horse labor	1.49	1.62	1.35	1.85	1.79	1.59
Seed .....	.80	.99	1.12	1.20	1.49	1.12
Equipment .....	.43	.44	.44	.56	.45	.46
Use of land (rent)....	3.42	3.50	3.59	3.97	5.64	3.97
Manure cost .....	.04	.03	.03	.04	.05	.03
Threshing .....	.65	.68	.60	.62	1.29	.79
Miscellaneous .....	.60	.64	.65	.66	1.64	.83
Total cost per acre	\$ 9.45	\$ 9.88	\$10.05	\$11.30	\$15.12	\$11.11
Yield per acre, bu....	26.1	20.	19.6	20.6	42.8	26.2
Cost of a bushel.....	\$ 0.35	\$ 0.49	\$ 0.51	\$ 0.55	\$ 0.35	\$ 0.42

THE COST OF PRODUCING WHEAT

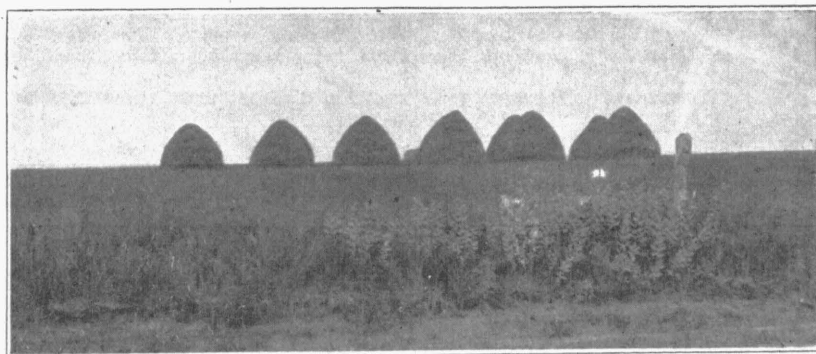
The main items in the cost of producing wheat are rent on land, man labor, horse labor, seed, threshing machine expense, equipment expense, twine and manure. There are additional expenses such as sack rent, coal for threshing, etc. Another particular item of cost in the case of wheat is the loss from abandoned acreage due to winter killing. This is often a considerable item.

RENT ON WHEAT LAND

A survey of 17,728 acres of share-rented wheat land showed that 67 per cent of it rented for one-third of the crop, 4.9 per cent rented for two-fifths, and 28.1 per cent rented for one-half of the crop. As



Bad stacking increases wheat costs



A good job of stacking wheat

in the case of oats, there is no close relationship between rent rate and yield of wheat per acre. The share is usually what it would be if the land were put in corn. The relative extent to which the cheaper corn land is put in wheat in normal times as compared with the corn land renting for one-half is indicated to a degree by the following. In the survey of share-rented land already mentioned, on low-priced land there were 117 per cent as many acres of wheat renting at one-third as acres of corn renting at one-third, while on high-priced land there were only 58 per cent as many acres of wheat rent-

ing at one-half as acres of corn renting at one-half. Where wheat land rents for one-half, the landlord usually pays his half of the threshing-machine expense and not infrequently furnishes the seed.

LABOR COSTS ON WHEAT

Table 5 shows the labor requirements for an acre of wheat as determined on the farms included in this study. As in the case of corn, the figures for 1915 are influenced considerably by an abnormally wet season. While the yield secured in 1915 would be expected to call for less labor than the 1914 yield, the extra difficulty in harvesting much of the wheat in 1915 tended to increase the amount of labor required out of proportion to the normal amount of labor such a yield would require.

TABLE 5.—LABOR REQUIREMENTS OF AN ACRE OF WHEAT

	1910-11-12-13		1914		1915		1916		1917		Average	
	Total A., 186 Yield per acre 14.7 bu.		Total A., 325½ Yield per acre 16.4 bu.		Total A., 347 Yield per acre 11.6 bu.		Total A., 342 Yield per acre 8.3 bu.		Total A., 404 Yield per acre 13.9 bu.		Total A., 1604½ Yield per acre 12.5 bu.	
	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours
Crop	11.78	21.37	13.94	26.92	13.50	26.61	10.52	23.20	12.66	23.68	12.52	24.51
labor												
Manur-	.29	.48	.18	.28	.19	.35	.28	.58	.23	.31	.24	.40
ing												
Totals	12.07	21.85	14.12	27.20	13.69	26.96	10.80	23.78	12.89	23.99	12.76	24.91

SEED EXPENSE

The rate of seeding varied on these farms from 1¼ bushels an acre to an occasional 2 bushels an acre, with 1¼ bushels the most common rate.

THRESHING MACHINE COST

The machine charge varied from 5 cents to 8 cents a bushel. This was where most of the farmers furnished the crew, excepting three or four men.

OTHER EXPENSES

The equipment cost per acre varied from 49 cents to 71 cents. Other miscellaneous costs are shown in Table 6.

TABLE 6.—COST OF PRODUCING WHEAT

	1910-11- 12-13	1914	1915	1916	1917	Average
Man labor	\$ 2.21	\$ 2.67	\$ 2.85	\$ 2.57	\$ 3.23	\$ 2.73
Horse labor	1.69	2.21	2.05	2.09	2.84	2.18
Seed	1.13	1.17	1.25	1.39	2.00	1.38
Equipment .....	.49	.60	.67	.64	.71	.62
Use of land (rent)....	4.02	4.43	4.25	4.27	5.86	4.54
Manure cost .....	.16	.14	.14	.18	.19	.16
Threshing .....	.74	.82	.61	.50	1.25	.77
Miscellaneous	1.07	.77	.73	1.13	.98	.93
Total cost an acre	\$11.51	\$12.81	\$12.55	\$12.77	\$17.06	\$13.31
Yield per acre, bu.....	14.7	16.4	11.6	8.3	13.9	12.5
Cost of a bushel.....	\$ 0.78	\$ 0.78	\$ 1.08	\$ 1.54	\$ 1.22	\$ 1.06

THE COST OF PRODUCING RYE

As a crop to be marketed other than thru live stock, rye was not a very important crop on the farms included in this study. Were the seed bed preparation generally as thoro as for wheat, the labor requirements would run about the same as for wheat. Because less care is usually taken in seed-bed preparation, the labor requirements in this section are as a rule a little less proportionately than for wheat. The labor requirements on rye as found in this study are shown in Table 7.

TABLE 7.—LABOR REQUIREMENTS OF AN ACRE OF RYE

	Total A., 62 Yield per acre 13.9 bu.		Total A., 49 Yield per acre 15 bu.		Total A., 18 Yield per acre 9 bu.		Total A., 69 1/2 Yield per acre 9.5 bu.		Total A., 28 Yield per acre 14.5 bu.		Total A., 226 1/2 Yield per acre 13 bu.	
	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours
Total labor	9.98	20.38	11.00	24.10	8.46	18.22	8.16	15.57	7.75	15.41	8.94	18.60

The records on rye, as will be noticed, covered a very limited acreage. The data on this crop, therefore, cannot be considered as representative as that on the foregoing crops. That the data are substantially correct may be inferred, however, from a comparison of the figures year by year. The proportionately smaller labor requirement for 1917 is due mainly to all of the acreage represented being put in with but little preparation of the ground. The dollar cost of rye is shown in Table 8.

TABLE 8.—COST OF PRODUCING RYE

	1910-11- 12-13	1914	1915	1916	1917	Average
Man labor	\$ 2.00	\$ 2.25	\$ 1.91	\$ 2.13	\$ 2.11	\$ 2.07
Horse labor	1.61	1.98	1.40	1.40	1.85	1.66
Seed	1.03	1.16	1.23	1.18	1.55	1.23
Equipment .....	.46	.54	.46	.43	.46	.46
Use of land (rent)....	3.66	4.00	3.24	3.55	4.39	3.72
Threshing .....	.70	.75	.46	.57	1.31	.76
Miscellaneous .....	.83	.68	.67	.89	.79	.77
Total cost per acre....	\$10.29	\$11.36	\$ 9.37	\$10.15	\$12.46	\$10.07
Yield per acre, bu....	13.9	15.0	9.0	9.5	14.5	13.0
Cost of a bushel.....	\$ 0.74	\$ 0.76	\$ 1.04	\$ 1.07	\$ 0.86	\$ 0.82

THE COST OF PRODUCING CLOVER

The data on clover represent the average cost of clover hay per year during the complete period the crop is let stand. Where a cutting is secured the same year the seeding is made it is generally light and the labor requirements per acre are therefore less than for the second year. The figures here presented, then, represent costs not at the most expensive period in the crop or at the most favorable period, but are a composite average per year for the usual life of the crop.

RENT RATE ON HAY LAND

In a survey of share-rented hay land, 5,636 acres out of 6,990 acres, or 80.5 per cent, rented for one-half; 765 acres, or 11 per cent, rented for one-third; and 589 acres, or 8.5 per cent, rented at two-fifths. Even where most of the corn land rented at one-third, most of the hay land rented at one-half. A reduction in the yield of hay is attended with a more nearly proportionate reduction in the operating costs than is the case with grain crops. This is because almost all of the labor on hay is in the harvesting and is, therefore, considerably dependent upon the yield, while only a fraction of the labor on grain crops is harvest labor. Other labor on grain crops is practically the same irrespective of yield. Since a lower yield of hay, then, does not mean an increase in operating costs to the extent that a lower yield of corn does where a considerable proportion of the labor is fixed whatever the yield, there is a tendency for the rent rate on hay to be a fixed share, namely one-half, while the rent rate on corn varies to a very large extent with average yield over a long period. Most of the small proportion of hay land that rented at one-third and two-fifths was land yielding one-fourth to one-third below

the average, usually three-fourths of a ton or less per acre. A small proportion of the hay land that yields well will rent at the lower rates. This is usually where the landlord is offering the tenant an inducement to keep a considerable area in grass.

The labor requirements per acre of clover as found on the farms included in this study are shown in Table 9.

TABLE 9.—LABOR REQUIREMENTS OF AN ACRE OF CLOVER

Crop	Total A., 127 Yield per acre 1.07 T.		Total A., 107 Yield per acre 0.81 T.		Total A., 213½ Yield per acre 0.82 T.		Total A., 194½ Yield per acre 1.0 T.		Total A., 245 Yield per acre 0.79 T.		Total A., 887 Yield per acre 0.89 T.	
	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours
labor	8.62	9.43	6.98	7.85	7.65	8.96	9.22	10.29	5.97	6.30	7.60	8.46
Manur- ing ....	.07	.11	.04	.07	.04	.08	.07	.12	.04	.07	.06	.10
Totals ..	8.69	9.54	7.02	7.92	7.69	9.04	9.29	10.41	6.01	6.37	7.66	8.56

The dollar cost per acre and per ton of hay for the different years covered by this study is given in Table 10.

TABLE 10.—COST OF PRODUCING CLOVER
Loose Hay in Stack

	1910-11- 12-13	1914	1915	1916	1917	Average
Man labor	\$ 1.28	\$ 1.06	\$ 1.28	\$ 1.78	\$ 1.20	\$ 1.31
Horse labor .....	.75	.65	.69	.93	.76	.75
Seed .....	.58	.60	.61	.61	.75	.61
Equipment .....	.22	.18	.22	.28	.19	.22
Use of land (rent)	3.74	3.02	3.57	4.54	3.49	3.82
Manure and miscellaneous .....	.51	.42	.49	.66	.50	.51
Total cost per acre....	\$ 7.08	\$ 5.93	\$ 6.86	\$ 8.80	\$ 6.89	\$ 7.22
Yield per acre, tons....	1.07	0.81	0.82	1.0	0.79	0.89
Cost of a ton	\$ 6.62	\$ 7.32	\$ 8.36	\$ 8.80	\$ 8.71	\$ 8.11

The main items included in miscellaneous costs are shrinkage and loss from weather. The latter item is so great in the case of clover hay that where possible this hay is usually put under cover. While these items of cost are difficult to get at in all individual cases, the allowance here made is a very conservative average. Where the hay is put under cover in a building there is a building charge to be made instead of the "loss from weather" charge. Because of the consider-

able loss at the bottom of the stacks and even on the sides and top where stacked in the open, the building charge in the case of clover is practically always less than the "loss from weather" charge. An intermediate charge has been made in Table 10 in order more nearly to approximate conditions as they are.

THE COST OF PRODUCING TIMOTHY

The labor requirements of an acre of timothy on the farms included in this study are shown in Table 11.

TABLE 11.—LABOR REQUIREMENTS OF AN ACRE OF TIMOTHY

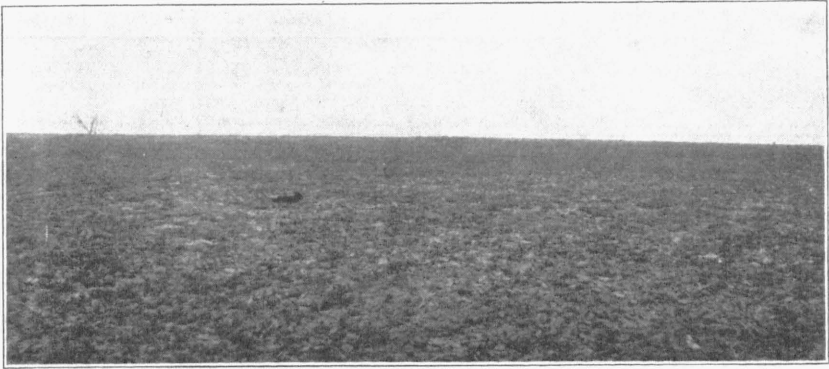
	1910-11-12-13		1914		1915		1916		1917		Average	
	Total A. 101 Average yield 0.98 T.		Total A. 163 Average yield 0.87 T.		Total A. 248 Average yield 1.06 T.		Total A. 344½ Average yield 1.03 T.		Total A. 264½ Average yield 0.94 T.		Total A. 1121 Average yield 0.99 T.	
	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours
Crop labor ..	7.06	9.50	6.19	6.78	5.17	8.68	7.17	8.43	6.77	8.16	7.15	8.26
Manuring .....	.09	.14	.06	.09	.06	.12	.09	.18	.06	.09	.07	.14
Totals ..	7.15	9.64	6.25	6.87	8.23	8.80	7.26	8.61	6.83	8.25	7.22	8.40

The loss from shrinkage and from weather in the case of timothy stacked out of doors is much less than that for clover and alfalfa. Because of this and its low labor requirements this hay finds favor, especially on tenant farms with little building storage space, in spite of its relatively poor feeding qualities. The cost per acre and per ton is shown year by year in Table 12.

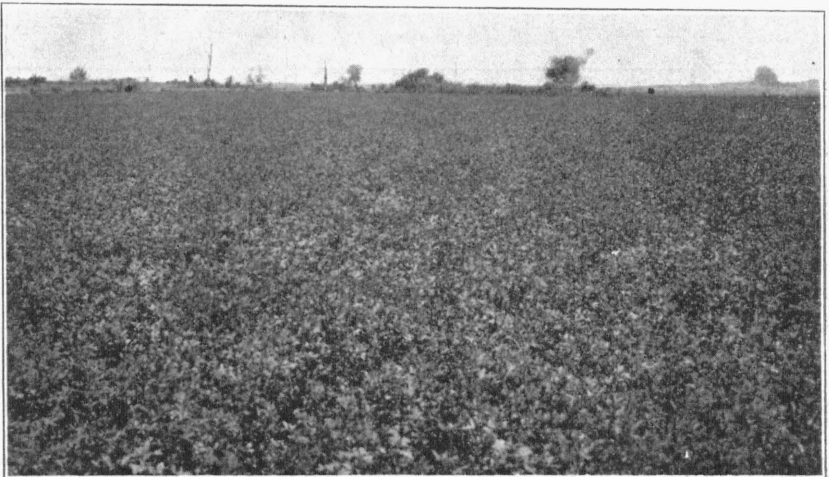
TABLE 12.—COST OF PRODUCING TIMOTHY
Loose Hay in Stack

	1910-11-12-13	1914	1915	1916	1917	Average
Man labor	\$ 1.05	\$.94	\$ 1.37	\$ 1.39	\$ 1.37	\$ 1.23
Horse labor .....	.75	.56	.67	.76	.98	.74
Seed .....	.12	.12	.12	.13	.12	.12
Equipment .....	.22	.15	.22	.23	.24	.21
Use of land (rent)....	3.74	3.23	3.98	4.70	4.91	4.07
Manure and miscellaneous .....	.34	.28	.34	.38	.44	.34
Total cost per acre....	\$ 6.22	\$ 5.28	\$ 6.70	\$ 7.59	\$ 8.06	\$ 6.71
Yield per acre, tons....	0.98	0.87	1.06	1.03	0.94	0.99
Cost of a ton.....	\$ 6.35	\$ 6.07	\$ 6.32	\$ 7.37	\$ 8.58	\$ 6.79

It will be seen in a comparison of timothy-hay costs (Table 12) with clover-hay costs (Table 10) that on the farms where these records were kept, timothy hay was produced cheaper ton for ton on the average than was the clover hay. This furnishes, of course, an inducement to grow timothy where hay is grown for a cash crop as the two hays usually sell for about the same price. Where live stock is kept, considerably more value in pasture in addition to the hay crop is had from the clover than from the timothy. Also, where the second cutting of clover the second year makes a good seed crop, the value of the seed reduces the cost of the hay crop.



Poor stands from lack of proper soil conditions increase alfalfa costs



Good soil conditions and a good stand of alfalfa

THE COST OF PRODUCING ALFALFA

The data herein presented on alfalfa costs deal with a rather small acreage. Most of this alfalfa was grown in two- to five-acre lots. For this reason the costs presented are for alfalfa growing as a part of the operations of a general farm and may not be applicable where the crop is grown extensively as a main crop.

Table 13 shows the labor requirements per acre for alfalfa as found on some typical general farms.

TABLE 13.—LABOR REQUIREMENT OF AN ACRE OF ALFALFA

	1910-11-12-13		1914		1915		1916		1917		Average	
	Total A. 5 Yield per acre 2.81 T.		Total A. 102½ No. cuttings 2.5 Yield per acre 1.87 T.		Total A. 121½ No. cuttings 2.6 Yield per acre 2.0 T.		Total A. 60½ No. cuttings 2.7 Yield per acre 3.2 T.		Total A. 54½ No. cuttings 3 Yield per acre 2.26 T.		Total A. 344 No. cuttings 2.6 Yield per acre 2.12 T.	
Crop	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours
labor ..	18.49	44.50	20.87	33.17	18.48	26.88	17.97	27.80	23.65	33.72	19.92	30.32
Manur- ing ....	.06	.10	.04	.06	.04	.08	.06	.12	.04	.06	.05	.09
Total	18.55	44.60	20.91	33.23	18.52	26.96	18.03	27.92	23.69	33.78	19.97	30.41

Table 14 shows the total cost per acre and per ton as found on the farms furnishing records.

TABLE 14.—COST OF PRODUCING ALFALFA

Loose Hay in Stack

	1910-11- 12-13	1914	1915	1916	1917	Average
Man labor	\$ 2.73	\$ 3.17	\$ 3.09	\$ 3.48	\$ 4.76	\$ 3.42
Horse labor	3.52	2.72	2.07	2.50	4.05	2.70
Seed .....	.42	.42	.50	.51	.63	.49
Equipment	1.06	.75	.67	.76	1.01	.85
Use of land (rent)....	12.62	10.37	9.48	12.47	15.60	11.01
Manure and miscellaneous	1.48	1.25	1.15	1.44	1.89	1.33
Total cost per acre	\$21.83	\$18.68	\$16.96	\$21.16	\$27.94	\$19.80
Yield per acre, tons	2.81	1.87	2.0	3.2	2.26	2.12
Cost of a ton.....	\$ 7.76	\$ 9.99	\$ 8.48	\$ 6.61	\$12.35	\$ 9.34

COST OF PRODUCING SOYBEANS

In the case of the data presented on this crop, it is especially important to bear in mind that they do not represent the full possi-

bilities in the crop, but what has been accomplished under just average management. This consideration is especially important in the case of soybeans because most frequently the cost of production is higher than it would otherwise be because of the loss of seed in harvesting and threshing. For best results the crop demands special care in these operations.

This crop is used largely for forage and to some extent for hay purposes. The data presented here apply only to the production of seed. Table 15 shows the average labor requirements.

TABLE 15.—LABOR REQUIREMENTS OF AN ACRE OF SOYBEANS

	1910-11-12-13		1914		1915		1916		1917		Average	
	Total A. 126 Yield per acre—		Total A. 77½ Yield per acre 6.7 bu.		Total A 45 Yield per acre 8.3 bu.		Total A. 29¼ Yield per acre 4 bu.		Total A 87 Yield per acre 6.6 bu.		Total A. 364¾ Yield per acre 6.2 bu.	
	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours
Labor	21.80	36.10	19.52	32.10	26.60	36.79	15.00	34.65	17.00	34.60	19.68	34.70

Because of the rather small acreage represented in any one year, the most significant figures are the average figures for the entire period.

Table 16 shows the cost per acre and per bushel as found on these farms.

TABLE 16.—COST OF PRODUCING SOYBEANS

Seed

	1910-11- 12-13	1914	1915	1916	1917	Average
Man labor	\$ 3.00	\$ 2.75	\$ 4.12	\$ 2.87	\$ 3.18	\$ 3.13
Horse labor	2.85	2.63	2.83	3.11	4.15	3.09
Seed	1.16	1.20	1.25	1.35	1.55	1.30
Equipment .....	.82	.72	.92	.95	1.04	.87
Use of land (rent)....	4.50	4.07	5.10	4.34	5.63	4.83
Miscellaneous	1.00	1.02	1.27	.75	1.30	1.06
Total cost per acre	\$13.33	\$12.39	\$15.49	\$13.37	\$16.85	\$14.28
Yield per acre, bu.....	.....	6.7	8.5	4.0	6.6	6.2
Cost of a bushel.....	.....	\$ 1.85	\$ 1.82	\$ 3.34	\$ 2.56	\$ 2.30

Most of the fields included in these data were small—from 4 to 10 acres. Only one or two men were growing beans on a larger scale. The farmers co-operating in this record work are in general making a more extensive use of soybeans in corn to be pastured.

In figuring the use of land charge for soybeans a base rent rate of one-third was assumed. Sufficient data on land rented for this crop were not at hand for determining the prevailing rent rate. The data presented are from owner farms. The assumed rate is conservative at least.

THE COST OF PRODUCING COWPEAS (Loose Hay)

Practically all of the cowpeas grown on the farms included in this study were grown for hay or silage. The figures presented are those on hay. Table 17 shows the labor requirements, per acre. The

TABLE 17.—LABOR REQUIREMENTS OF AN ACRE OF COWPEAS

	1910-11-12-13		1914		1915		1916		1917		Average	
	Total A., 132 Yield per acre—		Total A., 107½ Yield per acre 1.21 T.		Total A., 31¼ Yield per acre 1.9 T.		Total A., 30 Yield per acre 1.0 T.		Total A., 29½ Yield per acre 1.4 T.		Total A., 330¼ Yield per acre 1.4 T.	
	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours	Man hours	H'rse hours
Labor	19.94	30.27	15.80	32.10	23.98	47.50	14.60	31.75	15.90	36.40	18.10	33.18

exceptionally heavy labor requirements for 1915 are due to the heavier yield of that year and to the extra difficulty in harvesting caused by wet weather at harvesting time.

Table 18 shows the total cost per acre and per ton of hay.

TABLE 18.—COST OF PRODUCING COWPEAS
Loose Hay

	1910-11- 12-13	1914	1915	1916	1917	Average
Man labor	\$ 2.87	\$ 2.33	\$ 3.88	\$ 2.74	\$ 3.11	\$ 3.02
Horse labor	2.39	2.63	3.66	2.86	4.37	2.95
Seed	1.46	1.50	1.50	1.87	1.88	1.63
Equipment .....	.69	.72	1.19	.87	1.09	.83
Use of land (rent)	3.75	3.81	4.99	4.39	5.59	4.54
Miscellaneous .....	.53	.54	.58	.56	.60	.56
Total cost an acre	\$11.69	\$11.53	\$15.80	\$13.29	\$16.64	\$13.53
Yield per acre, tons....	.....	1.21	1.9	1.0	1.4	1.4
Cost of a ton .....	.....	\$ 9.53	\$ 8.32	\$13.29	\$11.89	\$ 9.66

Only one farm included in this study rented cowpea land. The rest of the data are from owner farms. For the one piece of land

rented for cowpeas the rent was two-fifths of the crop. In the absence of further rent-rate data, the rate of one-third was used as a basis for figuring use-of-land charge. The rate of one-third makes the cost figures on this crop within the limits of practice at least.

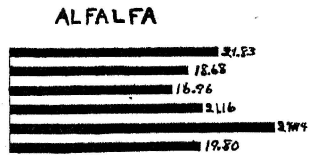
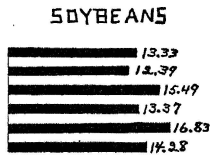
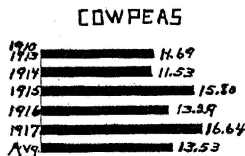
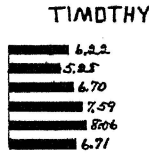
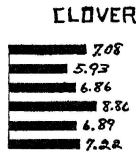
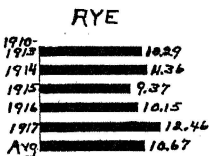
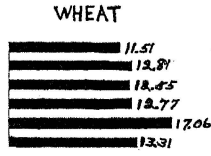
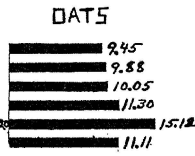
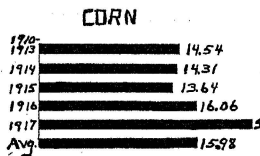
The foregoing data are on the principal crops found on the general farms of Missouri. They are only averages, and therefore do not represent the best or worst that is done. Another consideration often suggested in applying these data is that the farmers furnishing it are perhaps a little more efficient than the average. At least, they are trying to be to the extent that they can be persuaded to go to more pains in watching the details of their business than the average farmer will. As all of the farms included in the averages have their bad years and their good ones and as both the poor and the good records are included, the latter consideration will not affect the results presented to any marked extent.

SUMMARY

A study of farm-crop costs on Missouri farms that have kept complete cost-account records since 1910 shows the average costs for the years 1910 to 1917, inclusive, to have been as follows:

1. Corn in the crib at the farm cost:

	1910-11- 12-13	1914	1915	1916	1917	Average
Per acre	\$14.54	\$14.31	\$13.64	\$16.06	\$22.20	\$15.98
Per bushel .....	.54	.60	.47	.83	.56	.57



Dollar cost per acre of crops

Corn paid the farmer net for each ten hours of labor spent on it:

1910-11-12-13	1914	1915	1916	1917	Average
\$.87½	\$ 1.69	\$ 2.26	\$ 1.69	\$ 9.53	\$ 2.26

2. Oats in the bin at the farm cost:

	1910-11-12-13	1914	1915	1916	1917	Average
Per acre	\$ 9.45	\$ 9.88	\$10.05	\$11.30	\$15.12	\$11.11
Per bushel	.35	.49	.51	.55	.35	.42

Oats paid for each ten hours of labor:

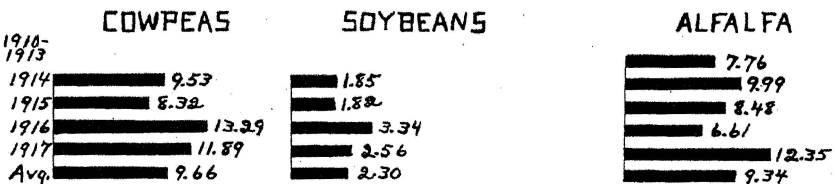
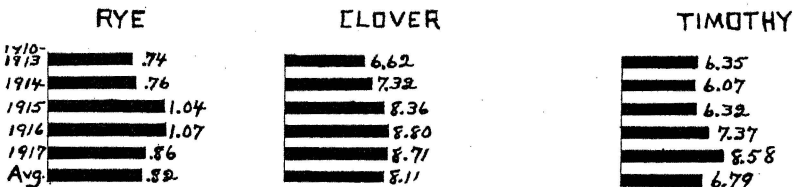
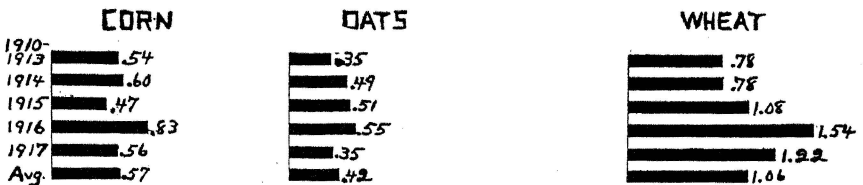
1910-11-12-13	1914	1915	1916	1917	Average
\$.91	\$.18	\$ 0	\$.40	\$11.40	\$ 1.17

3. Wheat in the sack at the farm cost:

	1910-11-12-13	1914	1915	1916	1917	Average
Per acre	\$11.51	\$12.81	\$12.55	\$12.77	\$17.06	\$13.31
Per bushel	.78	.78	1.08	1.54	1.22	1.06

Wheat paid for each ten hours of labor:

1910-11-12-13	1914	1915	1916	1917	Average
\$ 2.34	\$ 2.14	\$.80¾	\$ 2.68	\$ 9.93	\$ 2.33



Dollar cost per bushel or ton of crops

4. Rye at the farm cost:

	1910-11- 12-13	1914	1915	1916	1917	Average
Per acre	\$10.29	\$11.36	\$ 9.37	\$10.15	\$12.46	\$10.67
Per bushel .....	.74	.76	1.04	1.07	.86	.82

Rye paid for each ten hours of labor:

	1910-11- 12-13	1914	1915	1916	1917	Average
	\$ 2.28	\$ 1.67	\$ 0	\$ 3.67	\$18.40	\$ 4.05

5. Clover hay loose and in the stack cost:

	1910-11- 12-13	1914	1915	1916	1917	Average
Per acre	\$ 7.08	\$ 5.93	\$ 6.86	\$ 8.80	\$ 6.89	\$ 7.22
Per ton	6.62	7.32	8.36	8.80	8.71	8.11

Clover paid for each ten hours of labor:

	1910-11- 12-13	1914	1915	1916	1917	Average
	\$ 5.62	\$ 6.94	\$.10	\$.70	\$13.49	\$ 4.48

6. Timothy hay loose and in the stack cost:

	1910-11- 12-13	1914	1915	1916	1917	Average
Per acre	\$ 6.22	\$ 5.28	\$ 6.70	\$ 7.59	\$ 8.06	\$ 6.71
Per ton	6.35	6.07	6.32	7.37	8.58	6.79

Timothy paid for each ten hours of labor:

	1910-11- 12-13	1914	1915	1916	1917	Average
	\$ 7.44	\$10.41	\$ 3.69	\$ 3.14	\$14.08	\$ 7.59

7. Alfalfa hay loose and in the stack cost:

	1910-11- 12-13	1914	1915	1916	1917	Average
Per acre	\$21.83	\$18.68	\$16.96	\$21.16	\$27.94	\$19.80
Per ton	7.76	9.99	8.48	6.61	12.35	9.34

Alfalfa paid for each ten hours of labor:

	1910-11- 12-13	1914	1915	1916	1917	Average
	\$ 8.38	\$ 4.80	\$ 2.13	\$ 9.45	\$ 5.76	\$ 4.92

8. Soybeans cost:

	1910-11- 12-13	1914	1915	1916	1917	Average
Per acre	\$13.33	\$12.39	\$15.49	\$13.37	\$16.83	\$14.28
Per bushel		1.85	1.82	3.34	2.56	2.30

9. Cowpea hay cost:

	1910-11- 12-13	1914	1915	1916	1917	Average
Per acre	\$11.69	\$11.53	\$15.80	\$13.29	\$16.64	\$13.53
Per ton		9.53	8.32	13.29	11.89	9.66

10. An average of the labor records of 52 Missouri farms that kept strict account of the labor used, and for what it was used, shows that only 29.58 per cent of the man labor was on crops; 33.66 per cent on stock, and the remainder, or 36.76 per cent, on miscellaneous work much of which brought no direct returns but was necessary to the operation of the farm.